



Elephant Meat Trade in Central Africa

Democratic Republic of Congo Case Study

Daniel Stiles

2011



Supplement to the Occasional Paper of the IUCN Species Survival Commission No 45



About IUCN

IUCN, International Union for Conservation of Nature, helps the world find pragmatic solutions to our most pressing environment and development challenges.

IUCN works on biodiversity, climate change, energy, human livelihoods and greening the world economy by supporting scientific research, managing field projects all over the world, and bringing governments, NGOs, the UN and companies together to develop policy, laws and best practice.

IUCN is the world's oldest and largest global environmental organization, with more than 1,200 government and NGO members and almost 11,000 volunteer experts in some 160 countries. IUCN's work is supported by over 1,000 staff in 45 offices and hundreds of partners in public, NGO and private sectors around the world. Web: www.iucn.org

IUCN Species Survival Commission

The Species Survival Commission (SSC) is the largest of IUCN's six volunteer commissions with a global membership of 8,000 experts. SSC advises IUCN and its members on the wide range of technical and scientific aspects of species conservation and is dedicated to securing a future for biodiversity. SSC has significant input into the international agreements dealing with biodiversity conservation. Web: http://www.iucn.org/about/work/programmes/species/about_ssc/index.cfm

IUCN Species Programme

The IUCN Species Programme supports the activities of the IUCN Species Survival Commission and individual Specialist Groups, as well as implementing global species conservation initiatives. It is an integral part of the IUCN Secretariat and is managed from IUCN's international headquarters in Gland, Switzerland. The Species Programme includes a number of technical units covering Wildlife Trade, the Red List, Freshwater Biodiversity Assessments (all located in Cambridge, UK), and the Global Biodiversity Assessment Initiative (located in Washington DC, USA).

IUCN SSC African Elephant Specialist Group (AfESG)

The AfESG is a group of technical experts focusing on the conservation and management of African elephants. The broad aim of the AfESG is to promote the long-term conservation of Africa's elephants and, where possible, the recovery of their population to viable levels. Led by a volunteer Chair (currently Dr. Holly Dublin), the group consists of some 45 volunteer members drawn from all parts of the continent. All members are actively

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.

Elephant Meat Trade in Central Africa

Democratic Republic of Congo Case Study

Daniel Stiles





The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or other participating organizations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. The views expressed in this publication do not necessarily reflect those of IUCN.

Published by: IUCN, Gland, Switzerland

Copyright: © 2011 International Union for Conservation of Nature and Natural Resources
Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holder provided the source is fully acknowledged.
Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: Stiles, D. (2011). *Elephant Meat Trade in Central Africa: Democratic Republic of Congo Case Study*. Gland, Switzerland: IUCN. 53pp.

ISBN: 978-2-8317-1418-9

Cover photo: Reto Kuster. Elephants in Mehwa *edo*.

Layout by: Aksent Ltd

Produced by: IUCN/SSC African Elephant Specialist Group

Available from: <http://african-elephant.org>

Table of Contents

Acronyms	10
Acknowledgements	11
INTRODUCTION	12
Background	12
Objectives of the Study	13
The Okapi Faunal Reserve	13
Study Sites	18
Summary of Previous Activities Relevant to Elephants	20
National laws relevant to elephant hunting and bushmeat and ivory trade	24
METHODS	26
Personnel, data collection sites and dates	26
Data collection methods	26
RESULTS	28
Hunters	28
Elephant meat	28
Ivory	32
Transporters/Middlemen	32
Elephant meat	32
Ivory	33
Vendors	33
Elephant meat	33
Other meats	34
Ivory	34
Knowledge of laws	35
DISCUSSION	37
Elephant Meat	37
Ivory	37
Social networks and Commodity Chains	38
Transport and Distribution	40
External Factors	42

CONCLUSIONS	43
Policy Recommendations	43
REFERENCES	45
APPENDICES	48

Tables

Table 1. Important clearings (<i>edós</i>) in the Okapi F.R.	16
Table 2. Study sites.	18
Table 3. Bushmeat trade in the Ituri-Epulu-Aru Landscape.	21
Table 4. Sample case of work effort involved in an elephant hunt in OFR.	28
Table 5. Average utilization of meat taken from an elephant kill.	29
Table 6. Hunter's motive for killing elephants.	29
Table 7. Other animals hunted on an elephant hunt.	30
Table 8. Importance of different means of transport	32
Table 9. Tusks taken on last elephant hunt	32
Table 10. Prices of various meats in north-eastern DRC.	34
Table 11. Elephant meat prices compared to domesticated meats in Kisangani	34
Table 12. Ivory items seen for sale in Kisangani.	35
Table 13. Urban raw ivory prices in the DRC, 1989-2010, US\$/kg.	38

Figures

Figure 1. The Okapi Faunal Reserve.	13
Figure 2. Locations of <i>edos</i> and densities of Mbau forest (<i>Gilbertiodendron dewevrei</i>).	15
Figure 3. Elephant distribution in north-eastern DRC.	16
Figure 4. Elephant densities in OFR in 1995 and 2006.	17
Figure 5. Study sites.	19
Figure 6. The volume of ivory exports from DRC between 1888 and 1988.	22
Figure 7. Number of illegally killed elephants in OFR, 2003-2008.	24
Figure 8. The Ituri Forest area, in which the OFR is found, is increasing in the proportion of bushmeat it supplies to Kisangani.	37
Figure 9. The commodity chain permutations of elephant meat and ivory	39
Figure 10. Movement of elephant meat from OFR to marketing localities.	40
Figure 11. Movement of tusks from the OFR.	41

Photos

Photo 1. The Okapi Faunal Reserve makes up 22% of the Ituri Forest.	14
Photo 2. Illegal cut timber being loaded into a container on the RN 4.	19
Photo 3. Pygmies traditionally hunt small game with nets in the OFR, but they are often co-opted by commercial hunters to act as guides on elephant hunts.	25
Photo 4. Two 3-6 kg chunks of smoked elephant meat (<i>grume</i>) with tusks.	30
Photo 5. (A) 12-gauge shotguns (B) AK-47s	31
(C) A 12-gauge shotgun shell with manufactured bullet to hunt elephants	
(D) Different configurations of 7.62 mm AK-47 cartridges	31
Photo 6. Elephant meat vendor in Mambasa.	33
Photos 7 & 8. Smoked meat and dried fish were sold in a variety of manners, thus it was very difficult estimating prices per kg.	34
Photo 9. The largest carved tusk seen was about 35 cm, not big by African terms.	35
Photo 10. Most of the worked ivory seen was jewellery.	35
Photo 11. The Ministry of Culture and Arts in Kisangani issues export permits for worked ivory	36
Photo 11. Vehicles are stopped at the ICCN checkpoint at Epulu, but not searched.	42
Photo 12. Elephant meat-smoking racks are abandoned after the hunters depart. MIKE site monitoring patrols should include racks as an indicator signalling elephant meat as a cause of illegal killing.	44

Acronyms

AfESG	African Elephant Specialist Group
CARPE	Central African Regional Programme for the Environment (an initiative of the United States government to foster biodiversity conservation in the Congo Basin)
CBNRM	Community Based Natural Resource Management
CBFP	Congo Basin Forest Partnership
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DRC	Democratic Republic of Congo
ENRA	Enzymes Refiners Association
ETIS	Elephant Trade Information System, managed by TRAFFIC
FARDC	<i>Forces Armées de la République Démocratique du Congo</i> (The DRC national army)
GIC	Gilman International Conservation
ICCN	<i>Institut Congolais pour la Conservation de la Nature</i> (the wildlife and protected areas management authority in the DRC)
IMU	Inventory and Monitoring Unit of WCS
IUCN	International Union for Conservation of Nature
MIKE	Monitoring the Illegal Killing of Elephants, a CITES programme
OFR	Okapi Faunal Reserve
OSAPY	<i>Organisation d'Accompagnement et d'Appui aux Pygmées</i> (Organization of Aid and Support to Pygmies)
PC	Project consultant
SSC	Species Survival Commission
TRAFFIC	The wildlife trade monitoring network, a joint programme of WWF and IUCN
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCS	Wildlife Conservation Society

Acknowledgements

Thanks go to Pasteur Cosma Wilungula for inviting the consultant to visit the Okapi Faunal Reserve (OFR). The cooperation and assistance of Jean Joseph Mapilanga, the ICCN conservator of Okapi Faunal Reserve, and of Rosemarie Ruf, director of the Gilman International Conservation Okapi Conservation Project, is also much appreciated. Karl Ammann assisted greatly by putting the project consultant into contact with various helpful people, by sharing his extensive knowledge of the DRC and Central Africa in general, and by generously providing photographs and video material relating to elephant meat and ivory exploitation. Nathalie van Vliet shared information on the Kisangani bushmeat market, which is appreciated. Willy Loyombo, president of OSAPY, and research assistants Richard Lokoka and Andre Safari of OSAPY also contributed usefully to this study and Issa Issaka collected information in Kisangani. The support given by Diane Skinner and Holly Dublin of the IUCN/SSC African Elephant Specialist Group is gratefully acknowledged.

Introduction

Background

Wild game meat, or 'bushmeat', has been the most important source of protein in the Congo Basin forests of Central Africa for millennia (Wilkie & Carpenter, 1999; Bakarr, et al., 2001). Human population density was very low over most of this long period, but over the last century population growth has been rapidly increasing with the introduction of modern health care and better nutrition (Bennett, 2008). Roads are penetrating previously inaccessible forests to prospect for oil and minerals or to log for timber (Wilkie, et al., 2000; Laurance, et al., 2006). These new roads and economic activities attract farmers and hunters.

Agricultural interventions such as cocoa, coffee and oil palm plantations in the name of economic development degrade the forest and attract even more people (World Bank, 2011). Hunting methods have changed radically over the past few decades with the introduction and spread of military weapons, dramatically increasing bushmeat offtake (Barnes, 2002; Fa & Brown, 2009). All of these factors impact negatively on biodiversity in general and on mammals in particular (Nasi, et al., 2008).

Central Africa presents a radically and rapidly changing dynamic for elephants. Range fragmentation is pushed by human population growth and by the expansion of extractive activities into remaining wilderness areas. Associated corruption and disregard of established laws by government officials and the populace contribute to the uncontrolled exploitation of natural resources. In addition, persistent conflict in the region and subsequent spread of arms, facilitate the killing of elephants and the marketing of their products.

A growing body of evidence indicates that Africa is facing a dangerous resurgence in illegal elephant killing following a relative lull of over a decade since 1990 with the commencement of the Convention on International Trade in Endangered Species (CITES) international trade in ivory moratorium. News reports, announcements by Interpol and TRAFFIC, amongst others, report increasing numbers of ivory seizures, including some of the largest ever recorded. The Democratic Republic of Congo (DRC) was implicated in more ivory seizures between 1989 and 2009 than any other country in Africa. There is also evidence to suggest that the DRC is the source of some of the ivory found in large consignments destined for

Asian markets through Uganda, Kenya and Tanzania (Milliken, et al., 2009).

News reports to date have focused almost exclusively on the illegal trade in ivory, implying that this is the primary economic driver. An unacknowledged issue is the trade in elephant bushmeat. Elephant bushmeat is potentially a major economic bonus, and available to actors who may have little access to the proceeds from ivory.

In addition, the consumption and trade of elephant meat may reflect underlying human-elephant conflict, with retaliatory killings or 'authorized' culls being a source of meat. In many Central African countries, exaggerated claims of elephant crop raiding are used as a pretext for state sanctioned killing and distribution of meat. Permissions for the killings, and the meat windfall, are used by local politicians to gain popular support (John Hart, in litt., 2010). Wildlife laws in Central Africa permit the harvesting of administratively culled elephants.

While elephant meat may be a by-product of the ivory trade, it could also be a primary driver of elephant deaths in certain localities and of particular concern for conservation, given that elephants with small or no tusks can be targeted. While ivory networks target large tusk accumulations intended for export, and thus focus on the last remaining subpopulation concentrations – usually in protected areas – elephant bushmeat can be attractive and even profitable when the number of elephants to be killed are far fewer, and the value of the acquired ivory is almost negligible.

An initial assessment of the existing Convention on International Trade in Endangered Species - Monitoring the Illegal Killing of Elephants (CITES-MIKE) programme's carcass database, pertaining to information collected between 2001 and 2009, indicates that the demand for elephant meat, especially in the Central African subregion, may be an important factor underlying the illegal killing of elephants (CITES, 2010). The dynamics, scale and impact of the trade in elephant meat are not well understood and more information is required, both to improve the information in MIKE and the Elephant Trade Information System (ETIS) and to assist with the development of appropriate policy and management strategies.

