

The requirements of a practical forest management
plan for natural tropical African production forests

Application to the case of Central Africa
Volume 3 "Wildlife Aspects"

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THE REQUIREMENTS OF A PRACTICAL FOREST MANAGEMENT PLAN FOR NATURAL TROPICAL AFRICAN PRODUCTION FORESTS

Application to the case of Central Africa
Volume 3 "Wildlife Aspects"

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INTRODUCTION

WHY THE NEED FOR A MANUAL COVERING THE WILDLIFE ASPECTS OF SUSTAINABLE FOREST MANAGEMENT?

The last few years, have seen a growing number of initiatives aimed at defining concrete, realistic and feasible solutions to sustainably manage wildlife. These solutions have been the result of participatory approaches with all the concerned stakeholders, including the private sector and the forestry logging companies, the conservation community (with strong international NGO involvement), research groups, governmental bodies in charge on wildlife management, local indigenous communities as well as donors.

The challenge is to maintain an industry which brings economic development for the countries in Central Africa whilst preserving the ecological balance of tropical forests and the faunal and floral biodiversity.

In the Congo Basin, wildlife aspects have only recently begun to be taken into account, and there are few documents about how to deal with wildlife in forest concessions. Some events highlight the fact that there is an awareness of the problem. For example a workshop on wildlife management in forest concessions of Central Africa took place at the Lopé in Gabon in November 2000 (ADIE documents, forest series n°1, "How to minimise the impact of forest logging on wildlife in the Congo Basin"). There are also reports which document the stages in the evolution of the thinking on these issues. These include the report on "Wildlife management in forest concessions: the case study of CIB FMUs Kabo and Pokola in the Sangha forest ecosystem in the Republic of Congo" (by D.Nsosso, management of wildlife and protected areas in the Republic of Congo) which was presented during the third international congress on wildlife management in December 2003 in New Zealand.

An initiative called the CAWHFI initiative (Central African World Heritage Forest) was started in 2002 by UNESCO in collaboration with the FAO and the governments of Cameroon, Central African Republic, Congo and Gabon, as well as conservation NGOs. This initiative relies on the principle of sustainable forest management and aims to improve management of three key ecological forested areas in the Congo Basin (Shanghai Tri-National, TRIDOM and Gamba-Conkouati) by capitalising on the World Patrimony Convention. The project is financed by FFEM and has the ATIBT support. The CAWHFI project will develop partnerships with all stakeholders, including the local populations and the forestry companies who are located on the periphery of these three areas. The aim is to develop and ensure the coherence of wildlife and social management aspects for a more sustainable management of the forest resources.

It is within this framework that the ATIBT began this project to produce two manuals covering the social and wildlife aspects of practical forest management plan for natural tropical production forests in Africa. These manuals are aimed at professionals involved in the management of forest logging concessions in Central Africa, including the company directors, the heads of exploitation and forest managers, and also with other concerned people such as State agents, NGOs as well as any other people interested by sustainable development.

Even though documents are rare, research on one site or on one species, as well as the pilot projects which have begun and their publications and reports, are the basis of this manual.

Different initiatives, often of a pilot nature, have been carried out over the last five years in the Congo Basin aiming to better integrate the questions regarding wildlife into the management of forest concessions. At the time of this manual they were analysed and compared by reading the management reports, through direct personal accounts and also through a specially organised survey amongst the

operators. This manual is therefore an account of these new innovative practices which are currently in place in the Congo Basin, and which are at the route the actions suggested here.

This document is more a 'State of art' than a practical guide and suggests recommendations/instructions/models which are ready to use by the foresters and their partners. An overview of the wildlife situation in the forest logging concessions in Central Africa shows that there is a further need for reflection amongst all the partners about the remaining unresolved questions.

We must not lose sight of the limitations of their validity which should always be brought back to their original context. In addition, the actions suggested in this manual should be progressively improved: the impacts of the interventions taken as a consequence of this document being carefully analysed in order to enrich and share the experiences gained.

The manual is made up of the three following parts:

- ① The first part presents the issues, obligations, demands and objectives of the wildlife component of the management plan, i.e. **what should be done**.
- ② The second part presents an analysis of the strengths and weaknesses of the current situation in terms of the wildlife aspects of the management plan in Central Africa, i.e. **what is being done today**.
- ③ The third, and last, part presents **what needs to be done by the company and how it should be put into practice**.

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PART ONE

SUSTAINABLE FOREST MANAGEMENT: WHAT SHOULD BE DONE IN TERMS OF
WILDLIFE ASPECTS

11

Why take wildlife aspects into account in the management process of a logging concession ?

- **COMPANY OBLIGATIONS**
- **ECONOMIC DEMANDS AND INTERESTS**
- **A FUNDAMENTAL ASPECT FOR LOCAL COMMUNITIES**



■ **COMPANY
OBLIGATIONS**

The obligations arise from the forestry legislations and also from the timber consumer markets

The obligations can be split into three categories:

- **Legal obligations:** laws and codes, and their accompanying orders and decrees,
- **Contractual obligations** defined by the company's terms of references and in order to conform to national management standards,
- **Voluntary rights and duties,** self-imposed by the company for commercial reasons, in order to meet market demands, or as a result of pressure from environmental lobbyists in consumer countries.



■ **Legal obligations**

With regards to legal aspects, the general framework is the law and/or forestry codes. Regulations on wildlife issues in forest concessions are generally dispersed in several chapters of regulations and sometimes spread out amongst several laws. Certain countries have common laws on hunting and protected areas. These are completed by orders, decrees and other texts which are sometimes put in place: classification, species lists, dates, modes of exploitation, etc.

In Central Africa the laws and/or forestry codes have all been reformed at least twice since independence: in the 80-90s, and then in about 2000 (e.g In CAR, Forest Law no. 61/273 of the 2nd February 1962, followed by Law no. 90/2003 containing the Forestry Code). The first forestry regulatory mechanisms were put in place in a context of weak population density and reduced local needs for timber etc., and aimed to meet the industrial supply by taking into account:

- The definition of the different types of forest;
- Methods of classification;
- The different types of forest resources use:
 - Traditional use (exploitation);
 - Local exploitation;
 - Industrial exploitation;
- The different infractions and sanctions.

After independence, economic and social development was taken into account in the definition of policies, elaborating laws and regulations pertaining to the management of natural resources as the rapid demographic increase had led to an increasing pressure on the natural resources. Therefore, the most

recent laws aim to combine the need for conservation of the forest resources with those of socio-economic development.

The laws or forestry codes have generally been updated more regularly than hunting codes, particularly in countries where there is a large amount of trophy hunting. The forest legislation has been subject to several reforms since independence whereas hunting regulations have changed very little. Certain countries have a specific legislation for protected areas. To being with, protected areas legislation is generally combined with wildlife legislations. However, when it becomes more autonomous, it can nevertheless cover forest concessions, particularly in specifying the rights and authorised uses in the peripheral zones of national parks. This is the case in the new law on National Parks in Gabon for example.

The forestry legislations of Central African countries have many points in common. The rights of use are generally clearly defined in the different Forestry Codes with regard to wildlife outside forests with a protected status.

Consequently, a careful examination of these laws brings to light that fact that every rural economy in the region has a commercial component which is currently illegal: hunting, fishing, collection of caterpillars or raphia, collection and production of palm wine. It is surprising to notice that amongst the numerous forestry laws and codes which have been modernised in recent decades, informal commercial activities are sometimes little considered.

In the case of hunting, most regulations foresee closed periods: therefore subsistence hunting becomes illegal during these periods.

Texts covering hunting practices have the following points in common:

- Definition of the principles authorising hunting: rights of use, hunting zones, harvesting rates, seasons, prior declarations,
- Regulations on the use of hunting weapons,
- The practical modalities are the subject of additional decrees. However, it should be noted that not all countries have the necessary decrees, which could prevent the enforcement of certain legal articles. For example, the CAR has not published a decree listing the protected species in the country,
- There is no country where hunting is totally forbidden. However, trophy hunting is sometimes forbidden (Gabon),
- Every country authorises “customary” or “traditional” hunting. This particular type of hunting only uses methods and hunting tools which respect tradition: traps, nets, local materials which in general are not metallic, etc. In addition, the caught animals must not be commercialised but be consumed amongst the family or community.
- Regulations on hunting hours and seasons,
- Trade regulations and right of detention and use of firearms and hunting ammunition, as well as the traditional fabrication of the hunting material,
- Regulations for the trade in bushmeat. There are three trends: the banning of all trade, the authorisation of trade but with maximum quantities defined by law and authorisation of trade only by traders agreeing to supply themselves by authorised hunters (case of the traditional hunters in Cameroon).

Box 1: The customary hunting rights in the forestry laws

In most cases, laws are restricted to personal needs of the beneficiaries and sale is explicitly forbidden (for example, by article 42 in the Forestry code of the Republic of Congo). All commercial use (NTFP, wildlife, fishing) must be subject to special permits (for example, article 70 of the Forestry code in Congo). In this case, the current legislation clearly states that the forest and its resources belong to the State, and the rights of local communities and populations are strictly limited to subsistence use.

The law reflects that customary practices are a right, a dietary necessity, and are also practices which are assumed to be sustainable as they are regulated by the local community with regard to zones and periods of hunting, quantities, dimensions and species harvested. We note that in practice, it is difficult to quantify the amount which is "uniquely for subsistence".

Generally, the wildlife and hunting laws are difficult to apply in the context of dense Central African forests.

Box 2: The Convention on Water, Forests, Hunting and Fishing in CAR (2003)

In September 2003, CAR organised its **Convention on Water, Forests, Hunting and Fishing**, by which all stakeholders, administrations and civil society clarified the forest situation in the country and defined the main national strategic directions.

The following paragraph is an extract of the **Wildlife Commission** report, which highlights the difficulties in managing wildlife and hunting **that seem representative of the situation faced in many cases in Central Africa:**

The limits of traditional hunting territories are no longer respected, allowing a hunter from one territory to easily go and hunt in another.

The introduction of firearms, especially those of war, allows the hunters to hunt more game in record time.

The method of hunting by burning is becoming more common, is very destructive and does not take into account suitable mechanisms to avoid the fires getting out of control.

Hunting is no longer limited to subsistence, but is taking on a commercial character.



At the national level, influential trafficking and corruption by agents of the Water and Forests administration and hunting guides infringe on the application of law, which results in a real anarchy in the modes of wildlife management. Hunters, possessors of hunting weapons, bushmeat traders and other exploiters (Safari Companies) of wildlife products practice illegally and under impunity.

Hunting is practised all year round with no respect for the reproduction periods of the different species. The sectoral policy, with respect to wildlife, has not put in place the necessary means for its implementation and has not sufficiently involved local communities, NGOs and other actors into the process of rational management of wildlife resources. In addition, poverty, demographic explosion, technology development, increasing food and financial requirements of the population, and the proliferation of arms and ammunition have had consequences on the rarity of wildlife and has even led to the extinction of certain species around the larger towns such as Kage- Bando, Boda, Mbaiki, Berbérati and others.

Nevertheless, the country still has a relatively large wildlife potential, all which should be the subject of particular attention. The survival of wildlife has been achieved due to the support of development partners in the country.

At the same time, the **Juridical and Institutional Commission** made the following remarks regarding the Hunting Code:

The proliferation and irregular detention of firearms, socio-political crises, and the administrative dysfunction compromise the application of mechanisms in the present code. Customary hunting is practised in violation of the laws in force by use of prohibited means and during forbidden periods. The uncontrolled bushmeat trade and the proliferation of shops and trading points for hunting ammunition also hinder the respect of the laws. The mechanisms of law no. 82/036 of the 29th July 1981 prohibiting the manufacturing, detention and the use of firearms and traditional ammunition are not respected by those who have the right of customary hunting. The order regulating customary hunting as foreseen in article 39 of the present code has never been applied. In addition, it is unfortunate that exceptional agreements are delivered to certain categories of people authorising them to buy hunting arms. This situation undermines the normal procedure requiring a morality survey and is at the source of the arms proliferation.

■ Contractual obligations

In the particular case of forest logging concessions, companies are subject to national management norms as soon as they formally commit to the management process. In addition, the logging permit foresees the setting up of terms of references for the company. Once signed, these terms of references are legally binding and affect the company and its personnel.

□ National management norms

These become obligations from the moment the company signs a provisional management convention.

These norms define a more or less detailed technical framework, depending on the country, specifying the company's operational mode in the field to develop the forest concession management plan. It is a minimum framework demanded by the State. If the company so wishes, it is free to go above these norms, for example concerning the precision of the inventories, or in order to satisfy the additional voluntary criteria, for instance eco-certification.

Box 3: Extract from the national management norms concerning wildlife (CAR)

*Example CAR: **extract from the national management norms, harvesting of wildlife** (Parpaf, May 2001)*

We note that the norms give very little indication on the methods of collections and treatment of data. An updating of these norms is planned..

4.3.4 Wildlife observations	
The identification of species or tracks of animal species will be based only on one target sample of easily identifiable species, whose presence	can be relatively easy to analyse for developing the management plan.
List of species to be taken into account	
The list of animal species taken into account should be refined for each of the MPs depending on local characteristics. Experiences of past and current projects deal	with wildlife aspects should be identified and discussed (ECOFAC project in N'Gotto for example). The selected mammal species are listed in the table below.

Table	
List of animal species chosen for the management inventories	
Bongo (<i>Tragelaphus euryceros</i>)	Mandrill (<i>Mandrillus sphinx</i>)
Buffalo (<i>Syncerus caffer</i>)	Aardvark (<i>Orycteropus afer</i>)
Water chevrotain (<i>Hyemoshus aquaticus</i>)	Giant pangolin (<i>Smutsia gigantea</i>)
Chimpanzee (<i>Pan troglodytes</i>)	Leopard (<i>Panthera pardus</i>)
Forest elephant (<i>Loxodonta Africana</i>)	Small primates
Gorilla (<i>Gorilla gorilla</i>)	Red river hog (<i>Potamocherus sp.</i>)
Hippopotamus (<i>Hippopotamus aquaticus</i>)	Sitatunga (<i>Tragelaphus spekei</i>)
Types of observation:	
Direct observations (D) and indirect observations (I): * Direct observations: sight or sound * Indirect observations: traces (tracks),	fresh elephant trail, fresh dung, fresh signs of damage (barks stripping, damage trees...), burrows or nests, smells, dead animals (snared or not)
Observations of hunting and fishing	
* Snares and captures * Cartridge cases * Old or recent hunting camps and characteristics of the camps (permanent or not)	* Trails and passages (cutting) of hunters * Fishing dams * Noise of rifle fire * Collection of non timber forest products * Diamond and gold prospectors

□ The terms of references

A company which commits to the management process successively puts in place two terms of references:

- A provisional terms of reference, put in place during the period of validity of the Provisional Management Convention. It generally lasts less than 3 years
- A definitive terms of reference, put in place by the definitive management/logging Convention which is signed by the company and the Ministry in charge of forests.

■ **ECONOMIC
DEMANDS AND
INTERESTS**

**Meeting the demands of international
markets, all whilst improving the economic
performance of the company**

All countries where the companies carry out their activities are signatory to a number of international agreements and conventions. The States are obliged to respect these commitments and therefore to pass on these obligations to the economic actors, which include the logging companies.

In addition, companies whose products of forest exploitation (logs or processed) are destined, even partially, to European or North American markets, understand that there is a **growing** demand for **guarantees** of the complete conformity of the products they import with all the laws and regulations in force, and the respect of the highest environmental standards.

This growing demand is in the process of changing its nature:

- **Since the 1990s**, certification of good management has been **just a voluntary act** by the company who wished to access certain specific markets where clients are sensitive to the environment.
- **Since the beginning of this decade**, even though this type of voluntary approach still exists, a **new regulatory demand for certification** has been progressively put in place in parallel. Certain European countries, including the UK and France, have regulations to ban access to their public markets for forest products which do not have an independent certificate.

Respecting international treaties and agreements signed by the country

Respecting the laws and regulations

Justifying a good environmental and social practice of forest management in order to obtain of certificate of good management.

■ **Respecting international treaties and agreements signed by the
country**

Below is a list of the main international agreements on wildlife:

- Alger Convention (African Convention) on the Conservation of Nature and Natural Resources;
- Convention relating to the Lake Chad Basin Commission;
- The Hague Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA);
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES);
- United Nations Framework Convention on Climate Change;
- Convention on Biological Diversity (CBD);
- United Nations Convention to combat desertification;
- Bern Convention on the Conservation of European Wildlife and Natural Habitats;
- Bonn Convention on the Conservation of Migratory Species of Wild Animals;
- Ramsar Convention on Wetlands of International Significance.

■ Certificate of legality

Independently certified conformity to laws and regulations is demanded by certain export markets (including European public procurement markets). A system FORCOMS of criteria and indicators for monitoring the legality has been developed by IUCN/IFIA/WRI in close partnership with the majority of the interlocutors of the network. (See Monitoring Chapter in the third part of this manual). This system is based on the ATO/ITTO system. There are several independent private bodies (SGS, DNV) delivering legality certificates for forestry companies in Central Africa.

■ Certificate of good management

The aim is to justify a good environmental and social practice of forest management in order to be credible in debates and to defend the company's policy against ecological lobbyists and movements opposed to tropical forest exploitation. These pressure groups strongly shape international public opinion, particularly through the media, thereby influencing consumer choice. Their capacities of intervention have been widely seen.

The company therefore aims to obtain a certificate of good management from one of the independent certifying bodies (FSC, Keurhout, PAFC, etc.). Most of the certification systems include specific references to wildlife management. In the Congo Basin, the system of reference on which PAFC and, more and more, FSC base themselves, are the Criteria and Indicators of the African Timber Organisation/International Tropical Timber Organisation (ATO/ITTO), published in 2003.



Wildlife has a dietary, cultural, economic as well as a symbolic value for the local populations

■ Numerous representations under the term wildlife

The wildlife present in the forest of Central Africa is a natural resource with a smaller economic dimension than timber, but with a symbolic element which is equal or even larger than timber. Between the advocates of its complete protection and the defenders of the right for the local populations to develop, we find a range of possibilities of how to manage it in a sustainable way.

In the Congo Basin:

For the rural population, wildlife provides, through hunting and fishing, the majority and even all of the protein requirements. It is also an important, and sometimes the major source of revenue. Hunting is also an activity which is deeply anchored in the culture of forest populations.

For urban populations, bushmeat consumption remains anchored in their customs and considered a necessity in the context of poverty and heavy demographic pressure. The majority of the region is unsuitable for cattle rearing and game remains the main source of animal protein.

For forestry companies, timber logging remains the principal way to exploit the forest. There are thousands of jobs created in the timber industry and in the informal sector which is linked to it. This enables companies to be implicated in the rural development by building schools, dispensaries etc... The larger companies are also partners of NGOs from which they receive pressure, but with whom they also cooperate, whether regarding timber, wildlife or other natural forest resources. Wildlife is a factor that the private sector is taking into account more and more in its management as an industry.

The NGOs, either the international powerful lobbying conservation NGOs or NGOs working in the field, are also actors; some represent the aspirations of Northern countries, and in certain cases wildlife brings up mixed arguments between emotional elements and scientific reasoning.

African States, under pressure from the international community, including NGOs and donors, have been led to reform their forest policies, firstly not to simply take into account the production and commercialisation of forest species, but also to widen their initiatives to include the functioning of natural ecosystems and the conservation of biodiversity and therefore wildlife.

Research intervenes on the subject, by finding more general solutions: the subject is indeed complex and there are often diverging interests, but the symbolism that exists for wildlife remains very strong and comes out in debates on the need to manage this wildlife resource in a sustainable way.

Box 4: The status of the "wildlife" good

In French speaking Africa, the status of wildlife is very different depending on the point of view of each actor present.

- **At the country level**, wildlife is a public good in national parks and in the managed hunting zones and is a free good in the other hunting zones.
- **At the local level** it is a common good under village management such as under the Campfire initiative in Zimbabwe;
- **At the global level** it is a world public good and a "conservationist" approach should be taken: wildlife should be managed for the conservation of biodiversity by the State or international NGO. There are also other configurations: for example wildlife is a private good on the game ranches in Southern Africa or a public good in English speaking East Africa, managed by the State for hunting and wildlife tourism (C. Fargeot 2003).

Large mammals are the most sensitive species to hunting pressure as their populations are of low density, have a slow reproduction rate, a complex social behaviour and require large territories. We know however, that after the reduction or even the extinction of the large mammals, the small animals are then harvested at unsustainable rates.

We can roughly divide the forested areas of the Congo Basin into three main types of territories: about 10% has been classified as protected areas; the natural habitat and farmed land mosaics cover 10 to 20% of the forest surface. In a country such as Gabon, about 50% of the forest area is currently attributed in the form of forest concessions. In other words, the stakes of sustainable wildlife management lie undeniably in these concessions.

■ The context of the Congo Basin populations

A forest centre which is weakly populated

There are 78 million inhabitants in the Congo Basin, of which 70% live in DRC (Table). All these countries are characterised by weak numbers and population densities which are spread out over the region in a heterogeneous way. It is on the Atlantic edge that the population densities are the greatest, generally concentrating in the large agglomerations where there is major urban growth. Further inland

(and therefore towards the forests), the population density falls to less than 0.5 inhabitants per km² in the East of the Congo Basin (CAR, Gabon, Congo), the exception being in the zones of forest exploitation.

