

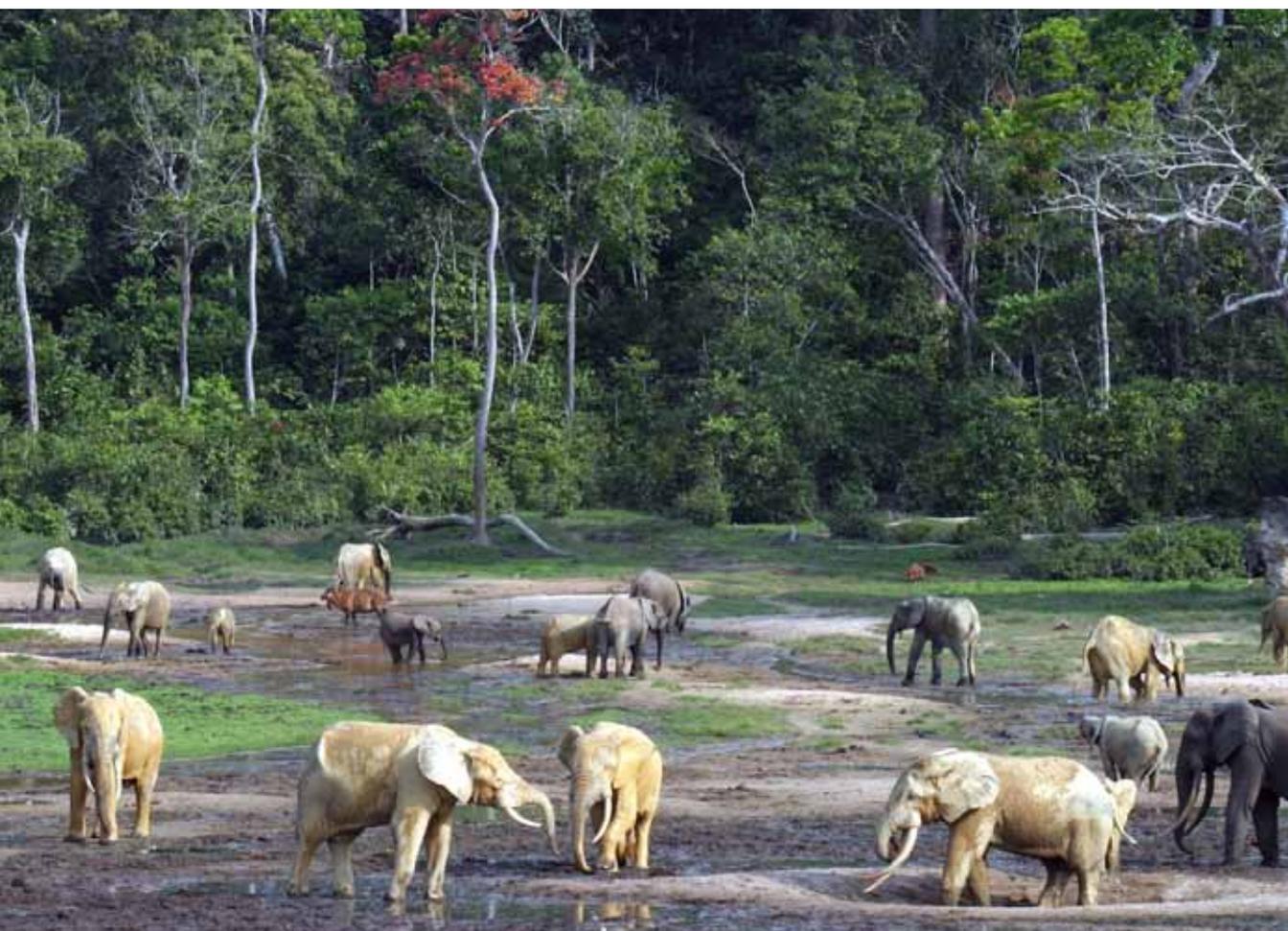


Elephant Meat Trade in Central Africa

Central African Republic Case Study

Ezra Neale and Daniel Stiles

2011



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The group meets approximately every one to two years to review status and trends of elephant populations and to discuss progress in specific areas related to conservation of the species. Since it was first convened in the mid 1970's, the AfESG has considerably grown in size and complexity. The AfESG Secretariat, based in Nairobi (Kenya), houses full-time staff to facilitate the work of the group and to better serve the members' needs.

The challenge of the group is to find workable solutions to country and regional problems in an open-minded atmosphere devoid of deliberate controversies. To meet this challenge, the AfESG has provided technical expertise and advice by helping to facilitate the development of national and sub-regional conservation strategies. The group has helped in the development of the Convention on International Trade in Endangered Species (CITES) system for monitoring the illegal killing of elephants (MIKE).

In addition, the AfESG has assisted in the organisation, facilitation and technical preparation of the Range States Dialogue process and more recently, the annual African Elephant meetings together with the CITES secretariat. This process has been instrumental in moving towards regional consensus on controversial elephant issues.

CITES MIKE

Monitoring the Illegal Killing of Elephants (MIKE) is a programme established by a resolution of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

MIKE is a monitoring system put in place across the entire range of the African and Asian elephants to provide information needed for elephant range States to make appropriate management and enforcement decisions, and to build institutional capacity within the range States for the long-term management of their elephant populations.

It is also intended that this monitoring system would assist the dialogue among Parties and facilitate the decision-making by the Conference of the Parties regarding the protected status of elephants by providing reliable information on levels and trends in the illegal hunting of elephants; to determine changes in these trends over time; and to determine the factors associated with such changes and to assess to what extent observed trends are related to CITES changes in listings or ivory trade resummptions.

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Table of Contents

Acronyms	8
Acknowledgments	9
INTRODUCTION	10
Background	10
Objectives of the study	10
Dzanga Sangha Complex	10
Study sites	14
Summary of previous research	16
Relevant national laws	18
METHODS	20
Personnel	20
Data collection sites and dates	20
Sampling method	20
Definition of actors in the elephant bushmeat trade	20
RESULTS	22
Hunters	22
Elephant meat hunters	22
Ivory hunters	25
Transporters/middlemen	26
Elephant meat transporters/middlemen	26
Ivory transporters/middlemen	28
Vendors	28
Elephant meat vendors	28
Prices of non-bushmeat meats	31
DISCUSSION	33
Elephant meat	33
Ivory	34
Social networks and commodity chains	34
Meat social networks	34
Ivory social networks	36
Transport and distribution	38
Meat transport	38
Ivory transport	38
CONCLUSIONS	41
Policy Recommendations	41
REFERENCES	42

Tables

Table 1.	Bushmeat observed in market PK 12 in Bangui, CAR from 2003-2005	17
Table 2.	Informants interviewed during the study.	21
Table 3.	Types of elephant hunters interviewed.	22
Table 4.	Work effort of elephant kills.	23
Table 5.	Apportionment of meat from known elephant kills.	23
Table 6.	Disposal of meat	24
Table 7:	Hunter's motive for killing elephants	25
Table 8.	Examples of Hunter Costs and Routes.	25
Table 9.	Prices of tusks from last sale.	25
Table 10.	Summary data of middlemen informants.	27
Table 11.	Examples of hunt organizer (middleman) costs and routes	27
Table 12.	Examples of middlemen meat profits.	28
Table 13:	Number of bushmeat vendors selling elephant meat at each study site.	29
Table 14.	Vendors buying and selling prices of elephant meat.	30
Table 15.	Average bushmeat buying and selling price observed at each CAR study site.	30
Table 16.	Prices of domesticated meats.	31
Table 17.	1999 and 2010 tusk prices in Bangui.	34

Figures

Figure 1. The Dzanga Sangha Complex and vegetation zones in Central African Republic	11
Figure 2. Elephant dung count and human-sign frequency across the Ndoki-Dzanga MIKE site.	12
Figure 3. State of PEAs in forestry concessions around the DSC	13
Figure 4. Map of all study sites where research was carried out	15
Figure 5. Social network of elephant meat commerce in CAR	35
Figure 6. Social networks of ivory commerce in Northern CAR.	36
Figure 7. Social networks of ivory in south-western CAR and SE Cameroon on CAR border.	37
Figure 8. Elephant meat source points and transport routes in CAR	38
Figure 9. Ndélé and Bamingui, sources for elephant and other bushmeat seen in in Bangui	39
Figure 10. Ivory source points and transport routes in Central African Republic	40

Acronyms

AfESG:	African Elephant Specialist Group
CAR:	Central African Republic
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DNP:	Dzanga National Park
DRC:	Democratic Republic of Congo
DSC	Dzanga Sangha Complex (includes Ndoki, and Sangha National Parks and the DSSR)
DSP:	Dzanga-Sangha Project
DSSR	Dzanga Sangha Special Reserve
FCFA:	<i>Franc de Coopération financière en Afrique central</i> (Financial Cooperation in Central Africa franc)
GTZ:	German Technical Development Agency
IUCN:	International Union for Conservation of Nature
MIKE	Monitoring of Illegal Killing of Elephants
MWFHF	Ministry of Water, Forests, Hunting and Fisheries (CAR)
NGO:	Non-governmental Organisation
NNP	Ndoki National Park
PA	Protected area
PARPAF	<i>Plans d'Aménagement Forestiers</i> (Forest Management Plans)
PEA	<i>Permis d'Exploitation et d'Aménagement</i> (Permit for Exploitation and Management)
PGTCV:	<i>Programme de Gestion des Terroirs de Chasse Villageoise</i> (Programme of Village Hunting Territory Management)
ROC	Republic of Congo
SEFCA	<i>Société d'Exploitation Forestière Centrafricaine</i> (Central African Forest Exploitation Company)
SSC	Species Survival Commission
TNS	Tri-National Sangha
US\$:	United States Dollar
WWF:	The international wildlife conservation organization

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Introduction

Background

The unsustainable trade of wild meat ('bushmeat') has placed significant pressures on populations of wild animals and is recognized by conservationists as a main threat to the preservation of regional biodiversity (Wilkie & Carpenter, 1999; Nasi, et al., 2008). In Central Africa, the African forest elephant (*Loxodonta africana cyclotis*) has been widely hunted for its tusks and more recently for its meat, threatening its future survival (Blake, et al., 2007).

This pilot study was instigated by the Monitoring of Illegal Killing of Elephants (MIKE) programme of the Convention on International Trade in Endangered Species (CITES) and is being implemented by the IUCN African Elephant Specialist Group (AfESG). It seeks to explore the many causes and motivations driving the illegal killing of elephants, particularly the trade and commerce of elephant meat and ivory. This pilot study aims to lay the groundwork for a long-term study that will explore the meat and ivory trade around the Dzanga Sangha Complex (DSC) in the Central African Republic (CAR).

Objectives of the Study

This study was a preliminary survey aimed at laying the groundwork for future long-term work on the impact of elephant meat and ivory trade on illegal elephant killing. The study focused on engaging local stakeholders to build awareness of the goals and objectives of the pilot study, selecting study sites that had high potential to yield useful information, developing and testing data collection tools with research assistants (RAs), and formulating recommendations regarding how best to carry out a long-term study in the Dzanga Sangha Complex MIKE monitoring site. The objectives were to:

- establish institutional support and working relationships with cooperating governmental and international and national organizations involved in biodiversity conservation in CAR;
- identify international consultants, national experts, technical advisors and field assistants that could contribute usefully to project goals;
- test the draft methodology developed by IUCN/SSC AfESG under field conditions with a view to refining the methods and data variables in order to produce improved results in future;
- identify the priority data collection localities;

- produce a set of quantitative and qualitative data that would present an initial depiction of the causes and circumstances of illegal elephant killing in the project sites; and
- generate the information necessary to plan a well focused project, second phase, in which all of the parameters for successful research would be in place.

Dzanga Sangha Complex

The Dzanga Sangha Complex (DSC) is a block of 4,589 km² of dense tropical forest located in the south-west of CAR (**Figure 1**). The complex is split into three management units: the Dzanga National Park (DNP, 495 km²), the Ndoki National Park (NNP, 727 km²) and the Dzanga Sangha Special Reserve (DSSR, 3,359 km²). The DSC borders the Nouabalé-Ndoki National Park in the Republic of Congo (ROC) and the Lobéké National Park in Cameroon; together they form the Tri-national Sangha (TNS) conservation zone. Tourism and research are permitted, but all other forms of utilization are strictly prohibited in the parks. Subsistence and sport hunting and logging are allowed in parts of the DSSR (Roulet & Mamang-Kanga, 2008).

In the late 1970s WWF sponsored the first wildlife surveys in the extreme south-west of CAR, which revealed the area's rich biodiversity. In 1985 and 1986, WWF carried out supplementary surveys at the request of the CAR government, which resulted in a plan to create a complex of protected areas. In 1988, the government and WWF signed an agreement for the creation and management of a complex of protected areas in the south-west, which gave birth to the Dzanga-Sangha Project (DSP) (Eves, et al., 1998).

The Dzanga-Sangha Complex and its management entity, the DSP, were formed on 29 December 1990 by the Central African Republic Government (Eves, et al., 1998). The DSP is run by government appointed nationals and advised by representatives from WWF and until recently, the German technical development agency (GTZ). Funding is provided by various donor agencies, now primarily through WWF. In 2000, at the first meeting of the Commission of Ministers in Charge of Forests in Central Africa (COMIFAC), the TNS agreement was signed by the ministers responsible for the forests of CAR, ROC and Cameroon, which set out the basis for cross-border cooperation in biodiversity management and law enforcement.

The DSC is located in the Sangha-Mbaéré prefecture. The headquarters for DSP is located just outside of the town of Bayanga, the largest town in the immediate DSC area, with an estimated population of over 4,000 people. Originally Bayanga was a small fishing village, but after the arrival of a logging company and a road in the 1970s, the town experienced a rapid influx of people (Hodgkinson, 2009), putting increased pressure on the park.

Biodiversity and wildlife

The site lies within the north-west of the Congolian lowland forest ecoregion. The entire region drains first to the Sangha River, the second largest river in the country, and then into the Congo River. The region is covered predominantly by dense tropical forest. Forest types include *Gilbertiodendron dewevrei* forests, *Guibourtia demeusii* forests, dense forest on marshy soil, dense forest on well drained soil and secondary and depleted forests. Savannah is found in the north-east of the region. Forest clearings, known as *bais*, characterized by soils with rich mineral content and an active water source, are found throughout the forest. These clearings typically attract large numbers of mammals, including elephants and great apes.

The region supports a rich assemblage of wildlife. The African forest elephant (*Loxodonta africana cyclotis*) is found throughout the DSC. Ungulates include forest buffalo (*Syncerus caffermanus*), bongo (*Tragelaphus euryceros*), sitatunga (*Tragelaphus speki*), seven species of duiker (*Cephalophus* spp.) and two species of pig (*Potamochoerus porcus* and *Hylochoerus meinertzhageni*) (Fay, et al., 1990; Klaus-Hugi, et al., 2000). There are over 15 primate species such as the chimpanzee (*Pan troglodytes*), the near endemic sun-tailed monkey (*Cercopithecus solatus*) and the black colobus monkey (*Colobus satanas*) (Noss, 1995). The park also supports large populations of western lowland gorilla (*Gorilla gorilla gorilla*), a species that is classified as critically endangered. Surveys estimate that between 0.66 and 1.45 individuals/km² can be found within the protected areas (PAs) (Fay, 1989; Carroll, 1986; Blake, 2005). The area is also thought to host 379 species of birds of 66 different families (Green & Carroll, 1991; Rondeau & Christy, 1999).