The IUCN/SSC African Elephant Specialist Group (AfESG) has been charged by MIKE with implementing a



Photo 1. The Okapi Faunal Reserve makes up 22% of the Ituri Forest. (Photo: Dan Stiles)

large population of elephants and where poaching activity with concomitant ivory and elephant meat trade has been demonstrated to occur (Mubalama & Mapilanga, 2001; Amboya, 2004; Hart, et al., 2008; CITES, 2010). Towns and villages along the National Road (RN) 4, part of the TransAfrican Highway, between Niania and the Orientale Province capital of Kisangani were also surveyed for bushmeat and ivory, as well as Kisangani itself.

The OFR was established in 1992 by Ministerial Decree no. 045/CM/ECN/92 of 2 May. In 1996, the reserve was established as a World Heritage Site and in 1997, because of armed conflict in the area, it was inscribed on the list of World Heritage in Danger sites, along with four other World Heritage sites in eastern DRC (UNESCO, 2010; Balongelwa, 2008).

The OFR covers 13,726 km², although if a section yet to be confirmed by the Government in the south-west corner is included, the area measures 14,139 km² (Hart, et al., 2008). The OFR is one of the most biodiversity rich protected areas in the Congo Basin and comprises about 22% of the Ituri Forest. The reserve is located in the basins of the Ituri and Nepoko rivers, with its tributaries the Epulu and Ngayu rivers. It varies in altitude from 700 to 1000 m, with a few rock inselbergs rising to 1200 m that provide microhabitats for a few particular species

(e.g. rock hyrax and cane rat). Rainfall varies between 1600 to 2000 mm annually.

The OFR is located within the Ituri-Epulu-Aru Conservation Landscape (40,862 km²), which is one of 12 landscapes in the Congo Basin Forest Partnership (CBFP) (**Figure 1**). The CBFP was launched in 2002 at the World Summit on Sustainable Development in Johannesburg. The partnership is based on a voluntary agreement between governments, the private sector, civil society and development organizations. Today, it comprises 48 members working together for a common objective of sustainable management and development of the Congo Basin forests and natural resources (CBFP, 2011). The Ituri Landscape planning team includes consortium members (Wildlife Conservation Society (WCS), IUCN, Central African Regional Programme for the Environment (CARPE) and Gilman International Conservation (GIC)) and local management partners such as the *Institut Congolais pour la Conservation de la Nature* (ICCN, the DRC protected area management authority) and the Ministry of Environment. One of the key initiatives is working with stakeholders to develop management plans for protected areas, community-based natural resource management zones (CBNRM) and extractive resource zones (ERZ). There are three CBNRMs: Banana (575 km²), Andekau (6,973 km²), and

Bakwanza (2,181 km²) and one EPZ: the ENRA logging concession (520 km²) (Brown, et al., 2008; Anon., 2009).

In the OFR, managers are drafting a revised management plan. Twelve agriculture zones (34,982 ha) have been delimited with management agreements signed between ICCN and local communities and authorities. Almost all of these are located on the RN 4 and most existed around villages before the reserve was created. Participatory mapping has produced geo-referenced data for hunting territories in nine villages covering 271,599 ha, and results from biological surveys helped define the limits of a proposed core conservation zone covering 481,600 ha in the centre of the OFR. A land use planning strategy document was written for these zones and local committees were formed to serve as governance structures for sustainable resource use, including timber exploitation in community-managed forests, bushmeat alternatives and agriculture.

The governance situation in the Ituri Landscape is unique. The national government has had a very weak presence there, particularly since the civil war beginning in 1996, and the provincial government holds effective power. This arrangement runs the risk that provincial decisions may be called into question by the national government at some later point in time, but what was done seems to be appropriate under the prevailing conditions (ECODIT, 2010).

There are four main forest types in OFR: swamp forest, mixed forest, *mbau* forest and secondary forest. Swamp forest occurs in narrow strips along drainage channels throughout the reserve. Mixed forest typically is tall with a crown height of 30-40 m, a heterogeneous canopy comprising frequent emergent trees with an open understory and dense sub-canopy. *Mbau* forest is 90% dominated by *Gilbertiodendron dewevrei*, which often occurs in pure stands (Figure 2). Tree height is typically 30-40 m with a dense even canopy. Secondary forest generally occurs in areas that have been deforested.

There are 52 mammal species in the OFR, including the eponymous okapi (*Okapia johnstoni*), which is endemic to the north-eastern DRC. Other species include the forest elephant (*Loxodonta africana cyclotis*), chimpanzee (*Pan troglodytes*), the endemic water chevrotain (*Hyemoschus aquaticus*), bongo (*Tragelaphus euryceros*), African golden cat (*Profelis aurata*), giant forest genet (*Genetta victoriae*), the endemic aquatic genet (*Osbornictis*

piscivora), leopard (*Panthera pardus*), giant ground pangolin (*Manis gigantean*), armadillo (*Orycteropus afer*), pygmy antelope (*Thryonomys swinderianus*), forest buffalo (*Syncerus caffer nanus*), bush pig (*Potamochoerus porcus*), giant forest hog (*Hylochoerus meinertzhageni*) and great cane rat (*Thryonomys swinderianus*). There are also a great number of duiker (*Cephalophus spp.*) and monkey (*Cercopithecus spp.*, *Colobus spp.*) species. Also present are the clawless otter (*Aonyx congica*), brush-tailed porcupine (*Atherurus africanus*), Sitatunga antelope (*Tragelaphus spekei*), black-legged mongoose (*Bdeogale nigripes*), black mongoose (*Crossarchus alexandri*) and marsh mongoose (*Atilax paludinosus*). Two crocodiles are found: the African slender-snouted crocodile (*Crocodylus cataphactus*) and the African dwarf crocodile (*Osteolaemus tetraspis*). The abundant and diverse wildlife provides a rich source of bushmeat to the local population.

Elephants have created small clearings in swampy areas for bathing or digging for minerals, while four larger

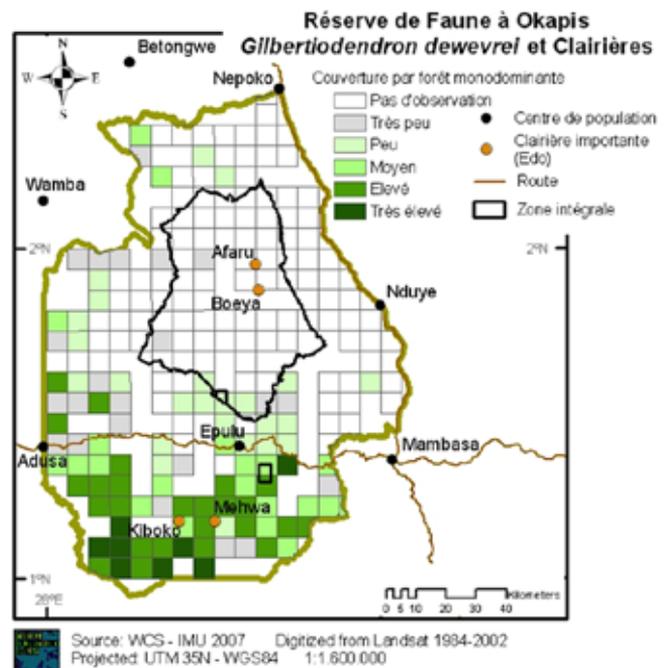


Figure 2. Locations of edos and densities of Mbau forest (*Gilbertiodendron dewevrei*)

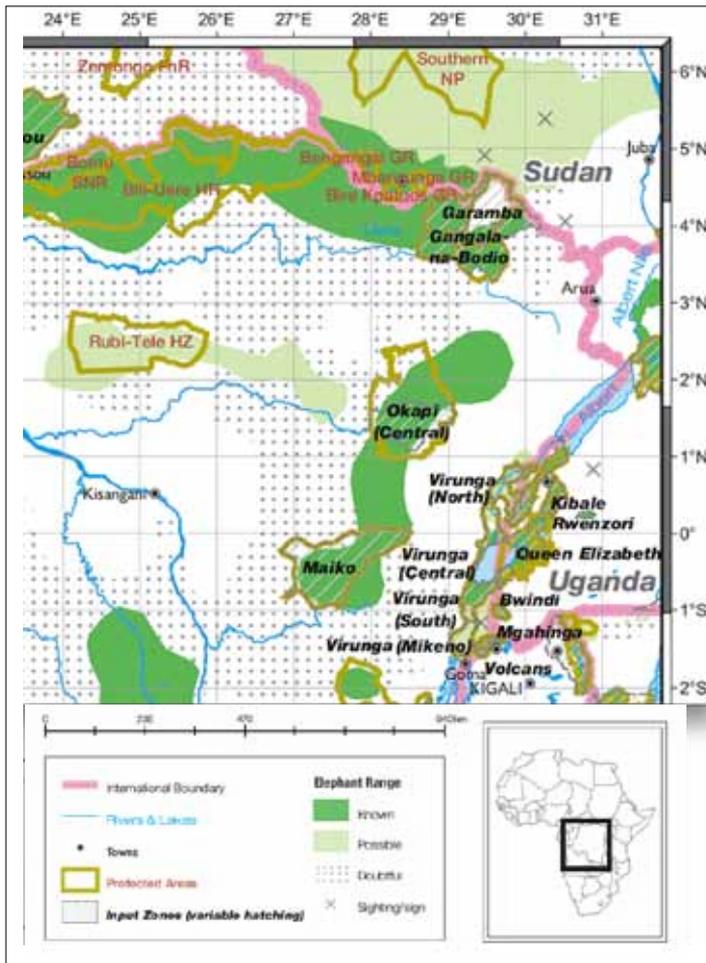
clearings of high importance have existed for centuries. These edos measure about 1.5 ha each in area and two of them are salt licks (see cover photo). Table 1 presents their characteristics and Figure 2 shows their locations. These clearings tend to draw poachers, because large game animals are attracted to them. Large mammals,

Table 1. Important clearings (*edos*) in the Okapi F.R.

Name	Importance	Exceptional Value
Mehwa	Salt lick, many large mammals and birds	Spectacular concentrations of pigeons, Grey parrots, turacos and others
Kiboko	Crocodiles and formerly elephants	Hosted hippos in the recent past
Boyea	Salt lick and high incidence of mammals	Many elephants, buffalo and bongo
Afaru	High incidence of large mammals	Many elephants

Source: Hart, et al., 2008

Figure 3. Elephant distribution in north-eastern DRC (Source: Blanc, et al., 2007)



including elephants, have abandoned Kiboko edo due to heavy poaching.

Figure 3 shows the elephant range distribution in the northeastern region of the DRC and the location of the OFR in relation to Kisangani and other protected areas in the region.

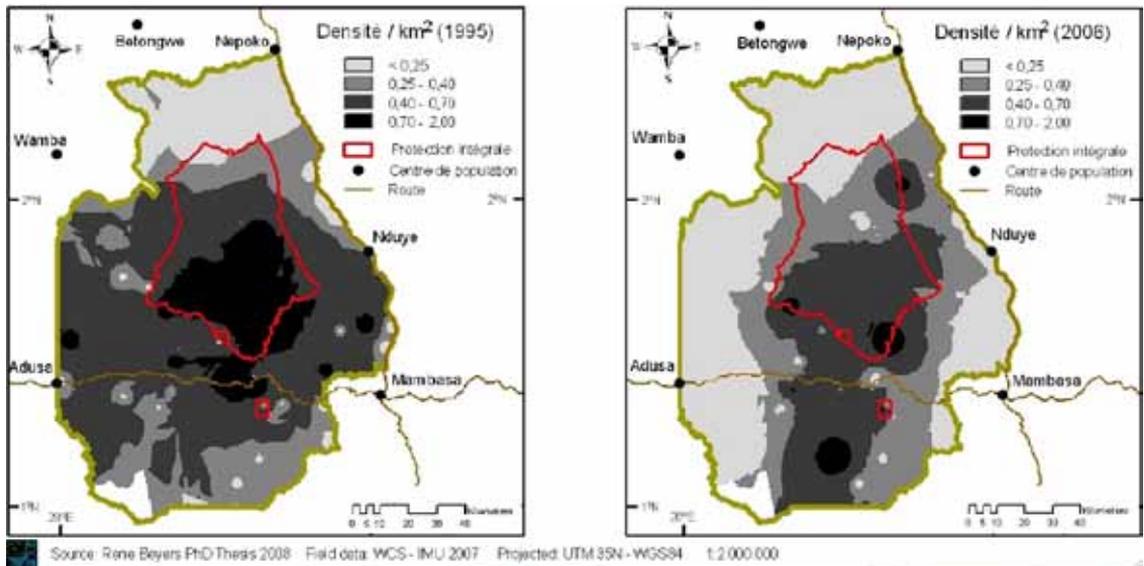
The number of elephants (*Loxodonta africana cyclotis*) in the forest was estimated in 1995 at about 6,800 (Hart, et al., 2008), but they have been heavily poached for ivory since then. The most recent survey estimates that there are about 3,500 elephants left in the reserve (Hart, et al., 2008), based on dung count transects (Figure 4). It is evident that the high-density areas of elephants in the OFR have declined considerably since 1995. This could be due to losses by poaching, to out-migration or to both.