Table 1 : Average population densities in Central Africa. Source: (a) Thiébaud, 2003; (b) Trefon & de Maret, 1999

Country	Area ^(a) (Km ²)	Population in 2002 ^(a) (millions of inhabitants)	Density ^(a) (inhab/ Km ²)	Population ^(a) in cities	Annual population growth rate in cities ^(b)	Annual population growth rate in villages ^(b)
Cameroon	475400	15.5	33	66.9%	4.9	1.2
DRC	2345400	53.8	23	49.8%	4.4	3.7
Eq. Guinea	28000	0.5	18	68.5%	5.9	0.4
Congo	342000	3.2	9	76.6%	4.8	0.7
CAR	622980	3.8	6	58.9%	3.1	1.7
Gabon	267600	1.3	5	69.6%	5.2	0.7

With the exception of Gabon, the Central African countries are amongst the poorest in the world. Forests cover 50% of the continental area (85% in Gabon), and are the livelihood for many people as they provide vital economic and social services through the use of natural resources: currently, twenty five to thirty million individuals in Central Africa have a direct link with this ecosystem and more than three million are dependant on it for their survival.

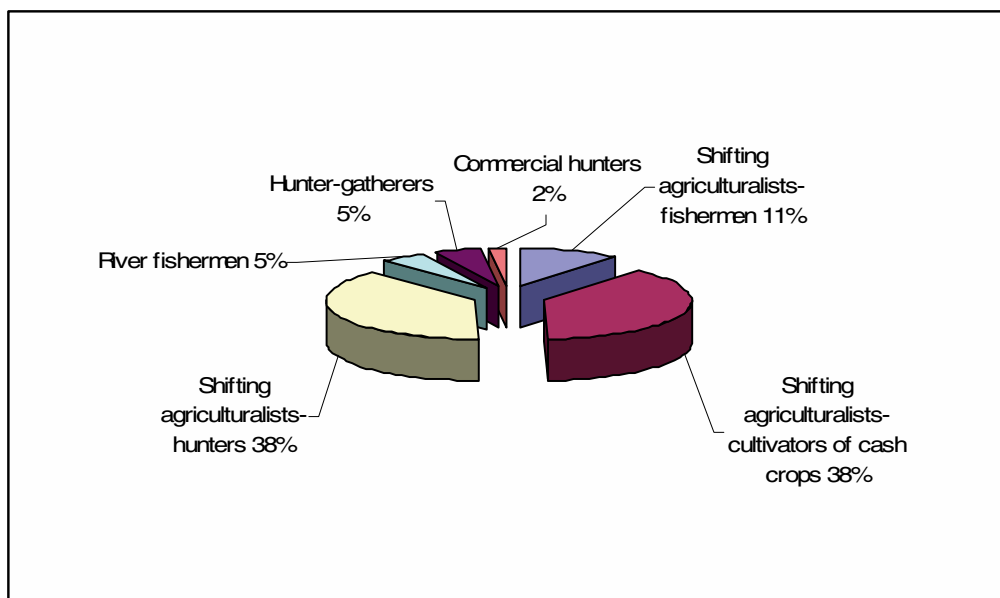
■ The “forest people”

A “traditional” environment, with a suite of populations of diverse origins and cultures spread out over the vast forest expansions, some of which can be the object of industrial logging. Most of the rural populations in Central Africa (made up mostly of the Bantus ethnic group) live off slash and burn agriculture (shifting agriculture) on the edges of the forest and commercial crossroads. Even though this activity provides a "starchy" alimentary base for their subsistence or trade, the use of forests remains complementary. The survival and economy of the rural populations depend very heavily on forest products and especially on wildlife which, through hunting or fishing, provides the majority and even all of their protein requirements.

In Central Africa, the pygmy societies are the most well known society with vital links to the forests in the Congo basin. The forest is their natural habitat and provides them with the daily necessary resources for food (meat, fruit, honey, roots...), clothes, housing, health (traditional medicinal plants), and also a place in which to carry out certain non-material cultural activities such as medico-magical or magical-religious rituals (Trefon & Maret, 1999).

The rural populations generally possess a deep cultural knowledge of the biology, ecology and behaviour of animal or plant natural resources (Dounias, 1995). Their knowledge of the forest habitat and their traditional practices, such as rotation of the hunting territories, are favourable for a rational harvesting of the resources and could be used to contribute to the sustainable development of forests and wildlife. However, it is not certain that the pre-colonial methods of traditional wildlife exploitation were in balance with the natural environment (no more than the traditional systems of today). It is more likely that these ancient hunting techniques did not reduce wildlife for the simple reason that there was a low population density as a result of disease and numerous conflicts, rather than a system of sustainable management (Vermeulen & Doucet JL, 2005).

Figure 1: Types of rural exploitation of forest habitats in the intervention zones of the ECOFAC programme Cameroon, Congo, Gabon and CAR (Joiris 1998)



■ Urban populations and the bushmeat crisis

The urban populations have complicated relationships of dependence with the inland forested areas of the country from a cultural, utilitarian and dietary point of view. A range of “source-sink” networks have been created in this way over time between the rural and urban zones to supply fuel wood, food products, and non-timber products, particularly wild animal meat (“bushmeat”). These networks usually reflect a very well organised trade (supply of cartridges and empty freezers by the resellers to the poachers etc.)

Even if the bushmeat trade to the urban centres in Central Africa is not the main concern of this manual, the current context of this activity and its impact on wildlife are such that we cannot overlook it. Previously situated at the centre of complicated rituals, today bushmeat is an integral part of the diet and local economy of Congo Basin populations (Bahuchet, 1991; Wilkie et al., 1992; Blake, 1994; Eves, 1995). A large part of the region is unsuitable for cattle rearing (because of trypanosomiasis carried by the tsetse fly and other diseases), and game is therefore the principle form of animal protein for city dwellers (Chardonnet, 1995). Currently, **more than one million tonnes of wild animals – the equivalent of 4 million cattle heads – are killed each year in Central Africa for consumption or sale.** The rate of harvesting of animals can vary from 50 to 897 kg/km²/year depending on the region (Wilkie & Carpenter, 1999). These figures reflect the complex cultural, economic and demographic changes

Table 2 : The 10 wild species which are found on the markets in Gabon WCS & WWF (2002)

Rank	Species	Total Number	Adult Weight(kg)
1	<i>Atherurus africanus</i>	21963	3
2	<i>Cephalophus monticola</i>	21334	4.9
3	<i>Cephalophus dorsalis</i>	7809	17.3
4	<i>Cephalophus callipygus</i>	5353	17.3
5	<i>Cercopithecus nictitans</i>	3858	5.1
6	<i>Cercopithecus cephus</i>	3827	4
7	<i>Potamochoerus porcus</i>	2316	82.5
8	<i>Mandillus sphinx</i>	1724	37.5
9	<i>Hyemoschus aquaticus</i>	1583	12.5
10	<i>Nandinia binotata</i>	1088	2.8
	<i>Other species</i>	10 188	
	Total	81 041	

The importance of hunting has grown over recent decades due to the collapse in cash crop (cocoa, coffee...) prices and by the reduction in remunerated urban employment by the petrol companies. These factors have contributed to limiting the economic opportunities of rural populations and increasing the value of bushmeat as a source of food and revenue. Associated with strong cultural roots and poverty, unemployment, food insecurity and greater and greater demographic pressure (except in Gabon), urbanisation and the economic crisis in Central Africa will have also contributed to the increase in wildlife harvesting rates and to the development of a lucrative network for the bushmeat trade for which there is a weak and inappropriate legal framework. For the poorest, who have few employment opportunities, hunting or the trade in bushmeat are important sources of revenue allowing them to meet their current vital needs. As we will see later on, the development of infrastructures for forest exploitation has facilitated access to the forest and to resources which have not been exploited up until now.

The conservation NGOs have introduced the concept "bushmeat crisis" by considering that the current levels of game consumption are unsustainable, neither for the wildlife nor for the local populations themselves (CARPE, 2001). These NGOs state that the bushmeat crisis, which has been observed for nearly 10 years, has really begun, and will have phenomenal effects on food insecurity all Central African countries due to the loss of natural resources on which depend millions of inhabitants ("empty forest syndrome"). At the same time, the bushmeat crisis will also mark a new step towards the extinction of endangered animal populations. Currently most of the large mammals fall into this category, with a possible impact on the forest ecosystems, given the role that these species play for seed dispersal.

On this basis, the international NGOs put pressure on the private sector and governments to reduce the hunting of non-protected species and to put in place alternatives to bushmeat. This is difficult to do, particularly as bushmeat consumption is anchored in African customs. As Jean Sudéa, a hunter in Mayo-Darlé (Cameroon) explains, "amongst us, it is a tradition to hunt and to eat bushmeat. A dish without meat is like a woman without her finery". In addition, a development approach based on a sustainable and rational exploitation of the wildlife resource has not yet received sufficient support. There are a few initiatives in Cameroon, Congo and CAR which aim specifically to put in place modalities of sustainable wildlife management by village hunting in dense forests.

12 What wildlife aspects should be taken into account in the management process of a logging concession?

■ **THE THREE OBJECTIVES OF THE WILDLIFE MANUAL**

The objectives directly ensue from the forest legislation, and the economic and ecological market demands

■ **OBJECTIVE 1:
ENSURE THE APPLICATION
OF EXISTING LAWS AND
REGULATIONS**

■ **OBJECTIVE 2:
MANAGE THE
CONCESSION IN A
SUSTAINABLE WAY**

■ **OBJECTIVE 3:
REINFORCE THE LOCAL
DEVELOPMENT PROCESS**



OBJECTIVE 1:
ENSURE THE APPLICATION OF
EXISTING LAWS AND REGULATIONS
ON ANIMALS IN ALL ACTIVITIES
CARRIED OUT BY THE COMPANY

Internal measures (internal regulations)

- Measures linked to the transport of goods and people (logging trucks, lorries, personnel): game and weapons,
- Measures linked to the illegal trade in bushmeat: base camps.

External measures of support for the State to control the illegal activities linked to wildlife (hunting, transport, trade).

OBJECTIVE 2:
MANAGE THE CONCESSION IN A
SUSTAINABLE WAY IN
PARTNERSHIP WITH ALL
STAKEHOLDERS

Measures to limit the negative impacts of the company's activity on wildlife, biodiversity and ecosystems in general: knowledge of the environment, reduced impact logging.

Measures aiming to encourage the populations to practice sustainable management of the natural resources, particularly wildlife.

Measures for managing the meat requirements of the entire population under the company's responsibility: provision of alternative sources of protein.

OBJECTIVE 3:
REINFORCE THE LOCAL
DEVELOPMENT PROCESS

Support for local organisation of village hunting.

Education and raising awareness amongst the local populations.

Contribution to local development through taxes paid to the community and local collectives.

2

PART TWO

SUSTAINABLE FOREST MANAGEMENT: WHAT IS BEING DONE IN TERMS OF THE
WILDLIFE ASPECTS


21 | **How is the wildlife dimension of forest management being taken into account today?**


Taking wildlife into account on forest concessions remains a recent idea and the tools for the wildlife inventory and analysis that are currently available were not originally designed for use in an industrial context. Tree populations have undergone several decades of research and development to produce field techniques that today are well tested and appropriate for the scale of industrial forestry companies. In the field of wildlife in dense forests, the tools remain very close to biology and conservation and are much more exploratory and experimental approaches.


As is the case for the social aspects, the situation is evolving very rapidly. Today, the companies have new internal assets, starting with the motivation of a number of company directors and professional organisations. There are also strengths and weaknesses of the external situation of the company, such as the regulatory mechanism which the manager must take into account and which is generally too obsolete to take into account the most recent expectations and evolutions.


Firstly, the tables below present a **“double entry” analysis**: strengths and weaknesses, internal and external to the company.

Secondly, it presents a **summary of the results of the survey on wildlife management carried out in the concessions** of Central Africa for this manual. In such a reactive and dynamic context as we see today, it seems essential to get the most recent a picture as possible of the different pilot experiences carried out in the field by companies.

-  **Internal strengths of companies**
 - A growing motivation of the professional sector, especially the companies with an international dimension:
 - awareness of the directors;
 - awareness of the professional organisations;
 - Constructive partnerships with international conservation NGOs,
 - Pilot experiences of internal organisation can serve as an example.

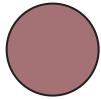
-  **Internal weaknesses of companies**
 - A very heterogeneous awareness amongst company directors, particularly according to the size and international position of the company,
 - A very low experience of the forest exploitation professional sector when it comes to wildlife: inventories, management,
 - The company's practices of supplying meat are not appropriate to the new context of intervention,
 - An ecological and social isolation makes it difficult to find alternatives to bushmeat which therefore remains the most appreciated and easy to access (cheapest) source of protein.

-  **External strengths of companies**
 - A very strong mobilisation of the international community on wildlife issues,
 - Donors are willing to compensate the extra cost of the pilot projects and target grants for these projects,
 - International conservation NGOs accept to take on the risk of working in partnership with the forest exploitation industry for a joint management of wildlife in the concessions,
 - Despite their weaknesses, the legislative frameworks are sufficiently supple and adaptable, and the populations are open to dialogue and consensus. This has enabled the large pilot projects to have begun.

-  **External weakness of companies**
 - A weak presence of the State in its role of monitoring and control of the laws,
 - Little recognition by the public authorities for the activities of collective interest done by the companies in terms of wildlife: ecological and economic contributions, a double payment to the State for the ecological contribution of the forestry company,
 - The services in charge of the forest concessions (department of forest production) have neither the technical nor the administrative expertise with regards to wildlife,
 - The forestry company is often the only operator in the zone and can therefore be held responsible for all aspects of wildlife management, including the roles normally taken on by public authorities,
 - Wildlife and hunting issues deeply touch the way of life of the concession's neighbouring populations, such as the social organisation which surrounds hunting, and as sources of food and revenue,
 - When the pressure of commercial hunting comes from urban partners situated outside the concession, the company has no means to act,

- The ancient regulatory mechanisms are not up to date, they are imprecise, exceeded by current practices, they are poorly controlled and infractions are rarely punished: consequently unlawful situations are frequent,
- Very different expectations from the international community, from the most rational to the most emotional,
- Scientific knowledge of wildlife is still very incomplete, even for the most emblematic species.

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Internal strengths of forestry companies

REMARKS

- 1 A growing motivation of the professional sector, especially the companies with an international dimension:
 - awareness of the directors
 - awareness of the professional organisations
- 2 Constructive partnerships with international conservation NGOs
- 3 Pilot experiences of internal organisation can serve as an example

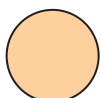
PERSPECTIVES FOR MANAGEMENT

The motivation of the company director is a key factor, as taking ecological aspects such as wildlife into account is a challenge for the company. This motivation needs to be passed down to all the staff. Professional organisations have a driving role in informing and raising awareness amongst their members

This partnership brings additional competences to the company, as well an additional international credibility.

Most of the large companies with European capital, and some Asian companies are today committed to the management procedure, taking wildlife into account. These pilot examples are very useful to generalise the methods for wider diffusion.

23



Internal weaknesses of forestry companies

REMARKS

- 1 A very heterogeneous awareness amongst company directors, particularly according to the size and international position of the company

PERSPECTIVES FOR MANAGEMENT

As mentioned below, most of the most motivated company directors are those of the largest concessions in the regions, and generally of foreign origin. The directors of the small and medium sized companies, with national capital are not very motivated, mobilised or informed about taking wildlife into account.

2	Difficulty in transferring the motivation of in favour of wildlife of the different company directors (in particular the international dimension) to the field staff.	The field training staff are often being confronted by problems of a higher priority to do with logging and therefore have difficulty in receiving and transferring instructions and additional constraints.
3	A very low experience of the forest exploitation professional sector when it comes to wildlife: inventories, management	A very small number of large companies have the means to recruit a qualified expert in wildlife matters. Some get pilot support from the large conservation NGOs. The vast majority remains unqualified about wildlife, and they often consider that this problem is not a part of their profession.
4	The company's practices of supplying meat are not appropriate to the new context of intervention	Classically, companies took on supplying meat to their staff as the remote situation meant that staff could not get supplies from local markets at reasonable prices. Meat supply is therefore a social and economic lever, keeping the staff healthy and performing.
5	An ecological and social isolation makes it difficult to find alternatives to bushmeat which therefore remains the most appreciated and easy to access (cheapest) source of protein	The attempts to import frozen meat are hindered as it is practically impossible to keep it cold over the long distances. Some companies support the major and sometimes ancient trade routes which exist between the countries who raise zebus and Central Africa. The know-how for ensuring a sustainable meat supply from hunting still remains low and experimental.

24



External strengths of forestry companies

REMARKS

- 1 A very strong mobilisation of the international community on wildlife issues
- 2 Despite their weaknesses, the legislative frameworks are sufficiently supple and adaptable, and the populations are open to dialogue and consensus. This has enabled the large pilot projects to have begun
- 3 Donors are willing to compensate the extra cost of the pilot projects and target grants for these projects

PERSPECTIVES FOR MANAGEMENT

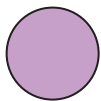
This mobilisation allows the motivated companies to find a favourable response to their pilot actions amongst their northern clients. It also enables them to mobilise public funds, on the basis of regional strategies (such as Congo Basin Forest Partnership).

This regulatory suppleness enables innovative approaches to be tried and, depending on the positive or negative results, regulatory modalities which have been tested in the field can be put in place.

It is common for numerous economic sectors that the public authorities and their grants target the companies who have to make large changes to their activities for environmental reasons. For tropical forestry, a small number of countries in the North have maintained this financial support, despite being discredited by a part of the international community. This support has been key for the pioneering companies in the sector.

- | | | |
|---|--|--|
| 4 | International conservation NGOs accept to take on the risk of working in partnership with the forest exploitation industry for a joint management of wildlife in the concessions | These NGOs, such as WWF, WCS and Nature+ take a risk as they subject themselves to lobbyists who are also in the field and who are more radical when it comes to forestry companies. Their presence in the field is vital for numerous reasons: they wish to act rather than simply to criticise, they bring complementary expertise, they accompany pilot studies and bring the methodologies up to standard. They also bring an international guarantee which is important for the credibility of the company. |
|---|--|--|

25



External weaknesses of forestry companies

REMARKS

- | | |
|---|---|
| 1 | A weak presence of the State in its role of monitoring and control of the laws |
| 2 | Little recognition by the public authorities for the activities of collective interest done by the companies in terms of wildlife: ecological and economic contributions, a double payment to the State for the ecological contribution of the forestry company |
| 3 | The services in charge of the forest concessions (department of forest production) have neither the technical nor the administrative expertise with regards to wildlife |
| 4 | The forestry company is often the only operator in the zone and can therefore be held responsible for all aspects of wildlife management, including the roles normally taken on by public authorities |
| 5 | Wildlife and hunting issues deeply touch the way of life of the concession's |

PERSPECTIVES FOR MANAGEMENT

- | |
|--|
| A company sees its activity strongly influenced by complex legal, regulatory and contractual (terms of references, management plan) mechanisms. During the implementation of numerous mechanisms regarding wildlife, the company finds itself alone, as the administration lacks sufficiently trained personnel and the material means to intervene. Therefore there is a double problem: either the company is confronted with ill-founded administrative demands due to lack of experience, or the company is obliged to a constant self-evaluation. |
| The cost of taking wildlife into account is generally not calculated separately. The repartition of actions limited to the company and those with a general interest is not always clear. The company may end up financing activities which should be carried out by the State. |
| Wildlife remains under “the departments of wildlife and protected areas” who do not have authority over the forest concessions. |
| This weakness of the State can mean that companies, who are pressurised by international commitments, will have to replace certain State services, notably those of controlling the legality of wildlife matters. Eco-guard salaries can fall into this category. |
| Companies have great difficulty in defining what actions to take for wildlife, due to the very complex |

	neighbouring populations, such as the social organisation which surrounds hunting, and as sources of food and revenue	local social organisation. Also, this organisation is in the process of changing, as a result of the interactions between the traditional societies and the non-native working populations attracted by the company. The company also often lacks qualified staff to act as mediators.
6	When the pressure of commercial hunting comes from urban partners situated outside the concession, the company has no means to act	In the concession, the company struggles against poaching as a result of urban demand for bushmeat. The company does not have the means to deal with the cause of this poaching pressure.
7	The ancient regulatory mechanisms are not up to date, they are imprecise, exceeded by current practices, they are poorly controlled and infractions are rarely punished: consequently unlawful situations are frequent	The weakness of the regulatory mechanisms for hunting and wildlife is a major issue in Central Africa. Hopefully, the numerous pilot initiatives will contribute to inspiring new mechanisms which are realistic and appropriate for the current hunting practices and the weakness of controls and sanctions.
8	Very different expectations from the international community, from the most rational to the most emotional	International public opinion principally remains shaped by the environmental lobbying NGOs. They use the media channels available to support the cause they defend, including using emotional arguments for hunting issues. The companies, alone or through professional groupings, seem totally undefended in the media.
9	Scientific knowledge of wildlife is still very incomplete, even for the most emblematic species	The data from the inventories carried out in the concessions are often new to science. Their analysis is not therefore a simple industrial routine, but must take into account expert opinion in order to identify the most appropriate action for each case.

Recent experiences or ongoing experiences of wildlife management in forest

A field survey was carried out during the elaboration of this manual to understand the practices in progress in forestry companies in Central Africa. A summary of the responses to the questionnaire is given below. In addition, numerous technical activity reports are available today and three examples of negotiation and technical practices are given.