Elephant populations

There has been extensive census work in the area focused on the African forest elephant. Andrea Turkalo has spent over two decades conducting one of the longest continuous studies of elephant social organization

Figure 1. The Dzanga Sangha Complex and vegetation zones in Central African Republic (Source: Rieu, 2005)

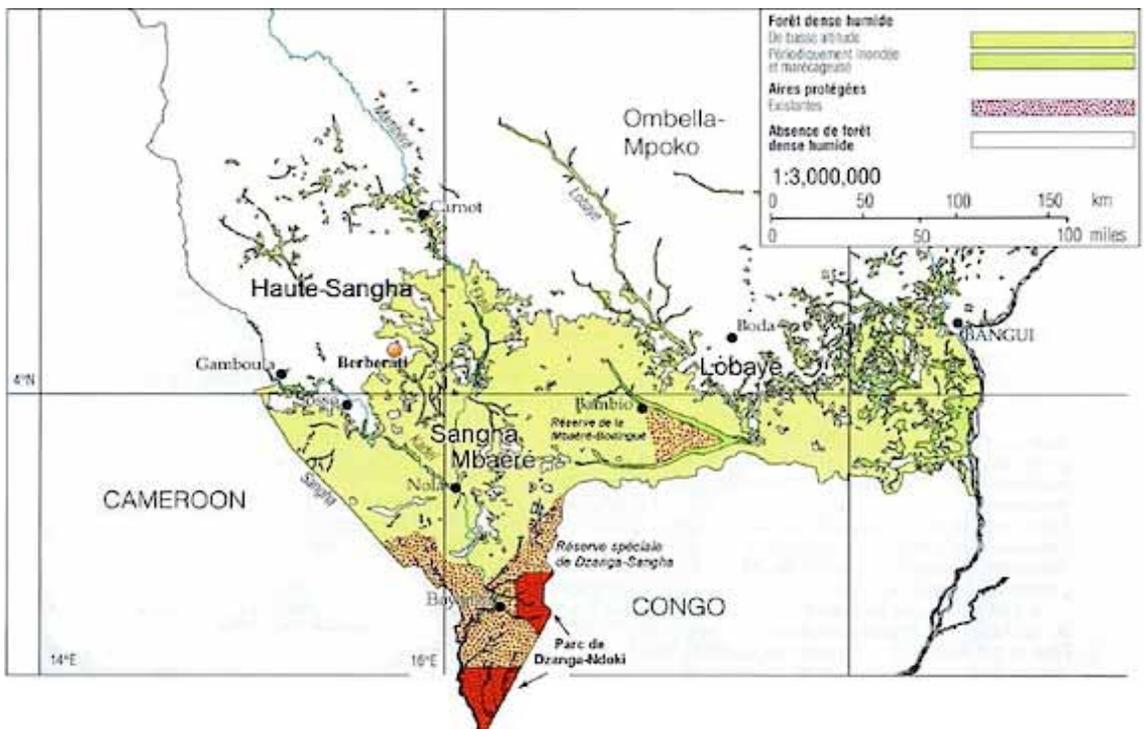
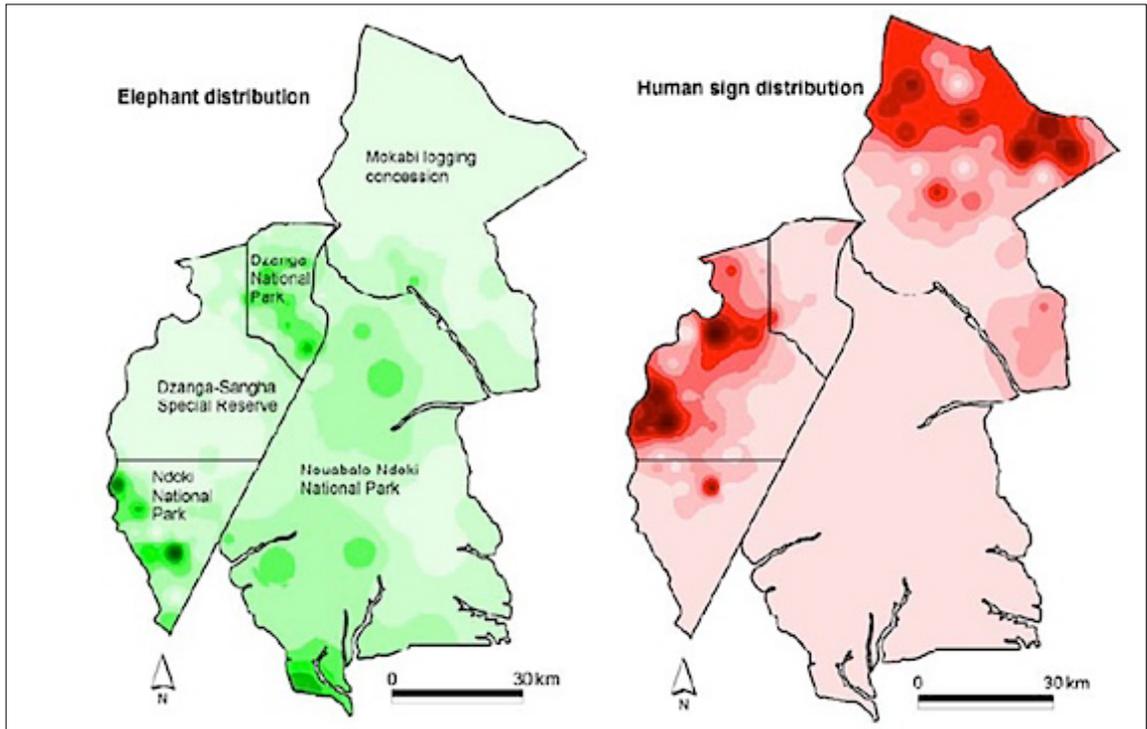


Figure 2. Elephant dung count and human-sign frequency across the Ndoki-Dzanga MIKE site. Increasing colour intensity indicates increasing dung and signs of humans. Note how human presence is negatively correlated with elephant distribution. (Source: Blake, et al., 2007).



and behaviour (Turkalo & Fay, 1995, 2001; WCS, 2010). Of particular importance are the *bais*, which draw in a large number of forest elephants and other wildlife. During Turkalo's work, over 3,000 individual elephants were identified in a single *bai*, the Dzanga Bai, in DNP (see this report, cover photo).

Early elephant surveys in the DSC (Carroll, 1986; Carroll, 1988; Fay, 1991) provided population estimates as inferred from elephant dung density. More recently, a survey team consisting of WWF-CAR technicians, advised by a WCS/MIKE team, completed an inventory of elephant dung, ape nests, and other ecological and human signs in the Dzanga Sangha Complex over ten months (August 2003 to May 2004). They estimated that there were 869 ± 216 elephants in a 2,554 km² area. Since elephants are highly mobile and are known to migrate in response to human activities and ecological conditions (Blake, et al., 2007), a population count of a relatively small area at one point in time may not be very informative. It would be more useful to have an estimate of the elephant population within the entire TNS area, which is currently not available.

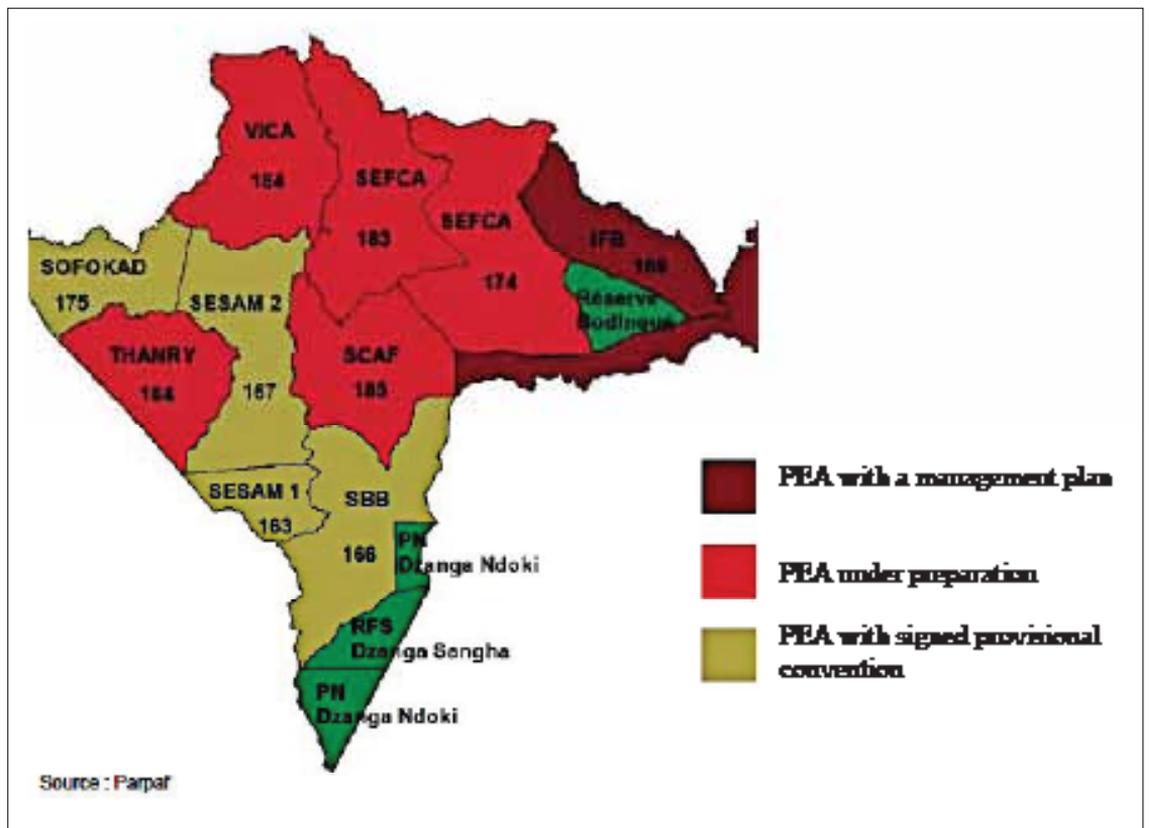
While conducting the 2003-2004 survey, the team found 11 elephant carcasses, eight of which were killed for ivory,

meat or both while one juvenile was killed solely for meat (Blake, 2005). All of the carcasses with one exception were found near or within DNP. Blake (2005) concluded that the DSC elephant population is under serious threat by illegal poaching as well as loss of available range. Unfortunately, no comprehensive surveys of the area have been completed recently.

The DSP anti-poaching programme in the DSC reported that 96 tusks were seized from poachers between 1999 and 2008. Average tusk weights were consistently in the 6-7 kg range over this period (Nambama, 2008). Elephant meat was also seized, but the weights were not regularly reported. In 2005, for example, 116 kg of elephant meat was seized (Nambama, 2006).

Figure 2 shows how elephants avoid humans in their geographic distribution. There are intense human activities in the Mokabi logging concession in the north-east, including bushmeat hunting and artisanal diamond mining, and in the Dzanga-Sangha Special Reserve. Elephants avoid these areas and congregate in the national parks.

Figure 3. State of PEAs in forestry concessions around the DSC (Source: Roulet & Mamang-Kanga, 2008)



Ethnic groups

Near the DSC, human populations are concentrated in eight villages as well as in many informal camps located along a road that traverses the complex (Figure 2). Generally speaking, the population is made up of two primary groups, the pygmy BaAka and the non-Aka. Non-Aka residents, mainly Bantus, reside in permanent settlements with multi-roomed houses constructed from bamboo or wood and exhibit a strong reliance on subsistence agriculture, rather than forest resources. The BaAka ethnic group resides in and around the forests of southern Central African Republic and northern Congo (Bahuchet, 1992). The BaAka share a single Bantu language and are culturally distinct from other pygmy groups (e.g. the Baka of Cameroon and Gabon, the Babendjélé of northern ROC and the Mbuti and Efe of the Democratic Republic of Congo). The BaAka are traditionally semi-nomadic, rely heavily on forest resources for subsistence, and live in round houses made of sticks and leaves. They are, however, becoming increasingly sedentary in roadside villages and active in cultivating fields (Bahuchet, 1985; Sarano, 1998). Merchants, mainly Hausa, live in towns to supply the

logging camps with commercial goods and also trade in ivory and diamonds (Carroll, 1998).

Economic activities

Logging

Logging is by far the most important economic activity in the CAR, including in the south-west. In 2005, seven large industrial timber groups were exploiting 2.6 million ha of forest in south-western CAR (Rieu, et al., 2007). Following the creation of the Forest Code (*Law no. 90.003 of 9 June 1990*), aimed at establishing rational management of forest resources, the Ministry of Water, Forests, Hunting and Fisheries (MWFHF), with French government assistance, launched the Forest Management Plan (PARPAF) mechanism. Each forest concession must obtain a Utilization and Management Permit (*Permis d'Exploitation et Aménagement*, PEA) before logging can commence (Decree no. 91/018 of 2 February 1991). The CAR government through PARPAF prepares the PEAs and the timber companies are charged with their implementation. PARPAF has resulted in improved biodiversity monitoring and introduction of

techniques of low-impact logging (Rieu, et al., 2007).

Figure 3 shows the state of PEAs in south-west CAR in mid-2005.

In 2005 the logging industry employed about 4,000 permanent and temporary employees in the south-west (Rieu, et al., 2007). The logging camps act as poles of development, as the companies usually establish schools, health clinics, roads, etc., attracting settlers. These workers and other immigrants, along with the local population, make use of forest resources such as bushmeat, caterpillars, wild plant foods and medicines and construction, artisanal and fuel wood.

Mining

Significant diamond deposits within the DSC have attracted a wave of immigrants (Mogba, et al., 1996). The main source of food in the mining camps is bushmeat from animals trapped within the reserve. The DSC management has carried out missions with the police and gendarmes to disband these mining camps, without much success. Many of the enforcement officers, the local political elite and a significant portion of the population are profiting from diamond mining, and are thus not willing to uphold the law creating the protected area (Carroll, 1998).

Hunting

Two main types of legal hunting exist in the CAR, village (i.e. community) hunting and tourist sport hunting. There are two types of hunting zone: (1) *Zone d'Intérêt Cynégétique* (ZIC), created in 1956 with the objective of rational utilization of wildlife, and (2) *Zone de Chasse Banale* (ZCB), created in 1962. Within the ZICs, are *Zones de Chasse Villageoise* (ZCV) set up by the *Programme de Développement des Zones de Chasse Villageoise* (PDZCV) of ECOFAC (Roulet & Mamang-Kanga, 2008). The ZICs are intended for sport hunting and ZCVs for community hunting. The hunting season is 15 December to 31 May of the following year.

Beginning in 1990, three sport hunting concessions have been developed in the DSC area, based at Bayanga, operated by three sport hunting companies. Bongo, forest buffalo, sitatunga and wild pigs were the main game hunted. These companies enjoyed a certain degree of success, but had ceased operations by 2007. They cited as problems poaching that reduced key species (e.g. bongo), cattle in the zones that spoil the hunt experience and diamond mining (particularly in the north-eastern sector), which destroys *bais*, creates noise and leads to poachers roaming everywhere. Local administration and community harassment for more money was also a factor. One company was planning to start up again, however (Roulet & Mamang-Kanga, 2008).



A poached elephant found in the Dzanga Sangha bai. Note that a forequarter was taken for meat.