Hunter-gatherers and shifting cultivators have occupied the margins of the Ituri Forest for centuries. The present populations derive from Nilotic and Bantu migrations and include the indigenous Pygmies, who number about 30,000. The Pygmy groups in the Ituri forest are the Efe and Mbuti. They follow a semi-nomadic hunter-gatherer lifestyle, depending on wild game and fish caught with traditional fibre nets or archery, but some groups today are settling into semi-permanent villages near settlements, mainly along roads.

The main game species of the Pygmies are small ungulates and primates; they do not traditionally hunt elephants (Ichikawa, 1983; Hart & Hart, 1986; Bailey & Peacock, 1988). When not hunting, they gather insects, fungi, fruits, seeds, plants

and honey and they excel in the use and identification of wild plants. Most of the cultivators in the region are Bantu, the dominant ethnic family that includes Lese, Bila, Mamvu, Bira, Ndaka and Budu. Long-standing economic and cultural ties exist between the Pygmies and traditional forest farmers, with the Pygmies exchanging

Figure 4. Elephant densities in OFR 1995 and 2006 (Source: Hart, et al., 2008)



Year	Dung Density (no. ² /km)		Population Estimate		
	Mean	S.D.	Mean	Minimum	Maximum
1995 (1993-1995)	0.483	0.1028	6,803	4,502	10,284
2006 (2005-2007)	0.251	0.0762	3,539	1,978	6,333

game and honey for cultivated starch foods to balance their diet. More recently, Pygmies trade to obtain tobacco and alcohol as well. Because the forest habitat offers little grazing land, there are very few livestock, except for goats, which are too few to offer a regular supply of protein to the human population (Anon., 2009).

Until 2000, the human population in the forest was relatively low, with few permanent settlements, mostly along the roads, with some gold mining in the interior. In 1990 the population was estimated at 15,600 people and decreasing owing to the decay of the road system. But since the disturbances in North Kivu beginning in the 1990s, urban Bantu immigrants and Nande cultivators are increasingly encroaching on the forest from the south-east. In 1996 a civil war erupted that evolved into a general state of armed conflict involving the armies of the DRC, Rwanda and Uganda and a plethora of heavily armed militias. During 2000 and 2001, due to a brief ten-fold increase in the world price of coltan, there was an influx of 4,000 coltan miners needing meat. With the accompanying Rwandan Interahamwe and Congolese Mai-Mai armed militias, these wiped out the animals around their camps, threatening the way of life of the

Mbuti and Efe Pygmies. Between 2002 and 2004 the national police and local militias set up camps in the OFR and hired poachers to kill elephants for their ivory (Human Rights Watch, 2005; Anon., 2009). These militias were cleared out of the OFR in 2005 by a joint operation of the *Forces Armées de la République Démocratique du Congo* (FARDC, the DRC national army) and the ICCN (Anon., 2009). By 2006 elephant poaching had decreased dramatically (Balongelwa, 2008; Hart, et al., 2008), even though OFR still has the highest proportion of illegally killed elephants of any MIKE monitoring site in Africa (CITES, 2010).

Due to chronic political instability to the south and east of the OFR, there continues to be a steady influx of immigrants in search of farm land and attracted by mineral resources such as gold, diamonds, coltan and cassiterite (tin) and organic resources comprised of timber, ivory and bushmeat. In 2007, WCS found four active villages inside the OFR with a total population of about 70 people. They also found several active and abandoned agricultural fields inside the reserve along with mining and fishing camps (Hart, et al., 2008). Legal agricultural zones exist around villages located on the

ENRA

WCS initiated forest inventories in the north-eastern region of DRC (Ituri Forest landscape) to assess timber resources in the logging concession of Enzyme Refiners Association (ENRA). The forests of eastern Congo are a major source of timber for neighbouring countries (Uganda, Rwanda and Kenya), a fact that is fuelling illegal logging and timber trade in the region (Hart & Ducarme, 2005). In addition, the ENRA concession has been invaded by hundreds of illegal farmers who practice slash-and-burn cultivation, destroying more forest.

ENRA is the only legitimate timber company presently operating in the OFR area. Timber extraction uses heavy machinery for road construction, skidding and transporting logs from the forest to the mills. All the logs are processed locally and the wood is turned into high quality parquet flooring, crafted doors and windows, and carved furniture. However, most of the final products are only destined for a small wealthy elite in DRC or exported abroad (Makana, et al., 2006).

When ENRA began operations in 1984, the forest contained elephants, chimpanzees, okapi and other wildlife. The concession was an important elephant migration corridor between OFR and Virunga National Park. Since the forest invasions, these species have largely disappeared (Anon., 2008). ENRA is now working with WCS and CARPE to formulate and implement a community participation plan for forest management, in conformance with the DRC Forest Code (*Law n° 011/2002 of 29 August 2002*).

With the creation of defined areas for cultivation, hunting, collecting and logging, it is hoped that the elephant corridor with Virunga can be re-established.

RN 4 (see **Figure 1**). There is also a 52,000 ha forestry concession to the south-east of the reserve run by Enzymes Refiners Association (ENRA) that produces from 5,000 to 7,000 m³ of cut timber a year (Anon., 2009). Additional cut timber is produced illegally from artisanal sawmills in the forests, which is smuggled out in containers carried on trucks, either to Uganda and Kenya or to Kisangani.

There used to be coffee plantations in the area, but all large-scale commercial agriculture collapsed after the conflict began, along with the road system. The only 'good' road is the unpaved RN 4, rehabilitated in 2005 by the World Bank (Anon., 2009).

Study Sites

Table 2 gives the names of settlements in which investigations were carried out.

See **Figure 5** for the study sites in Mambasa and Bafwasende Territories.

Mambasa Territory

Mambasa is the largest Territory in Ituri District, with an area of 36,783 km², with its administrative centre in Mambasa town. North Uélé District is located to the north, Tshopo District to the west, Irumu and Djugu Territories to the east and Beni and Lubero Territories in North Kivu Province to the south/south-east. The human population

Table 2. Study sites

N°	Study sites	Territories ¹
01	Bafwasende centre	Bafwasende
02	Bafwakobi (PK 314)	Bafwasende
03	Niania	Mambasa
04	Badengaido	Mambasa
05	Nduye	Mambasa
06	Banana	Mambasa
07	Mambasa centre	Mambasa
08	Bandisende	Mambasa
09	Lolwa	Mambasa
10	Kisangani	Ville de Kisangani

¹Territories are administrative units within Districts.

is estimated to be 307,162, made up of Lesse, Bilas, Mbos, Ndaka, Nande and Pygmies. The Nande originate in North Kivu and live mainly in the southern part of Mambasa. The OFR and the ENRA logging concession are in Mambasa Territory.

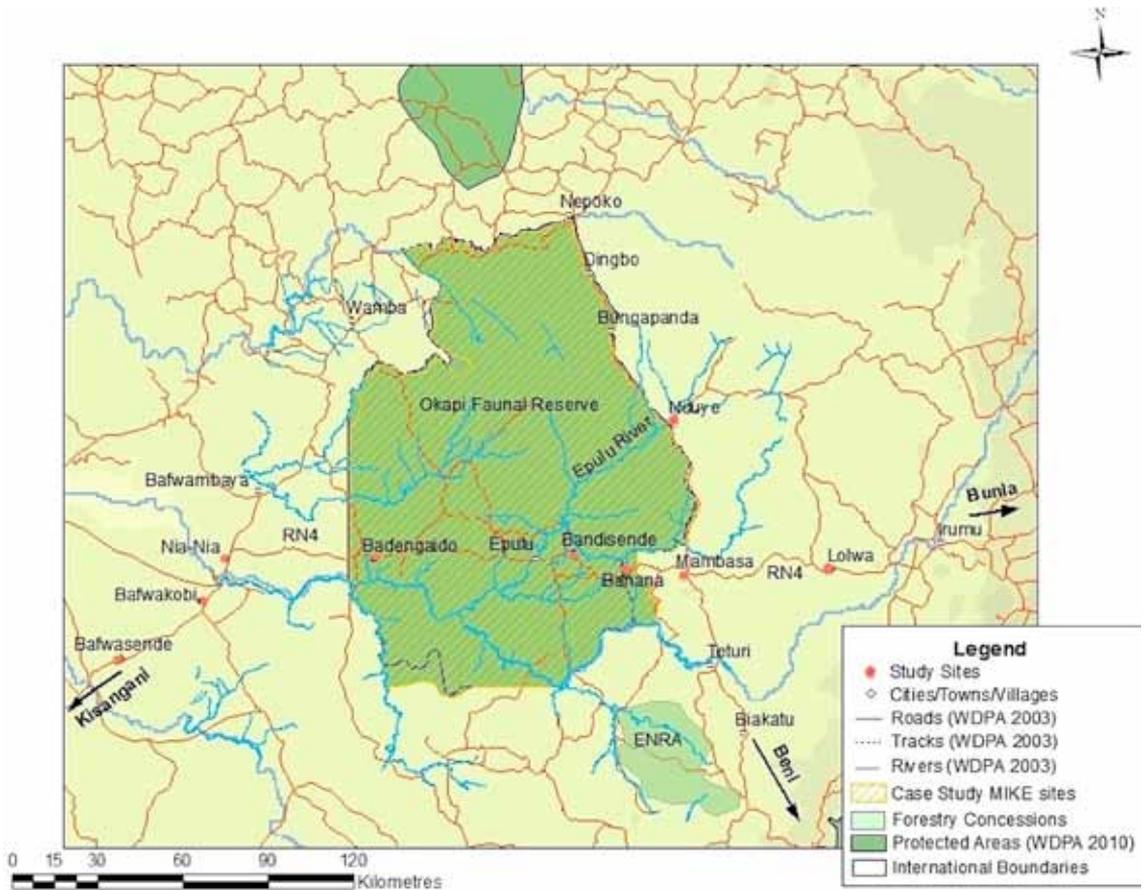
Bafwasende Territory

Located in Tshopo District, Bafwasende is the largest territory in the DRC, but the most sparsely populated. Mambasa Territory is to the east, Kisangani town to the west, Banalia Territory to the north and North Kivu Province to the south. The human population is made up of Bila, Kumu, Barombi, Pygmies and Nande. The TransM-Bois and La Forestière logging concessions are located in the Territory.



Photo 2. Illegal cut timber being loaded into a container on the RN 4 (Photo: Dan Stiles)

Figure 5. Study sites around the OFR



Kisangani

Kisangani is the third largest city in DRC (ca. 650,000 inhabitants) and is the capital of Orientale Province located about 450 km south-west of the OFR on the RN 4. It is located about 2,000 km from the mouth of the Congo River and 1,730 km from Kinshasa by river. It is the farthest navigable point upstream and there is a port that is used for shipping timber and other goods downstream. The city is an important commercial hub for river and land transportation and is a major marketing and distribution centre for the north-eastern part of the country. There are at least seven markets in the city where bushmeat is sold.

Summary of Previous Activities Relevant to Elephants

BUSHMEAT

Hunter-gatherer research

Various anthropological research projects were carried out in the 1970s and 1980s on Pygmies in the Ituri Forest (e.g. Hart, 1978; Hart & Hart, 1986; Baily & Peacock, 1988; Ichikawa, 1983; Wilkie, 1989; Wilkie & Curran, 1989; Wilkie, et al., 1992). These studies dealt with human ecology, hunting techniques, animal off-take, and land-use and settlement patterns. Since Pygmies did not traditionally hunt elephants, the research is of only indirect relevance to this study. None of them discuss trade in elephant meat or ivory.

Bushmeat research

Wilkie, et al. (1998) studied bushmeat off-take around the OFR and concluded that the area was too small to provide a sustainable supply of bushmeat to meet domestic demand from the area's inhabitants, given the over 3% annual population growth. The paper proposed management approaches that addressed the demand for and supply of bushmeat, which are targeted at those political districts within the OFR where hunting is the greatest threat to populations of bushmeat species.

In 1996 and 1997 De Merode and others (2004, 2006, 2007) studied bushmeat off-take, utilization and trade around the Garamba NP, about 200 km north-east of the OFR during periods of armed conflict and peacetime. They found that bushmeat was much more important economically than nutritionally, as most meat was sold, making up an important part of household income. They also found that the poorer segment of the population did not benefit much from wild resources because of social and political constraints on access – community leaders and/or military commanders controlled hunting

and trade in bushmeat and other natural resources. They also concluded that social institutions such as traditional leadership (i.e. village chiefs and elders) were more important than law enforcement (i.e. anti-poaching patrols) in controlling the poaching of protected species and trade in their products.

Lokoka & Boundawana (2010) studied poaching and bushmeat off-take in OFR from May 2009 to May 2010. The *Organisation d'Accompagnement et d'Appui aux Pygmées* (OSAPY), a local NGO that works mainly to improve the livelihood of Pygmies, set up a network of bushmeat hunting and trading monitors along the RN 4 highway and its north-south offshoots that pass in the OFR area, as part of the CARPE programme. The study identified a number of persons and localities involved in illegal hunting of elephants and other bushmeat species. They found that 18 of 24 informants reported poaching elephants and trading in either its meat or ivory. The AK-47, a small-calibre military firearm, was the most commonly used weapon to hunt elephants and other large mammals, often by members of the FARDC, the Congolese army. They found that local military officers, business people, professional poachers and even the environmental officer of Nia-Nia were involved in poaching and meat and ivory trafficking.