Summary of responses to the questionnaire

Pallisco (Cameroon), CEB (Gabon), HFC (Cameroon), Leroy Gabon and CIB (Congo) replied to the questionnaire given. We also have documents giving information on the management of interactions between logging and wildlife from Rougier Gabon.

WILDLIFE MANAGEMENT IN FOREST MANAGEMENT

1) Does the wildlife inventory lead to specific measures which appear in the management plan: delimitation of wildlife reserves/conservation series? If this is the case, how are these zones delimited (criteria)?

In the vast majority of cases, the data analysis of the wildlife inventory provides additional information which is used at the discretion of the company's manager to define special zones of protection or the choice of the series. Priority is given to production, the wildlife data being used to better define the limits and placement of the protection zones which are not exploitable.

2) Have the village hunting territories been the subject of study and/or have they been taken into account in the wildlife management policy?

The replies are split depending on the hunting territories: most of the time they are not taken into account but there are situations where the zones have been defined. Generally, attention is paid to respect the traditional subsistence hunting rights of use.

3) Is there a technical mechanism of wildlife monitoring (regular inventories, eco-guards...)? What are the modalities?

Most commonly, wildlife is not monitored, or it is being studied, or there are a few transects in the FMU. Teams which are external to the company can be solicited on demand.

4) Are all the logging roads closed after logging? How and how soon after? Are there hunting camps near the old logging roads? If this is the case, by whom and how are the roads maintained? What are the vehicles which use them?

The roads which are no longer used are always closed by putting logs across them- this is general practice. There are also padlocked barriers with guards during the night and day. Consequently, hunting camps in forest concessions which are being logged are rare (there are however poachers who walk through).

5) Are actions to provide alternative sources of protein suggested in the management plan? What are they?

All companies try to provide alternative protein sources for their personnel. The only successful attempts have been with poultry farms and with small amounts of extensive fish farming. The attempts to rear cane rats and ducks have been abandoned by certain companies, and are being studied by others. The abattoirs linked to the butchers or ranches are often too costly. Generally these are successful where the shops sell frozen meat and fish and when there are freezers in each camp. Very often, the company does not manage the shops but nevertheless controls the prices.

6) Is there training and awareness raising actions foreseen in the management plan? What are they?

Several companies have put in place partnerships with NGOs for the training of recognition of large mammals and signs of hunting. In the absence of a formal training, environmental and protected species awareness is extended to schools in addition to the company staff.

WILDLIFE MANAGEMENT IN THE DAILY MANAGEMENT OF THE COMPANY

1) Do hunting regulations appear in the company rules and regulations? In the workers' contracts? What are they?

2) Are sanctions foreseen (formally or informally?) if the regulations or tacit agreements regarding wildlife are not respected? What is the frequency of these sanctions? Are they effective?

3) Is there a control mechanism for hunting by the workers during and outside working hours?

For these 3 points: in the company rules and regulations, articles relating to hunting always exist. They are almost identical, bar a few details – generally there is a total hunting ban during working hours and a ban on the transport of bushmeat, hunters and illegal weapons. In some cases, where there is an almost nonexistent pressure from illegal hunting and where there is abundant wildlife, hunting outside working hours is authorised under a framework of regulations, hunting permits and the creation of a hunting committee. Heavy sanctions are foreseen and applied. During working hours there are systematic controls carried out by the site or camp head and more rarely subcontracted to an external company.

4) Are there workers syndicates, if yes are they implicated in the wildlife management?

The syndicates are generally not implicated, apart from in the application of articles in the company rules and regulations which concern hunting.

5) Is there a person (specifically or along with other tasks) who is responsible for wildlife management, what means do he dispose of? Does he have specific objectives to reach? Is this work limited in time? What is his principal role?

There is no example of a company, amongst the participating companies, where someone entirely responsible for wildlife management was identified. CEB in Gabon has someone who deals with all aspects linked to hunting (management of weapons, permits, organised hunts, field controls, monitoring of the committees) but not for the inventory and the monitoring of the wildlife itself. This example allows us to distinguish these two functions.

6) How are the teams working in the forest supplied with food?

We find all ways of provisioning the forest teams: daily rations provided with the use of freezer or regular supply by the company. In some cases the teams supply themselves from the towns with a budget and a company vehicle, or the teams supply themselves before leaving for each two week "stint".

7) Are there hunters who are certified and/or remunerated by the companies to provide animal proteins, what is the remuneration (compared with an average worker). How does this supply work?

There are no examples where there are hunters certified by the company. There is an experimental approach of community management which is being studied and put into place in community managed hunting zones. There are organised hunts, controlled by the company with a selection of hunters with common rules and recognised by the hunting committee (CIB) or the person responsible for hunting (CEB).

8) Does the company collaborate with an NGO specialising in wildlife management?

Collaborations with NGOs are becoming frequent, with WCS, WWF and also Nature + being commonly cited.

9) Does the company pay for eco-guards to monitor hunting and wildlife? What is their status?

Two companies pay for eco-guards, either directly or through an external security company.

WILDLIFE MANAGEMENT IN THE SITE'S SOCIO-ECONOMIC ENVIRONMENT

For many of the companies, the questions shown below, and their responses match up with previous ones. Some other questions do not have an answer. The questions are presented in one go, and the analysis of the responses are presented afterwards in one paragraph.

- 1) How is the camp supplied with protein (particularly during the closed hunting seasons)?
- 2) Is there a shop? What products/services are sold? How is it provisioned? How are the prices controlled?
- 3) Do the villagers participate in supplying of the forest camp with protein and other food products (banana, cassava...), and in non timber forest products?
- 4) Is there a market/ "boutiques"/camp traders place? What do they sell? Are the prices less than/similar to/greater than those of the town?
- 5) Is there a canteen at the camp/factory? How is it provisioned? Is there a small restaurant, cheap restaurant? Is bushmeat used in the preparation of cooked meals in these establishments? What species are used? What is the average price of a meal?
- 6) What are the main ethnic origins of the workers? Certified hunters? People who work in the canteens/ small restaurant owners? Traders?
- 7) How many freezers are there in the camp? Who owns them? What are they used for?
- 8) Do the traders come and buy hunting products on the concession? Who are they? Do they barter? Do they work on demand? How do they move around?
- 9) Do the logging trucks sometimes transport hunting products to the town? How often? Is there an agreement with the company to limit this trafficking?

It can be seen that the villagers participate little in the camp supplies, except for cassava and plantain. In terms of provisions, there are many alternatives. There are very different ways depending on whether or not there are regular markets for example, or the town being relatively far away, or traders nearby for essentials other than food. There are few tolerated small restaurants and these generally offer bushmeat. Very clearly, the traders buying bushmeat are not tolerated on the sites, and all the companies interviewed ban and control the transport of bushmeat by the logging trucks – disciplinary actions are taken.

INFORMAL INDICATORS OF HUNTING AND WILDLIFE MANAGEMENT IN THE ZONE

1) Do the villagers and workers complain about crop damage caused by animal pests?

Depending on the zone, the damage caused by large animals is not a problem or on the contrary elephants and gorillas cause a lot of damage; indemnities can often be granted if the Water and Forests department records the damage. Most of the forest legislation in Central Africa authorises very selective hunting of an occasional elephant if there is significant crop damage.

2) How many guns are there on the camp? Who are the owners (type of work)? Are they modern guns, rifles...? Do the owners have a hunting permit? A permit to carry arms?

The responses are split when it come to guns, hunting permits, the market for cartridges and ropes for the traps. Either the data is not available, or the surveys are not regularly done by the company or the Water and Forests department.

3) How many hunting and arms permits are there on the site?

Data not available

4) Are there observations/seizures of game killed in the concession? What are the main species? What is the method of conservation? Where were these observations made?

The seizures of game are either not reported, or observed very punctually on the edges of the roads near villages, or they are reported and reprimanded by sacking.

5) Are there signs of elephant hunting or of the trafficking of ivory, leopard skin or gorilla skulls (international trafficking of the mafia type, by opposition of informal circuits, illegal but not criminal)...

Most often, there is no observed trafficking. It is a fact that one elephant is hunted per year on a concession, or there is illegal hunting nearby but outside the concession.

6) General remarks and observations in hunting and wildlife management in the concession?

In their general conclusions the companies observe that the draconian measures taken right from the start with their staff are very dissuasive and therefore effective. However, they only regulate a small part of the village hunting activity and poaching. They insist on the necessity to put in place a common strategy for all actors: private companies, NGOs, professional hunters, village populations and governmental bodies.

■ Examples of negotiations and technical practices

Example 1:	<i>In a concession in Congo, a FMU is in a zone next to a national park bordered by rivers and swamps which have limited human penetrations and has favoured an abundance of wildlife, in particular a large population of chimpanzees. Wildlife and tree inventories have been carried out in this zone; jointly between the NGO and the company, before logging began. Despite a high richness of commercial timber species, the ecological importance and the biological richness of this zone convinced the company to give up its logging permit, at the request of the Government and the NGO and to integrate the zone into the national park.</i>
Example 2:	<i>The same company disagrees with the conservation NGO and the Congolese legislator. The legislation foresees setting up a processing unit in each FMU which is adapted to the available volumes. This effort assumes the installation of personnel necessary for its functioning, and therefore a large increase in the population living inside the FMU, which is next to a national park. There is also a disagreement about the opening of roads to the FMU: the NGO worries about the effect of the probable increases in road traffic, the population increase along the road and the upsurge of hunting and large scale poaching. It involves a choice about land management which therefore also concerns the administration. These disagreements have not yet been resolved.</i>
Example 3:	<i>A multi-resource forest inventory protocol (the case of CIB). The inventory carried out by CIB, with the aim of managing its different FMUs, takes into account all the forest resources, from timber production to non timber forest products (NTFP) production and wildlife. It uses classic techniques of statistic forest inventories, by cutting transects in a tropical forest habitat. The wildlife inventory, which takes place at least two weeks after the opening of the transects and before the botanic teams begins, takes into account the signs of animal presence over the whole width of the patch, in particular ape nests and mammal droppings. Signs of human presence (camps, cartridge cases, traces of fire, traps...) are also noted. At CIB, the method of the wildlife inventory, proposed by WCS, also involves animal counts made on each side of the track. This approach allows faunal density to be extrapolated and evaluated.</i>

3

PART THREE

**SUSTAINABLE FOREST MANAGEMENT:
WHAT DOES THE COMPANY NEED TO DO IN TERMS OF THE WILDLIFE ASPECTS**

31 The three main selected propositions

The bibliographical analysis as well as the recommendations of the different workshops in the sub-region (e.g Lopé workshop, 2000) enable the following three main propositions to be selected:

■ **OBTAIN A SUFFICIENT KNOWLEDGE OF THE HUMAN AND NATURAL ENVIRONMENT AND THEN ON THE BASIS OF THIS KNOWLEDGE PLAN THE INTERVENTIONS UNDER THE FRAMEWORK OF THE MANAGEMENT PLAN**

■ **CARRY OUT PRODUCTION IN RESPECT OF LEGAL AND CONTRACTUAL OBLIGATIONS AND IN RESPECT OF THE VOLUNTARY COMMITMENTS FOR CERTIFICATION**

■ **PERMANENTLY MONITOR THE IMPACTS OF ALL AREAS OF COMPANY ACTIVITY ON WILDLIFE**



OBTAIN A SUFFICIENT KNOWLEDGE OF THE HUMAN AND NATURAL ENVIRONMENT AND THEN ON THE BASIS OF THIS KNOWLEDGE PLAN THE INTERVENTIONS UNDER THE FRAMEWORK OF THE MANAGEMENT PLAN

The knowledge should be focussed on **the situation of wildlife and hunting in the forest concession** and on the **consumption of bushmeat** amongst the company's staff and neighbouring populations.



Acquiring this knowledge is done through **analysing documents, the inventories and surveys and consulting key people.** This knowledge also enables forest logging to be planned in the **management plan.**

It also enables the **elaboration of specific sections on wildlife** in:

- **The terms of references** binding the company and the State
- **The company internal rules and regulations**
- **The five yearly and annual technical and operational documents**

CARRY OUT PRODUCTION IN RESPECT OF LEGAL AND CONTRACTUAL OBLIGATIONS AND IN RESPECT OF THE VOLUNTARY COMMITMENTS FOR CERTIFICATION

Internal company activities, which the company has entire control over: These activities concern all the company staff, its material and its equipment. The company should also include good practice

clauses for all its sub-contractors.



- **Technical operations with reduced impact** on wildlife and on the environment: logging activities (felling, skidding etc.), installation and operation of all infrastructures (communication, permanent and temporary accommodation, industries etc.)
- **Internal operations to control** hunting and the transport of bushmeat on the basis of the company's regulations
- **Training and raising awareness amongst** company staff

Activities in partnership, in which the companies play a driving role

- **Setting up local participatory agreements** with the different actors in place
- **Control operations in support of the public authorities**
- **Raising awareness amongst the neighbouring populations**
- **Local development and actions** in favour of sustainable wildlife management

PERMANENTLY MONITOR THE IMPACTS OF ALL AREAS OF COMPANY ACTIVITY ON WILDLIFE

Monitoring is done at two levels:

- Variables which are measured periodically (number of patrols each month, number of awareness raising sessions, etc.) and which are written up in periodical and annual reports as well as the monitoring of the indicators resulting from the inventories.
- Different international reference systems of legality and good management.

32 Implementation in three stages

It is reminded here that these practical measures are targeted to companies who wish to put sustainable forest management in place in their forest concessions, and therefore have acquired **the principle of establishing a management plan** as a prerequisite. The management plan must conform to texts in force in all the countries in the Congo Basin, or in anticipation of their upcoming evolution.

In this management context, taking into account of the wildlife issues in the forest concession is done in three chronological stages corresponding to the three main propositions selected:

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**ESTABLISHMENT OF THE
MANAGEMENT PLAN AND
ITS PRELIMINARY STUDIES**

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**IMPLEMENTATION OF THE
MANAGEMENT PLAN:
MANAGEMENT MEASURES
IN THE FORESTRY
PRODUCTION PHASE**

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**MONITORING AND
EVALUATION OF THE
COMPANY'S PERFORMANCE**



33

**ESTABLISHMENT OF
THE MANAGEMENT
PLAN AND ITS
PRELIMINARY STUDIES**

This first stage takes about three years. Its precision will determine the quality of the management plan over several decades.

The elaboration of the wildlife sections of the management plan is done in 6 main steps:



Blue Duiker [*Cephalophus monticola*]



Forest elephant [*Loxodonta africana cyclotis*]

■ Step 1: Establishment of technical and scientific partnerships

Taking wildlife into account during the development of management plans requires entering into partnerships with recommended scientific organisations. The little available knowledge on wildlife means that the study is scientific rather than simply applying technical norms.

In the dense forests of the Congo Basin the wildlife data available is very incomplete. Due to their range and their inaccessibility, the forest massifs have only partially been inventoried. In addition, the behaviour of dense forest animals (reproduction, feeding habits, etc.) as well as their interactions with other species and their habitat remains largely unstudied. Consequently, in numerous cases the data collected by the forestry companies during their inventories are new to science.

Also, the scientific data available on the behaviour of animals in disturbed habitats, as a result of forest logging, remains patchy. These data generally come from very specific cases and therefore extrapolating from these data should be done with great caution.

During the development of the management plan, the support from scientific partners is particularly important for certain key phases:

Selecting the species to include in the inventory: the scientist could want to confirm the present of a particular species in the concession.

Analysis of the wildlife inventory results:

- **Identification of the wildlife issues:** pressures, threats, special elements, justification of possible conservation measures.
- **Putting the concession in its global ecological perspective** at the level of its forest massif, region, country and even the Congo Basin.
- **Identification of elements of biodiversity which are of great interest** and exceed the scale of the concession. This is the case when flagship species are detected (bonobos, sun-tailed monkeys, etc.)
- **Identification of measures to protect wildlife during the logging phase.** Scientific advice is essential for defining the field measures taken for certain sensitive species. There are no ready made prescriptions; the few experiences gained can only be transposed after a certain number of prior adjustments.

For example, what should be done if high chimpanzee densities are recorded in a forest concession? In some cases it has been seen that chimpanzees displaced by logging move on to disturb neighbouring colonies. However, we do not know if this behaviour is systematic, and the extent of the impact can depend on the ecological conditions of the environment that can only be appreciated by scientists.

Other phases are technically more robust and can be taken on by qualified technical staff:

Putting the wildlife survey methods in place in the field

Processing of data and mapping

Staff training in wildlife survey

The scientific partners to take into account are universities, national and international research institutions, and some NGOs.

■ Step 2: Collection of documented data

Collection of bibliographic data on the concession enables a first extrapolation to be made and enables us to anticipate the presence of an animal species which should be the subject of a special inventory.

Data on the ecological situation of the concession includes: climate, soils, topography, vegetation, wildlife, vegetation types, typology of the forest formations/habitats, bio-climatic areas, history, paleohistory (presence of glacial refugia)

Regulations : It is essential for the company to collect all the wildlife regulations in the country as is done for the bibliography and the labour laws.

The hunting management practices developed in pilot actions from forest concessions must get a formal guarantee from the public authorities in the form of derogations. For example, a strict read of the Congolese law forces one to notice that the delimitation of hunting territories by the PROGEPP project, implemented by WCS and which takes into account wildlife management in CIB, is in fact illegal as all "the populations whether Congolese or of foreign nationality..., enjoy use rights..." (Article 40 of the forest code). The condition for access to these use rights is residency and not ethnic origin. (right of soil and not blood rights).

International conventions to which the country is signatory (the list of conventions is given in the first part of this manual)

The documents for a certification of legality and voluntary commitment

We note in particular:

The indicators of legality developed under the coordination of Global Forest Watch/WRI (2004-2005)

The Principles, Criteria and Indicators of the African Timber Organisation/ International Tropical Timber Organisation (ATO/ITTO, 2003)

The Criteria and Indicators of the PEFC certification system

The Principles and Criteria of the Forestry Stewardship Council FSC system of certification

Step 3: Wildlife Survey

There are several elements involved in carrying out the surveys:

- **Defining and validating the objectives of the survey**
- **Organising the survey teams in the field**
- **Choosing the species to survey**
- **Collecting the data in the forest**



□ **Defining and validating the objectives of the wildlife survey**

The minimum objectives of the wildlife inventory are:

- **Identifying rare and/or endangered species** in order to determine zones of protection or to plan certain logging/management rules,
- **Gathering knowledge on species distribution** within the forest mosaic so that logging/management activities can be planned better,
- **Specifying the variability of the impact of human activities on wildlife;** confirming the information gathered in the participatory mapping of human activities and the appropriation of the territory and resources for a better planning of integrated logging/management activities; participatory mapping approaches are insufficient and should be integrated into a study of spatial occupation for which there is a standard method, see Vermeulen (1998) and Vermeulen & Karsenty (2002),
- **To provide the basis in order to monitor the** direct or indirect (hunting) **impacts** of forest logging on the animal species.

□ **Organising the teams in the forest**

The method today generally consists of carrying out wildlife inventories using the network of paths created for the management inventory. A limitation of this method is that it tends to mean that inventories are not done in certain zones which are of little interest to forestry production, such as swamps. This can lead to bias in the interpretation of distribution maps (e.g Elephants in the Loundoungou FMU in Congo).

NB, the tree inventory is carried out in two phases: cutting the transects, inventorying.

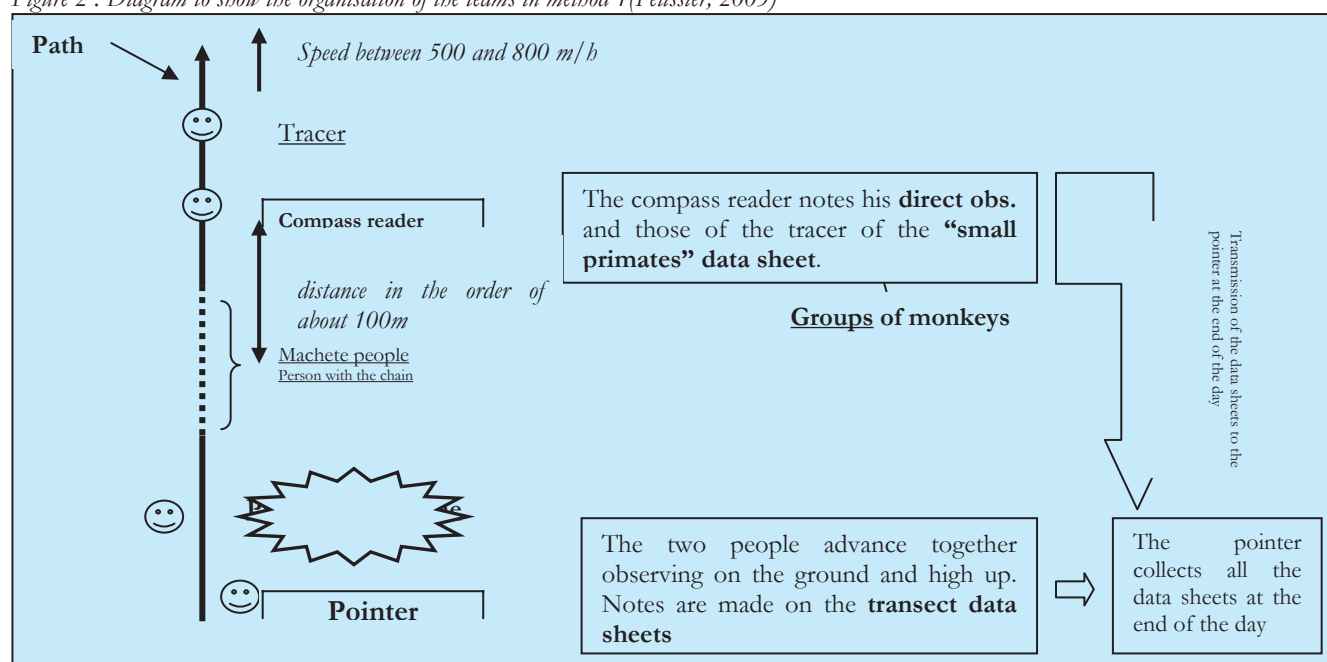
- **Cutting the transects** involves creating in the field all the paths identified on the survey map. The team is made up of a minimum of 9 people (national norms in CAR): the **compass person**, and the **tracer** (the person carrying the surveyor's rod; at least two **people with machetes**; the **ones in charge of the measures: the chain carrier, the assistant staker and the painter**. The **pointer** brings up the rear. The **team leader** checks that all the work is done well. The speed of progression of the transect team is between 500 and 800m/h. This speed depends of the terrain (topography, type of vegetation) and on the number of available people with machetes.
- The forest **inventory** is done in sections of 0.5 ha: 200 metres long (along the length of the main path) and 25 metres wide (12.5m each side of the main path). All trees which are greater than 30cm DBH are identified and measured.