(Photo: WWF)

Study Sites

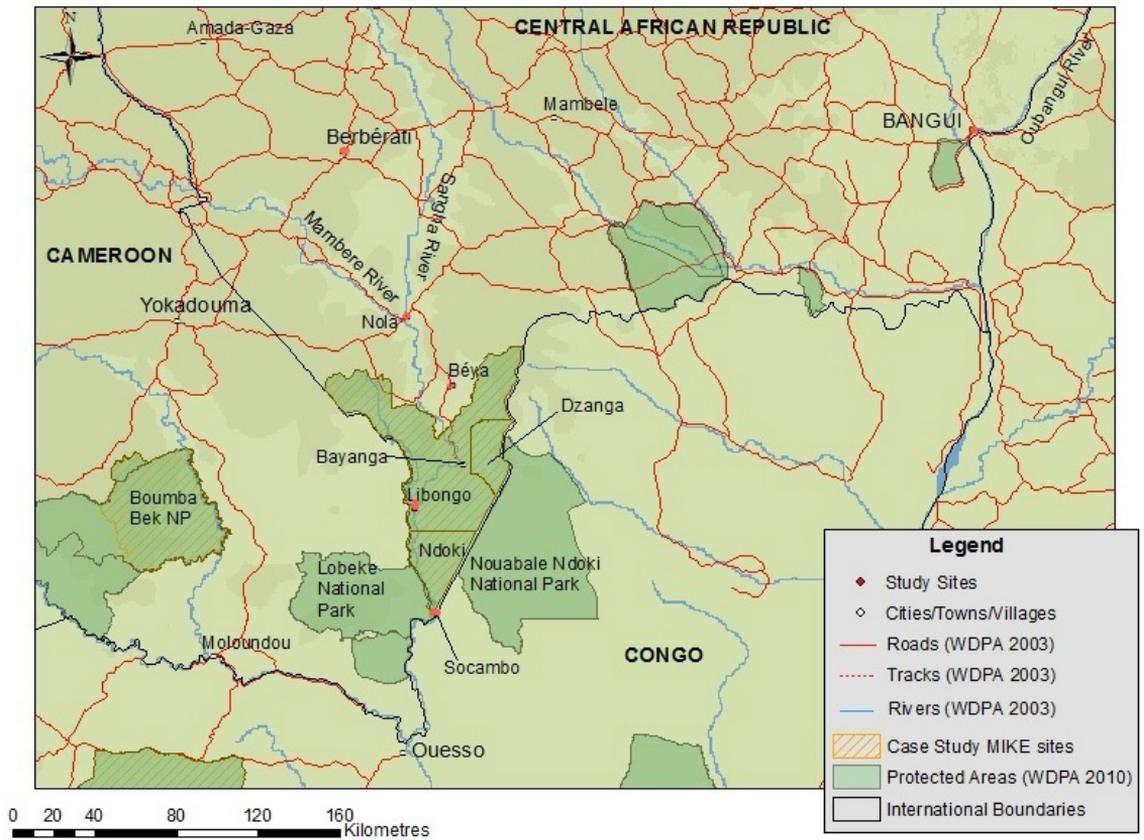
Preliminary research was carried out in six different localities within three categories: 1) small towns near the DSC MIKE site, 2) a regional town and 3) a major urban centre. The purpose was to have a sample of sites that would follow the commodity chains of elephant meat and ivory from the source (DSC) to localities of trade and/or utilization. Study sites were selected because of the scale of the bushmeat market and trade activity, history of elephant and ivory meat trading, geographic relationship to the DSC and other features such as transportation routes to neighbouring countries. Past research and local professionals working at the MIKE site informed site selection. A description of each of the study sites and the rationale for choosing each is provided below. A map showing each of the study sites is presented in **Figure 4**.

Beya is a small town located at the junction of roads running to ROC and north to Nola. Beya is an important transfer point for bushmeat and other products moving out of the forest region of the DSC, as well as from northern ROC, to the larger towns of Nola and Berberati. The DSP Conservator and the WWF Conservation Technical Advisor recommended this site for study in this project due to the scale of bushmeat trading activity that occurs there.

Nola

Nola was identified during a stakeholder meeting with DSP staff as one of the most important source points for bushmeat near DSC and the surrounding forest zone. Nola is the capital of the Sangha-Mbaéré *préfecture* and

Figure 4. Map of study sites in south-west CAR where research was carried out



has an estimated population of 29,181 (Rieu, 2005). Nola lies at the junction of the Sangha and Membre rivers, 104 km to the north of DSC. A lively market in the town centre acts as a focal point for bushmeat sales and distribution.

Libongo and Socambo

Libongo and Socambo villages in the Eastern Province of the Republic of Cameroon were identified by DSP staff based at the park headquarters in Bayanga. Libongo and Socambo are located along the Sangha River near the northern border of Lobéké National Park and CAR. These settlements are accumulations of people from different ethnic backgrounds who are working for, or searching for, jobs with nearby logging companies, notably the Italian logging company *Société d'Exploitation Forestière and Agricole du Cameroun* (SEFAC). These towns are important conduits for elephant and other bushmeat products harvested in CAR. In addition, many known poachers currently reside in these towns. There is a TNS control post in Socambo that patrols the southern Lobéké National Park and the active trans-border wildlife product trading area in south-west CAR and north-west ROC (WWF, 2009).

Regional town - Berberati

Berberati was chosen because it is a major centre of bushmeat and ivory trade. Berberati is located about 200 km north of Bayanga and the DSC. It is the capital of the Mambéré-Kadéï *préfecture* and the third largest city in CAR with a population of more than 76,918. There are a total of six established markets (Central, Poto Poto, Baba Salao, Sambanda, Rosine, and Selonmoyen) that support at least 49 bushmeat stalls. Lively market conditions exist where buyers, sellers and transporters are actively engaged in the sale and trade of bushmeat and elephant products (Rieu, 2005). It is situated 90 km from the border with Cameroon along a major transportation route where goods, notably timber, are transported to Cameroon. Berberati is surrounded by logging concessions, which attract large numbers of people, either employed by the logging companies, or seeking work with them.

Major city – Bangui

Bangui is the capital and principal city of CAR. In 2007 the population of Bangui was approximately 800,000 inhabitants (Fargeot, 2008). Although it is 526 km from DSC, it represents the centre for market commerce and

has a consumer demand for natural resource products from all over the country. A number of active bushmeat markets can be found in Bangui, most notably market PK 12, the largest bushmeat market in CAR (Fargeot, 2008). Bangui is a likely sale point for elephant meat sourced from many the forest and savannah areas in CAR, but it is unknown at present whether elephant or other bushmeat from the south-west is transported there.

A very short period was spent in **Sibut**, a small regional town located approximately 184 km north of Bangui, where one hunter was interviewed and the bushmeat market and a few restaurants were visited (no elephant meat was seen), but the town is unrelated to activities in the DSC and thus is not being considered as a project research site.

Summary of Previous Research

A number of bushmeat market studies have been or are currently being carried out in CAR (Rieu, 2004, 2005; Rieu, et al., 2007; Fargeot, 2003, 2004, 2008; Daspit, 2010; Hodgkinson, 2009; and Lombard (pers. comm., 2010). These studies have focused on the actors involved in bushmeat source points, the supply chain and consumer demand for bushmeat. A synopsis of each is provided below.

Linda Rieu

Linda Rieu completed two comprehensive and valuable studies that describe actors involved in the bushmeat trade in south-west CAR. The first was conducted from June to August 2004 in the village of Mambélé (*préfecture* of Mambéré-Kadei) and characterizes the operation of the bushmeat industry within the forestry concession of the logging company SEFCA and management areas PEA Nos. 174 and 183 (Rieu, 2004). In a follow-up study she conducted an extensive bushmeat market study in Berberati, which focused on understanding the network of actors (consumers, vendors, traders, and hunters) working in the area (Rieu, 2005).

The results provide a detailed analysis of bushmeat consumption in Berberati and a benchmark for bushmeat prices, source points, species composition and quantities being consumed. By analysing the origins of the game species being sold in the Berberati markets, she was able to establish that the forest area played an important part in the supply of bushmeat to the urban centre (77% of the total biomass). She found that the SEFCA logging concession at Mambélé was the most important source point (193 kg/day corresponding to 46% of the total

biomass sold in Berberati), followed by the forest area Mokabi Congo (25%) and the village of Ouodo (6%). The proportion of bushmeat from the savannah regions represented 23% of the total quantities sold while the proportion of elephant and hippopotamus meat combined comprised 5% of the biomass sold (Rieu, 2005).

She found that smoked elephant meat was among the most expensive bushmeats sold in Berberati. She concluded that this was so because it was more often bought by wealthy elites because of a cultural belief that associated the elephant with concepts of strength and virility.

Christian Fargeot

Fargeot has published widely on the subject of bushmeat in CAR (Fargeot & Diéval, 2000; Fargeot, 2003; Fargeot, 2004). The most relevant paper described a study of the whole marketing chain of bushmeat in CAR (Fargeot, 2008). As part of this study, he carried out a market survey of the largest market (averaging over 80 stalls) in Bangui (PK12). Researchers worked in market PK12 from 2005 to 2008 to assess the type and biomass of different animals being sold as bushmeat in the market. During this time the total number of individuals and total percentage of biomass were monitored to better understand the quantity and diversity of species found within the market. Monitoring was carried out by selecting three to four merchants per day and assessing the type and quantity of meat present on the selling tables. At least three questionnaires were completed each week and incorporated into an Access database. Determination of the type of animals was made by the investigators and the quantity estimated by the number of whole animals and pieces of animals present on the tables. In addition, the total number of tables selling products in the market was counted. The results of this inventory are outlined in **Table 1** below.

The quantity of elephant meat observed in market PK12 during the study period (2005-2008) was low (an estimated 18 individuals and 59.5 tonnes of meat after being converted to its freshweight equivalent, or about 1.5% of the total). Fargeot (2008) found that the average price of elephant meat (US\$ 12.65/kg¹) was much higher than that found in markets in surrounding towns such as Bangassou, Bambari Rafai or Bria and also higher than the average bushmeat price for other animals in Market PK 12 as a whole (av. US\$ 5.50/kg). Fargeot hypothesized that households display their financial

¹Fargeot (2008) provided a price of FCFA 7,087/kg for smoked elephant meat, which equates to US\$ 12.65/kg using FCFA 560 per US\$ 1 exchange rate in 2006 (XE Universal Currency Converter, Accessed 2 Feb. 2011).

Table 1. Bushmeat observed in market PK 12 in Bangui, CAR, 2003-2005 (Source: Fargeot, 2008)

MEAT TYPE	NUMBER OF INDIVIDUALS		BIOMASS	
	Number	%	Tonnes	%
Rodent	102,228	19	459.1	11
Rabbit	3,566	1	4.8	0
Pangolin	10,092	2	53.8	1
Primates	75,370	14	370.1	9
<i>Small monkeys</i>	71,417	13	261.0	6
<i>Baboon</i>	3,885	1	103.6	3
<i>Gorilla</i>	68	0	5.5	0
Carnivores	4,857	1	39.0	1
Elephant	18	0	59.5	1.5
Hippopotamus	1	0	1.6	0
Swine	8,137	2	514.7	13
Buffalo	695	0	284.9	7
Antelope	3,100	1	166.5	4
Duiker	213,863	39	1,294.2	32
<i>Large Duikers</i>	51,826	10	565.0	14
<i>Blue Duiker</i>	162,037	29	729.2	18
Bushbuck	13,575	2	696.8	17
Bat	2,585	0	0.7	0
Bird	84,090	16	25.1	0
Reptiles	16,115	3	103.7	3
<i>Crocodile</i>	131	0	8.7	0.2
<i>Snakes</i>	5,910	1	39.4	0.9
<i>Monitor lizard</i>	5,727	1	38.2	0.9
<i>Turtle</i>	4,347	1	17.4	0.4
TOTAL	538,292		4,074.6	

success by their ability to provide protected species' meat to guests; hence the high price of elephant.

Chloe Hodgkinson

Chloe Hodgkinson conducted PhD anthropology research in CAR as a student with University College, London. During her research, she carried out a market, household consumption and income survey, a household attitudinal survey, and a wealth-ranking exercise to assess the impacts of the conservation project being carried out around DSC on the livelihoods of the local populations in Bayanga (Hodgkinson, 2009). The market survey consisted of recording all meat, fish and vegetables on sale in Bayanga, noting food type, condition (fresh/smoked/dried), quantity, method of production, village of producer and price per unit over a 12-month period. The household consumption and income survey measured the ingredients, ingredient quantity (weight), ingredient source and number of individuals consuming the meal. For income, she measured all work activities conducted in a given day (formal and informal), duration of work activity (if known), income of work activity (cash/goods/debt relief) and any gifts received during the day. In addition, a

meat-ranking exercise was conducted to determine both species preferences and species consumption rates in 2006. Although her research was not focused specifically on bushmeat, her data provide an indication of the quantity of different species of bushmeat being consumed in Bayanga. She found that 85 kg of fresh elephant meat was sold over a 12 month period at an average price of US\$ 3.10/kg. Ms. Hodgkinson's research was completed in 2009.

Leslie Daspit

Leslie Daspit conducted PhD anthropology research with Purdue University in Bayanga from 2006 to 2009. Ms. Daspit's research focused on the social, ecological and economic factors of bushmeat supply and demand and its implications for conservation and development projects aimed at controlling the consumption and trade of bushmeat. Ms. Daspit's work consisted of market research in the central market of Bayanga and ethnographic research with local market women involved in the hunting, processing and selling of bushmeat. Her research findings have not yet been published.

Louisa Lombard

Louisa Lombard is a PhD candidate in cultural anthropology at Purdue University. She is investigating governance in the borderlands of the CAR (Lombard, pers. comm., 2010). Related to this topic, she carried out research with informants engaged in the sale and transport of bushmeat in Bangui. Her research is not yet published.

MIKE

The MIKE programme was established by CITES in 1997 as a result of Resolution Conf. 10.10 to monitor what effects, if any, legal international ivory sales would have on levels of elephant poaching. Its main objective is to measure levels and trends of illegal hunting of elephants in Africa and Asia (CITES, 2010a). MIKE has been monitoring elephant mortality in the DSC since 2005 attempting to document the annual proportion of illegal deaths and the causes (CITES, 2010b). When a kill is found, ecoguards collect data regarding the motive for the elephant kill, the age of the elephant, if tusks were removed and other relevant data variables. Between January 2005 and September 2009, a total of 47 elephant carcasses were found in the DSC, of which 32 (68%) had been poached or likely poached. One had died from natural causes; one was killed as a result of human-elephant conflict while the motive for the kill was inconclusive for 13 carcasses.

The Proportion of Illegally Killed Elephants (PIKE) is an index MIKE prepares based on annual reports submitted to them by the relevant monitors, in this case, DSP staff. The PIKE for the DSC between 2005 and 2009 ranged from 0.30 to 0.89, averaging 0.68, indicating that 68% of all elephant carcasses encountered on patrol in this period were killed illegally, a very high figure.



BaAka Pygmies live and hunt in the vicinity of the DSC. (Photo: Dan Stiles)

Relevant National Laws

CAR acceded to CITES on 27 August 1980. The following laws are relevant to elephant hunting and the bushmeat and ivory trade:

Ordinance No. 84.045 of 27 July 1984 established wildlife protection and hunting regulations within CAR. It defined categories of protected areas and the rules for their establishment and management. Article 27 defined three categories of wild animals: those that are fully protected, partially protected and ordinary games species. In Appendix II of this order it lists fully protected species in list A, partially protected species in list B and ordinary game species in list C. Under this ordinance, species listed as class A are given the greatest legal protection because of threats that endanger their survival, their habitat and population. Article 28 states that hunting, capture and collection of any individual belonging to these species are strictly prohibited. Those species listed in list B are partially protected and may only be taken under a special license; those listed in list C are considered ordinary game species and may be taken by 'traditional' hunters or holders of hunting licenses.