CBFP activity

In 2006, the Ituri-Epulu-Aru Landscape consortium began work on a land-use planning strategy that included bushmeat management. As part of this process, a stakeholder participation policy is being formulated. Consortium members (WCS, CARPE, GIC, IUCN) raise awareness and educate stakeholders about the national Forestry Code and the value of zoning and land-use planning. Since local government authorities lack funds and expertise, a consortium of NGOs helps build local capacity by facilitating the creation of local resource management structures and by assisting stakeholders to articulate a concept for resource management (Brown, et al., 2008).

Consortium partners have collected data on human populations and their livelihood activities in the Landscape. Biological and socio-economic data were collected in the ENRA logging concession. Studies on bushmeat hunting, non-timber forest products and artisanal timber exploitation were conducted. Participatory sketch mapping was conducted in 42 villages in the three CBNRM zones (Banana, Andekau and Bakwanza). This information is being used to guide the land-use planning process, especially for community-managed forests.

Table 3. Bushmeat trade in the Ituri-Epulu-Aru Landscape (Source: Brown, et al., 2008)

Bushmeat species	Site	Unit	Purchase price/unit (\$)	Primary destinations
Blue duiker (<i>Cephalophus monticola</i>)	Protected area, Epulu	Whole	4	Inside Landscape
	CBNRM Andikau	Whole	3	Inside Landscape
	CBNRM Bakwanza	Whole	4.5	Outside Landscape
	CBNRM Banana	Whole	4	Inside Landscape
	Mambasa town	Whole	5.5	Outside Landscape
	Makumo town	Whole	12	Outside Landscape
Monkey spp.	CBNRM Bakwanza	Whole	4	Outside Landscape
	Mambasa town	Whole	6	Outside Landscape
	Komanda town	Whole	7	Outside Landscape
	Niania town	1/6	3	Inside Landscape
Red duikers (ex. <i>Cephalophus dorsalis</i> , <i>C. callipygus</i> , <i>C. sylvicultor</i> , <i>C. leucogaster</i> , etc.)	Protected Area, Epulu	1/4	4	Inside Landscape
	CBNRM Andikau	1/6	3	Inside Landscape
	CBNRM Bakwanza	1/6	4.6	Outside Landscape
	CBNRM Banana	1/8	2	Inside Landscape
	Mambasa town	1/6	5.5	Inside Landscape
	Komanda town	1/6	7	Outside Landscape
	Niania town	1/6	4.5	Inside Landscape
Hog (ex. <i>Potamochoerus porcus</i>)	CBNRM Bakwanza	kg	1.5	Inside Landscape

The draft management plan calls for the commercial production of an ambitious range of products ranging from sawtimber and other wood and non-woody forest products to bushmeat and fish. The income projected to communities could be substantial, particularly from sawtimber (US\$ 2.7 million/year). Bushmeat would be marketed only in local villages – with long distance trade prohibited – and generate an estimated US\$ 21,600/year (ECODIT, 2010).

WCS/CARPE participation in the Bush Meat Task Force underscored the need to integrate bushmeat strategies with other programmes such as poverty reduction, livelihoods improvement, community forestry, mining and health. Much of the focus has been on monitoring the severity of the bushmeat problem. Natural resources management activities outside of protected areas showed promise for reducing small-scale bushmeat hunting (Brown, et al., 2008; ECODIT, 2010). **Table 3** shows bushmeat prices observed in 2008. Unfortunately, elephant meat was not among them.

The CBNRM approach is one that is being applied across Central Africa in an attempt to transfer tenure rights and management authority of forest lands from government to local communities. The basic assumption is that if local communities benefit significantly from local natural resources, they will work to utilize them sustainably (Karsenty, 2010).

IVORY

ITRG (1989)

In 1989 the Ivory Trade Review Group, working under the auspices of the IUCN/SSC AfESG, published the results of a continent-wide survey of the ivory trade in Africa (Cobb, 1989). The purpose was to gather together sufficient data on the trade to allow the Parties to CITES to make an informed decision on whether to instigate a moratorium on the international trade in ivory. Zaïre, as the DRC was then known, was included in this survey.

De Meulenaer & Meredith (1989) believed that the DRC in 1989 contained more elephants than any other country in Africa, 112,000, more than the total for all of eastern Africa. This estimate was later reduced to 72,000 after systematic surveys and modelling on the effects of poaching were undertaken (Michelmore, et al., 1994; Barnes, et al., 1995).

De Meulenaer and Meredith (1989) stated that the single most important source of ivory in Africa for the two decades preceding 1989 was the DRC. The massive decline of the elephant population since then would

suggest this trend has continued. They estimated that in the decade 1979-1988 some 2,648 tonnes of raw ivory were exported from the DRC, approximately 73% of this undeclared and illegal, much of it smuggled to the Republic of Congo, CAR, Burundi and Uganda for onward export. This amount constituted an estimated 36% of all raw ivory that was exported from Africa in this period.

Figure 6 shows an estimate of ivory exports from the DRC from 1888 to 1988, demonstrating that this country has a long history of elephant exploitation for ivory. North-eastern DRC and the project area has been involved in this trade for at least a century.

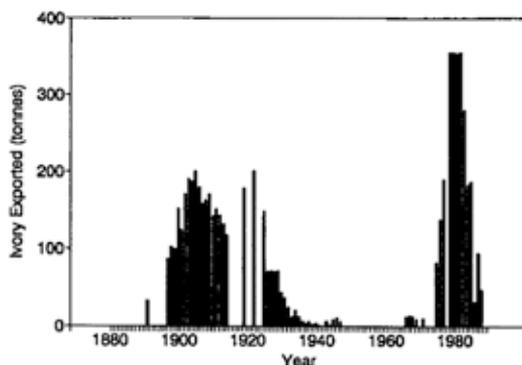


Figure 6. The volume of ivory exported from the DRC between 1888 and 1988 (The unusually high spike in 1967 is most likely a recording error.) (Source: Barnes, 1996)

Raw ivory middleman prices fluctuated considerably in the 1988-1989 period, but averaged in Kisangani around US\$ 36/kg for <5 kg tusks and US\$ 59/kg for 5-10 kg tusks. No prices were obtained for larger tusks, perhaps because they were all exported. Informants in Kinshasa stated that hunters in eastern DRC gained US\$ 20-25/kg.

The domestic carving industry was very active in the 1988-1989 period. The Ministry of Arts, Culture and Tourism registered workshops and carvers. In Kinshasa there were 21 ivory workshops employing 180 carvers, plus an additional 12 independent carvers. In Kisangani the industry was even more active, with 39 workshops and 245 carvers. A Hong Kong Chinese ivory factory was set up in early 1988 in Kisangani and was very active in August 1989. In the whole country there may have been 200-300 workshops with 3,000-5,000 carvers in 1989, although with the approach of the expected CITES ivory trade moratorium, activity began to decline (De Meulenaer & Meredith, 1989). The Chinese ivory factory, which had a Congolese army general as a partner with a Hong Kong businessman, was processing 2 to 4 tonnes

of ivory a month. In July 1989 it began processing 7 tonnes of ivory to make signature seals. It is not known what happened to this factory after the CITES trade ban.¹

Martin & Stiles (2000)

The next ivory survey took place a decade later in 1999, but focused only on Kinshasa (Martin & Stiles, 2000). ITRG did not examine retail outlets selling ivory in DRC, but informants at the Bikeko crafts market in Kinshasa in 1999 said that in 1989 there were between 68 and 74 tables selling ivory there (Martin & Stiles, 2000). The number of tables selling worked ivory in the Bikeko market had declined from around 70 in 1989 to 26 in 1999. A total of 3,324 ivory items was counted weighing an estimated 285 kg. Three other outlets were found in the city selling a total of 94 items weighing 7 kg. Thirteen ivory workshops were found in Kinshasa employing 157 craftsmen, some of them part-time. About 1,000 raw, partially worked and finished ivory pieces were seen in the workshops weighing an estimated 180 kg. Informants gave widely varying prices for tusks (as they did around OFR in this study), but they ranged from US\$ 30/kg for small tusks to US\$ 100/kg for large tusks. Informants said that prices had risen due to a cut-off of supplies from the east as a result of the civil war. An informant from eastern DRC said that ivory was much cheaper in the east, averaging US\$ 20/kg. The Kinshasa ivory traders exported and personally carried raw and worked ivory to Brazzaville, just across the Congo River, and to Luanda in Angola, and West Africans came to take ivory back with them to Nigeria and Senegal.

Even though informants said that there had been a sharp rise in prices in Kinshasa in 1999 due to the cut-off of ivory supplies from the east as a result of the civil war, tusk prices were still well below that of 1989 in inflation-adjusted terms.

Mubalama & Mapilanga (2001)

Mubalama & Mapilanga (2001) reported on anti-poaching activities in OFR during the civil war period (1996-2000), specifically focusing on elephants. They noted how the arrival of foreign military personnel and rebel militias, the increased number of weapons in circulation, and an upsurge in demand for bushmeat and ivory all led to an increase in poaching. In July 2000, elephant meat sold for US\$ 5/kg in Mambasa, Beni and Bunia and ivory had doubled in price from US\$ 10/kg in 1998 to US\$ 20/kg. The ICCN only had 50 guards to patrol a huge area

¹With the growth of the mammoth ivory business in China and Russia, there is a fear that a mammoth ivory factory could be set up in Africa that could function to launder illegal elephant ivory under the guise of legal mammoth ivory (see Martin & Martin, 2010).

(one guard per 274 km²) and they had little transport and carried muzzle-loading rifles, no match against AK-47s. The DRC government had cut off funding before the war broke out, so WCS, GIC and the Cincinnati Zoo raised money to keep ICCN going.

The critical situation regarding elephants was brought to the attention of the international conservation community, which resulted in additional funding from the United Nations Foundation and UNESCO and equipment, financial bonuses and training for ICCN from CITES-MIKE, WCS and GIC. Armed with modern weapons and support from the international community, and with political support negotiated with the strongest rebel group in the area, ICCN launched Operation Tango in October 2000. ICCN increased the number of patrols in OFR and managed to capture many poachers and illegal coltan miners in the reserve and seize ivory, arms and ammunition. This effort managed to reduce elephant poaching considerably, but without political stability and a functioning national government presence, the situation eventually deteriorated and elephant poaching once again reached critical levels (Amboya, 2004).

Amboya (2004)

A study on elephant poaching in the OFR area was carried out by ICCN, supported by the Inventory Monitoring Unit (IMU) of WCS (Amboya, 2004). Between June and December 2004, during a period of armed conflict and forest invasion by illegal coltan and gold miners, the OFR suffered an extraordinary level of poaching that put the area's wildlife, and especially its elephants, under unprecedented threat.

Amboya identified nine elephant poaching bands led by militia officers and three others led by police commanders in the OFR area. These bands ranged from three to almost 20 in number, with a minimum of 100 poachers involved. Ivory traders came to Mambasa from Bunia, Beni, Butembo and Isiro to buy tusks and export them overland to Uganda and CAR, where they probably ended up in China or Thailand from the eastern route and Sudan and Egypt from the northern route. Amboya (2004) named 27 middlemen that he identified from Mambasa, Beni and Bunia involved in this trade. He estimated that 425 to 850 elephants were killed in a six-month period in 2004, mainly for ivory, but meat was also traded locally.

During this six-month period, 17,000 kg of ivory was estimated to have left the OFR, through the complicity and active involvement of members of the Congolese military, two militia groups, members of the national police based in Mambasa, and a number of Congolese

businessmen and women from the region (towns of Beni, Butembo, Bunia and Mambasa). The report demonstrated that elephant poaching and ivory trafficking were directed by a well organized network of important government officials in Kinshasa using military commanders in the OFR area.

The ICCN report also documented that elephant meat was sold along the Mambasa-Dingbo Road and in the Mambasa market, under the eyes of the local authorities, as well as in several villages in the OFR vicinity.

TRAFFIC (in preparation)

An assessment of the Bikeko market in Kinshasa in May 2009 by TRAFFIC found 2,650 ivory items weighing some 345 kg openly displayed for sale with no apparent evidence of any effective control. The study also confirmed that Kinshasa carvers are regular suppliers of ivory products to ivory markets in Luanda and Cabinda, Angola and Pointe-Noire, ROC. There is also evidence to suggest that the DRC is the source of some of the ivory found in large consignments destined for Asian markets through Uganda, Kenya and Tanzania (Milliken, et al., 2009). Even in 1999 ivory was passing to Kampala and on to Hong Kong from eastern DRC, mixed in with hippo teeth (Martin & Stiles, 2000).