There are two methods for organising the inventory teams. The advantages and disadvantages of each method are listed (Pellissier, 2003).

Method 1: the wildlife survey is carried out at the same time as the forest inventory

The method is shown in the diagram below.

Figure 2 : Diagram to show the organisation of the teams in method 1 (Pellissier, 2003)



Disadvantages

- A large team which is not specialised in wildlife disturbs the animal observations in the forest, particularly the small diurnal primates.
- The agents must have a double expertise of pointing (or reading the compass), and recognising wildlife, which requires specific training.
- Additional work is required for the leading members of the team (tracer-compass reader). To make the additional direct observations of small diurnal primates takes on average about 10 minutes per working hour of the pair's time. The quality of the paths can therefore be affected, reduced speed of progression, azimuths non respected.

Advantages

- Logistics are needed to organise only one team in the forest, with a single passage by the whole group.
- There is less specialised staff to be recruited into the company.

Method 2: a specialised wildlife survey team carries out the survey after the transect cutting team.

(The wildlife survey has to take place after enough time so that the disturbance created by the first team no longer has an impact on the wildlife).

Composition of the wildlife inventory team (Pelissier, 2003)

- One person responsible for the observations at ground level;
- A second person responsible for the observations at height;
- A pointer/ team leader ensures that the information is recorded and coordinates the teamwork.

Disadvantages

- This method increases logistic requirements, and therefore the expected costs as the successive passages of the path layers, then the wildlife inventory team and finally the forestry inventory team at intervals of several days to weeks on the same paths, over several hundreds of kilometres of forest. A means of transport is needed for the wildlife team to enter and leave the forest, which can be coordinated with other teams. In addition, the team must have camping equipment (tarpaulin, cooking material...).
- This method requires good coordination between the teams who do not work at the same speed, but whose progress must be perfectly synchronised.
- It is also necessary to check that they delay is not too long. The indirect observations may be biased if it can be shown that the animal prefers to use the path to move around (which remains to be done).
- The company needs to recruit additional qualified.

Advantages

- There is reduced disturbance to the wildlife, at least for certain species.
- The wildlife team is completely focused on the task.
- The wildlife team becomes an identified team with an affirmed speciality within the company (and could carry out other work such as controls).
- The quality of the data is improved as it is always the same team who collect the data.

Examples

CIB in the north of Congo has used the second method, the wildlife survey team following 15 days after the inventory path has been laid but before the botanical inventory teams,

At Leroy Gabon the team which carried out the wildlife survey is autonomous and carries the survey out 1 or 2 months after the management inventory team. 1 out of every 2 management inventory paths is used.

The two methods require the presence of two wildlife prospectors. Generally, the companies “temporarily” recruit people from the populations living near the prospected zones. The difference between the two methods is that in method 1, the transect pointer contributes to the task whereas in method 2, someone needs to be hired on a permanent basis. This person must have a level of education which is high enough to fill in the data sheets correctly. He must also be able to coordinate the teams and check that the inventory methodology is being respected. There is therefore a supplementary cost of method 2 (see table below).

Table 3 : Monthly costs of a wildlife survey team (Pelissier 2003)

	Salaries (FCFA)		Total
	Temporary prospectors	Permanent pointer	
Method 1	1 x 16 x 800	-	25 600
Method 2	2 x 16 x 800	1 x 80 000	105 600

1 month = 3 weeks in the forest + 1 one week leave. During the period in the forest, 5 days are days off (Sundays and entry-exit). There are therefore 16 actual working days in the month.

In addition, this evaluation does not take into account the costs of the additional logistics of method 2. This is dependant on the characteristics of the zone to be prospected: additional porters may be hired temporarily, meals for the entire team, use of a vehicle... Finally, it is important to note that there is often difficulty in locally recruiting sufficiently educated staff.

Recommendation

Currently, there are no legal obligations as to which method to choose. **It is recommended to use two separate teams (method 2).** However, there must be room for flexibility and negotiating with the lead authorities in order to adapt to the very difficult logistical conditions that exist in certain concessions.

□ Choosing the species to inventory

Current practices correspond to an extensive type of inventory covering large distances in the field but which does not stop to make detailed counts. This approach is adapted to the fact that the majority of species concerned are large mammals.

Box 5 : Criteria for selecting the species to survey

There are currently 4 criteria of selection:

2 criteria focus on the mammals:

- **Criteria 1: Large mammals;** the current consensus between the States, the companies and the large conservation NGOs leads to focus on the remarkable or flagship species which are nearly all large mammals.
- **Criteria 2: The most hunted large mammals;** this choice is based on the fact that amongst the hunted species, mammals are most heavily hunted on most of the continent (Chardonnet et al., 1995): primarily antelopes and rodents, then the primates followed by the pigs and the large herbivores which occupy a secondary place.

Existing regulations and scientific knowledge are also taken into account:

- **Criteria 3: Existence of national norms** specifying the number and minimum selection of species (this is the case in CAR) and which take into account the legislations on protected species if they exist
- **Criteria 4: Bibliographical analysis** of pre-existing knowledge in the area to be inventoried. This analysis can increase the number of species set by the regulations, either on a voluntarily basis by the companies who feels responsible, or through the obligations in the Provisional Management Conventions.

It is suggested that the species to be inventoried are classified into sub-groups relating to their interest according to several combined criteria: biodiversity, local resource, indicator species, etc. The splitting into sub-groups is one of the outcomes of the prior bibliographical analysis. The “classification” is accompanied by a species description based on the different criteria in order to be used as a working document for the forest manager.

This classification is of particular interest when there is no national list of protected species (case of CAR) or when the list is obsolete.

Proposition of how to classify the animal species in the inventories

- **Strictly protected species (C1):** These species are found on list A of the Annexe II of the Wild Animal Code of Protection (MEEFCP, 1994).
- **Endangered species (C2):** This criterion refers to all species which present a high level of risk of global extinction, listed by the IUCN (2003) in the categories *critically endangered*, *endangered* and *vulnerable*. Where possible the local status of the species is specified.
- **Rare species (C3):** This criterion considers the rarity at a global level and at a local level when it can be specified.
- **Human pressure indicator species (C4):** This criterion specifies if the species considered is defined in the literature as an indicator of human pressure.
- **Keystone species (C5):** This criterion refers to the roles played by the species in maintaining the ecosystem structure and functioning.
- **Resource species (C6):** This criterion characterises the species as having an important place in the bushmeat trade network.
- **Flagship species (C7):** The charismatic species, at a national or international level.

There is no unique or standardised list of species to survey in the concessions of the Congo Basin, neither on a regional or country scale.

The final choice can only be made on a case by case basis, for each concession, by taking into account existing documents and expert opinion. The final decision, as indicated in the chapter “partnerships”, should be the result of a participatory process with the scientific partners of the company.

This notion of “list of species to survey” can also be dangerous as it runs the risk of excluding certain species which are particularly discrete or rare; for example, in track surveys, an open list is easily used, and allows a census to be made without distinction of every identifiable track.

Table 4 : Known, endemic or threatened species in the Congo Basin (Aubé, 1996)

Country	Higher Plants			Birds			Mammals		
	Known	Endemic	Threatened	Known	Endemic	Threatened	Known	Endemic	Threatened
Cameroon	8260	156	76	848	11	17	297	10	27
Congo	6000	-	3	500	0	3	200	1	12
Gabon	6651	-	78	617	0	4	190	3	17
Eq. Guinea	3250	66	8	392	3	3	184	1	15
CAR	3602	100	1	668	0	2	209	2	12
DRC	3200	-	7	1086	23	27	415	25	31

Two types of list are presented below. The example from CAR uses the classification into the seven categories above. The example from Gabon is a list of species according to their national and international status of protection.

Example 1

Classification of the main mammals likely to be encountered in the surveys (ecological situation in the South West of CAR)

Scientific name	Vernacular name	C1	C2	C3	C4	C5	C6	C7
<i>Pan troglodytes</i>	Chimpanzee	X	X	X	X	X		X
<i>Gorilla g. gorilla</i>	Gorilla	X	X	X	X	X		X
<i>Cercopithecus neglectus</i>	DeBrazza's monkey			X	X		X	
<i>Cercopithecus n. nictitans</i>	Greater white-nosed monkey				X		X	
<i>Cercopithecus cephus ngottoensis</i>	Moustached monkey		X		X		X	
<i>Cercopithecus mona pogonias</i>	Mona monkey				X		X	
<i>Cercocebus agilis</i>	Agile mangabey			X	X		X	
<i>Lophocebus albigena</i>	Grey-cheeked mangabey				X		X	
<i>Colobus guereza occidentalis</i>	Black and white colobus monkey	X	X	X	X			
<i>Procolobus pennanti oustaleti</i>	Central African red colobus monkey	X	X	X	X			
<i>Papio hamadryas tessellatus</i>	Baboon			X				
<i>Orycteropus afer</i>	Aardvark	X		X				
<i>Loxodonta africana cyclotis</i>	Forest elephant	X				X		X
<i>Hippopotamus amphibius</i>	Hippopotamus	X						X
<i>Potamochoerus porcus</i>	Ped river hog						X	
<i>Hylochoerus meinertzhageni</i>	Giant forest hog			X				
<i>Hyemoschus aquaticus</i>	Water chevrotain	X						
<i>Syncerus caffer nanus</i>	Forest buffalo							X
<i>Tragelaphus e. euryceros</i>	Bongo							X
<i>Tragelaphus spekei gratus</i>	Sitatunga							
<i>Cephalophus monticola defriesi</i>	Blue duiker						X	
<i>Cephalophus leucogaster</i>	White-bellied duiker				X		X	

<i>Cephalophus c. callipygus</i>	Peter's duiker			X
<i>Cephalophus n. nigrifrons</i>	Black-fronted duiker	X		X
<i>Cephalophus dorsalis castaneus</i>	Bay duiker			X
<i>Cephalophus silvicultor</i>	Yellow-backer duiker			X
<i>Panthera p. pardus</i>	Panther or leopard	X	X	X
<i>Smutsia gigantea</i>	Giant pangolin	X	X	

Example 2

List of mammal species encountered during a survey and their level of national or international protection (source Leroy-Gabon)

<i>Scientific name</i>	<i>Common name</i>	<i>Category of protection</i>
<i>Cercopithecus solatus</i>	Sun-tailed monkey	Complete protection (28/07/94)
<i>C.nictitans</i>	Greater white-nosed guenon	Class B, Alger convention
<i>C.cephus</i>	Moustached monkey	Class B, Alger convention
<i>C.pogonias</i>	Crowned guenon	Class B, Alger convention
<i>Lophocebus albigena</i>	White-cheeked managabey	Class B, Alger convention
<i>Colobus satanas</i>	Black colobus monkey	Class B, Alger convention
<i>Pan troglodytes</i>	Chimpanzee	Complete protection (04/03/87)
<i>Gorilla gorilla</i>	Gorilla	Complete protection (04/03/87)
<i>Miopithecus ogoouensis</i> (to be confirmed)	Talapion monkey	Class B, Alger convention
<i>Mandrillus sphinx</i>	Mandrill	Partly protected (04/03/87)
<i>Cephalophus monticola</i>	Blue duiker	Unprotected
<i>C.dorsalis</i>	Black-backed duiker	Unprotected
<i>C.ogilbyi</i>	White-legged duiker	Complete protection (28/07/94)
<i>C. callipygus</i>	Peter's duiker	Unprotected
<i>C.sylvicultor</i>	Yellow-backed duiker	Partly protected (04/03/87)
<i>Hyemoschus aquaticus</i>	Water chevrotain	Complete protection (04/03/87)
<i>Potamochoerus porcus</i>	Red river hog	Partly protected (04/03/87)
<i>Tragelaphus spekei</i>	Sitatunga	Partly protected (04/03/87)
<i>Syncerus caffer nanus</i>	Buffalo	Complete protection (03/02/81)
<i>Loxodonta africana</i>	Elephant	Complete protection (03/02/81)
<i>Dendrohyrax dorsalis</i>	Western tree hyrax	Complete protection (04/03/87)
<i>Smutsia gigantea</i> (= <i>Manis gigantea</i>)	Giant pangolin	Complete protection (04/03/87)
<i>Uromanis tetradactyla</i> ou <i>Phataginus tricuspis</i>	Tree pangolin	Unprotected
<i>Atherurus africanus</i>	Porcupine	Unprotected
<i>Cricetomys emini</i>	Giant rat	Unprotected
<i>Panthera pardus</i>	Panther	Complete protection (04/03/87)
<i>Civettictis civetta</i>	African civet	Unprotected
<i>Nandinia binotata</i>	African palm civet	Unprotected

This type of lists leads us to ask two questions which are not yet fully answered:

- The identification of certain species in straight transects can be difficult, both by sight and sound. The experience of the staff is of crucial importance, yet there are still too few specialists. Nevertheless, the recruitment of auxiliaries from the forest populations often enables these observations to be improved

- Some species are especially difficult to observe, and there is a strong chance that this method only very rarely takes into account signs of their presence.

□ Collecting data in the forest

Wildlife inventories allow the interesting zones, in terms of wildlife, to be clearly identified and should favour a conscious and multilateral decision with regards to localisation of the conservation sector.

In order to determine the most interesting zones to protect, the different parameters to consider are:

- The level of human activities, and in particular hunting,
- The total wildlife abundance,
- The abundance of threatened and sensitive species.

It is necessary to standardise these variables in order to give them the same level of importance.

The survey teams note all signs of human and wildlife presence.

Signs of human presence

All traces of human presence, even temporary, are noted.

- Temporary camps,
- Permanent dwellings,
- Cartridge cases, cartridges, other traces of arms,
- Traces of fire,
- Traps,
- Trails,
- Cuts in the vegetation,
- Others.

Signs of animal presence

Signs are collected over the width of the section, in particular ape nests and mammal dung by observing the animals and their signs/tracks (apes nests, dung, tracks and other trails, vocalisations).

For each sign, the data collected should indicate:

- Time of contact,
- Time of observation,
- Method of detection,
- Type of vegetation,
- Number of individuals seen and estimated number,
- Age,
- Sex,
- Activity,
- Height (for monkeys),
- Distance along the transect (pk)
- Perpendicular distance of the animal from the transect.

It becomes rapidly apparent that the experience of the observers is fundamental for the accuracy of the data. The following boxes present the main signs to collect for a selection of the large flagship species found in Central Africa.

Red colobus monkey [*Colobus badius*]Galago (promosiens) [*Galago sp.*]

Elephant

The high mobility of elephants mean that the animal tracks should be dated, particularly when it comes to dung. For example, in the Lopé, White (1995) estimates that the 'life expectancy' of dung sample can be 18 weeks. In addition, dating can be a pertinent tool for detecting possible seasonal movements of populations.

Dating of elephant dung (White & Edwards, 2000)

Fresh	Sometimes still warm, with shiny fatty acid sheen glistening on exterior and strong smell;
Recent	Odour present, there may be flies, but the fatty acid sheen has disappeared;
Old	Overall form still present although boli may be partly or completely broken down into an amorphous mass, no odour;
Very old	Flattened, dispersed, tending to disappear

Other indirect observations (tracks, trails, dung, remains of food, damage) are also interesting information mainly in the zones where there is a weak elephant population density, i.e. where the number of dung piles observed is almost zero. It is also recommended to only note these observations where they can be dated as recent. These different signs can be detected several months and even several years (trails for example) after the last passage of the animal. This criterion of detection (recent) is defined in a subjective way and should be discussed amongst the different prospectors.

The rare direct observations should be taken into account

Elephant signs to be noted

Indirect observations

- Pile of dung + age classification
- Other types if recent

Direct observations

- Sight + number
- Sound + number

Great apes

The identification of the species, gorilla or chimpanzee, at a nest site is especially difficult if the nests are old. In addition, if there are no clear indications such as dung in the nest or on the soil to distinguish between the two species, it is better to note the nest site as that of an 'ape' (White & Edwards, 2000).

Dating the apes nests provides interesting additional information (see table 5), helping to specify the population descriptions in a given zone.

Dating ape nests (White & Edwards, 2000)

Fresh	Presence of fresh dung and/or strong odour
Recent	Plants still mostly green, no odour, may be some dung remaining
Old	Intact but all the vegetation is dead, dung absent
Very old	Advanced stage of decomposition

Dating of other indirect ape observations is not relevant as they are signs which disappear relatively quickly.

In the case where the survey covers a zone particularly rich in nests, a diagram of the site should be drawn. It is very likely that the site will eventually benefit from some measures of protection.

'Great ape' signs to be noted

Indirect observations

- Species + nest sites + age classification + number of nests visible from the path + total number of nests
- Other types

Direct observations

- Sight + number
- Sound + number

Small primates

Small primates have the particularity of living in mixed species groups (*polyspecific associations*) (Gauthier-Hion *et al.*, 1999). For example, in the Lopé these polyspecific groups often involve four species (*Cercopithecus cephus*, *C. nictitans*, *C. pogonias* et *Lophocebus albigena*) and their overall frequency is similar to single species groups (Gauthier-Hion, 1996). It is important to take this characteristic into account during the inventory.

For small primates, the principle of the survey is based on direct observations (sight and sound). Getting a reliable estimation of the number of individuals in each group is a fastidious exercise as it requires special training and the observer must leave the path to follow the group. This is difficult to carry out in a management context.

'Small primate' signs to be noted

Direct observations

- Sight + identification of the species making up the group
- Sound + identification of the species making up the group

Duikers and red river hogs

Duiker signs are unreliable data. Their reduced size makes detecting them very random. In addition, their large number requires constant 'special' attention from the prospector. It is therefore recommended to only note duiker signs in zones where their population densities seem very low, i.e. where no dung pellets are present. This choice is justified by the fact that these species can generally be considered as common, therefore not requiring this 'special' attention. Dating duiker dung pellets is less important than for elephants as duikers are animals which are much more gregarious. However, a simple classification is used

Dating ungulate dung pellets (White & Edwards, 2000)

Fresh	Odour and sheen (fatty acids) still present;
Recent	Pellets with dry surface, no mould;
Old	Pellets starting to break down, presence of mould;
Very old	Pellets crumbling, dispersed and covered by leaf fall.

Red river hogs are considered in the same way, although their tracks are more easily detected.

Duiker and red river hogs signs to be noted

Indirect observations	
▪	Species + dung pellets+ age classification
▪	Species + tracks (possible in certain zones)
Direct observations	
▪	Species + sight + number
▪	Species + sound

Other ungulates

Amongst this group are the water chevrotain, the buffalo, the sitatunga and the forest hog.

'Other ungulate' signs to be noted

Indirect observations	
▪	Species + dung pellets + age classification
▪	Species + tracks
Observations directes	
▪	Species + sight + number
▪	Species + sound

Pangolins

Pangolin signs to be noted

Indirect observations

Species + dung
Species + other traces

Direct observations

Sight + number

Aardvark

Aardvarks and honey badgers (*Mellivora capensis*) construct burrows which are difficult to differentiate if there are no footprints (Genet, 2002). It is essential to walk around the surrounding area of the burrows to find tracks of the animal.

Aardvark signs to be noted

Indirect observations

Dung
Other tracks

Direct observations

Sight + number
Sound + number

■ Step 4: Data processing and analysis

Data analysis begins with simple **population counts** followed by more descriptive **ecological indices** in order to evaluate the biodiversity richness of the concession.

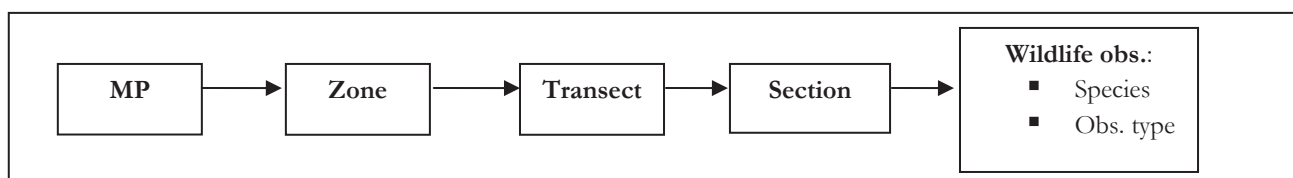
Data collection often takes place over several months in a single concession; this is an issue for mobile wide-ranging species such as elephants. This aspect is still poorly documented.