Under this ordinance, elephants with tusks less than 10 kg each are listed as a Class A species and unconditionally protected; those with tusks weighing more than 10 kg are listed as class B. The law established that large adult male animals alone may be hunted. There were weekly and daily quotas for these animals, and only approved arms could be used for hunting. This law unconditionally protected the majority of elephants with the exception of older bulls. Primarily, sport hunters who possessed special hunting licenses to take a limited number of adult male animals in designated hunting zones could legally kill elephants.

Ordinance No. 85/005 of 30 January 1985 prohibited any type of elephant hunting anywhere in CAR. It has been completely illegal since then to hunt elephants. A review and analysis of sport and village hunting in the DSSR did not list the elephant as a hunted species (Roulet & Mamang-Kanga, 2008), but Fargeot & Castel (2009) listed elephant bushmeat as a utilized resource in a discussion of village hunting management. This ordinance did not reclassify elephants with tusks larger than 10 kg, thus they remain

only partially protected (in class B).

Unfortunately, *Ordinance No. 85/005* made no mention of elephant trophies or other products that might originate from natural deaths, self-defence killings or legal, administrative elephant killings. *Ordinance No. 84.045, Article 77* states that trophies found (e.g. tusks) of A or B listed animals must be turned over to the nearest Forestry post or to the Department of Hunting in Bangui. Article 91, however, implies that tusks from an elephant killed in self-defence could be registered with the authorities and be legally owned. *Articles 84-89* in 84.045 allow legal ivory working and selling by registered carvers. All raw ivory must be marked and registered and annual reports must be filed with the government indicating from where and how much ivory was obtained during the year and what stocks remained as of 31 December of a given year. Until this law is amended, it appears that if ivory carvers can offer evidence that tusks they own predate 1985, or were obtained after that date from elephants killed in self-defence, and if they were able to register the tusks, the ivory would be legal to work and sell. Presumably, any worked ivory predating 1984 would be legal under any circumstances.

Decree No. 84.256 of 1984 regulates the transport and sale of bushmeat in CAR. It states that bushmeat commerce licenses are not valid inside hunting zones (i.e. ZIC and ZCV), that bushmeat from foreign countries is strictly prohibited to transit or circulate within hunting zones, and that licensed hunters living within hunting zones may dispose of bushmeat within the hunting zone but not export it. The purpose is clear; the government wishes to keep bushmeat obtained from within hunting zones segregated from bushmeat originating outside of hunting zones (i.e. the *Zones de Chasse Banale*).

Ordinance No. 90.018 of 29 December 1990 established the Special Dense Forest Reserve Dzanga Sangha (DSSR). The national territory comprises multiple zones, including protected areas reserved for conservation activities and hunting zones conceded to hunting safari operators (i.e., sport hunting zones).

Under *Ordinance No. 90.003 of 9 June 1990*, the Central African Republic Forestry Code, local populations can freely exercise their right of usage to meet their domestic needs outside of integral reserves and national parks. But any exploitation for commercial purposes is subject to the acquisition of a utilization license (*patente*). This law does not include utilization of protected species or any of their body parts.

Ordinance No. 94.006 established a mandatory permitting process to sell hunting products costing about US\$ 20

per year. It must be associated with a license issued by the Revenue Service (US\$ 70 per year). If the vendor, transporter or middleman cannot pay for these two documents, however, he or she can pay for a provisional authorization at MWFHF road checkpoints to sell hunting products, called a *Laissez-passer* (US\$ 10 for three months maximum, non-renewable). Most traders without permits will more likely offer a bribe of US\$ 2 to 10 at each checkpoint to pass with their goods, which, in the end, will cost them more than a permit and license would have cost.

All of the above laws concern only bushmeat obtained from hunting; they make no mention of meat obtained from protected species killed in self-defence or through natural death. Although legislation is ambiguous on the question, all trade in elephant meat is treated as illegal in CAR.

Methods

This pilot survey consisted of three phases: 1) a review of existing published and unpublished research and reports from NGOs and independent researchers on the bushmeat trade in CAR, 2) semi-structured interviews with experts and stakeholder meetings with those working in and around the DRC and 3) developing and testing data collection and recording methodologies in the field with informants over a short trial period.

Personnel

The team in CAR consisted of Ezra Neale, project team leader, and three research assistants: Carolin Sambo (RA1), Justin Mamadou (RA2) and Louis Fon Che (RA3). The team leader was in charge of organizing logistics, developing data collection tools, meeting with project partners and training RAs in the field. The RAs were responsible for testing the data collection methodology, which included interviewing informants and recording the data on sheets. Field work was carried out from 6 July to 13 August, 2010. Subsequent data collating and analysis and report writing were carried out from 6 September to 23 September, 2010.

Data collection sites and dates

RA1 was employed from 13 July to 2 August, 2010. RA1 conducted field research in three separate study sites: Berberati, Nola and Beya. RA2 carried out field work in Bangui from 18 July to 13 August, 2010. He spent approximately three weeks conducting market research in Bangui's primary bushmeat markets and the remaining days collating, scanning and sending field data to the PC. RA3 carried out field work with informants in towns located on the border of CAR and Cameroon, namely Libongo and Socambo, from 1 to 14 August, 2010.

Field work time was severely limited due to the fact that the project in CAR began much later than planned. The short time-frame for the RAs (two to three weeks) meant that only a small sample of informants could be identified and interviewed.

Sampling method

The RAs used respondent-driven sampling (RDS) to select hunters, transporters or middlemen and vendors engaged in elephant meat and ivory activities. RDS involves making contact with informants, developing

trust, gaining their assent to be interviewed, interviewing them and then being referred by this person to other willing informants as a means of obtaining an informant sampling pool (Heckathorn, 1997, 2002). RAs wrote a narrative description of the interviews noting key facts on the data form provided. The data was subsequently entered into a series of data variable categories on a MS Excel spreadsheet.

A set of data collection forms was developed based on the IUCN project methodology to gather market and restaurant data for elephant meat and other bushmeat sales. The data collection efforts focused on collecting information on a selected group of animals commonly found in bushmeat markets in CAR focusing on the elephant. Variables such as the unit of sale (e.g. piece), weight, purchase price, sale price, vendor and buyer ethnicity, as well as the source of meat found in bushmeat markets was collected. RAs engaged vendors within the market and asked a series of informal questions to gather the variables noted above. RAs also weighed samples of individual pieces of bushmeat to determine actual weights per kilogramme (kg).

Definition of actors in the elephant bushmeat trade

Vendors

Vendors are individuals selling elephant products in markets, shops, on the roadside in rural areas and in restaurants. Vendors generally proliferate in regional towns and large cities, where a large consumer base exists. The majority of bushmeat vendors are women.

Middleman

Middlemen act as intermediaries between hunters and other buyers of elephant products. They travel to source points or rural sale points to purchase products directly from hunters or hunters transport products to them. Middlemen sometimes organize, arm and finance hunting expeditions to obtain certain items ordered by a dealer or end user, for example, certain quantities of ivory or wild meat. This type of middleman is called a *commanditaire* ('one who orders'). Other middlemen travel to rural areas to purchase meat and/or ivory from local middlemen and return to urban areas to resell the products onwards to higher level middlemen or to vendors or consumers. Bushmeat 'middlemen' are often women, while ivory traders tend to be male, though not exclusively.

Table 2. Informants interviewed during the study

Informant Code	Actor Type	Date Interview	Interview City	Interview Place
HB1	Hunter	2010-20-07	Bangui	Market PK12
HB2	Hunter	2010-25-07	Bangui	Market PK12
HB3	Hunter	2010-26-07	Bangui	Market Miskine
HB4	Hunter	2010-29-07	Bangui	Market PK12
HB5	Hunter	2010-28-07	Bangui	Market Miskine
HSi1	Hunter	2010-31-07	Sibut	Market Sibut
HL1	Hunter	2010-08-08	Libongo	Libongo
HS1	Hunter	2010-08-13	Socambo	Socambo
MB1	Middleman	2010-19-07	Bangui	Market PK12
MB2	Middleman	2010-20-07	Bangui	Market PK12
MB3	Middleman	2010-21-07	Bangui	Market PK12
MB4	Middleman	2010-23-07	Bangui	Market PK12
MB5	Middleman	2010-24-07	Bangui	Market Miskine
MB6	Middleman	2010-27-07	Bangui	Market KM5
MB7	Middleman	2010-30-07	Bangui	Market PK12
MBer1	Middleman	2010-07-16	Berberati	Yamale
MBer2	Middleman	2010-18-07	Berberati	Yamale
VB1	Vendor	2010-22-07	Bangui	Market Miskine

All price data is provided in United States Dollars (US\$) at an exchange rate of FCFA 500 = 1 US\$.

Transporter

Transporters move elephant products from point to point on hire by hunters or middlemen traders. Sometimes, multiple transporters are involved in the movement of one product. For example, ivory tusks may be moved by a pedestrian transporter from forest to the nearest village, then by a motorcyclist or taxi man to a specified meeting spot, where a pre-arranged transporter, such as a logging truck driver or a private car owner, is contacted to retrieve the ivory. In the case of wild meat, there may be several different transporters involved in moving the meat from forest to final sale point, whereas ivory may bypass stopover towns because it does not rely on public bus routes but uses private or government cars. Transporters do not sell meat or ivory, which distinguishes them from middlemen.

Hunter

Hunters are individuals hunting wildlife. Most of them hunt primarily for subsistence, using snares, homemade guns or shotguns to capture small to medium sized game. Some hunters are commercial hunters; they hunt primarily to sell meat and other animal products such as skins, horns or teeth. The majority of commercial hunters use snares, homemade guns or shotguns and target smaller game. Elephant hunters use large-bore hunting rifles (e.g. .458, 10.75), automatic military weapons (e.g. AK-47), or in some cases 12-gauge shotguns with homemade bullets.



Research assistants collected data with market vendors using semi-structured interviews. (Photo: Linda Rieu)

Informant identity was kept anonymous using a coding system to assist in maintaining trust and building relationships with respondents. A summary of the informants engaged during the study is provided in **Table 2** below. Eight hunters and nine middlemen were interviewed in depth. While only one bushmeat vendor was interviewed in depth in Bangui, several bushmeat tables were monitored in Bangui (42), Berberati (14), Nola (12) and Beya (5) over the course of several days to observe elephant meat sales. Numerous restaurants were also visited to observe whether elephant or other bushmeat was being served and to collect price information.

Results

Due to time constraints, the data presented here are not intended to be comprehensive for the overall dynamics of the elephant meat and ivory trade in the study area, but rather to be a snapshot in time of a small sample of the system as a whole. The results are intended primarily to inform the development of a long-term study to determine eventually the dynamics of supply, demand and the various actors operating at different scales within the trade system. Whenever possible, data from existing studies have been referenced to better inform the results.

Hunters

Elephant meat hunters

In Bangui, three hunters were interviewed in market PK 12 and two were interviewed in Miskine Market, while one hunter identified in Bangui was interviewed in Sibut in the central market. Two hunters were interviewed in Cameroon on the border of CAR, one in Libongo and one in Socambo. None were found elsewhere. Hunters can be grouped into categories based on their motivation for killing elephants and how they use elephant meat. Subsistence hunters are those individuals who hunt bushmeat for food with the objective of procuring food resources to sustain themselves and their family. Subsistence hunters may also carry out hunting as a social event (rites of passage) in which young men prove their manhood. Commercial hunters aim to sell or trade elephant meat, ivory, and other elephant products with a primary goal to obtain cash income. Hunters may hunt on command to satisfy a specific order from a third party or carry out hunting activities for themselves. Of the five hunters interviewed in Bangui, three worked for themselves, owned guns and organized hunting missions with large groups. The hunter interviewed in Sibut also worked for himself. Two worked on the command of others. In Cameroon the two hunter informants hunted on command (**Table 3**).

CAR informants appeared to be motivated by both meat and ivory and felt minimal risk from the authorities, particularly when engaged in meat commerce. Hunter

informants interviewed in Bangui carried out hunting activities primarily in northern CAR using large hunting parties consisting of six to 13 people and regularly smoked large quantities of meat in hunting camps over two to four days. Orders for elephant meat were received from elites in Bangui as well as the middleman organizing the hunting operation and the transport and sale of elephant meat and ivory. Of the two hunter informants in Cameroon, one was Cameroonian and the other was Central African. Both hunters hunted on command in and around the DSC and in Lobéké National Park in Cameroon. These hunters carried out hunting almost exclusively for ivory on command from middlemen based in Yokadouma, Moloundou and Kika.

Although hunters usually hunted outside of the Bamingui-Bangoran National Park to avoid being discovered with the carcass, they limited themselves to two to four days after the kill to smoke the meat and prepare it for transport. In most cases hunters travelled with a smaller hunting party of six to eight people to track, find and kill the elephant but sent for four to seven additional porters to transport the meat, which indicates that a substantial amount of the meat was removed from the carcass. Each porter can carry 30-50 kg of meat packed into racks constructed from forest branches and tied in with vines. Ten to 15 porters could carry approximately 400 to 600 kg of meat, which would usually, also consist of other species (e.g. buffalo, bongo) as well as elephant. Most hunters indicated that due to the size of an elephant, it was not possible to carry all of the meat out. In all cases, hunters took the tusks to sell for themselves or to give to a third party that ordered the kill. After the kill, elephant tusks would be quickly removed and hidden while the meat was being smoked.

The information presented in **Table 4** was derived from descriptions of specific elephant kills provided by informants. In most cases, informants described one elephant kill. Location information included the town where they were based and a general description of where they carried out hunting activities. Informants in

Table 3. Types of elephant hunters interviewed

Type	Number	Full time	Part time	Works for self	Works on command
Commercial	8	0	8	4	4
Subsistence	0	0	0	0	0
Total	8	0	8	4	4

Table 4. Work effort of elephant kills

Ele kill	Location	A	B	C	D	E	F	G	Total hours
1	Near Ndélé	13	-	722	1	8	72	-	816
2	Near Ippy	6	-	168	1	8	48	-	231
3	Near Ndélé	9	-	168	1	8	72	-	258
4	Near Ndélé	13	-	504	1	8	96	-	620
5	Near Ndélé	7	-	192	1	8	48	-	249
6	Near Ippy	11	-	288	1	8	72	-	380
7	Near Libongo	3	-	336	1	8	0	-	348
8	Near Socambo	3	-	336	1	8	0	-	348

A - Number of people in hunting party

B - Total distance travelled (km)

C - Time to find elephant (hrs)

D - Time to kill elephant (hrs)

E - Time to butcher elephant (hrs)

F - Time to smoke meat (hrs)

G - Time to carry products to destination (hrs)

Bangui described elephant kills near Ndélé outside of Bamingui-Bangoran National Park in northern CAR and near Ippy, a regional town located approximately 100 km from Bria. These hunters spent from one to four weeks in the forest looking for elephants and each spent two to four days in camps to smoke elephant meat to preserve it for transport.

The two hunters along the border of CAR and Cameroon described kills in the forest outside of Lobéké National Park and DSC. These hunters killed elephants on command for ivory and did not stay to smoke meat in order to avoid being apprehended by the authorities. Although informants described the length of the trip, they did not indicate the distance travelled or the distance or time it took to transport the meat from the kill site to nearby villages. In future studies with more time, these variables can be more closely examined.