MIKE

The CITES-MIKE programme has established a series of monitoring sites in most of the African and Asian elephant range States (CITES, 2010). These monitoring sites consist of protected areas (national parks or reserves) in which relatively important elephant subpopulations are found. The overall goal of MIKE is 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. More specific objectives within this goal are:

- to measure levels and trends in the illegal hunting of elephants;
- to determine changes in these trends over time; and
- to determine the factors causing or associated with such changes, and to try and assess in particular to what extent observed trends are a result of any decisions taken by the Conference of the Parties to CITES.

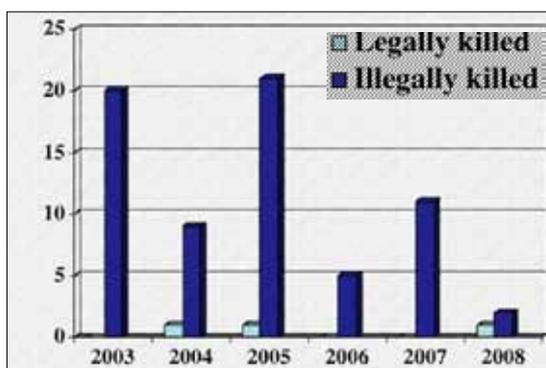
The main benefits of the programme include a much increased knowledge of elephant numbers and movements and a better understanding of the threats to their survival, as well as an increased general knowledge of other species and their habitats.

Additional outcomes are anticipated as follows:

- Elephant populations and their ecosystems in Africa are managed in sustainable ways; and
- Observation reports and data about threatened and endangered species are regularly available in all elephant range States.

MIKE, in cooperation with ICCN, has been monitoring the illegal killing of elephants in OFR since 2003. Between 2003 and the end of 2008, 71 elephant carcasses in the OFR were reported to MIKE. Of these, 68 (95.8%) were thought to have been poached (**Figure 7**). Whether for ivory, meat or both is not known. MIKE does not aim to estimate the total of all illegally killed elephants, but only the Proportion of Illegally Killed Elephants (PIKE) encountered in patrols.

Figure 7. Number of illegally killed elephants in OFR, 2003-2008



Source: Data provided by Sebastien Luhunu, MIKE Central Africa Subregional Support Officer.

The OFR has the highest PIKE of any monitoring site in its programme.

National Laws Relevant to Elephant Hunting and Bushmeat and Ivory Trade

DRC acceded to CITES on 20 July 1976. Hunting in DRC is governed by *Law no. 82-002 of 28 May 1982* and *Decree No. 014/CAB/MIN/ENV/2004 of 29 April 2004*.

All subspecies of African elephant fall within Class I, which are totally protected species.

Of relevance to the elephant and trade in its products in the 1982 law are the following articles:

Article 4 – No person may hunt without authorization from the competent authority.

Article 7 – A hunting licence does not dispense with the need to obtain a gun permit.

Article 11 – Officers with authority to enforce hunting laws [this includes ICCN] are responsible for protected areas, hunting zones and a zone extending 50 km around each.

Article 13 – In faunal reserves, people are forbidden to introduce domestic animals, firearms or other type of hunting equipment, nor to carry out any live or dead wild animal or any product from one.

Article 14 – In faunal reserves, it is prohibited to introduce any type of human activity that was not present at the time of entry into force of this present law [i.e. 1982].

Article 21 – Hunting is prohibited with any type of weapon used by the Congolese armed forces or police [which includes AK-47s].

Article 27 – It is prohibited, except in the case of obtaining a scientific permit, to harm in any way an animal listed in Class I protection.

Articles 61-63 – These describe under what conditions Class I species may be hunted for scientific purposes.

Article 65 – An administrative hunting permit can be issued in exceptional cases in the higher interests of the government.

Article 74 – Elephant tusks, amongst other trophies, are property of the State. A person who finds or obtains tusks by hunting must turn them over to a government official within 30 days, or face prosecution.

Article 80 – All tusks [held in storage] should be marked as determined by the Department Commissar of the State and these marks, as well as the weight and circumference of each tusk, should be recorded.

Article 81 – All illegally owned trophies are prohibited from being worked, and any illegal trophy or worked form of the trophy is prohibited from export.

Article 83 – Any person may act in legitimate self-defense to harm a wild animal.

Article 85 – Any person in breach of the present law is subject to five years in prison and/or a fine of 50,000 Zaïres. These penalties can be increased under certain conditions.

Article 86 – Any person found with a Class I animal, alive or dead, or any of its products, is considered to have captured or killed it himself, unless proof to the contrary can be provided.

The 2004 decree amends the 1982 law in certain areas. Of relevance to this study are:

Article 37 – The meat of animals killed in self-defence or administratively (i.e. problem animal control) cannot be sold. It must be freely distributed to residents in the immediate vicinity.

Article 38 – Anyone desiring to exploit wild animals or their products commercially must obtain a licence and pay a tax. These persons must meet certain criteria of good conduct.

Article 41 – The permit to import, export or re-export any wild animal is issued by the CITES management authority.

Article 43 – The import, export or re-export of any wild animal is subject to CITES regulations.

It is clear that killing elephants, except in self-defence, and trade in any of its products is totally illegal.

The national Forestry Code (*Law n° 011/2002 of 29 August 2002*) governs how communities are to utilize forest natural resources, although ministerial regulations for its application are still awaiting signature (ECODIT, 2010). Likewise, there is a new *Law on Nature Conservation and the Environment* awaiting signature.



Photo 3. Pygmies traditionally hunt small game with nets in the OFR, but they are often co-opted by commercial hunters to act as guides and porters on elephant hunts. (Photo: Dan Stiles)

Methods

Personnel, Data Collection Sites and Dates

The field work in OFR and Kisangani was organized by Project Consultant (PC) Daniel Stiles and carried out largely by Research Assistants (RAs) Richard Lokoka (RA1) and André Safari (RA2) of OSAPY in the OFR area. The PC worked in OFR from 2 to 7 July, obtained the cooperation of the ICCN conservator and received basic information concerning elephant poaching from him. The PC also visited the WCS headquarters in OFP to inform them of the project and be briefed on the WCS programme there. The PC carried out research on elephant meat and ivory in Kisangani between 8 and 12 July 2010, assisted by RA3, Issa Issaka.

Between 3 July and 2 August, the OSAPY RAs spent two days at Epulu, 18 days in the vicinity of Mambasa (eastern area of OFR), seven days around Niania (western area of OFP) and four days around Bafwasende, a town on the RN 4 leading to Kisangani, which is a centre of bushmeat trading and transport. They conducted interviews in the localities indicated in **Table 2**. They interviewed seven hunters, six transporters/middlemen and two vendors. The sample is smaller than would be required to apply statistical analysis because of the exceedingly brief field work period, which was caused by delays in identifying a qualified person to supervise the research. In addition, since elephant hunting and trade in its products is highly illegal, it was difficult to identify informants who would agree to cooperate. It is not known what the total number of elephant hunters, middlemen traders or vendors are in the OFR area, but given a longer time for research, it is believed that the numbers could be estimated and a representative sample interviewed.

The RAs performed preliminary data analysis and report writing while the PC prepared the report.

Data Collection Methods

The OSAPY RAs selected informants from participants in the bushmeat trade monitoring network that they had established in their CARPE study noted above (Lokaka & Boundawana, 2010). They used questionnaires in French provided by the PC to carry out structured and semi-structured interviews with hunters, transporters/middlemen and vendors. The variables investigated are

shown in the questionnaires in **Appendix 1**. This type of rapid assessment interview used to ask informants to summarize their activities over a period of time is common in these types of studies. Jones, et al. (2008) assessed the reliability of this method as a tool for monitoring trends in the harvesting of wild species and found that it yielded valid results. The RAs also visited old elephant kill sites with groups of informants and held informal discussions with them to reconstruct what had occurred.

Since the field work period was extremely limited (one month), due to the fact that the study commenced implementation well behind schedule, the RAs understood that their objective was to gather a preliminary set of key data variables, focusing on the meat and ivory trade. They also made use of a camera and mini-DVD video camcorder to record observations and interviews.

The PC visited the central bushmeat market in Kisangani to obtain a first hand assessment of the layout, number of tables, etc., but prices of elephant meat were obtained by RA3, who actually purchased various weights of the meat. The PC also spent six days visiting the ivory workshops and retail outlets to gather price, source, transport route and social network data, although more extensive research would be needed to answer questions that arose from the preliminary research.

To pose all of the questions in the Appendix 1 questionnaire and ask follow-up and verification questions with one informant would take hours over two or more days, time that was not available. Therefore, there are gaps in the data from the various informants.

Four categories of actors in elephant bushmeat and ivory trade were defined in the methodology developed for this project:

Hunter

Hunters are individuals hunting wildlife. They can be subsistence hunters, who snare, net or shoot animals primarily to feed the family while practising another profession (e.g. farmer, shopkeeper), or they can be professional, commercial hunters who hunt primarily to sell wildlife products (e.g. meat, ivory, skins).

Middleman

Middlemen act as intermediaries between suppliers and buyers of elephant products. They might travel to source points or rural sale points to purchase products

Code Type	Coding sequence	Example	Decoding
Hunter	LocalityTypeNumber	MH1	Mambasa hunter #1
Middleman		BM3	Bafwasende middleman #3

All Congo franc prices were converted at a rate of 900 CF = 1 US\$.

directly from hunters, local traders or local markets, then return to urban and semi-urban areas to resell to vendors. Middlemen often organize, arm and finance hunting expeditions to obtain certain items, which makes them what is commonly called in Central Africa a *commanditaire*. These *commanditaires* have access to money and influence and are usually government officials, military officers or businessmen.

Transporter

Transporters carry elephant products from point to point on hire by hunters, middlemen or vendors. Sometimes multiple transporters are involved in the movement of one product. For example, smoked meat or ivory tusks may be moved by a pedestrian transporter from the forest to the nearest village, then by a motorcyclist or taxi man to a specified meeting spot, where a pre-arranged transporter (e.g. logging truck driver, private car owner) is contacted to retrieve the meat and/or ivory. In the case of wild meat, there may be several different transporters, depending on the distance between source and sale points, whereas ivory often bypasses stopover towns to reach the urban

buyer. Transporters do not sell meat or ivory, which distinguishes them from middlemen.

Vendor

Vendors are individuals selling elephant products in markets, shops, restaurants, hidden locations, personal homes and on the roadside. Vendors generally proliferate in regional towns and large cities, where a large consumer base exists. Ivory vendors can be the individuals who craft worked ivory items or they can be crafts hawkers or crafts kiosk/shop owners.

Participant identity was protected to promote the formation of trusting relationships and to improve the percentage of truthful responses. Anonymity was ensured through the use of a code-identification system for raw data collection.

Informants were identified with a letter indicating their location, a second letter indicating their role in the trade using the above definitions and a number assigned to them in order of the interview in that locality, as follows:

Results

Hunters

Of the seven hunters interviewed, three were in Mambasa town, one was in Nduye, two were in Niania and one was in Bafwasende (**Figure 5**). They were between 27 and 45 years old and all but one was married. All seven were professional commercial elephant hunters working on command (i.e. professional poachers). Six were hired to hunt usually by military officers, although three of these admitted to hunting also for local officials, and one hunted on command for his uncle, a businessman in Mambasa.

Elephant meat

The hunters were asked to provide certain information about their last elephant hunt to provide an understanding of the time and work effort involved. **Table 4** provides relevant data.

Elephant hunts can range from as few as three days with only two hunters to up to a month with a group of 18 hunters and porters. Sometimes, especially from Mambasa, soldiers of the FARDC might go on a hunt with commercial hunters acting as guides and assistants, as ordered by an officer. The chiefs of villages through which the hunting party pass are complicit in the hunt, as they often receive some of the meat when the hunters return. The meat given might be from elephants or other animals. The elephants are almost always shot deep in the forest to avoid detection by ICCN rangers. However, in late June, just a few days before the PC arrived in Epulu, three elephants were shot by poachers near enough to the RN 4 for ICCN rangers to hear the gunfire. When

they arrived, the three poachers ran off. The rangers set up hidden surveillance by the carcass and the next day when the poachers returned, a shootout erupted in which there were casualties. The poachers were apprehended and the tusks taken to the ICCN headquarters. It turned out that the poachers were FARDC soldiers from the army camp in Mambasa (Jean-Joseph Mapilanga, ICCN Warden, OFR, pers. comm., July 2010).

Many villages have paths that lead into the OFR forest for the purpose of hunting and collecting forest products. Villages identified with such paths in this study are:

Mambasa Territory - Balika, Badengaido, Babesua, Molokay, Bawambaya, Tobola I et II, Kilonge, Parana, Banana I, II et III, Bandisolo, Mabukusi, Seti, Utama, Tuonane, Bandisende, Koki, Babama, Babukeli, Bandindikwe, Mambasa centre, Biakato, Nduye, Katine, Lolwa, Banakongo, Tolitoli, Komanda, Irumu, Etabe, Bukulani, Bamenye, Yedi, Harua, Makalanga, Bakaiko, Zunguluka and Bafanakengele.