□ Scale of analysis

The data analysis introduces an intermediary level between the transect and the plot: the section of a transect. The idea is to use the results at the appropriate scale in order to identify the interesting areas in terms of wildlife.



Figure 3: Scales of analysis of levels of wildlife data collection in the field



□ Counts

There are three types of counts:

- Species lists
- Numbers per group of species
- Detailed counts of certain flagship species

Tables and maps are the two methods of representation. Plumptre (2000) showed that there was a large inherent variability between the different methods of indirect counting due to the successive addition of coefficients of variation. Density estimates using these methods are therefore relative.

Count 1: List of observed species during the surveys

This list consists of a simple table of species observed during the surveys. The list includes the scientific names in Latin and the name in English. The conservation status of each species can also be indicated.

Count 2: By groups of species

In order to simplify the analysis of the numerous signs collected, it is possible to regroup the animal species into sub-groups with common characters (primates, small monkeys, herbivores, rodents, etc.).

In the example below, the Anthropoids (gorilla and chimpanzees) have been regrouped to analyse the number of nests counted per kilometre of inventory.

Example of counts for a group of species: the Anthropoids

*Anthropoid (gorillas and chimpanzees) nests count table
Number of Anthropoid nest sites counted per kilometre of inventory.*

	Plot 28	Plot 30	Plot 32
Gorilla	0.146	0.048	0.272
Chimpanzee	0.522	0.248	0.643
Total	0.668	0.296	0.915

Example of data analysis

Anthropoid densities in plot 32 and the Lopé reserve are similar.

Compared to Lahm's study on plot 32, this plot has less chimpanzee nests and more gorilla nests. The reason for the reduction in chimpanzees could be behavioural (displacement following logging).

However, it is difficult to explain the increase in gorillas by logging of the forest and by it becoming secondary (gorillas prefer for secondary forests), as the time between the logging and the survey was too short.

Count 3: Detailed counts for flagship species

For certain flagship species, such as elephants, some monkeys and duikers, all the signs collected in the field each year are analysed one by one. Data accuracy as well as the use of standardised methods means that the results can then be compared with other concessions: this is especially important for species such as elephants which can move over large distances, from one concession to another.

An example of a detailed count for a population of elephants estimated from dung counts is given below.

Example of a detailed count: elephant dung counts

Estimation based on dung counts. The r coefficient corresponds to the rate of dung decay. Punctual estimation of elephant population densities using values of r measured by White and by Barnes & Barnes.

Example of the data analysis

$r = 0.018$ (White, 1995)		
Plot	Density (individuals/Km ²)	Number of elephants
Plot 28	0.300	330
Plot 30	0.534	612
Plot 32	0.371	110

$r = 0.023$ (Barnes & Barnes, 1992)

Plot 28	0.389	425
Plot 30	0.692	793
Plot 32	0.474	141

In comparison to other Central African countries, the estimated elephant densities in this forest show similar values to zones which have a low population density.

Counts of human signs

These counts involve presenting the various signs of human presence, identified and collected in the field, in tables and also possibly on maps. The tables are simple and need no additional explanations.

The table below shows a summary of all human signs counted in each plot of a forest concession.

An example of human signs counts

Counts of human signs observed in the plots and in the sub-zones of a forest concession.

	Plot 28 North	Plot 28 Centre	Plot 28 South	Total Plot 28	Plot 30 North	Plot 30 Centre	Plot 30 South	Total Plot 30	Total Plot 32
Number of observed signs	15	43	29	87	34	59	52	145	14
Number of observed signs per kilometre covered	0.32	0.64	0.37	0.45	0.52	1.03	1.24	0.88	0.34

Example of data analysis

The central part of plot 28 covers the zones occupied by the Gongué and Offoué base camps. The inhabitants of these base camps hunt (confirmed by the socio-economic study).

Plot 32 is inside the Reserve, where hunting is banned, explaining the fact that the number of recorded human signs are the lowest there, as well as in the north of plot 28.

□ Combined analysis of the inventory data

The results obtained are significantly stronger if the data is combined. A particularly good example is combining wildlife densities with signs of human presence in the forest.

Example

An important human presence in a given zone could explain:

- *The lack of direct Anthropoid observations and lower nest density in the zone,*
- *The lower density of elephant dung piles in this zone,*
- *The lower density of duikers.*

Overall analysis of biological diversity and identification of zones of interest

For example, the analysis of biological interest in a concession for Anthropoids can be based on results of the nest counts which highlight the most important forest zones for gorillas and chimpanzees.

Elephant dung pile counts give an indication of elephant diversity. The areas which have the highest density (especially if forest roads cross these areas) should be given particular attention by the Ministry of Waters and Forests and the company.

Overall ecological analysis

One type of combined analysis is the overall analysis of the presence of key resource species. Their determination enables them to be protected. Their protection can have very positive effects on animal species which depend on these resources for their survival.

The key resource species are species on which the animal populations depend during critical periods. The identification of these species is a research activity. The notion of key resources to maintain animal populations is however, a difficult notion to integrate into forest management. The key resources are different from one site to another during the same period of crisis and can even vary from year to year on the same site.

Example

Analysis of key resources identified in the Abeilles Forest (Leroy-Gabon) by researchers of the Makandé site.

- The main dry season of June to September is a period of rarity for fruits which are critical for a number of animals.
- Padouk was a key resource species for arboreal monkeys in the dry season of 1993, as it flowered at this period and the flowers were eaten. In the dry season of 1994 however, the monkeys ate an abundance of fruits from numerous *Dialium* species (eyoum and omvong).
- Iroko is also important for gorillas during the dry season. The animals eat the leaves and the bark of the terminal branches.

Another type of ecological analysis is the **identification of endemic species**.

It can also be useful to combine the **relative abundance** of different species, in different sectors of the concession with the **biodiversity richness** of these sectors. This can be calculated with the Shannon Index described below. There can be sectors with a high abundance of animals, but with low biodiversity.

□ Indices to evaluate the richness in wildlife

Indices of abundance

There are the numerous types of indices of abundance:

Heterogeneity index:

Rate of plots with observations.

Particularity: the main characteristic of this index is to reduce the preponderance of the observations of medium quality, i.e. those which are highly variable.

Scale of the calculations: sections;

Species: all;

Types of observations: all;

Analysis: the calculation of this index is used to classify zones in terms of wildlife abundance.

Kilometric index:

Rate of encounter of a particular type of observation; the number of observations per kilometre of transect for a given species.

Particularities: the calculation of the kilometric index is used for very visible species in terms of direct and indirect observations. It is a stable indicator of animal population density (Genet, 2002), except in cases where the period of inventory is too long and covers several seasons. In addition, it must always be specified whether the Kilometric Abundance Index (KAI) is based on direct (very reliable) or indirect (variable) observations.

Scale of the calculation: zones;

Species: elephants, primates, apes;

Types of observation:

- Dung: elephants
- Nest sites: great apes
- Direct observations (Kilometric Abundance Index): small primates

Analysis: the different kilometric indices are used to compare relative species abundance between different zones;

Comments:

The inventory method to survey primates such as the *Cercopithecus* and *Lophocebus* species does not allow a reliable calculation of the KAI. A fundamental behavioural characteristic of these species is that they form polyspecific associations which cannot be detected by this index.

Some studies have limited the kilometric indices to elephants, gorillas and chimpanzees by considering that these wildlife species are good indicators of the overall integrity of the region. In addition, these three species are classified as “Endangered” by the IUCN and are strictly protected in most countries. They must be given special attention by the forest manager.

These three species are often considered as “flagship species”.

In the example below, the group of duiker species consists of a mix of two species (*C. monticola* and *C. sylvicultor*) and a sub-group (Red duikers). The index used for duikers is an index of abundance, the Kilometric Abundance Index (KAI).

Example**Duiker abundance**

Example of KAI (Kilometric Abundance Index) values measured for duikers.

Species	KAI			
	Plot 28	Plot 30	Plot 32	Average
Cephalophus monticola	0.03	0.05	0.07	0.04
“Red” duikers	0.15	0.08	0.15	0.12
C. sylvicultor	0.015	0	0	-
Total for all species	0.20	0.13	0.22	0.17

Example of the data analysis

The KAI value in plot 28 is the same as that found by Brugière in 1996 around the Makandé station.

The average density of the group of red duikers in the Abeilles Forest is similar to estimated densities elsewhere in Africa. The lowest densities are in the south part of plot 30 and in the north part of plot 28 which can be explained by the increased hunting pressure in these more populated zones.

The estimated density of the blue duiker may be lower compared to other sites but it is difficult to estimate absolute densities for this species.

Biodiversity indices

Biodiversity can be evaluated by two different diversity indices:

Shannon Index:

$$I = - \sum_i \left[\frac{n_i}{N} \ln \left(\frac{n_i}{N} \right) \right] \text{ where } \frac{n_i}{N} \text{ is the relative density of species } i$$

Particularities: this index allows the species richness to be summarised in a single variable. In addition the Shannon index can be used for rare species.

Scale of the calculation: sections;

Species: all;

Types of observations: all;

Analysis: the Shannon index calculation is used to categorise zones in terms of biodiversity.

Modified Shannon Index:

$$I_{vs} = \sum_i \left[\left(vs_i \frac{n_i}{N} \right) \ln \left(vs_i \frac{n_i}{N} \right) \right] \text{ where } \frac{n_i}{N} \text{ is the relative density of species } i$$

and vs_i is the subjective value of species i

Particularity: this index allows us to take the conservation status of each species into account in the biodiversity calculation by using **subjective values**.

Box 6 : Subjective values of biodiversity

The **subjective values** were established based on IUCN classification (see Table below);

Species	IUCN Categories	Subjective values
Water chevrotain	DD	2000
African brush-tailed porcupine	NR	1000
Buffalo	LR-cd	5000
Bay duiker	LR-nt	4000
Blue duiker	LR-lc	3000
Yellow-backed duiker	LR-nt	4000
Peter's duiker	LR-nt	4000
Grey-cheeked mangabey	NR	1000
Black-fronted duiker	LR-nt	4000
Chimpanzee	EN	9000
Black colobus monkey	VU	7000
White-legged duiker	LR-nt	4000
Red duiker	LR-nt	4000
White-bellied duiker	LR-nt	4000
Elephant	EN	9000
Gorilla	EN	9000
Greater white-nosed monkey	NR	1000
Forest Hog	NR	1000
Mandrill	VU	7000
Moustached monkey	NR	1000
Aardvark	NR	1000
Pangolin	NR	1000
Leopard	NR	1000
Giant pangolin	NR	1000
Mona monkey	LR-lc	3000
Red river hog	NR	1000
Sitatunga	LR-nt	4000
Sun-tailed monkey	VU	7000

The subjective values are between 1000 and 9000 in order to guarantee a constant I_{vs} (modified Shannon Index) sign. Finally, the result of the calculation is divided by 10000 for an easier evaluation of the index.

Scale of the calculation: sections;

Species: all;

Types of observations: all;

Analysis: the modified Shannon Index is used to classify the zones in terms of “modified” biodiversity.

□ Species /habitat correlations

Characterising the habitats

Vegetation classification, at the plot scale, carried out when cutting the transect provides a relatively detailed description of the different habitats. An example from Gabon (SBL, Pelissier, 2003), shows a stratification of the forest into 13 types of habitats (see table below). These strata are considered as different habitats.

Table 5; Forest stratification

<i>Code</i>	<i>Description</i>
RG	Rocky outcrops
AG	Cultivated land
DF	Dense forest
IF	Inundated forest
MAF	Marantaceae forest
YSF	Young secondary forest
FSS	Forest on shallow soil
MSF	Mature secondary forest
FL	Fallow land
CS	Closed swamp
OS	Open swamp
RF	Raphia forest
ROA	Roads

Species /habitat correlations

The correlations between the different species and habitats found were evaluated with a chi-squared (χ^2) test on a contingency table of species/habitats. Contrary to a simple abundance analysis the χ^2 test allows the relative percentage of the different habitats to be taken into account.

Ratio of habitat preferences

For the “dung” (or faeces) type indices, the habitat preference was estimated for each species by calculating the ratio (r) as described in Neu et al. 1974 (in Hart, 2000).

This ratio evaluated the percentage of use of a given habitat in relation to the availability of this same habitat:

$$r = \frac{d_i / D}{h_i / H} \text{ where } d_i \text{ is the number recorded signs in the habitat } i \text{ (} h_i \text{ is the number of surveyed habitats) and}$$

D and H represent the total number of indices and the total number of habitats respectively.

A ratio > 2 is considered an indication that there is a strong positive selection of a given habitat i .

Identification and cartography of conservation series (Mathot & Doucet, 2005)

The different parameters to consider when defining the most interesting wildlife zones for protection are:

- (1) Overall wildlife abundance (A);
- (2) Abundance of threatened or sensitive species (B);
- (3) Importance of human activities, in particular hunting (C).

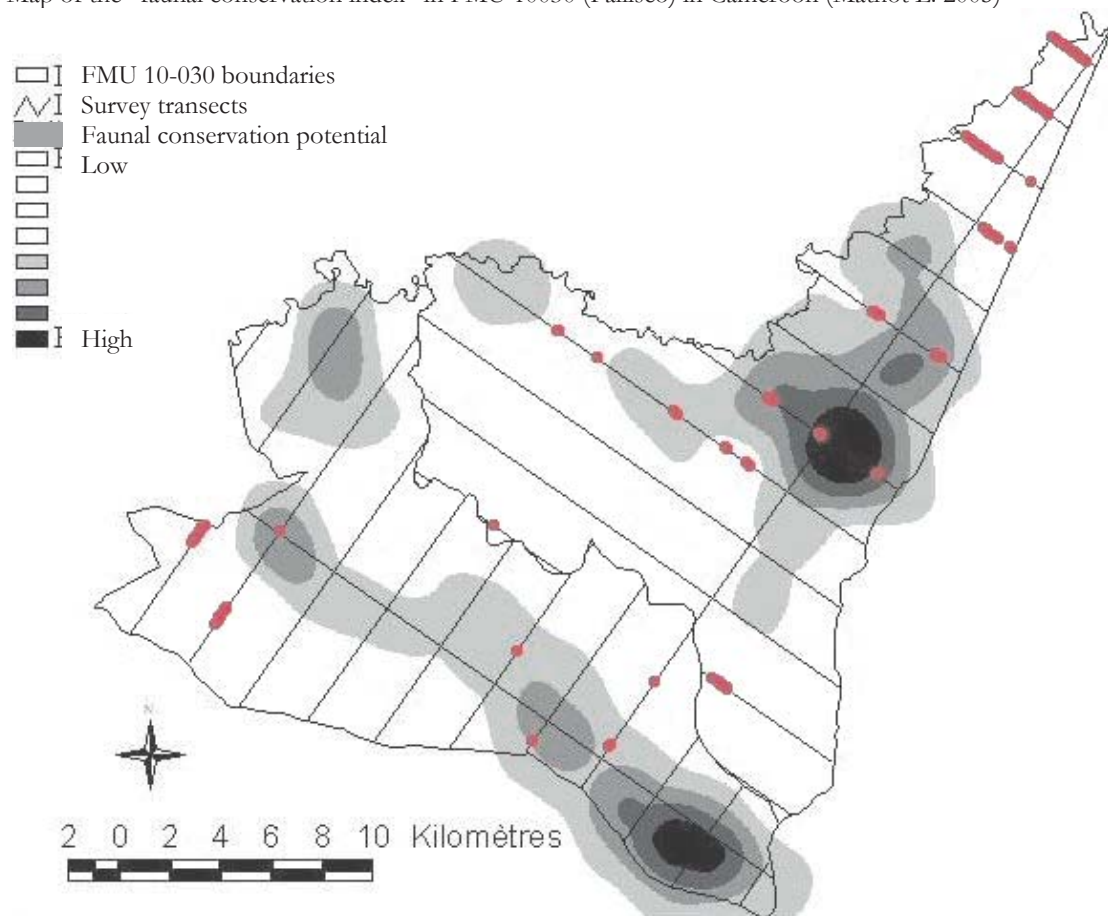
In order to give the same importance to these three variables, it is necessary to standardise them: $v_{si} = (v_i - mv) / \sigma$ ($i=1, \dots, n$) where v_{si} is the standardised value in plot i for a considered variable, v_i is the value of plot i of a given variable, mv is the arithmetic mean value and σ is the estimated standard deviation.

For each inventory plot we then add the standardised value of animal abundance with the standardised value of abundance of threatened species and then subtract the standardised value of hunting activity ($A+B-C$). The index we get is called the “fauna conservation potential”.

From a botanical point of view, species richness, species diversity, endemism and rarity are the four parameters to consider (DOUCET, 2003). The standardised values of each of these variables can also be calculated, but it is more complicated given the hundreds of species to consider and the difficulties linked to their accurate determination. Standardised values for fauna and flora can make up the superimposed data layers.

Example

Figure 4: Map of the “faunal conservation index” in FMU 10030 (Pallisco) in Cameroon (Mathot L. 2005)



□ Some recent tools of data collection and processing

The DISTANCE software is frequently used to process wildlife census results. It allows processing wildlife counts on transects and extrapolating wildlife density with a statistical calculation of the accuracy of the results.

In some cases, particularly when data collection is repetitive, it is a good idea to collect the data directly in a computerised form instead of collecting data on a piece of paper in the forest and transferring the data onto computer at a later point. Errors are often made during the recopying. However, this assumes that there is a computer in the field, with enough available back up and power source.

The “Cybertracker” is a tool used to collect data in the field, consisting of a computer such as a Palm or Pocket PC linked up to a GPS. All collected data include the time of collection and the GPS coordinates. In the field the data is kept in the memory and is then downloaded onto a central computer for analysis. The GPS coordinates allow the data to be visualised very rapidly on a GIS map. A indirect interest of Cybertracker is that the progress of the inventory teams can be followed. Data collection can be facilitated by the programming of visual data sheets: instead of having a list of variables (animal species...), the operator can use the touch screen of the Cybertracker to simply touch the specially designed icons (animal silhouette, male/female, adult/offspring etc.) with his finger. The tool does therefore not require the operator to be able to read or write.

■ Step 5: Village surveys

The different components of the village surveys focussing on wildlife aspects are presented below, with a few additional tables showing the results of the work at (CIB) as examples.



We note that it is necessary to survey both **the villagers and the workers and that the surveys for each are different**. After an initial analysis of the situation, the surveys are based around two main themes:

The different protein sources:

- Commercialisation
- Consumption
- Cost

Hunting

- Hunting practices (zones, hunting effort, etc.)
- Ways of combating illegal hunting
- Current impact of logging on hunting activities

□ The initial situation

A prior study must include a documented analysis of any previous surveys.

□ The different sources of protein

Commercialisation

- Commercial networks for the different sources of protein:
- Beef, the role of foreign butchers, relationships with the animal breeders
- Frozen imports; smoked fish and bushmeat
- Sellers: ethnic and geographical origin
- Mode of commercialisation: per kilo, in small quantities. Prices and conformity with the level of purchasing power.
- Products sold individually/in bulk

Meat consumption surveys

- Nutritional monitoring of the population:
- Prior stratification of the sample of interviewed families.
- Structure of pre-existing consumption before the sale of animal of reared or imported origin.
- Quantity of protein actually consumed (survey).
- Types of protein eaten during a meal.
- Number of meals based on reared or imported protein.

Example 1

Kabo site(CIB). Frequency of meals by source of protein

	January 2001-May 2002	November 2002- May 2004
Bushmeat	35 %	30 %
Fish	55 %	50 %
Domestic meat	2 %	10 %
Other proteins	6 %	10 %

Example 2

Frequency of meals based on reared or imported meat on the different (CIB) sites

	January 2001-May 2002	November 2002- May 2004
Pokola	2-3 %	15 %
Kabo	3-4 %	5-10 %
Ndoki 1	0	5 %
Ndoki 2	2-3 %	10 %
Loundougou (2004)	Site not open	5-10 %

Costs of the different sources of proteins

- Commercial products: farmed fish, river fish, frozen fish, beef, other reared meat; amount of company help,
- Estimate of the cost of bushmeat for a company worker who carries out subsistence hunting within the rules,
- Estimate of the extra cost of changes to the dietary habits after bushmeat has been replaced by other sources of protein.

□ Hunting

Hunting practices (zones, hunting effort, etc.)

- Hunting effort: duration, distance, hunter's perception
- Hunting zones, quantity and nature of species hunted, seasons, formal and informal economy
- Legal and illegal, subsistence and commercial hunting
- Hunting methods (day/night, snare/rifle)
- Hunters: numbers, origins, type of hunting, revenue, partnerships

Ways of combating illegal hunting

- Authorised rifles in the camps
- Existing means and ways to combat illegal hunting
- In the organised hunting in the concessions, number of rifles involved

Current impact of logging on hunting

- Evolution of captures
- Evolution of infractions
- Evolution of game densities

□ The “village hunting” studies

The village hunting studies, along with the inventories, are another major technique for evaluating the degree of perturbation to the environment and the level of hunting on the concession. The following paragraph is taken from Dethier (1995), Jeanmart (1997), and especially Delvingt et al. (2002).