The apportionment of meat for each of the eight kills described during the study is outlined in **Table 5**. The

weight of meat harvested was derived from the number of pieces accounted for in the description of the kill. For example, hunters typically stated that they took X number of pieces for sale, provided four to five pieces to their porters, provided X number of pieces to the driver, etc. For the purposes of this study an average weight of all pieces of elephant meat weighed during the study (3.5 kg/piece) was used to calculate the total weight removed from the carcass. Please note that the weight per piece is only indicative and the average weight of a piece in any given time period (i.e. a week or a month) may vary between 3 and 5 kg. Rieu (2005) categorized two types of elephant meat pieces for sale in Berberati: large pieces >3 kg (averaging 5.2 kg each) and small pieces <3 kg (averaging 942 gm each).

The final percentage of the carcass carried away was derived by dividing the weight of the pieces by the average weight of an African savannah elephant (those being targeted by the hunters interviewed in Bangui), estimated to be 5,000 kg and the African forest elephant

Table 5. Apportionment of meat from known elephant kills

Informant Code	Elephant kill	Location	% eaten	% carried away fresh	% carried/smoked	% left at kill site
HB1	1	Ndélé	5	0	30	65
HB2	2	Ippy	3	0	12	85
HB3	3	Ndélé	3	0	14	75
HB4	4	Ndélé	5	0	57	48
HB5	5	Ndélé	3	0	-	-
Hsi1	6	Ippy	5	0	26	79
HL1	7	Libongo	2	0	0	98
HS1	8	Socambo	2	1	0	97

Table 6. Disposal of meat

Informant code	Hunting Party Size	Fresh for personal use (kg)	Smoked for personal use (kg)	Amount to porters (kg)	Place of Sale	Amount smoked for sale (kg)	Total (kg)	Sale price US\$ / kg
HB1	13				Ndélé	504	504	2.86
HB2	6		10.5 to family 7 to authorities	175	Bangui (to dealer)	17.5	210	-
HB3	9			120	Ndélé	119	239	2.86
HB4	13			210	Bamingui	735	945	2.86
HB5	7		10.5		-	0		-
HSi1	11			98	Ippy	327	425	2.86

(those targeted by hunters along the CAR – Cameroon boarder), estimated to be 3,000 kg (Haltenorth & Diller, 1980; and Stephenson, 2004). Burns (2000) estimated that 55% of the live weight of a steer could be harvested as fresh meat. Elephant bones are larger and denser proportionately than cow bones, so perhaps a maximum of 50% could be harvested as meat.

The disposal of meat by Ndélé hunters is documented above in **Table 6**. The amount listed is a result of harvesting meat from one elephant, usually paired with collection and sale of the tusks. Meat was also used as payment for porters in the hunting team in 80% of the cases. In all but one case (HB2), meat was sold in a town or village near the kill site (see place of sale in **Table 6**). In the case of larger hunting parties, a substantial amount of meat was smoked and sold. For three of the cases (HB2, HB3, and HB5), weights were estimated by multiplying the average weight of one piece (3.5 kg) by the number of pieces given to porters and smoked for sale as indicated by the informant. For HB1, an estimated amount of weight that could be carried by a porter (approximated at 42 kg or 12 pieces of smoked meat) was multiplied by the total number of individuals in the hunting party, not including the lead hunter (12), who was assumed to carry the hunting weapon, ammunition and perhaps other products (e.g. trunk or tail). In the case of HB4, the informant provided a specific number of pieces sold after the kill (210 pieces). Multiplying this by the average weight of a piece (3.5 kg), the amount of elephant meat carried (945 kg) averages 79 kg/porter, which exceeds the load bearing ability of a porter. If this informant accurately reported, the amount likely reflects at least two portage trips made to the carcass.

The number of trips made to carry meat should be investigated further in future studies to provide more accurate estimates of the disposal of meat. In the case of HB5, the hunter was primarily interested in meat but travelled with a group of six porters. He took only the trunk and ivory from the carcass and allowed the porters to take an unknown portion of meat. The price in US\$/kg is based on the sale price/kg noted by the informant divided by the average weight/piece (3.5 kg/piece). The gross income from smoked meat from one elephant sold by hunters varied from US\$ 340 (HB3) to US\$ 2,102 (HB4).

All of the hunters interviewed in Bangui indicated that their primary motivation was profit for both ivory and meat, with the exception of HB5 who hunts primarily for ivory (**Table 7**). Four of the six hunters (HB1, HB3, HB5 and HSi1) were engaged in privately funded operations where they sold both meat and ivory for themselves and their family and two hunted on command (HB2 and HB4). The hunters on the CAR-Cameroon border (HL1 and HS1) carried out poaching on command strictly for ivory. HL1 carried out kills for a court official working in Yokadouma. Sometimes the court official provided a private car to transport ivory, but HL1 also provided transport services to move the ivory to Yokadouma using his personal motorcycle. HS1 carried out elephant kills on the command of Muslim middlemen based in Moloundou.

In all six cases, hunters interviewed in Bangui were involved in organizing and carrying out the hunt as well as the sale and transport of meat and ivory. In two cases, the hunters even travelled from the site where the elephant was poached to Bangui to sell ivory and meat. A

Table 7. Hunter's motive for killing elephants

Informant Code	A	B	C	D	E	F	G	H
HB1	3	2		1				
HB2	3	2			1			
HB3	3	1		2				
HB4	4	3	2		1			
HB5				1				
HSi1	3	2		1				
HL1					1			
HS1					1			

A - Meat for self, family

B - Sell meat for self

C - Sell meat on command

D - Sell ivory for self

E - Commanded to hunt for ivory

F - Protect crops, property or life (HEC)

G - Cultural reason

H - Other

Rank 1 (most important) to 8 (least important)

summary of hunter costs and routes is provided in **Table 8** below.

Ivory hunters

Ivory hunters interviewed operated out of Bangui (HB1, HB2 and HSi1) and around Bamingui National Park (HB3, HB4). All ivory hunters also collected and sold meat. Three operated independently and two hunted on command. One commander was a Bangui school director and the other was unspecified. (See hunter section

above for more information on ivory hunter operations, as the meat and ivory hunters are the same.)

Ivory selling prices for each ivory middleman are listed in the table below (**Table 9**). Ivory tusks ranged in price from US\$ 170 to 600 per tusk (US\$ 340 to 1,200 for two tusks); the price varied according to tusk size. Unfortunately, informants were not able to provide tusk weights, so it was not possible to calculate prices per kg.

Table 8. Examples of Hunter Costs and Routes

Informant Code	Hunt Party Payment	Transport	Source Point	Sale Point	Authorities Formalities	Other Costs
HB1	US\$ 300	US\$ 40	Ndélé	Ndélé	US\$ 10-20	
HB2	US\$ 100		Ippy	Bangui		6 kg meat to authorities
HB3	US\$ 80		Ndélé	Ndélé		
HB4	US\$ 50		Bamingui	Ivory -Sudan, Meat -Bangui	US\$ 10	US\$ 100 + 120 kg meat to HB4 from Bangui dealer
HSi1	US\$ 174	US\$ 30	Ippy	Bangui		

Table 9. Prices of tusks from last sale

Informant code	Locality of kill	Locality of sale	No. tusks	Total Price	Independent/ Command	Meat collected
HB1	Ndélé	Bangui	2	US\$ 1200	I	Y
HB2	Ndélé	Bangui	2	US\$ 520	C	Y
HB3	Ndélé	Ndélé to go to Sudan	2	US\$ 340	I	Y
HB4	Bamingui	Bamingui	2	-	C	Y
HSi1	Ippy	Bangui	2	US\$ 940	I	Y

Weapons

Hunters used a variety of guns and bullets. Bullets used included calibres 10.75, 3.75 and .458. Bangui bullet prices were estimated to be US\$ 18 to 20 each (TB5, pers. comm., 2010). Rieu (2005) reported a price of FCFA 10,000 (US\$ 20) for a .458 cartridge in the Berberati area used to hunt elephant and hippo. The hunter in Libongo used an AK-47 Kalashnikov supplied by his *commanditaire*.



An old .458 elephant gun. Large-bore .458 bullets cost US\$ 18-20 each in CAR. (Photo: WWF)

Transporters/middlemen

Elephant meat transporters/middlemen

A total of seven middlemen informants were interviewed in Bangui, five near market PK12 and two near Miskine Market, and two middlemen were interviewed in Berberati. These middlemen were mostly middle aged (ages ranging from 36 to 55) and seven of the nine were female. They had been in the elephant trade for several years. **Table 10** below provides summary details of the middlemen interviewed during this study.

On the day RA2 began his research in market PK12, a bus arrived from Ndélé with elephant meat. On this day he was able to make contact with several middlemen informants who then provided contacts for hunters. The social relationships and data derived from these informants are only a snapshot of the relationships between these actors and more information is needed to determine social relationships between hunters and middlemen in CAR.

The middlemen in this informant group were based in Bangui and regularly made trips to the far north of CAR near Ndélé to purchase elephant and buffalo meat and transport this meat to Bangui for sale (from one to three trips/month). Only one of the middlemen informants (MB5) reported transporting ivory. MB5 is an unusual case, she works hand in hand with her husband who is an elephant hunter carrying out hunting activities near Ndélé. She organizes the transport and sale of elephant meat and ivory acquired by her husband.

All of the middlemen had strong relationships with hunters and buyers in Bangui and played an integral role in setting up the hunt, conducting hunting activities as well as transporting and selling the meat to vendors and other middlemen operating in Bangui. Most of the middlemen indicated that they transport moderate quantities of elephant meat (25 - 50 pieces or 75 kg - 150 kg) per trip, with the exception of MB5. As explained above, MB5 operates a business with her hunter husband and apparently she has been successful in transporting and selling large quantities of meat as a result of this partnership. Most of the middleman informants indicated that they traded in both elephant and buffalo meat with a strong preference for elephant meat because of high profit margins gained from this product. Most of middlemen travel to and from Ndélé from Bangui using a public bus service.

The two middlemen interviewed in Berberati organized and carried out elephant hunts near Mambélé (also

Table 10. Summary data of middlemen informants

Code	Age	Sex	Years in Trade	Trans. From	Trans. To	Meat	Ivory	Trips/ Month	Transport	No. Pieces Last Trip	Trades in
MB1	42	M	7	Ndélé	Bangui	Yes	No	2	Public bus	40	ele, buffalo
MB2	39	M	10	Ndélé	Bangui	Yes	No	3	Public bus	35a	ele, buffalo
MB3	51	F	14	Ndélé	Bangui	Yes	No	3	Public bus	50a	Ele
MB4	55	F	10	Ndélé	Bangui	Yes	in past	-	-	35	Ele
MB5	46	F	8	Ndélé	Bangui	Yes	Yes	1 to 3	-	150	ele, buffalo
MB6	36	F	7	Ndélé	Bangui	Yes	No	1	Public bus	25 ele, 42 buf	ele, buffalo
MB7	41	F	10	Ndélé	Bangui	Yes	No	2	Public bus	50	ele, buffalo
MBer1	46	F	-	Mambere	Berberati	Yes	Yes	-	Private bus	-	ele, buffalo
MBer2	47	F	-	Yamale	Berberati	Yes	Yes	-	Private bus	-	ele, buffalo

referred to as Mambéré), the site identified by Rieu (2005) as an important source locality for bushmeat sold in Berberati. Both informants indicated that they transported elephant meat and ivory to Berberati for sale to established buyers. MBer1 is based in Berberati and travels to Mambélé to carry out elephant hunting operations. She preferred selling elephant meat in her restaurant because the elephant tusks were often very small and did not bring in much money. MBer2 carried out hunts near Yamale, indicating that she had an established buyer in Berberati that purchased ivory from her and transported it to Cameroon to sell. RA3 reported that elephant meat is sometimes transported along the Sangha River to Congo (Brazzaville) to middlemen operating there.

Table 11 above illustrates the variable costs of a hunting trip for the middleman. In paying 'formalities' (i.e. a bribe) to authorities at several checkpoints between source and sale points, middlemen usually do not have any problem

transporting their meat to destination sale points where higher prices deliver a much better profit. Transport costs varied depending on the type of transportation (private or public) as well as the state of the road.

Table 12 presents a few possible examples of the middlemen's meat cost and profits for one trip. This is time specific data; prices and profits reflect the conditions, relative cost of hunting and availability of elephants at this time of year (August). The annual profit was calculated based upon the profit information provided by informants for a sample trip. The frequency of trips was placed at one trip/month for the year to accommodate for changes in weather and road conditions that may limit road travel between Bangui and Ndélé throughout the year. In all three cases, the middleman travelled from Bangui to Ndélé to purchase meat from a hunter and return to Bangui to sell meat to an urban vendor or urban middleman. MB1 transported 140 kg and sold the meat at US\$ 5.72/kg, MB2 transported 123 kg and sold the meat

Table 11. Examples of hunt organizer (middleman) costs and routes

Informant Code	Source Point	Sale Point	Transport	Authorities Formalities	Type of Transportation
MB1	Ndélé	Bangui	US\$ 80	US\$ 6-10	Public
MB2	Ndélé	Bangui	US\$ 80	US\$ 4-10	Public
MB3	Bamingui	Bangui	US\$ 44	US\$ 18	Public
MBer1	Yamale	Berberati	US\$ 100-200	-	Private

Table 12. Examples of middlemen meat profits Based on example of sale, assuming all trips average the same over the year.

Infor. Code	To– From	Bribe Costs (US\$)	Meat (kg)	Buy US\$/kg	Buy Cost (US\$)	Sell Total(US\$)	Meat Profits (US\$)	Trips / Month	Annual Profit (US\$)*
MB1	Ndélé-Bangui	80	140	2.86	400	800	320	1	3,840
MB2	Ndélé-Bangui	80	123	2.86	352	703	271	1	3,252
MB3	Bamingui-Bangui	62	175	2.86	501	1000	437	1	5,244

*Based on example of sale, assuming all trips average the same over the year.

at US\$ 5.72/kg and MB3 transported 175 kg and sold the meat at US\$ 5.72/kg. They all purchased the meat at US\$ 2.86/kg in the north.

Ivory transporters/middlemen

Because of the sensitive nature of ivory trading and the limited time available, it was not possible to collect much information about ivory middleman or transportation activities. MB5 was the only middleman who provided an ivory price for the last kill: US\$ 600 for two small tusks. She said the price ranges from US\$ 600 to 1,400 for a pair of 'large' tusks.

Hunters sell ivory obtained from killed elephants in south-west CAR and in south-east Cameroon in Libongo, Socambo and in Moloundou, a large town on the Cameroon-ROC border, to local middlemen, many now residing in the town of Kika, Cameroon, on the border of ROC. These middlemen are often Muslims from Senegal and Mali. Hunters are paid according to the size of the tusks. The price of ivory locally ranges from US\$ 24-36/kg for small tusks to US\$ 36-50/kg for large tusks, with a maximum of US\$ 60/kg (i.e. FCFA 30,000/kg). Informant VY1 indicated that he could sell ivory for US\$ 120/kg in Yokadouma, a town in Cameroon not far from the CAR border on the main road. Ivory often passes through Yaoundé, Cameroon, on its way to Nigeria where there are regular customers who are said to pay as high as US\$ 240/kg for ivory, according to RA3.

Vendors

Elephant meat vendors

RA1 gathered market and restaurant data in three locations: Berberati (5 days), Nola (6 days) and Beya (3 days). RA2 gathered market and restaurant data in Bangui for approximately 14 days. Beya is a transit intersection location and has only one very small central market. Hunters and middlemen are known to pass

through Beya moving bushmeat, including elephant meat, to Nola, Berberati and other population centres. No elephant meat was seen in the Beya market, though some was observed being sold in six restaurants that were visited. Nola has a large, bustling central market and acts as a regional hub of economic and trading activity. The market operates every day. Berberati has five markets within the city limits that are known to sell bushmeat. Bangui has a number of markets known to sell bushmeat. RA2 focused his market research in market PK 12, the largest market in CAR as well as eight other markets found within the Bangui city limits; PK9, KM5, Miskine, Konbamta, Gobongo, Galabadja, Fouh and Damala. RA3 did not collect market data in Socambo and Libongo but focused on identifying and engaging middlemen and hunters involved in the elephant meat and ivory trade.