Bafwasende Territory - PK 314, Bafwakobi, Bigbolo, Bafwasende.

Experienced commercial hunters know the locations of elephant trails, clearings and watering points that elephants frequent and select the village path they wish to take to reach the hunt area. Once in dense forest, elephant trails are used to trek. Since other animals, particularly larger mammals, also use elephant trails to traverse dense forest areas, these pathways form hunting

Table 4. Sample cases of work effort involved in an elephant hunt in OFR

Hunter code	Starting location	Period of hunt	Kill site	Distance Travelled	Time on hunt Days	No. in party
SH1	Epulu	June 2010	Inside OFR	150 km	7	12
MH1	Bangole	April 2010	Inside OFR	100 km	21	18
MH2	Bandisende	March 2010	Inside OFR	30-40 km	-*	5
MH3	Nduye	May 2010	Inside OFR	80 km	21	14
NH1	Niania	End June 2010	Inside OFR	70 km	3	7
NH2	'upstream from OFR on Ituri River'	June 2010	Inside OFR	-	17	9
BH1	Niania	July 2010	Inside OFR	262 km	30	6

* A dash '-' indicates a lack of data, either because the question was not asked or there was no response.

Table 5. Average utilization of meat taken from an elephant kill

Hunter code	A	B	C	D	E	F- US\$
SH1	-	315 kg	0	250 kg	5.55	1,389
MH1*	-	-	-	-	-	-
MH2	-	5 kg	0	20	-	-
MH3	6 kg	0	0	0	N/A	0
NH1	0	60 kg	0	100	1	100
NH2	-	-	0	500-1000 kg	1-3	500-3,000
BH1	-	20 kg	0	100 kg	3	300

A-Kg fresh meat for personal use

C-Kg fresh meat sold

E- price US\$/kg

B-Kg smoked meat for personal use

D-Smoked meat sold

F- Total meat earnings

*MH1 hunted on behalf of his uncle and turned over all of the meat to him in exchange for various goods.

arteries. The informants said that elephants rarely came near villages because of the poaching threat.

Table 5 shows the quantities and utilization of the meat taken from an elephant kill as an average for elephant hunts recalled by each informant. More research needs to be carried out to quantify and price products taken and investigate the use and prices of fresh versus smoked meat.

Income from meat on a single hunt varies greatly (0 to US\$ 3,000), depending on the primary purpose of the hunt (meat or ivory), how many elephants were killed and how many porters were available. Only hunting parties with a high number of participants to carry meat and other products can feasibly realize the economic potential of the available meat. Other items taken from elephants to sell include the tusks, trunk, tail, ears, eyes, feet, hide, bone marrow, fat and dung. The most common were the trunk and tail. UN peacekeepers paid US\$ 1 for six tail hairs, used to make bracelets (MH1, pers. comm., 2010). Frequently, the hunting parties are also provided with food (e.g. cassava flour, rice), drink, cigarettes and marijuana by the person ordering the hunt.

The non-meat products and usages are:

- trunk – preferred to meat for its succulence; given to the authorities as gifts for their complicity in poaching
- tail – used to make bracelets and believed to protect from lightning
- spinal column marrow – medicinal, to treat rheumatism by massage, and culinary, to use in cooking
- hide – undetermined in this study, but the high demand suggests it has an industrial use (an Internet search found elephant skin boots selling for US\$ 400-700 a pair in the USA, and South Africa has an active legal elephant-skin boot industry)
- ears – high quality drum skins
- feet – food, prized even more than the trunk
- dung – medicinal, used to treat malarial convulsions in young children; agricultural, used to chase away birds from crops (oddly, not used as manure).

Elephant meat is usually sold by hunters in smoked chunks weighing 3-6 kg called a *grume*. A *grume* was reported to cost US\$ 5-20, depending on its size. The hunters sell meat along the return route in villages or on the road, in gold and diamond mining camps in the OFR, to middlemen, to market vendors, to soldiers and to

Table 6. Hunters' motives for killing elephants

Informant Code	Meat for self, family	Sell meat for self	Sell meat on command	Sell ivory for self	Commanded to hunt for ivory	Protect crops, property or life	Cultural reason	Other
SH1		2			1	3	4	
MH1		1			2	3		
MH2		2			1	3		
MH3		2			1			
NH1		2			1			
NH2		2			1			
BH1		2			1			

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



Photo 4. Two 3-6 kg chunks of smoked elephant meat (grume) with tusks (Photo: Karl Ammann)

contractors (*abonnés*), the latter being private individuals who order meat. Meat is also given to the *commanditaire*.

UN peacekeepers in Mambasa and Ugandans were also said to buy elephant meat. The main markets for elephant meat are Mambasa, Niania, Bafwasende and Kisangani and some meat travels south-east to Beni.

Hunters were asked what their primary motivation was for killing elephants in an attempt to assess the relative importance of meat and ivory as causes of poaching.

Table 6 presents the results. Only one hunter (MH1) from Mambasa said that meat was his primary motivation in hunting elephants, consistent with the fact that 18 people were on the hunting trip, so there were many porters to carry meat. The other six hunters all hunted on command for ivory. Crop/life protection was the third most important

motivation for three of the hunters. None listed meat for the family, probably because other animals were also hunted on the trip.

Other animals that are hunted while on elephant hunts and the reasons are shown in **Table 7**.

It is evident that elephant hunts are also used as opportunities to obtain a variety of wildlife products to sell, including bushmeat, skins (mainly okapi and leopard, which fetch high prices) and parakeet feathers. Animals, mainly primates and antelopes, are also shot for subsistence.

Weapons

Two types of firearm were reported to be used usually in hunting elephants: the AK-47 Kalashnikov and the

Table 7. Other animals hunted on an elephant hunt

Hunter code	Sell	Consume	Cultural
SH1	monkey, pig, buffalo	monkey, antelope and chimp	
MH1	-	-	-
MH2	okapi (skin and meat)	Monkey	
MH3	parakeets, leopard (skin)	Primates	Leopard teeth and urine
NH1	Monkey	Monkey	
NH2	monkey, antelope, duiker, pig		
BH1	monkey, antelope		

12-gauge shotgun. The former was by far the most commonly used. One hunter (MH3) reported an M-16 being used, the American army standard weapon. The AK-47s were in all cases owned by Congolese army soldiers, often officers.

A minimum of 60 rounds of ammunition was used on a hunt, with most hunts using up more than 100, even up to 500 cartridges in the case of BH1. Each AK-47 cartridge costs CF 150-250 (US\$ 0.17-0.28) in the study area. As this appeared very cheap, an Internet search was performed to ascertain what AK-47 bullets (7.62 mm cartridges) sold for on the open market. Prices ranged from US\$ 0.24 each for Russian-made ones to US\$ 4.17 each for more specialized ones, thus the prices quoted by informants are possible, especially since FARDC soldiers do not pay for them. The AK-47 bullet is small-bore, thus it takes many rounds to kill an elephant.

Hunters also use a 12-gauge shotgun with a specially made bullet to hunt elephant. Many pieces of shot are melted and forged into a large bullet to fit into a 12-gauge cartridge. This type of bullet has tremendous stopping power, but the hunter must get quite close to the elephant, as accuracy is poor.

Transport

The hunters were asked what means of transport they used and which were the most important. **Table 8** shows their responses.

The responses vary considerably and reflect differences in how hunters operate, what social connections they exploit and where they dispose of their products of the hunt. The two in Niania (NH1 and NH2), for example, are the most basic. NH1 went on foot into the forest with two guides, two family members and three friends. A FARDC captain supplied them with AK-47s and supplies. They remained three days and walked 70 km in all. They brought out 80 kg of elephant meat, a number of other elephant products, monkey bushmeat and eight tusks. NH2 went with two Pygmy guides and seven members of his family on foot into the forest for 17 days. He did not report the distance they travelled. A FARDC soldier supplied them with AK-47s and three clips of ammo (90 bullets). They brought out over 500 kg of elephant meat, many other elephant products, a lot of other bushmeat and 150 kg of ivory (14 tusks). They must have made more than one trip to transport such a large quantity. They sold meat to vendors and *abonnés* and gave the tusks to their *commanditaire* in Niania.



Photo 5. (A) 12-gauge shotguns



(B) AK-47s (Photos: WWF)



Photo 5. (C) 12-gauge shotgun shell with manufactured bullet to hunt elephants (Photo: Karl Ammann)



(D) Different configurations of 7.62 mm AK-47 cartridges (WWF, 2010)

Table 8. Importance of different means of transport used to hunt elephants and carry products

Hunter code	Most Important	Least Important
SH1	Bus, military vehicle, UN vehicle, motorbike, foot and canoe	Government vehicle and bicycle
MH1	Bus, military vehicle, UN vehicle, government vehicle, motorbike, foot and canoe	Bicycle
MH2	Motorbike, private vehicle	All others
MH3	Business men's cars, government vehicles, motorbike escorted by soldiers, foot and canoe	Bus and bicycle
NH1	Foot	
NH2	Foot	
BH1	Motorbike	Vehicle

The same level of detail could be reproduced for each of the hunters from the data sheets, but suffice it to say that they operate and transport illegal wildlife products unhindered. Even the UN peacekeepers of MONUC were said to assist them, a troubling finding.

Ivory

Out of the seven hunter informants described above, six of them hunted primarily for ivory. All variables other than ivory are presented in the Elephant Meat, Hunters section above. **Table 9** presents relevant data on the tusks.

There was very high variability in the reported sale prices for different weights of tusks and it is very likely that some of them are not accurate responses, if these represent hunter selling prices in the vicinity of the OFR. The average price for five hunters (rounded off) probably gives a fairly accurate picture, however, except for the >10 kg tusks. The two US\$ 80/kg prices may be the prices the *commanditaire* obtained, which would make them technically middleman, not hunter, prices. One reason for the variability may be that the hunters do not normally sell the tusks themselves, but rather they turn them over to the *commanditaire* who acts as a middleman to sell

the tusks elsewhere. Thus, these hunter informants do not have first hand knowledge of tusk prices. In the past, the tradition was to let the hunter keep one tusk of each elephant shot, but with the increase in the value of ivory and the generally exploitative nature of those in power, this tradition seems no longer to be respected. No hunters who work for themselves hunting elephants for ivory were found in this initial study, though it would be useful to identify a sample in any future research, if they exist.

In any case, whoever ends up with the money from a hunt could expect about US\$ 160 from a pair of 5 kg tusks, US\$ 580 from a pair weighing 10 kg each and US\$ 1,680 from a 15 kg each pair.

Transporters/Middlemen

Elephant Meat

Six middlemen were found willing to answer questions, three in Mambasa, one in Nduye (who lives in Mambasa), one in Bandisende and one in Kisangani. They ranged in age from 29 to 46 years old and all but one were males. Only one acted as an elephant meat middleman, the others traded in ivory and will be discussed below.

Table 9. Tusks taken on last elephant hunt

Hunter code	No. of tusks	Total weight kg	Prices US\$/kg		
			<5 kg	5-10 kg	>10 kg
SH1	18	160	8	15	50
MH1	0	0	N/A	N/A	N/A
MH2	4	50	5	20	25
MH3	3	22	30	50	80
NH1	10	125	15	30	80
NH2*	14	150	-	-	-
BH1	8	125	20	30	45
Average	10	105	16	29	56

* NH2 said only that prices were negotiable.

The meat middleman was the sole woman interviewed, a 30-year old unmarried woman from Mambasa. She works for herself and is also a farmer. She has been trading in bushmeat for two years. On her last trading trip she went into the forest with her own motorbike to meet hunters and spent the night, returning the next day with about 30 kg of elephant meat and the tail, scrotum, bone marrow and some skin to Mambasa, covering 70 km in all. She sold 15 kg of meat at US\$ 5/kg in the market and 15 kg to people who had ordered it, also for US\$ 5/kg. She bought the meat for US\$ 2/kg, thus made a gross profit on the meat of US\$ 90.

In Kisangani, the project consultant was told that bundles of bushmeat arrive from Bafwasende at the 15th Tshopo market on the 'City Train' bus every Saturday night, but more research would need to be carried out to establish the elephant meat movements to markets around the OFR and to markets further afield such as Kisangani (460 km from Epulu).

Ivory

Three transporters and two middlemen were interviewed. The transporters generally carried tusks (and meat) from the forest on foot or bicycle. Once at a road, the tusks were transferred to motorbikes or to private or government vehicles to be taken to where they would be stored and accumulated for further onward shipment. One transported elephant products to his uncle, a businessman in Mambasa, one took them from around Nduye to Beni and Kassinde for military and businessmen middlemen, and one transports the ivory from Bandisende to traders in North Kivu.