Method

- Study of the hunting territory using the spatial occupation method
- Village and active hunters survey
- Records of all snare lines, GPS locations, number of snares, type, location
- Notebook to monitor hunting is given to village hunters in order to collect data on caught animals, recording all animals killed and brought into the village (species), date of capture, type or weapon or snare, vernacular name, sex and state of the animal (live, fresh, rotten, pregnant...). Each animal is identified by a number. Two assistants help the hunters to fill in the data sheets correctly.
- Systematic weighing of the game (fresh or smoked)
- Destination of the caught animal (subsistence, sale, gift), transaction amount, buyer, destination).

Recorded parameters:

- Demography of the village, split into permanent and potential residents, % and age of hunters
- Hunting territory areas, spatial distribution of the camps and snare lines
- Destination of the game (% sold, % eaten)
- Revenue (per hunter, per inhabitant)
- Price of game

- Hunting techniques
- % of each hunting technique (% of captures by rifle, snare...)
- Number of trappers, number of lines, number of traps per line
- Average weight of captures
- Number and weight (kg) caught per km², per year, per hunter
- Biomass distribution of hunting records, rodents/artiodactyls ratio
- Biomass distribution of hunting records amongst the artiodactyls
- Calculation of the impact of hunting on the animal populations

Together, all these factors allow the commercial or non commercial nature of village hunting to be estimated. Specific analysis of the hunting records enables us to detect whether the environment is already disturbed or not.

This type of approach has been successfully used in different villages in Central Africa and specifically around a Pallisco concession (Ecodeck, 2004).

■ Step 6: Strategic decisions resulting from the analyses

The documented analysis shows that, in the absence of accurate data on the wildlife situation and dynamics, measures of protection are often based on the precautionary principle rather than on objective and precise figures.

□ Expert opinion; consultation

Identification of interesting elements of wildlife biodiversity and evaluation of their importance (rare, representative, etc.) can only be done on a case by case basis, by experienced scientific specialists who have enough solid experience to be able to compare and interpret the data in relation to existing scientific knowledge and data from neighbouring sites.

Most frequently, the company calls upon an international NGO (WCS and WWF were the first to accept these types of collaborations) who coordinates and supports series of studies involving international and national researchers.

In some cases the company directly recruits its own experts.

Generally we observe that biodiversity protection measures are most advanced where there is collaboration with an NGO. This type of structure uses its power of influence to demand stronger conservation measures than the company would have put into place on its own.

□ GIS and mapping

The use of a Geographical Information System extrapolates results of systematic sampling to the whole concession.

The most commonly used software in forest concessions is **Arcview**. In order to map wildlife data, a spatial analyst extension is used to extrapolate the point data over the entire study zone. The technique involves representing the density of observations using the Kernel method, which analyses distribution and quantity of objects in point mode in order to produce a special representation of the densities in raster mode over a continual area. For this the relative density of the observations is calculated for a given scope of analysis. This scope of analysis must be larger than the distance between two consecutive parallel transects in order to ensure a continual spatial representation over the entire study zone.

GIS allows us to stack numerous types of information:

- Annual small logging units (known as “assiettes de coupe”) planned in the management plan

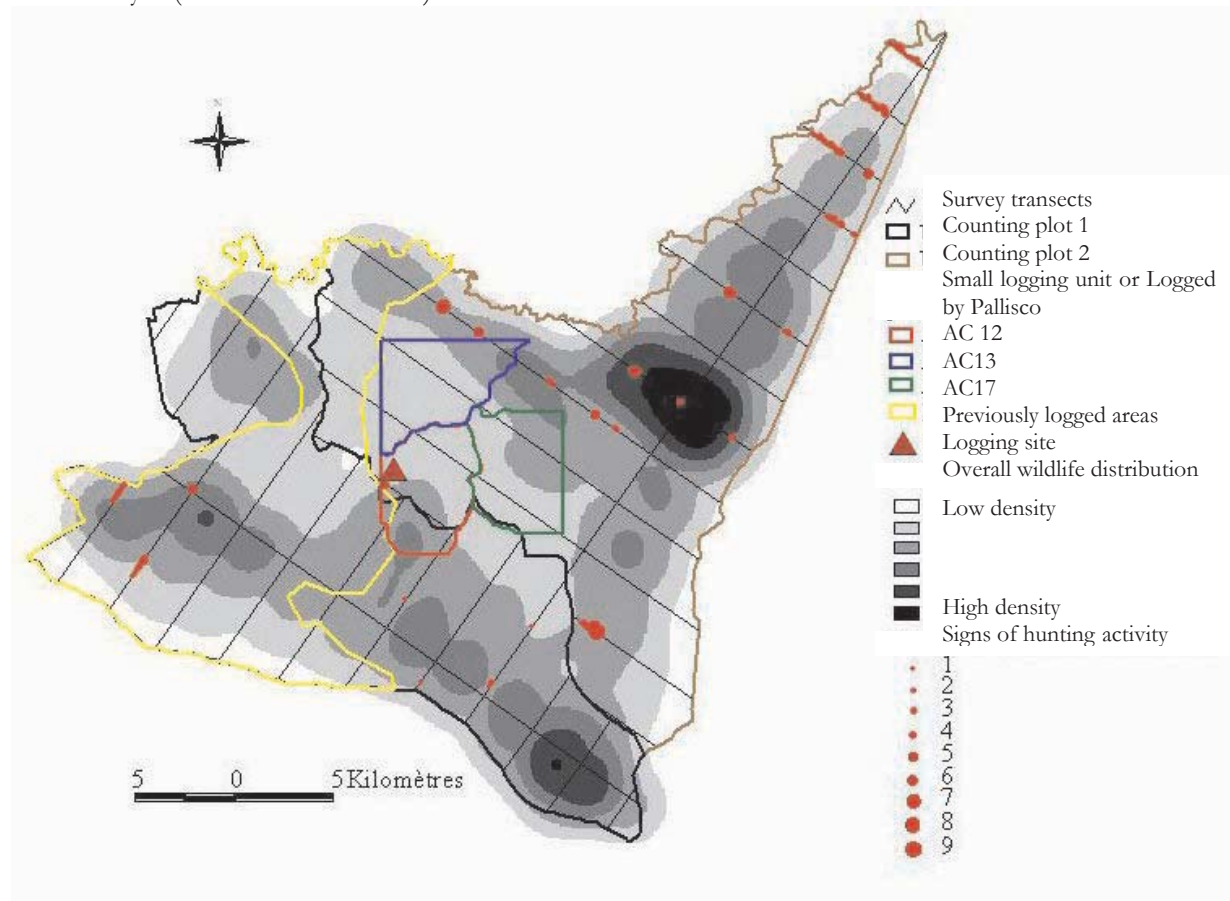
- Previously logged zones
- Location of the logging site
- Inventory transects and the sampling plots
- Importance of hunting activity
- Overall wildlife density

Combining these data allows us to very rapidly locate the zones of high human activity by zones of lower wildlife densities. These multi-criteria map representations are important **tools for decision making**.

*Nevertheless, it should be taken in to account that the map gives an image of the concession at the time of the inventory. The third stage, “**monitoring and evaluation of the company’s performance**”, gives the methods for regularly updating the data.*

Example

Figure 5 : Use of Arcview with the Spatial Analyst extension for the FMU 10030 (Pallisco) in Cameroon for a multi-criteria analysis (Mathot & Doucet 2005)



□ Three types of strategic decisions

Decision 1- Close a part of the concession to all forest logging activity.

These areas are dedicated to conservation and can have two different statuses:

When they remain **integrated inside the concession** they are generally classed as 'conservation series'. These zones have a cost for the company representing at least the annual taxes on their total area.

In certain cases the dialogue between the company and its conservation partners can lead to the **exclusion of large zones**. The logging company could therefore wish to negotiate with the relevant authorities to exclude these zones from the taxable area. In such cases the excluded areas are returned to the public forest estate. However, this is a complicated process which requires an amendment to the attribution decree of the concession.

In certain conservation series, active contribution, including financial contribution, from the logging company (when he pays taxes for non productive areas) will involve logistical support to its conservation partners: access routes, trails, making staff available, etc.

Decision 2 – Putting special measures into place to protect wildlife in certain production series.

This involves mitigating certain known impacts on wildlife that are generated by different logging activities. This type of decision is made in three cases:

- When the fragility of the environment is considered as **tolerant** to forest logging,
- In the case of a **neighbouring protected** area. There are special measures of wildlife protection in the production series immediately bordering the protected areas. These measures are put in place after discussions with the ecologists working in the protected area.

On the periphery of protected areas, there is no prescribed solution. However, guiding principles can be given:

- Discussion with ecologists over the ecological analysis of the inventory results,
- Choice of targeted species for conservation based on the priorities of the protected area,
- Additional inventories: in certain cases, the wildlife inventory systematically carried out by the company is not precise enough and additional fieldwork is necessary. If this is the case, discussions with the protected area could lead to agreements about the financing of these additional measures,
- Priority is given to wildlife movements: preservation of ecological corridors, limitation of edge effects created by the opening up of roads,
- Maximum reduction in wildlife disturbance:
 - Adaptation of logging periods to optimal seasons for the wildlife;
 - Preservation of essential vegetation for targeted wildlife: habitat, feeding, shelter, reproduction zone, resting zones etc.;
 - Avoidance of logging, machines and staff in sensitive wildlife zones;
- Strict application of rules controlling the access roads,
- Clear delimitation of special areas for the staff, mapping, field reconnaissance,
- Joint patrols between the company staff and the eco-guards from the protected area: joint organisation, planning, and financing.

- **In the specific case (still rare in Central Africa) where the wildlife issue is taken into account at a larger scale, beyond the concession** it involves taking large migratory zones into account, or ensuring that a forest gallery next to a water course which crosses several different concessions is protected. This approach requires the ability to have access to the management plans of the neighbouring concessions and to analyse them together from a biodiversity point of view.

Decision 3 – General measures in the whole concession

The third type of decision concerns common measures in the whole concession, including production zones and related areas such as transport networks as well as industrial and living areas. These measures are described in detail in the following chapter.

Example of a strategic decision

An example of a strategic decision made by Leroy-Gabon in its forest concession in the Abeilles forest, next to the Lopé National Park, is given below:

"From the results of the wildlife study carried out in 2001, it is not appropriate to create special protection zones for wildlife, given that the wildlife is distributed over the whole FCSM (no specific zone shows a remarkable abundance).

However, various measures have been made to better protect the wildlife present:

- *Total ban on hunting in the west of the Offoué;*
- *Transport of bushmeat in company vehicles is banned;*
- *Access to the Abeilles forest is limited by numerous guarded barriers;*
- *Severe sanctions if the measures taken and integrated into the company regulations and rules are not respected (firing...)"*

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**MANAGEMENT PLAN
IMPLEMENTATION:
MANAGEMENT MEASURES
DURING THE LOGGING
PRODUCTION PHASE**

Regulatory, contractual or voluntary measures to reduce the impacts of forest logging on wildlife

The main objective is to sustainably manage hunting. All wildlife harvesting in the forest should not be banned, but off-take of authorised species should be regulated by quotas ensuring their sustainability. There should be a total ban of all hunting of strictly protected species.

There are three main issues relating to this objective:

- Institutionalising the measures to combat illegal hunting;
- Controlling the hunting quotas for authorised species in specific hunting zones;
- Putting into place accompanying measures to facilitate the economic and social acceptance of increased controls on hunting.



A multifaceted approach, involving the hunters, eco-guards and company workers, must be put in place to manage and control wildlife harvesting in the forest. It requires monitoring and control over the whole bushmeat network, from harvesting to the end consumer. This control can only be effective if there is a strict internal company policy and sufficiently dissuasive sanctions.

The State also plays a major role in the juridical monitoring of offenders, such as illegal hunters and traders in illegal products such as ivory.

Conservation organisations push the companies to put a complete control on illegal hunting in place. As seen above, the strict application of the law means that all forms of commercial hunting are banned. The only hunting allowed is subsistence hunting.

■ The main measures carried out during logging production

The measures to be carried out by the company during the logging production can be split into two categories:

Internal actions of the company, over which it has a full control,

Actions in partnership with other entities, in which the company has a driving role, but needs consultation with partners for the external factors that it cannot control.



INTERNAL ACTIONS OF THE COMPANY

These actions concern all the company personnel, its material and its equipment. The company will also include clauses of good practice with all of its sub-contractors.

All technical operations should be carried out with reduced impact on wildlife and the environment: logging activities (felling, skidding, etc.), installation and operation of all infrastructures (communication routes, permanent and temporary accommodation, industries, etc.)

Internal operations to control hunting, transport and trade in bushmeat should all be based on company rules and regulations.

Training and awareness raising of the company personnel

Management of hunting and alternatives to bushmeat

MEASURES IN PARTNERSHIP WITH OTHERS

- Setting up **local participatory agreements** with the different stakeholders
- **Control operations supporting public authorities**
- Raising awareness **amongst the neighbouring populations, and local development actions and other activities** in favour of sustainable wildlife management

■ Internal actions: Reduced impact of technical operations on wildlife

Classic reduced impact logging techniques (RIL) initially aimed to minimise the loss of commercial timber during the different logging processes and to optimise the opening of roads by improving the planning and techniques of construction.

□ Mainly indirect impacts

Indirectly, these techniques have a positive impact on wildlife, mainly by a better preservation of natural habitats. They do not have a direct effect on hunting practices.

■ **With regards to timber losses**, inefficient logging techniques result in a loss of up to 30% of harvested volume. This percentage is made up of the following components:

- Felled but abandoned (lost) trees
- Poor felling and sawing techniques (fissure, ring shake, tear)
- Avoidable damage to commercial standing trees (future trees)
- Inefficient use of heavy machinery and labour due to poor planning

The advantages of RIL techniques reducing the loss of timber includes the following points:

- Better use of timber (yield per tree)
- Improved yield by better felling and sawing techniques
- Improved efficiency of forestry operations
- Reduction of forest damage

■ **RIL techniques applied to road construction** include planning of the network, opening up on the ground, construction and maintenance of the roads and subsidiary constructions such as bridges, dykes and ducts. Well planned, designed and built roads reduce the construction costs, increase efficiency and the security of the transport and minimise erosion and other environmental damage.

□ Concrete measures in favour of wildlife

Very practical measures must be implemented during each activity in the forest, especially during the passage of the inventory teams, the planning and construction of the roads and controlled felling.

Measures (Mans Vroom, Form International, 2005)

Inventories

Camps:

- Set up camp at least 25m from the nearest water course,
- Dig the latrines at least 35m from the nearest water course and at least 60cm deep to cover the excrements each time with a layer of earth (real danger of infestation of human to mammal parasites),
- Dig a rubbish pit at least 25m from the nearest water course and at least 75cm deep to cover the rubbish every night with a layer of earth (security: danger of attracting ants and rats is greater than snakes),
- Well clear the ground between the tents and the latrines of vegetation.

Leaving the camp:

Completely cover the latrines with earth. Pack down the earth heavily.
Cover the rubbish pit with earth. Pack down the earth heavily.
Remove all non-degradable waste and rubbish (plastic bags, sardine cans, wrapping etc.) to the road.

During work:

Always bury excrements after having gone to the toilet
To not make excessive noise to scare the animals, except if the presence of elephants, buffalo or gorilla is suspected.
Regularly supply the temporary camps with meat to limit poaching by the compass readers, inventory or transect cutting teams...

Planning and construction of roads

Plan and build as many bridges in the canopy and wildlife corridors as possible when where it does not affect the quality and safety of the road. These canopy bridges will especially allow the smallest animals (mammals, reptiles, amphibians, rampant insects) to cross the logging road with less danger, thereby assuring continued genetic flow.

Avoid silting up water courses which will impact aquatic life

Assure a sufficient passage of water to the bridges and under the road, especially in the rainy season to facilitate the movement of fish and amphibians and to avoid the formation of ponds of stagnant water.

When removing the felled and cleared trees in the axial direction of the road, they should be sawn into several logs to allow a free passage of large game (elephant, buffalo bongo, sitatunga). The smaller mammals (red river hog, duiker, etc.) will pass underneath the cleared trunk.

Limit the width of clearings to a minimum.

Assure a good visibility in the turns. Traffic accidents with large game are as dangerous for the person as they are for the animal in question.

Controlled felling

- Make lots of noise before beginning to fell to allow the arboreal mammals (monkeys, hyraxes, flying squirrels, bats) to save themselves.
- Avoid all damage to trees which have been identified as particularly important for wildlife (trees with primate nests, feeding trees with fruit, etc.)
- Avoid all unnecessary damage to vegetation and biodiversity around felling sites during the silvicultural operations: maintaining lianas, termite mounds, ant hills, etc.
- **Plan felling** in such a way that the cutting fronts are not wide enough to prevent wildlife escaping, or on the contrary to cause major movements over large distances.

There are few additional measures which can be carried out during **skidding, work in the parks** and **transport** taking place in areas already affected during the logging.

□ Protection of ecologically sensitive areas

In addition to the more formal zoning into conservation or protection series, logging systematically will protect certain ecologically sensitive areas.

Respect tree lines in riparian forest

This is a case of a real conservation measure. Respecting tree lines in riparian forests helps to protect river banks and reduce erosion at high water. It is also important for biodiversity conservation, as riparian forest usually provides a habitat for distinctive animal and plant species.

Stop logging during periods of flood

Stopping logging in the rainy season was a natural decision by the logger given the instant degradation of the roads, increasing difficulty to carry out the different operations, and an increase in the level of risk for the machines. For conservation this break is very positive as the natural rhythm of activities is returned and also as the erosion of roads and other traffic areas are reduced. The seasonal break in activities is also positive for some flora (regeneration of vegetal cover) and animals (fully occupied habitats).

■ **Internal actions: Planning of camps and traffic roads**

This action is taken on two different scales:

First, it involves **planning the permanent technical and industrial buildings** at the level of the concession, so that areas which are most sensitive for wildlife are avoided. Whether permanent or temporary, the choice of location for a camp is constrained by logging activities, particularly transport which strongly reduces the number of possibilities. The respect of these (logistical) conditions has regularly tended to take precedence over environmental concerns, even though the choice of camp location introduces major constraints on



the areas (impact on the managed area itself and the surrounding areas). The camp should be located as much as possible outside the forest space, and definitely outside of sensitive areas.

On the other hand, **the company should not take the risk of attracting and maintaining illegal hunters** interested by abandoned temporary camps in the forest. At the end of logging, it is normal to abandon the camps, even though they can sometimes be reconverted. If the camp is abandoned, all constructions and equipment must be disassembled and removed, and the areas should be carefully cleaned. This procedure is already carried out to a certain extent everywhere.

The network of trails and roads has a major and widely documented impact on the penetration of illegal hunters into the concessions. As for the camps, this network must meet the essential logging requirements. However, careful planning is essential, taking the different status of roads opened by the company into account. The main roads have a structuring role over the territory, whereas the logging and skid trails are only used temporarily.

It is important therefore to create this logging network to avoid direct connections with the national road system as much as possible, limiting axes of penetration. Where crossing is inevitable, entrances into the forest should have a guarded barrier adapted to the nature of the road: a permanent road should have a permanent barrier and there should be a temporary barrier if the road is a logging trail which will close up after a few years.

Measures

Managing immigration to the forest concession linked to the location of the base camps, permanent camps and industrial sites.

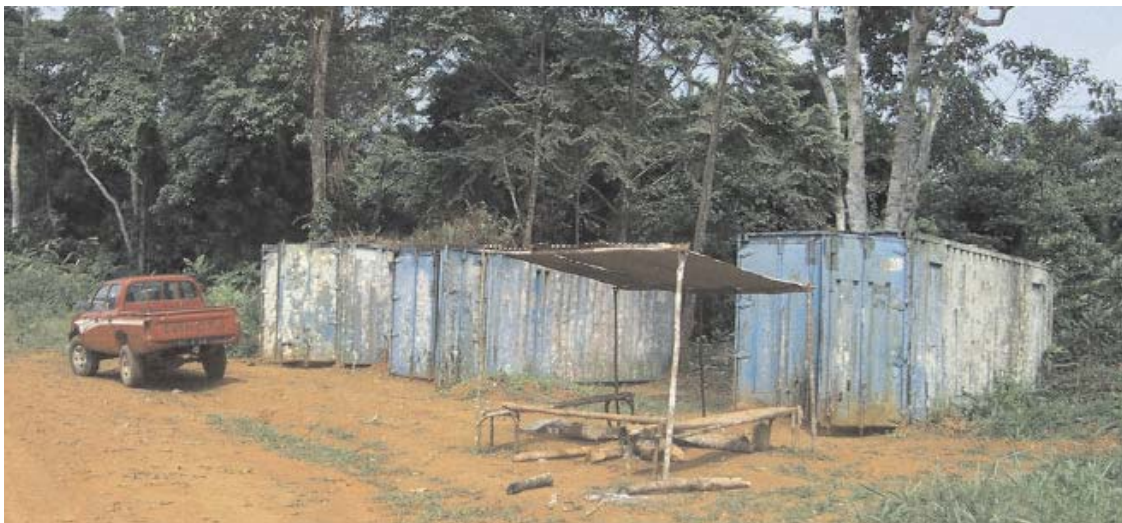
- Plan new logging and processing infrastructures to avoid the most sensitive areas
- Avoid numerous forest camps within the forest concession
- Favour recruitment of local workers on the concession site

Avoid leaving camps in the forest

- Disassemble and systematically clean temporary camps set in the forest so that they are not used by hunters
- Systematically recuperate the tarpaulins which are sometimes abandoned in the forest
- Recuperate all used material, including old engines and other bulky items

Plan the road network to minimise the possibilities of access

- Minimise the number of connections of the logging network to the national road network
- Plan for barriers at inevitable intersections



Abandoned camp in the forest

■ Internal actions: internal control of hunting, transport and trade of bushmeat

□ Company rules and regulations, sanctions

The company is responsible, within the areas it manages and amongst its paid staff, for controlling the activities carried out by its staff in the forest in the context of their professional activities. Bans should be made known to all staff in their contracts at the time of employment and through posters and pictures.