In this section specific weights and prices have been generated for each study site where the data were collected. This allows for price comparison between study sites.

Nola

RA1 observed one piece of elephant meat on each of three different days on three different tables out of 16 tables selling bushmeat (156 total bushmeat pieces). The pieces weighed an estimated 3 kg, 4 kg and 2.5 kg respectively. The vendors bought the meat for between US\$ 2.33/kg and US\$ 2.50/kg and sold it for US\$ 2.75 to US\$ 3.20/kg, yielding a modest gross profit of between 16 and 18%, although the sample is small so this result should be considered provisional.

Berberati

Three pieces of elephant meat (5.9% of total 54 bushmeat pieces) weighing 3.2, 3.6 and 3.75 kg each on three tables out of 14 tables were observed in Berberati over four days. The buying price was US\$ 2.50/kg and

selling price was US\$ 2.56-3.44/kg, averaging US\$ 2.93/kg, yielding a gross profit margin of about 18%.

Bangui

RA2 found two vendors selling elephant meat with a total of 21 pieces and a total combined weight of 73.9 kg. Pieces ranged from 1.7 to 5.2 kg, averaging 3.7 kg each. RA2 did not conduct a complete survey of the entire market but focused on finding elephant meat. All elephant meat recorded by RA2 in Bangui markets was observed on the first two days he was in market PK12. After this time, he did not observe any additional pieces of elephant meat in other markets in Bangui. The elephant meat that came from Ndélé (10 pieces) was purchased by vendors for prices ranging from US\$ 2.23 to US\$ 4.04/kg, averaging US\$ 3.02/kg², and sold for an average of US\$ 6.97/kg. Elephant meat from Bria (11 pieces) was purchased for an average of US\$ 3.06/kg and sold for an average of US\$ 6.65/kg. Based on these few data, it is not possible to extrapolate the amount of elephant meat being sold on a weekly basis for a city as large as Bangui. The price data are very limited as well.

The average price of elephant meat found in the town of Bayanga (US\$ 3.10/kg) is included here (Hodgkinson, 2009). This value is comparable to the prices found in Nola (US\$ 2.98/kg) and Berberati (US\$ 2.93/kg) in this study, indicating that the price of elephant meat remains relatively constant in Bayanga, Nola and Berberati (**Table 13**). Although there are slight differences in price of elephant meat ranging from least expensive in Berberati to most expensive in Bayanga, the price difference is very small (US\$ 0.13). Small variations such as these may result from differences in weighing methods used by Hodgkinson (2009) and this study. The price data noted

in **Table 13** was derived from a very small sample of all the elephant meat moving through these markets over a short time period. More data are needed to confirm these results.

A closer look at the difference between buying and selling prices in the three locations where elephant meat was observed (Nola, Berberati, and Bangui) indicates that vendors are making very low margins in Nola (US\$ 0.55/kg) and Berberati (US\$ 0.65/kg) as compared with Bangui (US\$ 3.83/kg) (**Table 14**). The price of smoked elephant meat in 2005 in Berberati averaged approximately US\$ 5.20/kg (Rieu, 2005), higher than the prices observed during this study. Without further research, the reason for the price drop cannot at present be explained³.

A summary of bushmeat prices for animals commonly found in bushmeat markets in each of the study sites is shown in **Table 15** in order to assess the popularity and demand of elephant meat. In Nola and Berberati, elephant meat (US\$ 2.97/kg and US\$ 2.93/kg) is comparably priced to other commonly consumed bushmeat found in the market, e.g. duiker (US\$ 3.26/kg) and monkey (US\$ 3.13/kg). However, elephant meat in Bangui (US\$ 6.94/kg average) is significantly higher than commonly consumed bushmeat, e.g. monkey (US\$ 4.67/kg) and duiker (US\$ 4.43/kg).

The information gathered from informant interviews suggests that in CAR hunters frequently act also as traders of meat. They are the central point connecting urban traders and local porters and guides in elephant source locations. Organizing the hunt, they involve local porters and guides who know the terrain and can assist in transporting elephant meat. In addition, family members

Table 13. Number of bushmeat vendors selling elephant meat at each study site

Location	No. vendors	No. tables	Price range US\$/kg	Price av. US\$/kg	Quantity sold per week (kg)	Source
Bayanga	-	-	-	3.10	1.6*	-
Nola	3	3	2.75 - 3.20	2.98	8.5	Adjacent forest
Berberati	3	3	2.56 - 3.44	2.93	10.45	Mambere, Amada Gaza
Bangui	2	2	5.66 - 9.23	6.94	-	Ndélé, Bria

*Fresh elephant meat, 85 kg sold over a 12-month study period (Source: Hodgkinson 2009)

² The vendor buying prices are not consistent with the middlemen selling prices, unless the middlemen were selling directly to consumers, in which case the fit would be good.

³ Since the field work was completed, it has been learned that Sudanese poachers operating in south-west CAR were flooding the market with elephant meat during the research period (Anon., 2011), which was probably the cause of the price decline.

Table 14. Vendors' buying and selling prices of elephant meat

Date	Nola		Berberati		Bangui	
	Buy US\$/kg	Sell US\$/kg	Buy US\$/kg	Sell US\$/kg	Buy US\$/kg	Sell US\$/kg
Aug. 2010	2.41	2.97	2.50	2.93	3.10	6.94
Aug. 2009	-	-	-	-	-	12.65 ¹
2005	-	-	-	5.20 ²	-	-

¹Source (Fargeot, 2008)

²Source (Rieu, 2005)

Table 15. Average bushmeat buying and selling price observed at each CAR study site

	Avg Weight (kg)/Piece	Avg. Buying Price US\$/kg	Avg. Selling Price US\$/kg
Bangui	3.63	3.10	4.96
Buffalo	3.47	3.33	4.08
Cane rat	2.27	3.09	3.99
Duiker	3.65	3.43	4.43
Elephant	3.52	3.10	6.94
Gazelle	4.80	1.73	2.15
Monkey	4.18	3.58	4.67
Sitatunga	3.22	2.39	3.93
Berberati	2.01	2.39	3.39
Buffalo	4.50	-	2.22
Bush pig	3.40	1.87	2.63
Chimpanzee	2.15	2.11	2.49
Duiker	1.75	2.25	3.26
Elephant	3.52	2.50	2.93
Gorilla	3.03	2.31	2.80
Monkey	1.74	2.25	3.13
Porcupine	1.12	3.45	5.66
Beya	3.07	2.04	2.54
Bush pig	2.00	2.80	3.00
Chimpanzee	3.00	2.30	2.67
Duiker	2.97	2.05	2.81
Gorilla	4.20	1.76	2.29
Monkey	2.97	2.02	2.28
Porcupine	4.00	1.00	1.25
Nola	2.01	2.51	2.98
Antelope	1.67	2.57	3.14
Bush pig	2.45	2.54	2.85
Chimpanzee	3.60	-	2.22
Duiker	1.78	2.26	2.79
Elephant	3.17	2.41	2.97
Gorilla	2.20	3.10	3.21
Monkey	1.90	2.72	3.21
Porcupine	2.30	2.26	2.76
Grand Total	2.56	2.65	3.65

Sources: This study

cooperate in coordinating and carrying out activities. Hunters then sell their meat through local vendors, sometimes the wives of hunters, to middlemen who come to the village site to buy meat. These vendors then sell

to restaurants, other markets and urban consumers, but for elephant meat, most transactions occur outside of or under the table within the physical market places. Local authorities detected but did not seize meat on



The central bushmeat market in Berberati (Photo: Linda Rieu)

any occasion documented for this study. Based on the information provided by informants, nothing beyond ‘formalities’, transportation costs to move to and from source points, and a base capital for purchasing meat was necessary to operate as a hunter or middleman.

The survey of the restaurants and chop shops serving bushmeat in each study site indicated that elephant meat was present at restaurants much less frequently than other meats. During a week of observation, the ratio of elephant meat to all other meat types being served was one plate versus 16 plates in Beya, four plates versus 73 plates in Nola and five plates versus 57 plates in Berberati. In Bangui, 14 out of 34 restaurants in nine different market locations were serving elephant. The price per plate for bushmeat and elephant meat was fairly constant at CFA 500 (US\$ 1), ranging from US\$ 0.50 to US\$ 2, for a serving of four small pieces with an estimated weight of 25-35 grams/piece. This equates to approximately 100-140 grams/plate.

It is important to note that restaurant owners indicated that smoked elephant meat expands significantly when cooked in a stew or sauce and is likely to have a density similar to fresh elephant meat after rehydration. An initial 100 gm cooked in a stew could therefore become a 300 gm serving. In order to accurately define profit margins and quantities of meat used in restaurants, a more detailed study that

includes exact weight measurements of elephant meat servings and serving frequency in individual restaurants over a longer time period will have to be carried out.

Prices of non-bushmeat meats

The prices of domesticated animal meats in the project area and in Bangui are shown below in Table 16. The table indicates the price/kg of domesticated fresh meats, as this is the manner in which these meat sources are typically sold within the market. Unfortunately, domesticated meat prices in Berberati in 2010 are unknown; thus no current comparisons can be made for the south-west. In 2005, however, Rieu (2005) provided prices, given in **Table 16**.

In rural areas in south-west CAR, smoked elephant

Table 16. Prices of domesticated meats

Place	Elephant (US\$/kg)	Beef (US\$/kg)	Goat (US\$/kg)	Chicken (US\$/kg)	Fish (US\$/kg)
Bayanga ¹	2.00 ²	4.50	1.40	4.00	1.70
Berberati ³	5.22 ⁴	5.00 ⁴	1.45	3.34 ⁵	3.00 ⁶
Bangui ⁷	12.65 ⁴	3.34 ⁸	4.94	5.00 ⁵	3.75 ⁶

Source: ¹Hodgkinson, 2009; ²Rieu (2005) reported this price for the ‘rural zone’; ³Rieu (2005);

⁴smoked; ⁵whole; ⁶fresh; ⁷Fargeot, 2008; ⁸fresh, without bones

meat in the mid 2000s was cheaper than beef or chicken and more expensive than goat or fresh fish, according to Hodgkinson (2009) and Rieu (2005). In Berberati in 2005, smoked elephant meat was comparable to smoked beef in price, and both were significantly more expensive than other fresh meats and fish. Fresh beef without bones sold for US\$ 3/kg in 2005, much cheaper than smoked elephant meat (Rieu, 2005). This would appear to demonstrate a preference by consumers for elephant over any form of fresh domesticated meat or fish. Fargeot (2008) monitored meat prices during a similar period (2005-2008) in Bangui and also found that elephant meat was distinctly more expensive than any form of other bush or domesticated meat or fish. This study collected much lower prices for elephant meat in Berberati (US\$ 2.93/kg) and Bangui (US\$ 6.94/kg) than earlier studies, but the samples and time period were limited so it would be hazardous to draw any conclusions.

Ivory Vendors

No research was carried out on ivory vendors due to time constraints.

DISCUSSION

Elephant meat

The evidence gathered from hunter, middleman and vendor informants suggests that there is an active meat trade emanating from northern CAR (Ndélé and Bria) with a network of actors that support elephant poaching as well as meat sales in Bangui. Middlemen are engaged in elephant meat commerce and have strong relationships with hunters (suppliers) and clients in Bangui. The trade can be regular and lucrative. Middlemen (MB1, MB2, and MB3) described making a profit of between US\$ 320 and US\$ 437 per round trip from Bangui to Ndélé to purchase elephant meat. Based on the number of trips they make annually, elephant meat ventures may yield as much as US\$ 3,840 to US\$ 5,244 a year on meat alone (**Table 12**).

Elephant meat is also being traded in south-west CAR, but much more research needs to be carried out to confirm prices and quantities.

The risks and costs associated with transporting meat are quite low compared to the benefits. Meat transport and trade is allowed by the authorities on primary routes with appropriate payment for 'formalities' with very low cost compared to benefit for meat sales and apparent low risk for transporting meat to Bangui and Berberati markets, with no reported cases of seizures. No middlemen selling meat to vendors or vendors selling to consumers indicated that they had a permit for the sale of meat in the market.

Preliminary data gathered in this study seems to suggest that smoked elephant meat has significantly dropped in price in Berberati from about US\$ 5.20/kg in 2005 to US\$ 2.93/kg in 2010. The price in Bangui has declined from an average US\$ 12.65/kg in 2008 to US\$ 6.94/kg in 2010. One must consider that the availability of elephant meat is likely to be tied to seasonal conditions, human activities and other factors like drought that may affect elephant population movements and distribution and thus price. Conclusions on the actual quantities of meat being sold and numbers of elephants killed can only be determined through long-term research.

Rieu (2005) stated that restaurant owners in Berberati make a much higher profit on elephant meat – three to four times the buying price – than on the bushmeat of smaller game (e.g. duikers, monkeys or rodents) – twice the buying price. Her explanation for this seemed to be that meat without bones can be sold for a higher

price, but an additional reason may be the rehydration phenomenon referred to above, whereby 100 gm of smoked elephant meat becomes 300 gm when cooked in liquid. She found that the same phenomenon occurred with beef during the rainy season, when transhumant cattle from the north moving south provided an abundance of cheap beef, which was smoked and sold in south-west markets. The profit margin for elephant meat, Rieu found, was considerably higher than that observed in this study. The reason is unknown (see footnote 3).

It appears that Fargeot (2008) may have underestimated the amount of elephant meat sold and consumed in Bangui, given that his study focused only on what was openly sold on market tables. From the present research, it was found that much of the elephant meat flows through a more clandestine market. RA2 was able to access actors that could not have been reached by market studies alone as a result of his relationships and experience working in Bangui markets and using the RDS sampling method.

In addition, Fargeot's (2008) estimate that only 18 elephants were represented by almost 60 tonnes of meat must be a gross underestimate. His method of calculation was not explained in any detail, but apparently the 59.5 tonnes for elephant is a conversion to fresh meat at a three-to-two ratio from what was observed in the market in smoked form. If this is correct, he actually observed about 40 tonnes of smoked elephant meat for sale. The time period over which the quantity was seen is also not stated. One must assume it was over the three-year period 2005-2008 in the absence of any other information. He assumed that a savannah elephant would provide about 3,300 kg of fresh meat, hence his estimate of 18 elephants (59.5/3.3). However, 100% of the meat from an elephant carcass never ends up in a bushmeat market, especially if the market is hundreds of kilometres from the kill, as Bangui is. As this study has shown, only part of a carcass is harvested because of transport constraints, some of the meat is eaten by the hunting party, more of the meat is used as payment to porters, and other proportions are no doubt given to family and friends, used as bribes and sold in local markets. In this study, only about 150 kg on average of elephant meat was transported at a time from the north from elephant kills. At that rate, the amount of meat Fargeot observed would result from 484 elephant kills. The data are not good enough to draw this conclusion, but the factors just highlighted indicate that a more realistic method based on empirical evidence should be used to estimate the number of elephant kills from meat seen in markets.

Both Rieu (2005) and Fargeot (2008) noted that elephant meat was more expensive than other meats, and both hypothesized that the higher price was due to cultural reasons. They both found that only wealthy consumers bought elephant meat and demand from elites was hypothesized to be caused by either their belief that elephants represented virility and strength, or that serving elephant meat to visitors demonstrated the elites' wealth and influence. A targeted consumer survey is needed to answer the question with any certainty.