A middleman in Mambasa takes ivory to Bunia where he exchanges the tusks for merchandise he sells in his shop. The other middleman is based in Kisangani. He said that he was associated with UN people and Chinese businessmen and that he went on elephant hunts himself to bring back tusks to sell to his associates. No further details were collected.

Middlemen not interviewed were said by the OSAPY RAs to be FARDC (usually officers), businessmen, government officials, MONUC peacekeepers, priests and even West Africans. The middlemen in the vicinity of OFR commonly arrange an elephant hunt with known poachers and pay all of the expenses for the hunt. They pay the hunters by letting them keep and sell whatever products other than ivory they carry out with them, plus a little money.

Ivory prices obtained by the PC in Kisangani were said to be US\$ 30-50/kg for small tusks (*petit-petit* <5 kg), US\$

60-70/kg for medium tusks (6-10 kg) and US\$ 80-120/kg for large tusks (10-20 kg).

Vendors

Elephant Meat

Only two meat vendors in Mambasa were interviewed, one man and one woman of 39 and 36 years of age respectively. One reportedly sold about 60 to 80 kg of elephant meat monthly, obtained mainly from Nduye, for US\$ 5-6/kg, although during periods of scarcity, the price could go as high as US\$ 8/kg. The other sold only 25 kg a month on average, at the same prices quoted by the other vendor.

In Kisangani, elephant meat in the Central Market sold for US\$ 35 for a 7-8 kg *grume*, or about US\$ 4.40-5/kg, a little less than the amount quoted in Mambasa. When cut up into small pieces and sold in ~100 gm piles, a pile would sell for CF 500, or US\$ 0.56, about US\$ 5.60/kg.

There are at least seven markets in and around Kisangani that sell elephant meat. They are:

- Central Market
- 11th Tshopo Market
- 15th Tshopo Market
- laté
- Spiro
- Kapalata – on the road to Buta
- 15th Market – 15 km from Kisangani on the road to Isangi

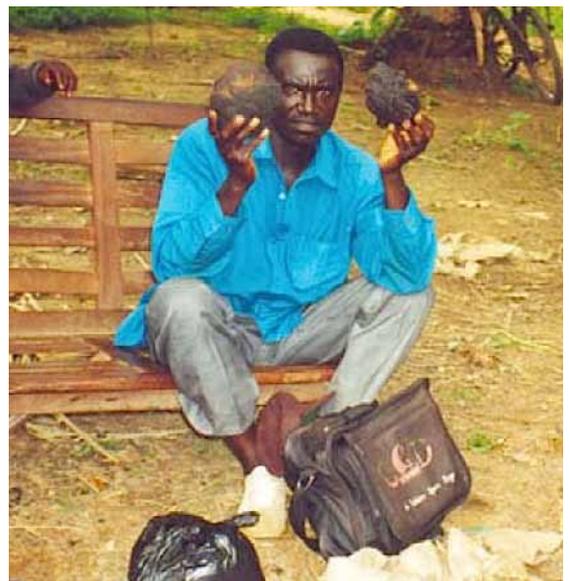


Photo 6. Elephant meat vendor in Mambasa (Photo: Richard Lokoka)

Table 10. Prices of various wild meats in north-eastern DRC in US\$/kg

Meat	Mambasa/Niania	Bafwasende	Kisangani
Elephant	1-6	-	5-6
Antelope	2.20	2.80-3.20	3.60-4.80
Monkey	2.20	2-3	3.22-3.50
Dry fish	1.10-2.45	1.45-2.60	-

Other meats compared to elephant meat

Bushmeat is extremely common in markets around the OFR, in towns on the road to Kisangani and in Kisangani itself. The PC collected prices of other types of meat by asking a number of market vendors. The purpose was to compare prices with elephant meat prices in order to assess its relative popularity and demand. **Table 10** presents the findings, which are only preliminary and need to be verified by further research. All of the meat was smoked, except for the fish, which was dried.



Photos 7 & 8. Smoked meat and dried fish were sold in a variety of manners; thus it was very difficult to estimate prices per kg. (Photos: Dan Stiles)

It was difficult to estimate weights in the absence of a scale and these prices should be considered as tentative. That given, it appears that elephant meat is somewhat more expensive than other commonly eaten bushmeats and fish, both around the OFR and in Kisangani, suggesting that it is endowed with a certain degree of consumer demand.

Table 11 compares elephant meat to fresh domesticated meats in Kisangani.

Only beef compares to elephant meat, although fresh fish comes close; thus elephant meat does appear to be a preferred meat in fairly high demand, although scarcity of elephant meat could be a factor. Much more research is needed on the question, including a meat consumer study.

Ivory Vendors

Ivory vendors normally sell worked ivory, as tusks are not sold openly retail; it is too risky. No retail worked ivory vendors are to be found around the OFR as there are too few potential buyers.

Four retail outlets were found by the PC in Kisangani that sold worked ivory, three of them in a suburb called 3rd Tshopo on the road leading to Buta. The fourth was on the terrace of the Riviera Hotel, where the carvers and vendors from 3rd Tshopo congregated to try and sell their wares to tourists, development aid workers and visiting businessmen. A survey of the types, numbers and prices of pieces seen was carried out, which will be reported in detail elsewhere. **Table 12** presents a summary of relevant data on the ivory seen. One kiosk displayed no ivory, as the informant said that he had not had raw ivory to work in quite a long time. He displayed only wood carvings.

Table 11. Elephant meat prices compared to domesticated meats in Kisangani

Meat	Elephant	Beef	Goat	Chicken	Fish
Price US\$/kg	5-6	6	4.50	3.60	4.95

Source for domesticated meat prices: van Vliet, et al., 2010



Photo 9. The largest carved tusk seen was about 35 cm, not big by African standards. (Photo: Dan Stiles)

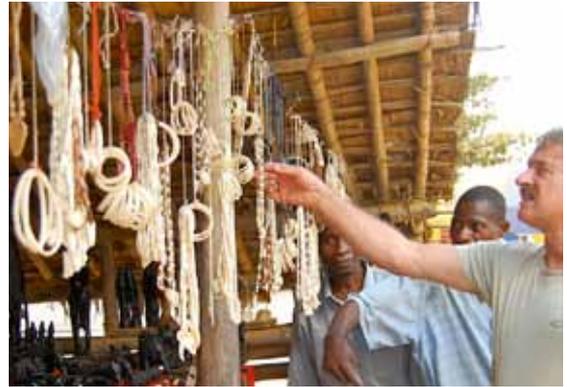


Photo 10. Most of the worked ivory seen was jewellery. (Photo: Dan Stiles)

Ivory carvers said they paid US\$ 80/kg for small tusks (<5 kg), US\$ 100-150/kg for medium tusks (5-10 kg) and US\$ 200-250/kg for large tusks (10-20 kg). They said that prices had been rising considerably over the past two years. These high prices could only be explained if the Chinese buyers mentioned previously had cornered the market on tusks entering Kisangani and they preferred exporting the tusks to China, where prices are reported to be on average US\$ 750/kg for <5 kg tusks and US\$ 900/kg for 5-9 kg tusks in southern China (Martin & Vine, 2011). Local carvers cannot compete at this price level. Whether the prices reported by informants for raw ivory are accurate, or exaggerations, can only be determined by a more extended period of research.

The worked prices in general were quite low, considering the high prices that carvers said they had to pay to obtain raw ivory. The prices indicated in **Table 12** are starting prices and with a little bargaining the highest could be reduced by half.

Most of the ivory items consisted of jewellery, with only a few figurines and carved tusks, followed by key chains and cigarette holders. Vendors said that the Chinese ordered them to make signature seals and chopsticks and they paid US\$ 50 on average for a 6 x 2 cm seal and US\$ 25 for a pair of chopsticks.

Three ivory and wood-working workshops were located on the premises of the kiosks that sold ivory and other crafts items in 3rd Tshopo. One carver-vendor said that he worked at home. There were perhaps ten carvers in all. None of them were working ivory at the time of the survey as they said no raw ivory was available. They seemed quite pessimistic about the future of the ivory business in Kisangani, unless tusk availability increased and prices came down.

Chinese, Russians, Belgians and American soldiers in that order were the main buyers of ivory. The U.S. army has established a training base near the airport to train a rapid intervention force of Congolese soldiers. Some of them stay at a hotel in the city and occasionally they buy ivory.

Knowledge of laws

Hunters and vendors seemed well aware of the law as it related to killing elephants and selling elephant products, except in one area. Many informants both around the OFR and in Kisangani knew that it was strictly illegal to kill an elephant or trade in its meat or tusks. There appears to be a common misperception, however, that once ivory is worked, it is legal to sell. Since it is openly displayed on sale, vendors obviously do not fear the authorities. National laws make clear that this is not the case (see legal section above).

Table 12. Ivory items seen for sale in Kisangani

Outlet	Total no. ivory items	Jewellery	Price range US\$	Figurine/worked tusk	Price range US\$
3rd Tshopo 1	284	221	1-40	40	1-150
3rd Tshopo 2	66	62	1-10	4	50-150
3rd Tshopo 3	0	0	0	0	0
Riviera	27	8	15-40	13	25-150
TOTAL	377	291		57	

In addition, the ivory vendors are not aware of CITES regulations concerning export of an Appendix I specimen. The PC met a gentleman at the 3rd Tshopo ivory outlets who claimed he could issue export permits from the Ministry of Culture and Arts that would render legal export of any wildlife product. His office was visited in the provincial Culture and Arts building. He had for sale there an okapi skin (US\$ 1,000) and a leopard skin (US\$ 300). He showed the PC examples of export permits he had issued to a Frenchman and to an Israeli to export ivory to Europe, which is completely illegal by local law and CITES regulations.

Elephant meat is sold openly in the OFR area, but it is sold clandestinely in Kisangani, where the authorities monitor markets more often. The *grumes* are kept under the market table and slices are cut off and the meat sold in small piles on the table for CF 500 each (US\$ 0.56). This study has hidden video footage of a transaction.

Although participants in illegal wildlife hunting and trading activities are aware of the relevant laws, given the fact that the authorities are often complicit in the illegal activities, or at least that infractions can be negotiated (i.e. bribes), the law does not serve its intended purpose of deterring illegal acts to any appreciable extent.

REPUBLICQUE DEMOCRATIQUE DU CONGO
 PROVINCE ORIENTALE
 MINISTÈRE DE LA CULTURE ET DES ARTS
 DIVISION PROVINCIALE DE LA CULTURE ET DES ARTS
 KISANGANI

N°228/DCA/PO/CAR/2010

DECLARATION D'OBJETS D'ART ET D'ARTISANAT

- Nom et Post nom du déclarant : Monsieur ELIAS PALAMBY
 - Nom du propriétaire : Monsieur ELIAS PALAMBY
 - Qualité : Therapeute Chargé de Massages

N°	Description des Oeuvres	Matière	Dimension	Quantité	Valeur	10 %	Recens	Total
01	Grande Statue Retour de Chasse avec Fume-cigarette	Bois Noir	G.D.	1				
02	Grande Statue retour de Chasse avec Chien	Bois Noir	D.M.	1				
03	Une Statuette de Femme retour de la source	Bois Noir	P.D.	1				
04	Un village Maçonnerie sculpté	Ivoire travaillé	D.M.	1				
05	Tête - pointue avec figure d'Homme sculpté	Ivoire travaillé	P.D.	1				
06	Tête - pointue avec figure de femme sculptée	Ivoire travaillé	P.D.	1				
07	Gournette	Ivoire travaillé	P.D.	5				
08	Jeux d'échec Mixte sans pions	Bois - mixte	P.D.	1				

Poids : 10,700 Kgs Valeur marchande = 400 \$ 20 % = 80 \$ EXPORT = 50 \$ Recens = 20 \$
 Net à payer = 80 \$ + 50 \$ + 20 \$ = 150 \$ (Dollars américains cents cinquante)

Fait à Kisangani, le 20 Janvier 2010

LE DECLARANT
 Mr ELIAS PALAMBY

LE CHEF DE DIVISION PROVINCIALE DE LA CULTURE ET DES ARTS
 PALAMBY KIMURE KINDO
 20/01/2010
 PALAMBY

Photo 11. The Ministry of Culture and Arts in Kisangani issues export permits for worked ivory (in red box), which is illegal (Photo: Dan Stiles)

Discussion

Elephant Meat

There is a well organized elephant meat harvesting system operating in the Okapi Faunal Reserve area, although it is subsidiary to killing for ivory. Hunters work on the command of military, administration or business people who desire ivory. Hunters enter the forest for anywhere from three days to a month with hunting parties varying from five to 20 participants. The hunters keep the elephant meat to consume and sell as a form of recompense, along with other elephant products (tail, trunk, skin, etc.). Enough meat is harvested to support middlemen and vendors in the system. An unquantified amount is transported smoked to Beni and Kisangani to sell. Over US\$ 3,000 can be earned from meat and other body parts of one elephant, but that much is rarely taken because of transport constraints.