The company should refer to national laws on hunting, to its contractual engagements in the management plan, and to the demands of good management certificates which the company wants to obtain if relevant. Some regulations and measures taken under the management framework and imposed by the company on its workers must be integrated using a special administrative process: in Gabon, companies which fired their employees for poaching (who therefore clearly violated the Gabonese law) lost their case when confronted to the labour inspectors as poaching was not integrated in the official labour laws and regulations. The measures must therefore be integrated as annexes in the worker's contracts and signed by each of them.

Measures

Put strict regulations and effective control mechanisms in place in the concession.

- Define wildlife management standards which will be included in the company rules and regulations with the forestry syndicates (terms, sanctions, incentives)
- Define the conditions for people without a direct relationship with the company's activities who settle in the concession in the company rules and regulations.
- Loggers and employees must inform the competent authorities of any commercial hunting, poaching and trafficking of illegal animal products (ivory, skins, etc.) going on in the concession.
- At the moment of recruitment, each employee commits not to hunt (written signature of this commitment).
- Sanctions are described in the rules and regulations (severe sanctions including firing). In practice, managers tend to give warnings when this rule is broken – which is rarely the case.
- High level staff should carry out controls on the sites in order to show the environmental concern of the company.

Example of Leroy-Gabon

A whole series of articles have been integrated into their company rules and regulations:

- *It is forbidden to plant food-producing crops, to hunt, to trap, or to set camps in the protected areas;*
- *It is forbidden to carry firearms in places of work;*
- *It is forbidden to transport bushmeat in vehicles;*
- *Breaking these rules is considered as a serious fault and can lead to the terminating of the working contract without indemnity or warning. This concerns in particular any kind of hunting carried out during or outside working hours in protected areas.*
- *Staff delegates have signed the rules and regulations which outline the measures to protect local wildlife, as outlined above.*
- *In 2003, 14 people were fired for illegal hunting. Nevertheless, the company is yet unable to confirm whether or not its environmental policy is effective.*

Example of Bordamur, Gabon

- *Vehicle access to the concession is strictly limited to vehicles belonging to the administration, the company or to its partner, WWF.*
- *All transport of bushmeat, arms, munitions and hunters is forbidden in company vehicles.*
- *It is forbidden to hunt in places of work. The employees can only hunt on foot, outside working hours and around where they live.*
- *The villages along the public Oyem-Mitzic road can only hunt on foot in strict respect of the law (for subsistence only). The maximum distance to go hunting is the Okan River, 20km away as the crow flies.*

□ Controlling hunting and arms

Respecting company rules and regulations requires that the company puts in place control measures. These measures concern different hierarchical scales of personnel who are in charge of enforcement. However, vigilance in the field involves the presence of specialised personnel who are trained and who have sufficient logistical means. There are several examples of companies who have recruited their own security staff to control hunting in the concession. These personnel complement the personnel of the Ministry in charge of forests, but do not have the same mandate. In particular they do not have a police or judicial role, which is the role of the State.

**Measures****Ban of all commercial hunting or hunting which uses non selective techniques in the forest concession.**

- Ban the arms in daily places of work.
- Control arms on the concession: register legal arms. Illegal arms should be subject to legal measures; their seizure should be carried out by agents who are legally authorised to do so.
- Ban the use of company facilities to make hunting weapons.
- Formal ban of the camp staff shop managers to sell or keep iron netting and cables in stock as they could be used as snares (bike break cables!).

Internal control of company rules and regulations

- The site leaders must regularly control the workers under their responsibility (searches...) during work. The camp leader has to watch other people carrying weapons (external visitors...).
- Put control units in place which are sufficiently trained and with sufficient means to control the company's rules and regulations.

The example of CIB

The eco-guards are trained on site by Waters and Forests executives and WCS staff.

There are mobile patrols as well as fixed control points.

The guards are recruited locally. Training lasts between 6 and 8 weeks and covers wildlife laws, company principles and regulations, use of GPS and monitoring of wildlife.

The number of guards deployed in the forest depends on the species being monitored. In 2002, CIB had a total of 6 agents from the Ministry in charge of forests, as well as 25 eco-guards employed by the company.

The example of HFC

Ten guards were recruited by HFC in 2000 and their salaries are paid for by the company. The guards are stationed at the entrance gates next to the MINEF agents. The guards have equipment, including motorbikes and a four wheel drive vehicle.

The example of Pallisco

The three-party anti-poaching operations were set up under the lead authority of MINEF, ECOFAC eco-guards, and WWS/Nature+ as well as members of the logging company (drivers, observers, logistic agents).

Comments

Some companies accepted the principle of putting eco-guard patrols in place inside the concession and to control the access roads. The role of the company in relation to the status of these guards is very variable from one site to another.

Some companies only provide basic support such as logistical support, to the Waters and Forests patrols (IFK Gabon: reinforcement of the intervention capacity of the DFC brigades in the field, and possible registration of hunting arms and hunting permits).

Other companies make the effort to recruit guards at their own cost. In these cases, a clear convention with the government is essential, as the private sector agents are not entitled to carry out repressive actions. Only agents authorised by the Ministry in charge of forests can legally do this. This type of recruitment is necessary however, where the government does not have the sufficient ability to put the necessary controls in place (usually due to lack of financial means). The replacement of the State role by the private sector is an approach which must be clearly planned. The cost of these agents should be integrated into the total environmental costs of the management plan.

□ Control of access roads and vehicles

Context

The logging company is required to close roads at the end of the logging period. However, it is not always done. Improved access to the area is closely associated, in all minds, to an improvement in living conditions. However, old logging roads allow the forest to be penetrated, often having negative impacts in terms of conservation, particularly in the case of commercial hunting in the area. The sections of trails which do not have an explicit economic function should be closed after use, and as much as possible traffic should be controlled during the periods of logging.



Main categories of roads, management and control measures

	Use	Maintenance	Control
Principal roads	Servicing of the company, opened permanently with a platform for heavy weights and deliveries, in all weathers and all vehicles.	Permanent. In some cases these roads become public interest and can be included into the national road system.	Permanent; barrier access to the concession. If the road is public there is no restriction of vehicles.
Main roads	Servicing the main sectors of the concession. Open in all weather. Logging trucks, service and control vehicles.	Permanent maintenance with occasional exits for logging trucks and regular exits for patrol and control.	Permanently closed by a barrier, except for company vehicles and vehicles of the Ministry.
Logging roads	Temporary, transport of logs, depending on the annual management unit, optimised according to the multi-year blocks.	Abandoned after logging of the annual management unit or the multi year block.	The road closes naturally. Complete closure. Controlled for three years.
Skid roads	Temporary, extraction of logs according to the annual management unit.	Abandoned after logging	The road closes naturally.

Measures

Restrict access to the concession

- Limit the access of the logging roads to company vehicles only, or those authorised by the company (clearance for an assignment delivered by the company management for outside visitors).
- Close the roads after logging, except in exceptional circumstances (access to villages).
- Install a sufficient number of control barriers and facilitate control by the competent authorities on the roads of general interest (public roads, river routes).

Restrict the use of company vehicles

- Ban the transport of hunters, game and arms in company vehicles (and the vehicles of its service providers), except if there is a hunting management plan agreed to by the different stakeholders
- Systematically control hunting activities at the entrance and exits to the concession.

Examples of controls and bans put in place in the Abeilles forest (Gabon):

- Access to the Abeilles forest is limited by guarded barriers at the different entrances.
- An operational procedural form, details the barriers operations and the conditions of access.
- The personnel of the worksites can not hunt or lay traps during working hours. This mechanism is integrated into the company rules and regulations, along with sanctions.
- Collaboration with the officials will be sought in order to control hunting in the FCSM.
- An agreement has been put in place with the transport company to ban transport of bushmeat by the logging trucks. This agreement is respected in practice.
- Control of vehicles entering and leaving the camp, as well as random checks of staff belongings, cars, logging trucks... is carried out by an independent control company (S.G.S).
- The transport of bushmeat in company vehicles is banned. Third party transporters have signed an agreement which obliges them to respect the rules in force (company rules and regulations, ban on the transport of bushmeat...).

■ Internal actions: training and raising awareness amongst staff

Context

Most of staff training is focussed on reduced impact logging techniques, such as how to carry out logging inventories, planning and tracing the skid tracks as well as the felling and the cutting after felling.

In terms of the environment and protected species, awareness raising should involve everyone, including the company staff, schools and villages. These training and awareness raising programmes should be done each year.

The awareness raising and training should include the following aspects:

- Presentation of general company policy in terms of the organisation of hunting and bushmeat trade,
- Company rules and regulations: bans, sanctions, responsibilities of each individual, hierarchy,
- Reminder of the legal mechanisms in force and the different civil or penal sanctions, and previous history within the company,
- Presentation of contractual and voluntary “certification” obligations of the company,
- Presentation of the internal and external control system,
- Organisation of periodic meetings at each opening of the hunting period, communication of official dates.



Measures

- Establish and disseminate a series of good wildlife management practices in logging concessions,
- Raise awareness amongst staff when they are hired: professional training, knowledge of the company rules and regulations, systematic updating,
- Signing of a charter of good practice by each employee,
- Set up employment files for executives and employees,
- Distribute material to raise awareness: company rules and regulations, protected species,
- Internally publicise staff “environmental” performance (based on the example of oil companies which publish the number of safety incidents each day, with an “objective of zero”).

■ **Internal actions: hunting management and alternatives to bushmeat in the concession**

□ **Name a person in charge of the hunting issue in the company**

The complexity of operations linked to hunting management requires **a permanent hunting manager**. It is not necessarily a full time position, but a position that could be given part time to an executive staff member aware of the issues.

This agent could be the forest manager in the company. It is especially important that he is motivated. This executive staff member should benefit from training on wildlife and social issues, at least by an internship in a wildlife learning facility and by being accompanied by professionals in the field.

The terms of references of this agent include the following points:

- Technician or engineer with knowledge about wildlife, hunting and forest management. If it is the first post, a prior internship in another company or with a specialised NGO will be necessary.
- Supervision of hunting aspects: permits, arms, organised hunts, field controls, hunting committees, meetings to raise awareness at the opening and closing of hunting periods, preparation and distribution of awareness documents, monitoring of the barriers, communication with the Ministry of Waters and Forests about the infractions noted, etc.
- Supervision of alternatives to bushmeat.
- Supervision of hunting monitoring, trade and consumption of bushmeat: monitoring of regular data (infractions of company rules and regulations, type of offence), steering a survey sub-contracted to specialists (socio-economy experts) on the bushmeat trade and consumption in the concessions and the neighbouring villages.

Examples

Very few companies have employed a full time person in charge of wildlife or hunting issues. At HFC in Cameroon this role, in theory, is carried out by the company's forest manager. This person managed the team of eco-guards (10 people) who are paid by the company and who control for poaching. Two mobile control missions are planned each month which complement the Ministry team of eco-guards.

At CEB (Gabon), the person in charge of hunting issues is an executive who does this in addition to his work. He supervises all aspects related to hunting in the concession.

□ **Alternatives to bushmeat to supply the camps**

Measures

Promote the use of alternative sources of protein to meet the needs of employees and their families.

- The logging company should plan to have an internal or external means of provisioning its staff and their families and ensure that it works well.
- Set up staff shops in the concessions which sell alternative sources of proteins at cost prices, either by imports or local semi-industrial production.
- Set up a monitoring program for the sanitary conditions of animal rearing and meat or fish imports.
- Support local initiatives to rear domestic animals (chicken, sheep, goats, and pisciculture).
- The various initiatives should not have a negative impact on the forests (Environmental Impact Assessment).



Zebus in a timber park (CAR)

Example of measures to provide alternative sources of protein at HFC, Cameroon

- Agreement with a cattle breeder for beef delivery to the butchers every fortnight.
- Purchase of frozen products (chicken, fish) in the nearest town and transport by a company vehicle each week.
- There is no canteen, but there are small restaurants in the villages near the camps. As they are in the villages, these restaurants are not controlled by the company and therefore likely to serve bushmeat (price of a dish is 500 Fcfa). A contract has been signed by the company with a canteen owner for the meals of external visitors: the dishes are 1500 Fcfa and are without bushmeat.
- There are 4 freezers at Campo (2 are owned by the company and 2 by traders), and two freezers on each of the other camps (owned by the company).

*Box 7: The limitations of alternative solutions***The point of view of Leroy-Gabon**

Draconian measures taken towards employees in the case of infraction of company rules and regulations (immediate firing) discourage poaching. Nevertheless, the company considers that the problem of illegal hunting practiced by employees is only a small part of the problem when you take into account that the majority of the local populations have no revenue other than that from hunting.

Analysis of the social impact of alternative solutions at CIB/Congo (source: External evaluation of CIB, 2004, Intercoop)

Firstly, the numerous traditional hunters, originating in particular from the Sembé and Souanké regions, who were settled in the temporary camps along the roads on the forest logging front, have been driven away by the first anti-poaching operations. These actions had the support of the local populations who were suffering from the pillaging of their wildlife resources with no means of defending themselves.

Secondly, the struggle against commercial hunting has become a much more delicate social problem, as bushmeat represents 70% of the currency in the villages (source JM Pierre). It is therefore an essential base of the rural economy which is put into question by the project. This problem concerns the villagers, such as the pygmies, who are particularly fragile and who see their traditional way of life contested by the brutal interruption of modernity and cash economy.

This modernisation and the introduction of alternative sources of protein have also affected the CIB staff. The staff has been involved, especially through the syndicates, in taking wildlife management into account in the company policy, rules and regulations (transport of game, hunting zones and seasons, organisation of the hunters...). Before the arrival of the project, bushmeat was the cheapest source of protein for the workers, just as for the villagers, in the context of a mining exploitation. Restrictions accepted by the staff also have a significant cost, especially for the poorest households who are directly affected by this consumption.

□ Hunting management in the concession

The company can put in to place internal measures at two levels:

On one hand the company can strictly control hunting, by banning it completely for its entire staff, except under well defined conditions: hunting on foot allowed for workers, outside working hours, around their living area (central camp of the concession).

On the other hand the company organises hunts and controls:

Hunting hours and seasons

Hunting zones

Number of hunters

Number of rifles

Box 8: Organised hunts, the example of CIB/Congo

The concession was split into zones with different levels of restrictions on hunting including: zones with no hunting, community hunting zones (establishing a community wildlife appropriation), and buffer zones around the National Park (CIB, 2002). The hunts organised by CIB took place in the community hunting zones in carefully defined territories.

Hunting is only authorised in these territories and the origin of the hunters is controlled. As previously mentioned, this restriction is stricter than the law, which does not limit access to all the hunting zones to a particular social group. The number of hunters is limited: 15 rifles per hunt in Pokola, 10 rifles per hunt on the other sites. Finally it seems that the CIB agents can delegate their hunting permits and arms for the organised hunts, which again is different from the law (source Evaluation CIB-2004, Intercoop).

This initiative is nevertheless interesting as it represents one of the only cases in Central Africa where a large conservation NGO accepts to contribute to organised hunting with the long term objective of biodiversity protection. This position involves a risk for this NGO, as it finds itself under attack from more radical environmental lobbying NGOs who are completely opposed to any kind of hunting.


The example of organised hunts nevertheless only seems applicable in zones with a low population density. In zones where the workers have a close contact with villagers, the latter will demand the same system and the situation can quickly become difficult to manage.

■ Measures in partnership: local participatory agreements with the different actors

Wildlife management measures in concessions aim to regulate the harvesting based on acceptable quotas and to stop all form of hunting of strictly protected species. In many cases, the company collaborates with a specialised institution. In areas near protected areas, the company must be more vigilant and most often the partner is the operator of the neighbouring national park. In this case, collaboration between the company and its environmental partner involves “building up functional relationships between the park and the adjacent forests and using these forest areas which are under good management as a buffer zone for the park. This collaboration allows the cost of sustainable forest management to be better shared amongst all actors in the area” (CIB/WCS, 2000).

Wildlife management in the concession requires an organisation allowing the integrations of all short-term and local initiatives. All actors should be implicated in this organisation: logging company, NGO, professional hunters (safari operators), local collectives, State representatives, local populations. At HFC in Cameroon for example, the COVAREF committees foreseen on a provincial scale by a public initiative could receive support from the concession, in order to put a common management strategy in place.

Example*Signing of a protocol of understanding on hunting management in the Bordamur forest concession (Gabon-WWF)*

<p>PROTOCOLE D'ENTENTE</p> <p>PORTANT SUR LA GESTION</p> <p>DE LA CHASSE DANS LA CONCESSION</p> <p>FORESTIERE DE BORDAMUR</p> <p>(PERMIS 1/97, lot 1)</p> <p>Périphérie ouest de l'Aire Protégée de Minkébé</p> 	<p>Signatories</p> <ul style="list-style-type: none"> ■ Minister of Waters and Forests, Fishing, Reforestation, in charge on Environment and the Protection of Nature: Richard ONOVIET ■ Governor of the Province of Woleu-Ntem: Ignace EBE ENGOHANG ■ General Director of Bordamur: Andrew TIONG ■ Head of the Canton of Elelem: Jean-Marie NTOUTOUME EKOME ■ Head of Communities and Villages: AFIA NKOUGOU ASSOK BEGUE OKALA
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Here, the wildlife questions fall under the framework of social and economic partnerships which are more general than those which the company puts in place with partners and neighbours. These aspects are described in detailed in the ATIBT manual regarding the integration of the social aspects in the forest concessions of the Congo Basin.

Measures

Initiate a local dialogue, privileging partnerships with NGOs, at a national and international level, which strongly implicates them in a participatory approach to a multiple use forest and building a real dialogue in the field.

In addition, the company should not isolate itself so that it can be regularly informed of new technical and scientific knowledge, learn from experiences in their country or in neighbouring countries, and also anticipate new development in regulations.

It involves increasing the level of participation, through meetings, workshops and other seminars where the main stakeholders can get together, with the key-words being inform/convince/negotiate/share, and by giving these events the widest possible media coverage which will go out to the public.

Box 9 : Examples of workshop themes in the local participatory process

In particular it will be very useful to increase the number of small workshops, with the two or three most relevant stakeholders, to discuss a precise topic, and operations of research and studies for example:

- *After the forest legislations have been largely revised in the region, are there the necessary decrees for enforcement, are they consistent and applicable in the field?*
- *What are the actual costs of a given operation and who are the stakeholders who must pay for all or part of these costs?*
- *What is the qualitative and quantitative effectiveness of a system of undisturbed forest reserves, each of about a hundred hectares, spread out over the managed zone and serving as temporary refugia for disturbed animals?*
- *What means and what length of time must be given to research for defining wildlife inventory methods which are most appropriate Central Africa?*
- *What additional means should also be planned for research so that we know how to process / analyse and integrate the wildlife inventory data into management plans?*
- *What are the necessary conditions for an abattoir, a butcher, a pisciculture project, a duck rearing project etc... to be profitable?*

■ **Measures in partnership: Control operations in support of the public authorities**

The public authorities generally have insufficient logistical means of intervention. They are also very often not numerous enough to be effective.

It is therefore recommended that the company has its own control personnel, particularly to control the adequate enforcement of the company rules and regulations.

The delicate point for the company agent is about controlling the respect of the laws, for which they do not have an official mandate.

The solution is therefore a mixed one. The company, through its staff and related material and logistical means, supports the agents of the Ministry in charge of forests which have the police authority. The company should refrain from taking their role.

The collaboration includes:

- Joint patrols
- Joint guarding of posts and barriers
- Exchange of information on infractions

In the particular case of a concession who receives support from a conservation NGO, the mixed State/NGO patrols are organised with the State personnel accompanied by the NGO personnel. This situation can be legitimised by special agreements signed between the NGO and the State.

■ **Measures in partnership: Raising awareness in the neighbouring populations and development operation and activities in favour of sustainable wildlife management**

□ **Raising awareness and training**

- Disseminate documents on wildlife (hunting, repressive measures, alternatives to hunting, knowledge on the importance of wildlife other than as a resource) in schools.
- Raise awareness amongst the populations by adapting the information for the various focus groups: young people, women, logging companies, workers, consumers, etc...
- Use the media (regular publicity on the radio, television and in newspapers) in order to raise awareness amongst the entire trade network from the hunter to the consumer.

Measures of awareness raising and training can be sub-contracted to local NGOs, which will contribute to reinforcing local civil society.



□ Support to community zones

Box 9: The example of community forests in Cameroon with Pallisco (Vermeulen & Dethier, 2002, Vermeulen et al., 2004)

The community forests around the periphery of the Pallisco concession in the South Eastern part of Cameroon received exterior support (the NGO Nature +, in collaboration with Gembloux University and with European financing) for the management of the small forests located outside classified forests. These community forests, with a surface of 5000 hectares or more, are managed by the legally registered local groups. Benefits of logging go to the community. The management of the community forests has allowed logging production to be put in place, providing local revenue and employment. Partnership agreements with the neighbouring company, Pallisco, have permitted to buy back some of the logged timber and also to manage village hunting, which the company could not do alone.