It must be clearly stated here again that the information was gathered in a very short period with only one RA at each site. Therefore, the results presented here may have some inherent bias. They certainly do not describe all sources of elephant meat in CAR, but likely elucidate a small cross-section of this dynamic trade. Also, the data collected represent only one point in time and there are likely to be seasonal variations. Additionally, other source points (e.g. DRC) are likely to be identified and articulated with further research. Fargeot (2008), for example, mentioned south-east CAR (Bangassou area) as a source of elephant meat seen in Bangui.

Ivory

All but one hunter said that ivory was the primary motivation for hunting elephants. Meat was a valuable by-product, but time, labour and transport constraints meant that targeting elephants primarily for meat was usually not an option.

More ivory appears to be moving to Sudan from Ndélé and Bria due to the fact that it is easier to transport and sell ivory there and there is a ready market in Khartoum (Martin, 2005). A smaller percentage is moving to Bangui for sale.

Cameroon appears to be an important destination for ivory from elephants poached in south-west CAR. There are known Chinese traders in Yaoundé who illegally export tusks in containers by sea (Ofir Drori, pers. comm.,

2010)⁴. Additionally, ivory sourced from elephants killed around Berberatii is known to move west into Cameroon for further distribution on to Nigeria.

Changes in ivory prices since 1999 are shown in **Table 17**, along with inflation-adjusted prices.

Ivory prices in Bangui have risen approximately 60% for smaller tusks and 100% for medium size tusks since 1999 in inflation-adjusted terms. This would suggest that either there is a shortage of ivory arriving in Bangui to meet present demand, or that demand has risen since 1999. The former is most likely the case, given that most northern and south-eastern tusks seem to go to Sudan, while those in the south-west go to Cameroon.



Tusks like these seized by ecoguards near the DSC would fetch about US\$ 50-60/kg in Bangui. (Photo: WWF)

Social Networks and Commodity Chains

Meat social networks

A social network diagram graphically represents the interactions between actors within complex social systems. The diagram uses nodes (circles) to represent actors and links (lines) to represent interactions between actors. Social relationships in the figure are represented by variables such as the size of a node (indicating the number of interactions) and line thickness (strength of the social relationship). Clusters represent close relationships between different nodes (individual actors) and there

Table 17. 1999 and 2010 tusk prices in Bangui

Tusk weight	1999 US\$	2009 US\$1	2010 US\$
1-5 kg	15-20	18-24	30-40
>5 kg	20-25	24-30	50-60

¹ GDP Inflation Index applied to obtain current value of 1999 prices. (<http://cost.jsc.nasa.gov/inflateGDP.html>). Source: Martin & Stiles (2000) and this study

⁴ In 2011 these traffickers were arrested (see <http://www.youtube.com/watch?v=hUOsqvJ1k>).

are focal points within the clusters. Clusters can exist independently or there can be ties between nodes linking clusters to one another.

Figure 5 shows the social network for elephant meat hunting, transporting and marketing reconstructed from interviews with informants.

In the hunter cluster (top left hand corner of the diagram), the elephant hunter is the primary focal point. The cluster contains the small group of porters, a guide and the

co-hunters, which make up the primary hunting team. A second ring of porters surrounds this group representing the porters that are called in after the elephant kill to haul meat to a nearby village. The hunter maintains stronger social links with local vendors who sell meat locally and with middlemen who assist in purchasing both meat and transporting it to Bangui. The middlemen share strong social links to urban middlemen who purchase meat and sell to local consumers as well as to urban vendors who distribute locally to consumers. Typically, urban vendors have customers such as restaurant owners who purchase

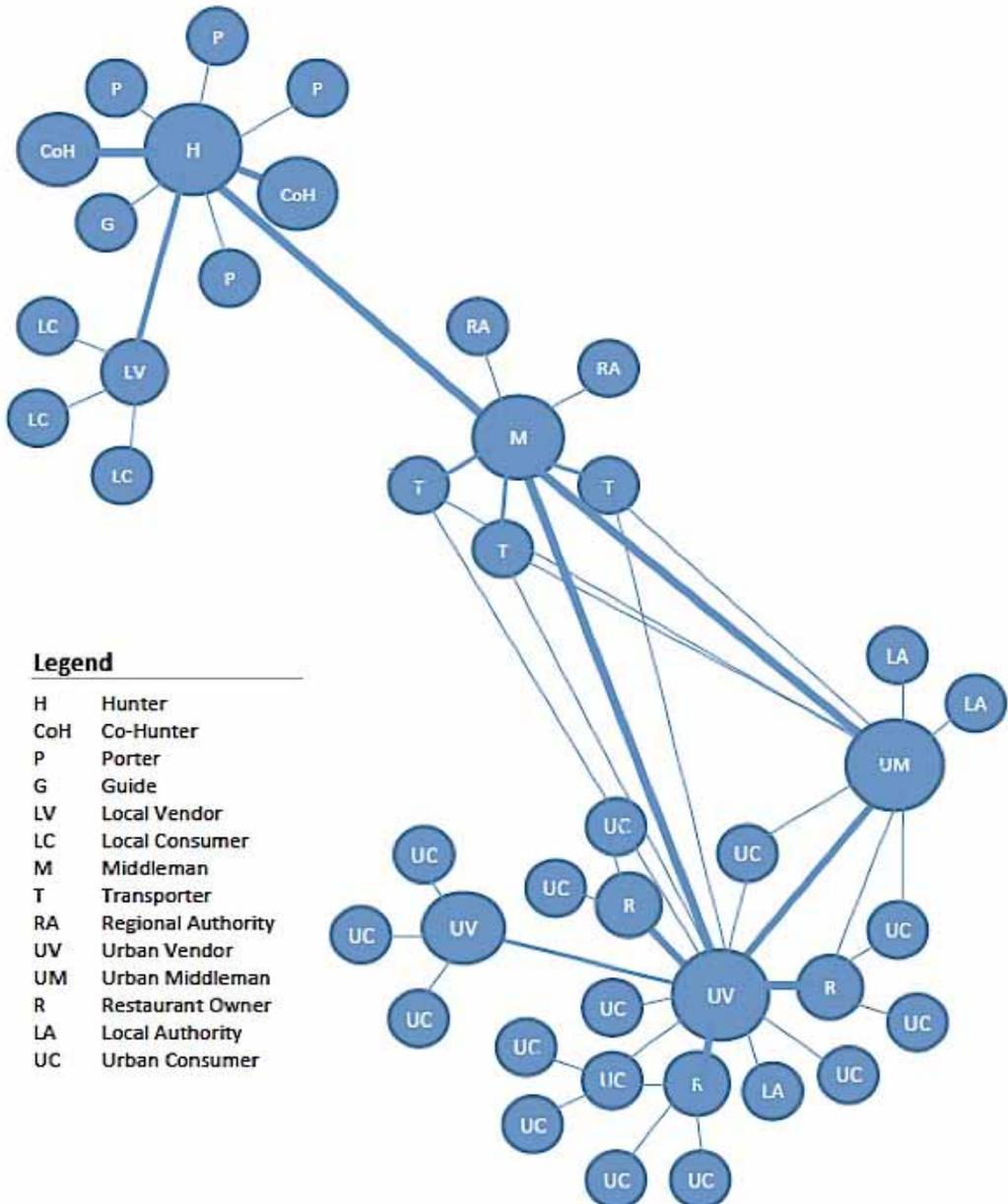


Figure 5. Social network of elephant meat commerce in northern CAR and Bangui

meat on a regular basis and distribute the meat to other urban consumers.

Ivory social networks

The ivory trade utilizes the same actors at the local level, namely porters, hunters, hunter/middlemen and family co-hunters (**Figure 6**). Some of the same middlemen that traded elephant meat also traded in ivory in Bangui and Berberati, an interesting phenomenon to examine further. Ivory, however, appears to be a much riskier business, as indicated by the extra precautions taken to hide ivory near the kill site while meat is being openly smoked

and the separate transport of ivory, in private vehicles whenever possible. Middlemen inferred that the local authorities would regularly seize tusks yet would let meat pass with only a small payment. Those dealing in ivory would sometimes hide the ivory with a local contact and the buyer would come to the area to collect the ivory at a later date.

In the case of ivory harvested near DSC, it was frequently sold to Cameroon-based middlemen where it fetched a higher price than in CAR.

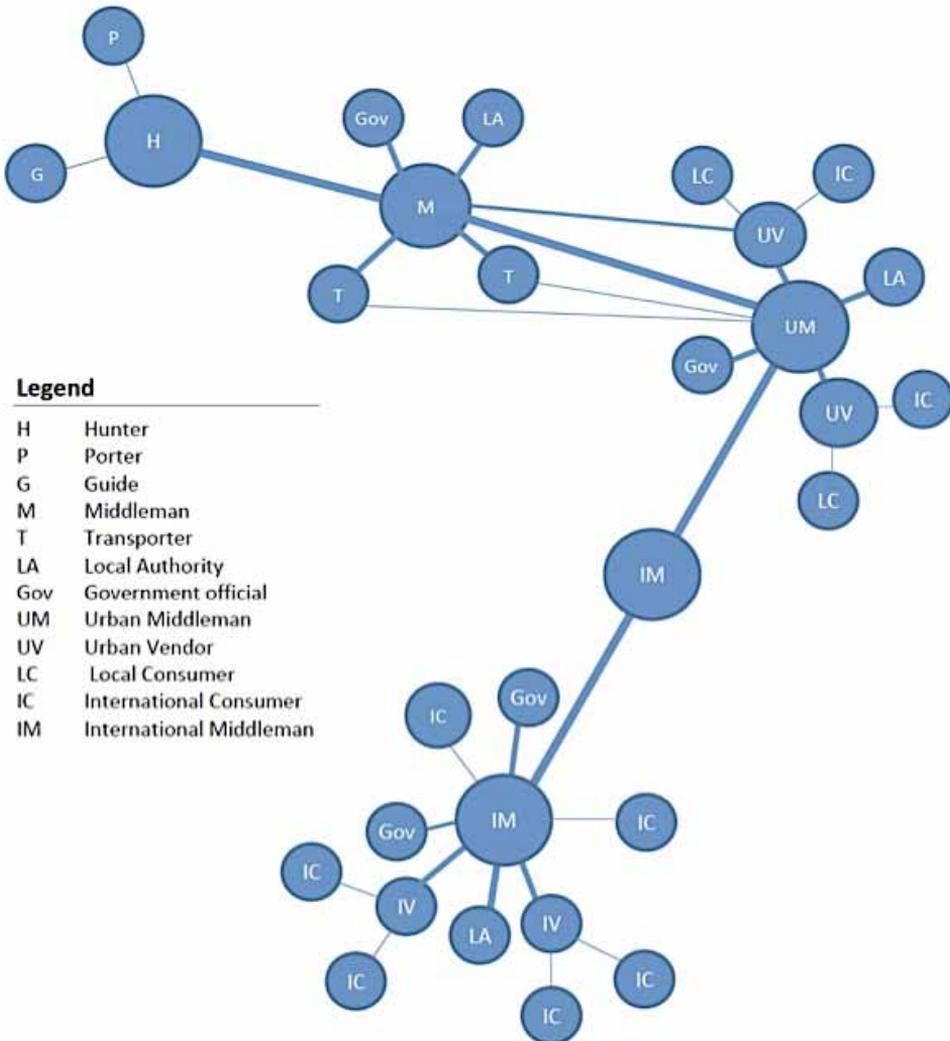


Figure 6. Social networks of ivory commerce in Northern CAR

The diagram shows clusters of actors around focal points of the hunter who interact directly with middlemen who then transport ivory to Bangui as well as those who transport it to Sudan. Some hunters also interact directly with urban middlemen who process ivory locally or distribute it to international middlemen who move the product on to consumers. More research would be required to establish specific social relationships (e.g. kin or ethnic links) that exist within the trade networks.

Finally, a social relationship network for hunters, middlemen, vendors and consumers operating in extreme south-western CAR is depicted in **Figure 7**. This shows smaller groups of hunters that operate near the CAR/ Cameroon border and those operating around Berberati. These hunters and middlemen carry out hunts in the forest area using smaller hunting parties. They engage local middlemen to transport ivory to, first of all, urban middlemen and then, to the international market for sale to international consumers.

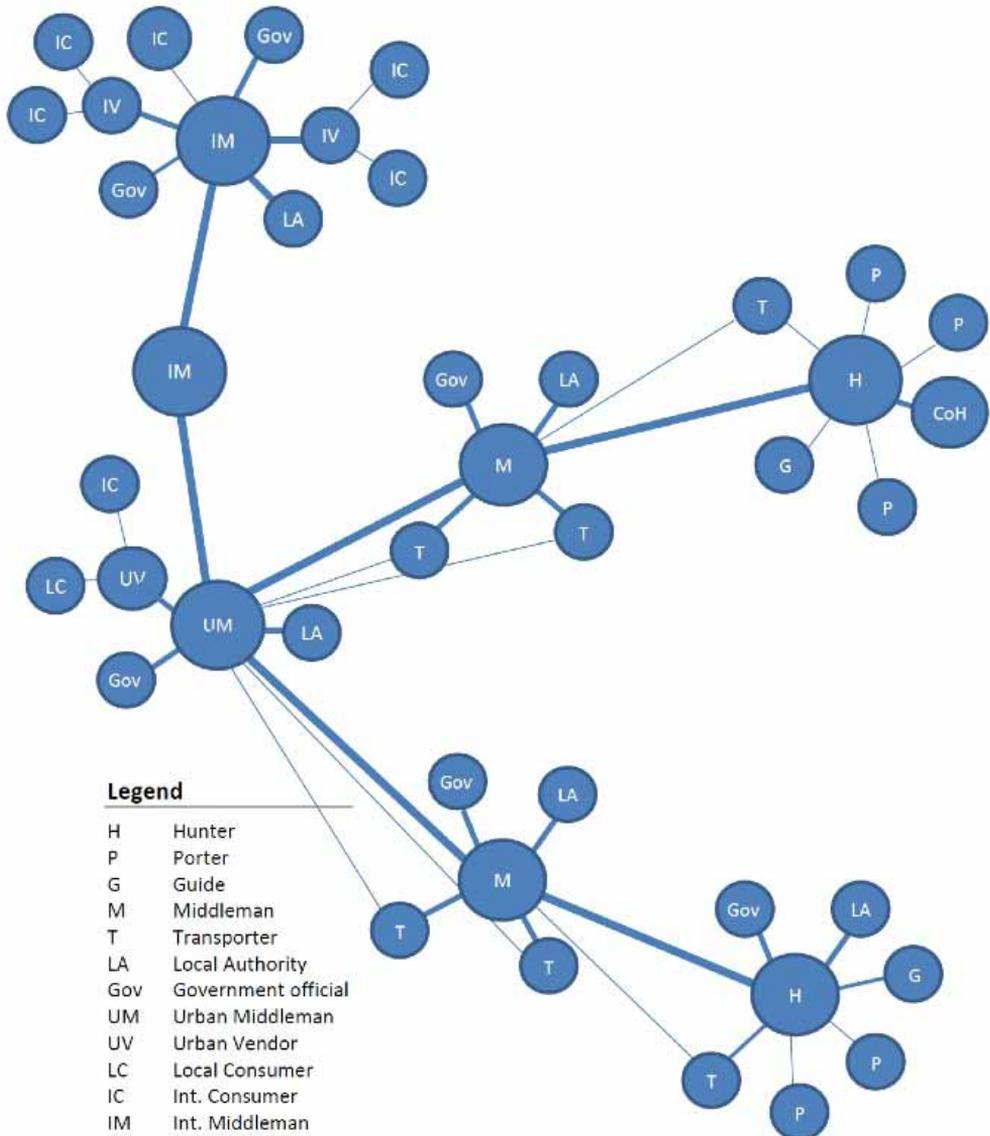


Figure 7. Social networks of ivory commerce in south-western CAR and SE Cameroon on CAR border

Transport and Distribution

Meat transport

The elephant and other bushmeat transport routes uncovered in this study are depicted in **Figure 8**. This map includes information generated during the market studies and discussions with stakeholders at the DSC project site. Vendor informants in markets were asked about the source of elephant meat being sold on their tables. On 19 and 20 August 2010, elephant meat in the market PK12 in Bangui had been delivered from the towns of Ndélé and Bria located in the far northern savannah region of CAR. In follow-up discussions with RA2, he indicated that a large percentage of the elephant meat arriving in Bangui originated from the savannah region. During the study period, no elephant meat found in Bangui was sourced from the south-west forest region near DSC, nor did any informants interviewed in Bangui conduct poaching or trading activities there.

Meat in Berberati originated from Mambélé and Amada Gaza towns, located approximately 100 km distant. The SEFCA logging concession of Mambélé was shown as one of the most significant source points for bushmeat due to the trade connections with Berberati (Rieu, 2005). Elephant meat being sold in Nola originated from

the forest region adjacent to the town. Beya, a small junction town, acts as a transfer point for bushmeat, including elephant meat originating from the forest region. Although Bayanga, the town just north of the DSC, was not included as a study site by request of the Conservator of DSC, a total of 85 kg of elephant meat over a 12-month period was found in the central market by Hodgkinson (2009).

Ndélé and Bamingui in the north and much of the south-west are made up either of protected areas or hunting zones (**Figure 9**), thus transporting bushmeat of any kind to urban areas for sale would be illegal according to *Decree No. 84.256*.

Ivory transport

Market studies suggest that ivory is moving regularly from areas surrounding Ndélé and Bria south to Bangui and north-west to Sudan. Transport routes are depicted in Figure 10. Ivory moved north-west from Ndélé and Bamingui-Bangoran is transported mainly by camels and horses, as it is acquired by poaching or bought by Sudanese Arabs, who take most of it to Omdurman, where there is a thriving ivory market (Martin & Stiles, 2000; Martin, 2005). Considering that market research was carried out in Bangui for only 14 days, one can

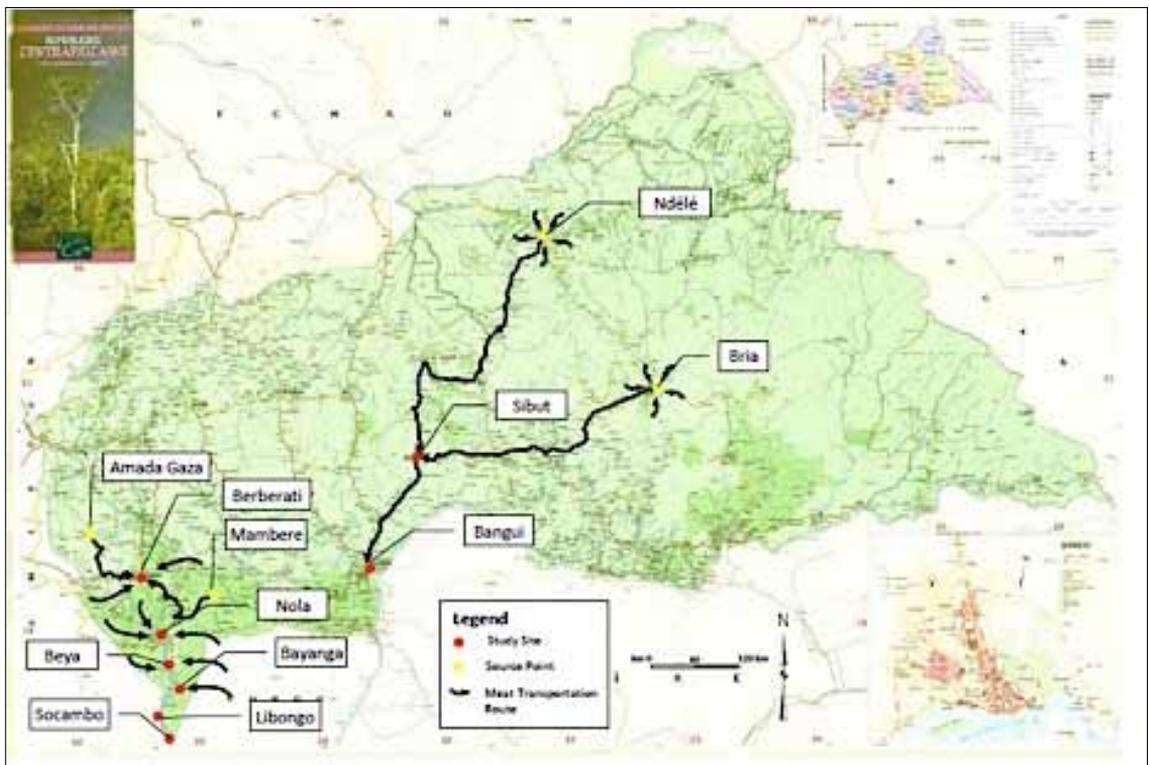


Figure 8. Elephant meat source points and transport routes in CAR (Source of Base Map: *Institut Géographique National français*, 1993)

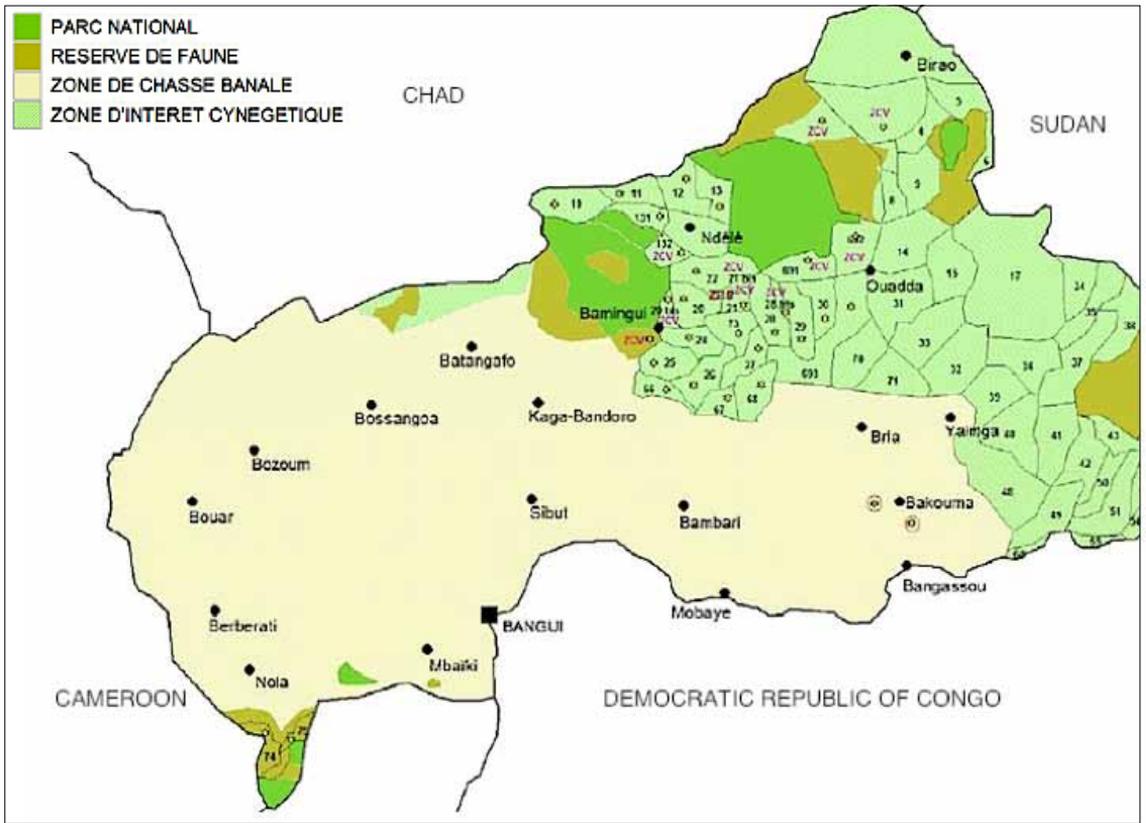


Figure 9. Ndélé and Bamingui, sources for elephant and other bushmeat seen in in Bangui, are located in hunting zones (the numbered polygons) and surrounded by protected areas, thus export of bushmeat is illegal. The same applies to meat sourced from within and around the DSC going to Nola and Berberati. (Source: Roulet & Mamang Kanga, 2008)

expect that additional details would emerge during a long-term study.

In Socambo and Libongo, information was gathered primarily from HL1, a hunter from CAR engaged in elephant poaching for over five years and HS1, a Cameroonian hunter engaged in elephant poaching for over three years, but also from other informants operating in the trade of ivory and meat in the region. The informants indicated that ivory from CAR crosses the Sangha River by pirogue and from there is stored in Libongo or Socambo until a buyer can be found. The middleman buyer then transports the hidden tusks by road (private car or logging truck most often) to Yaoundé or Douala via Yokadouma. No ivory sourced from the DSC area was documented in Bangui.

In 1999, Martin and Stiles (2000) found that most of the ivory used in manufacturing in Bangui originated in the Bangassou area to the east near the border with DRC. There has been recent activity involving ivory poaching

by Sudanese Arabs all along the CAR south-eastern border area (K. Ammann, pers. comm. to D. Stiles, July 2010); it is probable therefore that little ivory from there makes it to Bangui currently.

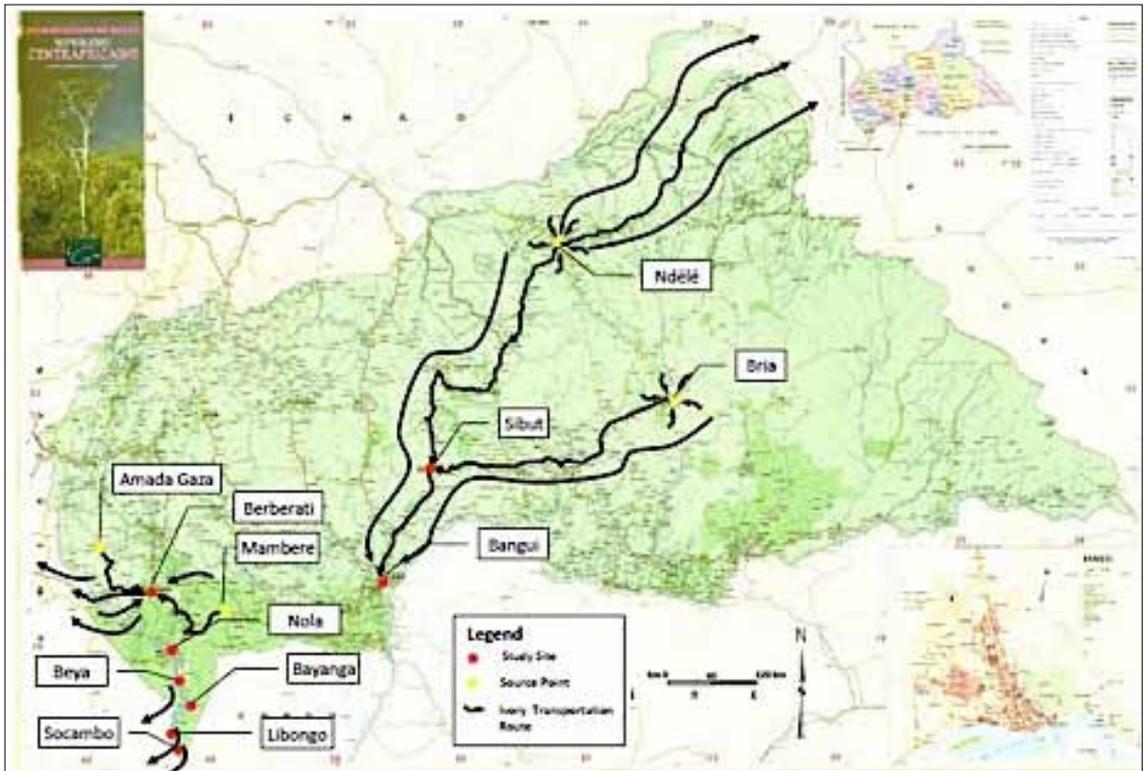


Figure 10. Ivory source points and transport routes in Central African Republic (Source of Base Map: *Institut Géographique National français*, 1993)

Conclusions

The CAR has strong legislation prohibiting the hunting of elephants and equally robust laws governing the trade in bushmeat. Trade in elephant meat and ivory, however, is not explicitly addressed by current legislation, and the legality of trade in both is ambiguous if laws are strictly interpreted. There are loopholes that potentially could be exploited, but apparently the Government considers trade in both elephant meat and raw ivory strictly prohibited, according to informants. Nevertheless, this study and others have documented the illegal hunting of elephants in all elephant habitats in CAR and the illegal trafficking of their products, primarily ivory and secondarily meat. Elephant meat is found openly for sale in Bangui and Berberati, for example, and worked ivory is sold openly in Bangui. The DSC MIKE monitoring site has reported a very high proportion of illegally killed elephants since 2005 (68%), demonstrating that the authorities do not have adequate control of poaching.

Although currently elephant meat is not common in markets and restaurants in Bangui and south-west CAR, there is evidence that elephant meat possesses a disconcertingly high status in urban areas amongst the elite. The wealthier segment of society is prepared to pay prices for elephant meat considerably higher than for most other meats. There is therefore the double risk that demand for elephant meat could increase as (1) the well-off sector grows in number and (2) elephant meat assumes a prestigious status, motivating the less well-off to purchase it for special occasions. For these reasons, it is imperative that demand for and availability of elephant meat be curtailed.

There are several levels of action that need to be addressed to reduce poaching of elephants and trade in their products. Efforts are needed to build up national ownership of conservation issues and concerns. This will require a willingness to confront the realities of a multi-million dollar trade, and of cultural practices that approve of consumptive use of wildlife.

Policy Recommendations

1. Inadequacies of good governance and law enforcement are at the root of the poaching and illegal wildlife trade issues. These inadequacies affect all areas of economic and social development and natural resource management, including biodiversity conservation. Poor governance and weak law enforcement

are seemingly intractable problems found in many parts of Africa and can probably only be influenced by the strongest possible measures taken by the international community – particularly a conjoined effort by donors and conservation organizations – to promote and encourage good governance and effective law enforcement.

2. In respect of elephants, national wildlife laws need to be amended to remove ambiguities and inconsistencies. All elephants, regardless of gender or tusk size, should be placed in list A and trade in any of their products, including the working of ivory, should be strictly prohibited.
3. The capacity of enforcement personnel operating within the TNS conservation zone should be strengthened so that operations can be targeted internationally in known meat and ivory transport sites (e.g. Libongo and Socambo).
4. Connected to (1.) above, wildlife management and police staff need better training, motivation and monitoring to increase their effectiveness in controlling illegal bushmeat and ivory movements and marketing at road checkpoints and in market places.
5. Public awareness and education campaigns to sensitize communities about the importance of conserving elephants should be intensified.
6. Elephant meat variables, such as butchered carcasses and smoking racks, should be scrupulously recorded in MIKE data collection and local staff of the DSC and other elephant areas trained to systematically collect these and other relevant data.



In 1999 worked ivory was sold openly in Bangui.
(Photo: Dan Stiles)

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