□ Support for subsistence activities of local populations: agriculture, gathering, small scale animal rearing

The respect of subsistence activities and the development support of the local populations should be amongst the priorities of intervention. This respect inscribes itself particularly in the framework of the regulations in force in terms of customary law.

As for the occasional damage caused by wildlife, only passive and deterring defence techniques are allowed to be used. The culling of certain animals will be done in conformity of the laws in force and is the responsibility of the Administration.

Part of the man-made savannah zones as well as some swamp zones could be used for certain types of animal rearing under the condition that they are integrated into a comprehensive plan and that they can be supported by the natural habitats.

Examples of game species which have the potential to provide alternative sources of protein in Central Africa.

A: Cane Rat [*Thryonomys swinderianus*] ; **B:** Red river hog [*Potamochoerus porcus*] ; **C:** Gambian Giant Rat [*Cricetomys gambianus*] ; **D :** African Brush-tailed porcupine [*Atherurus africanus*]. Source: DABAC, 2004.

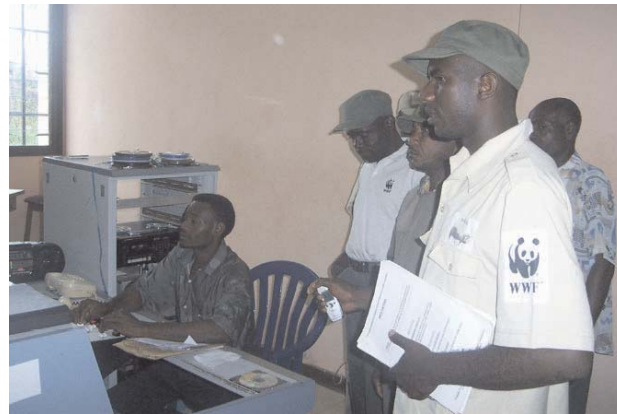


■ Partnership with specialised institutions

The collaboration between a forestry company and a conservation institution such as an international NGO for example, is only possible if both partners share a real interest in conservation and social responsibility and commitment.

(photo wwf)

This collaboration is consolidated by very practical and mutual motivations:



- The company's image benefits from having an NGO partner, which in certain cases allows the companies to obtain additional grants to put environmental measures in place. This partnership also helps to ease the numerous criticisms from militant environmental organisations that the most exposed companies regularly receive, no matter what they do.
- For the NGO, this constitutes a big advancement in having contributed to steering a large forestry company towards sustainable management of its environment. In the case of concessions near protected areas, the NGO has an interest to encourage the company to manage its concession as a buffer zone by increasing the zone of influence and the size of the conservation series.

Example of CIB

For example, in the framework of the CIB, WCS and Ministry of Waters and Forests partnership, collaborations focused on the following points:

- Awareness raising,
- Monitoring and legal enforcement,
- Monitoring and enforcement of the company rules and regulations banning the transport of bushmeat,
- Organisations of controlled hunts with the company workers in defined areas.

Example of Pallisco

Examples of the results obtained in the Nature plus/Pallisco partnership under the framework of the "Partnership network" project which was financed by the EU:

- *Feasibility study of a butcher,*
- *Setting up a pisciculture pond,*
- *Setting up a chicken production unit,*
- *Hunting studies (Ecodeck, 2004),*
- *Anti poaching operations (Van den Haute et al., 2005),*
- *Awareness raising campaigns amongst the workers and villagers,*
- *Setting up an experimental hunting zone under community management, experience in progress (Vermeulen, 2004, Julve, 2005).*

In order to be feasible, these efforts have been accompanied by measures such as support for access to alternative proteins, by promoting local animal rearing or pisciculture, or by importing. These pilot activities can only have an impact if they have the sufficient scale and duration.

Over the longer term, the NGO presence should be organised in a different way. At the moment, its presence is facilitated by external financing, which does not guarantee its sustainability. However, the company's approach is a long term one, at the scale of the length of rotation. It is therefore necessary to integrate at least the routine practices within the company. Other, more specialised activities that the company does not want to integrate could be sub-contracted out by the company to selected partners, including NGOs for certain aspects.

■ Other interventions which could have an impact on wildlife

□ Management of savannah fires

Some concessions include savannah areas or are bordering open areas. Bush fires are regularly lit in these vegetation types, contributing to the maintenance of grassy areas to the detriment of neighbouring forests. In certain contexts, these fires are started by hunters to then catch the game in the large grassy areas when they grow back after the fires. The burned areas are particularly sensitive to erosion, at least during the transition period whilst the grass grows back. In addition, numerous animal species are directly concerned by these human practices; their survival in the savannah is directly linked to their ability to recolonise the area after the fire.

Methods for managing fires should be put in place in all the relevant savannahs in a participatory framework based on clearly defined objectives.

□ Tourism management

Nature tourism has begun in certain forest areas based on the landscape, particularly the plains and the circular eroded features, and the large animals: elephants, buffalos, antelopes and large birds. Ideally this activity should continue to develop progressively, but it should be planned and controlled so that it does not have a significant impact on the natural environment. The sensitive zones should be protected from all disturbances and a maximum tourist capacity should be respected in all exploited areas.

The logging company could have a facilitating role, particularly by contributing to the maintenance of the roads.

■ The overall cost of the measures

There is no overall and standardised economical evaluation of the costs of wildlife management in the forest concessions of Central Africa. However, some occasional data, calculated by projects, are available, generally in the context of a partnership between a company and an NGO, and with external financing.

- Two estimations of the costs per hectare have been identified:
The costs of the special anti-poaching unit at CIB/Congo were estimated between 1.25 and 1.5\$ per hectare, a comparable amount to the area tax (source: CIB evaluation, Intercoop, 2004).
- Once the forest has been logged, one of the largest and newest costs for the company is the monitoring after each rotation. The logger must not only rehabilitate any damage to nature caused by logging (destruction of storage parks and secondary roads with harrowing to facilitate the germination of seeds, removal of all broken machinery, etc.), but it must also monitor the regeneration of the forest for biodiversity and environmental services... IFIA evaluated the overall costs of developing a management plan (which does not cover just the wildlife aspects) at about 5\$ per hectare. This cost seems relatively high, and even dissuasive, in light of the positive results gained by some companies with limited means, essentially a highly mobilised agent and a team of eco-guards.

External financing

Certain sites benefit from external support. Numerous donors, generally bi-lateral ones, have given financial support to forestry companies to set up pilot projects linked to wildlife: France, Germany, EU, USA, the Netherlands, Switzerland and Japan (via ITTO). Some large conservation NGOs, mainly WWF and WCS, have also focused some of their financial resources on supporting selected concessions. In addition, the NGO notoriety helps the companies to attract additional sources of financing. The drawback of this international financing is that the company is under constant scrutiny from the international community.

It is not certain that the first pilot actions will be financed over the long-term; they will become integrated into the technical and administrative routine of the sector. The pioneering companies take financial risks and the corresponding extra costs are partly taken on by the international community.

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**MONITORING AND
EVALUATION OF
THE COMPANY'S
PERFORMANCE**

**A long term step to implement during
the production activities of the
company**

■ **Monitoring objective**

The objective of monitoring is to **measure the overall impact of the company's activities on the wildlife during logging activities, as planned in the management plan.**

On the whole, the data collected for monitoring are less intensive than for the initial inventories for the management plan. In practice, the intensity of data collection will vary depending on the periodicity of the measurement: frequent inventories are easier to do than more detailed inventories which are required less frequently.

In addition, routine inventories are more focussed: they do not have to be done at the scale of the entire concession each time, but are optimised depending on the season, on the sector which is open to logging that year, and on the presence of previously logged areas, etc.

Monitoring will therefore be a periodic activity (every month, year etc.) as well as a permanent one to be carried out over the entire duration of management plan execution.

For less than 5 years, forestry companies in Africa have been using several different monitoring references for taking wildlife into account in their concessions. These references are based on lists of Principles, Criteria and Indicators to monitor the effective implementation of the adequate practices by the company. Several good management systems for logging concessions in Central Africa are listed below:

- African Timber Organisation
- PEFC (Programme for the Endorsement of Forest Certification), which is the reference for PAFC (Pan African Forest Certification) in the process of being put into place in Africa.
- FSC (Forestry Stewardship Council)

Nevertheless, none of these references specify the variables to measure in the field. When a certification system only indicates that "Protection measures will be put in place for rare, threatened or endangered species and their habitats (e.g. nesting and feeding sites). Conservation zones and protected areas, which are adequate for the scale and intensity of forest management and to the unique character of the affected resources, will be put in place. Inappropriate hunting, fishing, trapping, and gathering will be controlled", it leaves lots of room to manoeuvre in terms of the concrete measures to put in place and of the daily monitoring of the application of this type of criteria in an operational way within the company.

It seems therefore essential to present a number of **guidelines for implementation of an operational monitoring** of wildlife aspects which is in phase with the company's functioning: monitoring, variables and reference documents.

■ Monitoring must be operational

□ Appropriate frequency of monitoring for the company

The main monitoring commitments are regular. The indications of the different frequencies of regular controls for the company to carry out are presented below. **A particular mention is given to the annual monitoring, which takes the form of an annual planning document.**

Monthly monitoring

Monitoring	Variables	Doc.	Responsibilities
Offences carried out by the company personnel	Number of incidents, number and category of people involved, types of incidents (hunting, trade, food, transport, barriers, carrying illegal arms, etc.), quantities seized, follow up on infractions.	Activity reports	Team leader, Wildlife agent
Effort of control	Number of people allocated to patrols, number of control days, kilometres covered, number of barriers in place, number of new and removed barriers, number of guard days, number of controlled vehicles.	Activity reports	Team leader, Wildlife agent

Quarterly monitoring

Monitoring	Variables	Doc.	Responsibilities
Support of alternative proteins by the company	Number, weight of cattle, fish, etc. Number of points of sale, turnover of each point of sale. Average sale price over the grant period.	Activity reports	Logistical personnel
Opening/ closing of the camps	Number of open/closed camps, camp capacity, location	Report, map	Site leaders

Seasonal monitoring: dry seasons/rainy seasons

Monitoring	Variables	Doc.	Responsibilities
Organisation of hunting in the concession	Number of registered hunters, number of rifles per hunt, origin of the hunters, areas opened to hunting, off-take, monetary value.	Reports	Hunting manager
Free hunting by the personnel	Number of personnel who hunt, number of registered rifles, off-take: number, categories, value.	End of year/season survey	Hunting manager with the support of sub-contracted surveyors.
Sensibilisation	Nombre d'Ateliers/sessions de sensibilisation, nombre de participants		

*Annual monitoring: annual planning table****

Monitoring	Variables	Doc.	Responsibilities
Reduced impact logging (RIL)	Number of trained staff, area and volumes logged with RIL, kilometres of roads with RIL	Work sheets	Heads of sites, head of logging
Personnel allocated to wildlife issues	Number of personnel allocated to (equivalent to full time) over the year, categories	Report	HR manager

Wildlife inventory prior to the annual management unit	Presence/absence, density measures of wildlife to select flagship species at the time of the inventory	Annual inventory	Forestry manager
Annual internal assessment: offences, alternative proteins	Assessments	Periodic assessment reports	Supply manager
Professional training	Number of sessions, number of participants, themes, distributed material	Annual training reports	Trainers, Human Resource managers
Contracting of personnel	Percentage of personnel having signed a contractual engagement of good management	Report	HR managers
External assessment	Assessment of patrol effort by the Waters and Forests, recorded offences	Assessment reports	Hunting manager
Raising awareness amongst the populations	Number of sessions, number of participants, number and distributed material	Reports	Social issues manager
Partnership	Annual summary on the situation of the relationships between the company and its partners	Annual workshop	Initiated by the company director
Internal bushmeat consumption of the company	Consumption surveys of the workers and their families. Impact on household revenues	Annual survey	With a company technician, support and surveys by sub-contracted experts
Local protein production	Number, categories, weight of local production of domestic meat	Annual survey	With a company technician, support and surveys by sub-contracted experts

Monitoring every five years

Monitoring	Variables	Doc.	Responsibilities
Post logging inventory/last block closed	Presence/absence and wildlife density measures for all mammals observed	Inventory report	Coordinated by the forest manager. External wildlife expertise (methodology). Inventory by company wildlife inventory teams.
Hunting studies	Data on territories, hunting surveys, demography	Study reports	Coordinated by the forest manager. External wildlife expertise (methodology). Inventory by company wildlife inventory teams.
Bushmeat consumption in villages of the zones of influence.	Consumption surveys in the village communities	Global socio-economic studies	Company technician with support and the surveys by sub-contracted experts

*****The annual monitoring has a special status:** It follows the rhythm of annual logging units, annual company assessments etc. It is therefore a good opportunity to summarise all the collected variables over the year and to compile annual statistics. This annual report is the responsibility of the forestry manager who will collect data from various internal and external sources, analyse them and prepare the annual monitoring report, the environmental assessment, for the company directors.

This assessment will be accompanied by a note on the main difficulties encountered and on a first analysis of the trends over the period.

The frequency should be compatible with the variability of observed phenomena. Some biological impacts require several years before they are felt. In addition, numerous ecological variables are seasonal. Timing of other types of monitoring depends on the company's industrial activity, such as the opening and closing of new logging units, or a new logging block.

Nevertheless, there is no problem in performing regular monitoring assessments on these biological and industrial data on a yearly basis.

Other types of monitoring do not have a pre-defined rhythm. This is particularly the case:

- **During the revision of a management plan** which could be done once or several times during the period of rotation, at the company's initiative,
- **At the end of the management plan**, especially in countries who validate a plan (for 15 years) for a period of time which is less than the period of rotations (30 years),
- **At the end of the rotation as defined by the management plan.**

There is no practical experience on implementing these steps in industrial logging concessions in Central Africa as management plans are still recent in the sub-region. Nevertheless, we can predict that the management plan phases are sufficiently exceptional to justify more extensive wildlife monitoring than routine operations. Each of the three phases may lead to very radical changes in management procedures (useful area, length of rotation, minimum diameters, industrialisation plan, etc.). They must therefore be the opportunity to thoroughly evaluate the wildlife situation in the concession in order to entirely revise how it is taken into account in the company.

□ **Methods and technology that are adapted to available precision and means**

Monitoring will be done by the company in three different ways:

Internal implementation of monitoring

Involving actions which are compatible to the level of training of the company's permanent staff: all the actions related to human resources and monitoring of industrial activities. The cost of these actions are internalised within the company.

Involved personnel are:

- Guards and control personnel
- Permanent inventory personnel
- Team leaders, heads of site
- Some company executives with a part-time role in monitoring
- Company forestry manager

Internal leadership for monitoring with temporary external staff

This type of monitoring corresponds to activities which are too specialised for the company and not frequent enough to take on permanent staff.

This monitoring can be the periodic bushmeat consumption surveys for example: the questionnaire could be brought up to standard by the executive in charge of social issues in the company and the surveys done by the surveyors hired specially.

Monitoring steered by external experts and executed by permanent staff

Some surveys require specific competences right from the start and justifies the temporary recruitment of an expert. However, implementation of the surveys can be done (directly or after a simple training) by the company staff.

This is usually the case for large wildlife surveys, implementation of reduced impact logging on the periphery of a protected area, or socio-economic surveys of the concession's neighbouring populations. It should be noted that numerous companies in Central Africa have received financial assistance from donors for these kinds of costly approaches.

Ways of monitoring which are easily repeated from year to year

It is important to be able to compare annual data series over the long term. Sub-contracting external people should be carefully supervised to ensure that the methods are always carried out in an identical way.

Monitoring in three steps

Monitoring is carried out based on the three following steps:

- Data collection
- Processing and analysis of data
- Conclusions and decision making

The data processing and analysis phase enables an understanding of evolutions by combining information. Combining wildlife data with data on human activities in the forest is very informative.

Decision making is a decisive step of monitoring/evaluation. Depending on the importance of the measured impact:

- It could be decided to modify certain activities of the company. The company will naturally be very sensitive to the financial consequences of these new measures on the profitability of logging. Each decision requires discussion between the company and its partners.
- It could be decided to deepen the knowledge to make the available data more accurate (more precise punctual surveys, more detailed surveys, etc.).

It is suggested that any decisions to significantly modify company practices should be synchronised to forestry management (e.g. when new blocks are opened every five years) or to external control such as certification audits, except in exceptional circumstances.

One of the issues of the next five years will be harmonising monitoring methods between different concessions in the same sector, or even within the same country. This assumes a partnership between the companies and the public authorities in order to develop a specific chapter covering wildlife in future "national forest logging norms".

■ Monitoring references

Monitoring the legality of operations is an obligation for all companies exporting their products to countries who control for legality at their borders, such as a growing number of European countries. Initially, this only appears to concern the large companies, including those who export mainly to less sensitive countries such as in Asia, as the European markets are difficult to abandon totally. However,

secondly, the smaller companies, including sub-contracted concessions, become concerned, as generally, the logs pass through the large companies who impose their constraints on the suppliers and sub-contractors.

□ **Monitoring legality**

Industry approaches to proving the legality of timber include the following points:

- **Obligatory government certificates** authorising production/transport – obligatory (legal framework to respect)
- **Voluntary systems** of the forest industry – verification is not obligatory, nor based on regular and unexpected audits (limited to participating companies)
 - IFIA code of deontology
 - FORCOMS (IFIA/UICN/WRI)
- **Certificates of traceability** (EUROCERTIFOR, SGS, etc.)
- **Permanent monitoring of the forest by tele-detection** to detect infractions (especially cutting of illegal roads) and to make geographical maps with geo references available for public access (WRI-GFW)
- **Certification** also controls for legality (PAFC, FSC, etc.)

There are also independent approaches of the industry, such as that put in place by Global Witness, which is based on free access to information in the field and the capacity to publish the results.

At an international level, the initiative of reference to control illegal logging and trade is called FLEGT (Forest Law Enforcement, Governance and Trade). A summary of the European Union FLEGT process is given below.

FORCOMS (Independent Forest Concession Monitoring System in Central Africa)

This initiative is steered by IUCN/IFIA/WRI and is the result of a participatory process between a large number of actors involved in forest management in Central Africa (especially Waters and Forests Administrations, private sector, NGOs...). In Douala, in March 2004, more than 70 people of all competences and sensitivities participated at a workshop to select a series of indicators to check the conformity of forest operations to regulations and the forest logger's commitment to sustainable forest management. This information will be collected in a database, which will be publicly accessible on a web site created and updated by the FORCOMS initiative.

www.globalforestwatch.org/english/centralafrica/pdfs/Indicateurs_fr_05nov2004.pdf

This system will be particularly useful for:

- Governments in tropical timber producing countries: this system will allow them to improve the profitability and long term benefits of their forest resource by promoting sustainable management and improving their image.
- Governments in tropical timber importing countries: these countries can limit (and stop) imports of forest products which have been logged illegally, encouraging a fairer competition with the legally logged products.
- Forestry companies: by respecting the national regulations, they will have a larger access to forest resources in producer countries, to the European tropical timber market and to financial resources from investors as they can prove their commitment to sustainable management.

- Processing industry in consumer countries: this industry will have a commercial advantage as it will access markets which are sensitive to the origin of timber.
- Consumers and public and private loan institutions: they will be able to make an informed choice when they buy or finance forest products.

FLEGT process

The European Union is supporting the implementation of the **Forest Law Enforcement, Governance and Trade Action Plan** (FLEGT). Not respecting wildlife and hunting regulations is an immediate cause for illegality and it is important that the companies are informed about the initiatives which are being put into place.

Information can be found on the website: www.cbfp.org/documents/brazza/flegt.pdf

□ Good management references

A detailed description of the three references can be found on the following websites:

- PCI - OAB/OIBT, www.itto.or.jp
- PAFC/PEFC, www.pefc.org
- FSC, www.fsc.org

According to the degree of company mobilisation, the measures required by these processes, as is the case for the social aspects can be costly and mainly concern the large companies.

NB 1: All of these approaches for taking wildlife into account are recent. Due to their pilot nature, numerous companies in the region have been able to get external financial support to implement them: FFEM, AFD, GTZ, Coopération Suisse, etc.

NB 2: The measures for taking wildlife into account cannot be done in an isolated way. They have impacts on the environmental situation of the logging concession as much as on the living conditions of the neighbouring populations. They must therefore be integrated into the more general process of the social, economic and environmental conditions of the logging permit.

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LIST OF ACRONYMS AND ABBREVIATIONS

ATO: African Timber Organisation
FAO: Food and Agriculture Organisation of the United Nations
FCSM: Forest concession under sustainable management
FFEM: Fonds Français pour l'environnement mondial
ITTO: International Tropical Timber Organisation
IUCN: The World Conservation Union
NFTP: Non timber forest products
NGO: Non governmental organisation
SME: Small and Medium sized Enterprises
UNESCO: United Nations Educational Scientific and Cultural Organisation
WCS: Wildlife conservation society
WWF: World wildlife fund

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The requirements of a practical forest management plan for natural tropical African production forests

Volume three : Wildlife Aspects



During the last few years, there has been a growing number of initiatives aimed at defining concrete, realistic and feasible solutions to sustainably manage wildlife. These solutions have been the result of participatory approaches with all the concerned stakeholders, including forest administrations, forestry logging companies, the conservation community, with strong involvement from national and international NGOs, research groups, local and indigenous communities as well as donors. Different initiatives, often of a pilot nature, have been carried out over the last five years in the Congo Basin aiming to better integrate wildlife issues into the management of forest concessions. At the time of this manual they were analysed and compared by reading the management reports, through direct personal accounts and also through a specially organised survey amongst the operators.

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