Van Vliet, et al. (2010), in a study of the Kisangani bushmeat market, found that, comparing source areas supplying wild meats to the market from 2002 to 2009, the Ituri area showed the only increase, quite a significant one (Figure 8). If this trend also applies to elephants, it would show an increasing threat in future as other forested areas become cleaned out of bushmeat. Van Vliet, et al.'s study found that the meat of 16 elephants was sold in the Kisangani market in 2002 as compared to 28 in 2008 (van Vliet, in litt. to D. Stiles, 2011), a 57% increase.

However, rates of elephant killing and thus meat offtake in the OFR have declined since the 1997-2005 period, when militias, the Congolese army and miners invaded the

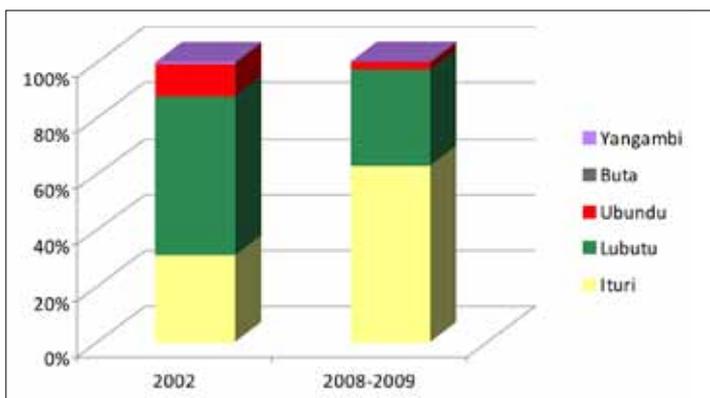


Figure 8. The Ituri Forest area, in which the OFR is found, is increasing in the proportion of bushmeat it supplies to Kisangani. (Source: van Vliet, et al., 2010).

OFR. Elephant meat prices around OFR have remained fairly steady, being US\$ 5/kg in 2000 and US\$ 5-8/kg in 2010. There is no reason for complacency, however. Extraction rates of the easier to take small to medium size mammals is already unsustainable in many parts of the Congo Basin, exacerbated by the increase in commercial bushmeat trading to supply urban areas, forcing hunters to go ever further into the forest (Fa & Brown, 2009). Elephant hunting for bushmeat is constrained by logistical requirements and the fact that elephants inhabit areas far from roads and human activities (Blake, et al., 2007). As humans encroach ever deeper into forests in search of timber, minerals and farmland, an increase of conflict with elephants will occur. As other bushmeats become scarce, and human population continues to increase from immigration and natural reproduction, hunters and traders will almost certainly begin to target elephants for meat. It seems inevitable that this scenario will come to pass, unless economic development, bushmeat alternatives and CBNRM initiatives bear fruit.

Ivory

Ivory is the primary motive for killing elephants, according to informants, not a surprising finding. Although as much, if not more, could be earned from meat than from ivory from one elephant, several factors favour trade in ivory:

- From the commercial hunter's point of view, ivory hunting is subsidized by a *commanditaire*, reducing investment costs to near zero and often decreasing seizure risks as well, if the *commanditaire* is influential.
- Trading in meat is costlier for the hunter and more work is involved, as many porters must be organized and supported during the hunt, and after dividing the meat as payment to labour and concomitant transport constraints, the hunter is left with only a relatively small portion to market himself.
- Bushmeat hunters, whether subsistence or commercial (though the two overlap), will always favour game that is the easiest, the least risky and the quickest to capture. Elephants require specialized hunting techniques that involve high costs, long time inputs and high risks.

Therefore, ivory will never be a by-product of hunting for bushmeat, because meat hunters do not target elephants; they do not have appropriate weapons or enough porters.

- From the *commanditaire's* perspective, it is much simpler and cost-effective to profit from ivory. Tusks are comparatively compact, high value items, easy to transport and with a ready buyer. A tonne of smoked elephant meat in one marketing unit does not have these attributes. Per unit weight, ivory is on average approximately ten times more valuable than meat for a middleman (US\$ 50/kg compared to US\$ 5/kg). With each additional elephant killed on one hunting expedition, the advantage of ivory increases.
- Ivory value has been increasing in recent years, while elephant meat has remained about the same.

Ivory prices - In 1989, an average tusk sold for US\$ 20-25/kg in rural eastern DRC (De Meulenaar & Meredith (1989). The price remained about the same 10 or 12 years later (Martin & Stiles, 2000; Mubalama & Mapihanga, 2001). In 2010, however, hunter tusk prices rose to an average of US\$ 33.50/kg in the OFR area, depending on tusk size² (Table 9).

In Kisangani and Kinshasa in 1989, raw ivory prices fluctuated considerably in the 1988-1989 period, but averaged around those shown in Table 13. Even though informants said that there had been a sharp rise in prices in Kinshasa in 1999 due to the cut-off of ivory supplies from the east as a result of the civil war, tusk prices were

processed locally, most likely because higher prices in East Asia make it more profitable.

Increased pressure from CITES and conservation NGOs on the DRC government to implement recommendations contained in CITES Resolution Conf. 10.10 (Rev. CoP15) 'Trade in elephant specimens' seems to be having some effect. There have been increased in-country seizures of illegal ivory in 2010 and the ICCN announced that more than 11 tonnes of ivory seized from poachers and traffickers were stored in the Central Bank of Congo (Anon., 2010a).

Commodity Chains and Social Networks

It is important to determine the social networks that operate in the illegal hunting and trading of elephant products if policies and actions are to be devised to address the problem. It is people who trade commodities through a chain from the producer (hunter, in this case) via middleman (possibly several along the way) and retail vendors to the final consumer. To tackle the problem of illegal elephant killing and trade of its products, the actors in these networks must be identified, then the key figures thwarted in the most effective way possible

Table 13. Urban raw ivory prices in the DRC, 1989-2010 in US\$/kg

Weight	1-5 kg		6-10 kg		10-20 kg	
	Kinshasa	Kisangani	Kinshasa	Kisangani	Kinshasa	Kisangani
1989	67	36	89	59	119-178	-
1999	47.50	-	68	-	89	-
2010	50	30-50	90-95	60-70	100-120	80-120

Sources: De Meulenaar & Meredith, 1989; Martin & Stiles, 2000; this study. The 1989 and 1999 prices are adjusted for inflation using the GDP Inflation Index and are in estimated 2009 US\$ values (<http://cost.jsc.nasa.gov/inflateGDP.html>). Raw ivory is commonly priced by traders in US\$ in DRC, not in Congo francs, because of the historical highly fluctuating local currency values in DRC.

still much lower than in 1989 in inflation-adjusted terms. Prices in 2010 appear to have risen since 1999, and are approaching pre-trade ban levels.

There does not appear to have been an appreciable difference in ivory market activity in Kinshasa between 1999 and 2009, although more details are meant to be forthcoming from TRAFFIC from a 2007 ivory survey in Central Africa (Lagrot, in prep.). In Kisangani, the ivory industry has crashed since 1989, with the number of carvers falling from 245 to fewer than a dozen in 2010. Raw ivory is being smuggled out rather than being

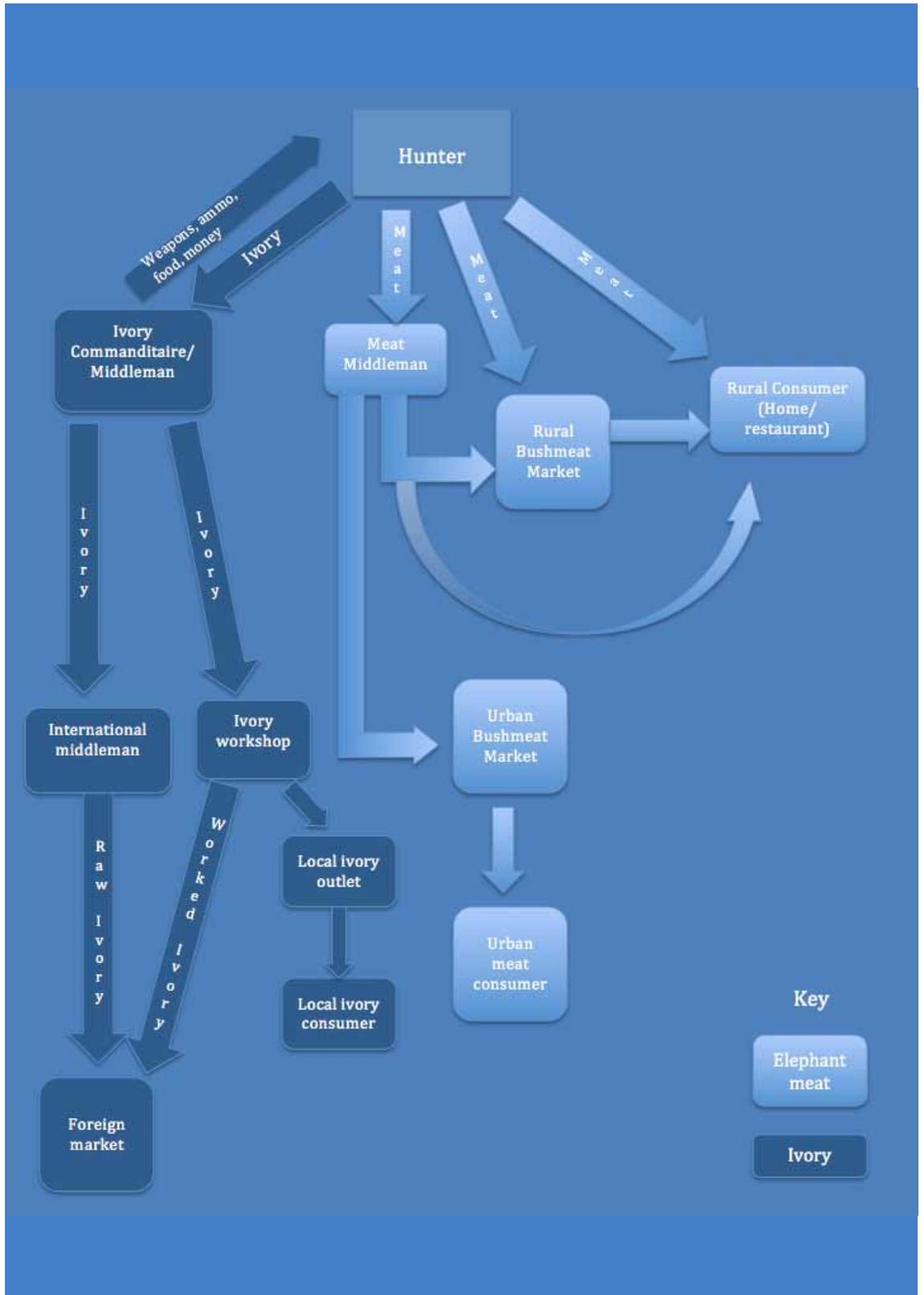
in the circumstances. Even religious leaders are known to be involved in trading ivory; a priest was identified by Amboya (2004) operating in Nduye and a pastor was uncovered in Kisangani after a truck accident revealed tusks hidden in it. A pastor in Kisangani owned the ivory and an RA of this project discovered the identity and location of this person, who has since been arrested along with two accomplices³.

The commodity chain of elephant meat and ivory could be envisaged as in Figure 9. There are several possible permutations.

³ The RA was not involved in the arrest, which was carried out independently by the police.

² All prices in Table 9 averaged.

Figure 9. The commodity chain for elephant meat and ivory. All of the connections indicated do not necessarily have to occur.



Not enough research was completed to determine social networks, but it is interesting to note that of the seven hunters interviewed, six of them employed family members in the hunting party, usually with other non-family members. Only one of them was given an order to hunt by a family member, however; the other *commanditaires* were military people. One hunter's wife was a middleman selling meat. Hunting does not appear to be dominated by any ethnic group, as Ndaka, Lese, Nande, Kakwa and Bila were represented amongst the hunters, Lese, Ndaka, Hema, Nande, Budu and Kusu were transporters/middlemen and Lokole and Nande were vendors in the OFR area.

Based on preliminary information gathered in this study, it is hypothesized that hunting is carried out by kin-based networks connected to primarily non-kin elites who play the role of ivory middleman. Meat trading does at times remain within a kin-based network.

Transport and Distribution

Figures 10 and 11 show a schematic representation of how meat and ivory is moved out of the OFR. The same routes are used initially for both meat and ivory as they leave the OFR, but once in a village or town, the two commodities go their separate ways. Hunters and porters and, on occasion, middlemen, carry meat and ivory out of the forest by foot and/or motorcycle on paths and on rivers by canoe. Once a road is reached, the commodities are transported by vehicle, either to Mambasa (if on the east side of OFR) or to Niania (if on the west side). Meat could be consumed, given away as gifts or sold along the way. Most of the remaining meat is sold in Mambasa or Niania, although some evidently makes its way to Beni and Kisangani. More research needs to be carried out to determine how much.

Ivory is hidden in official or private vehicles belonging to military personnel, the UN, business people (commercial

Figure 10. Movement of elephant meat from OFR to marketing localities

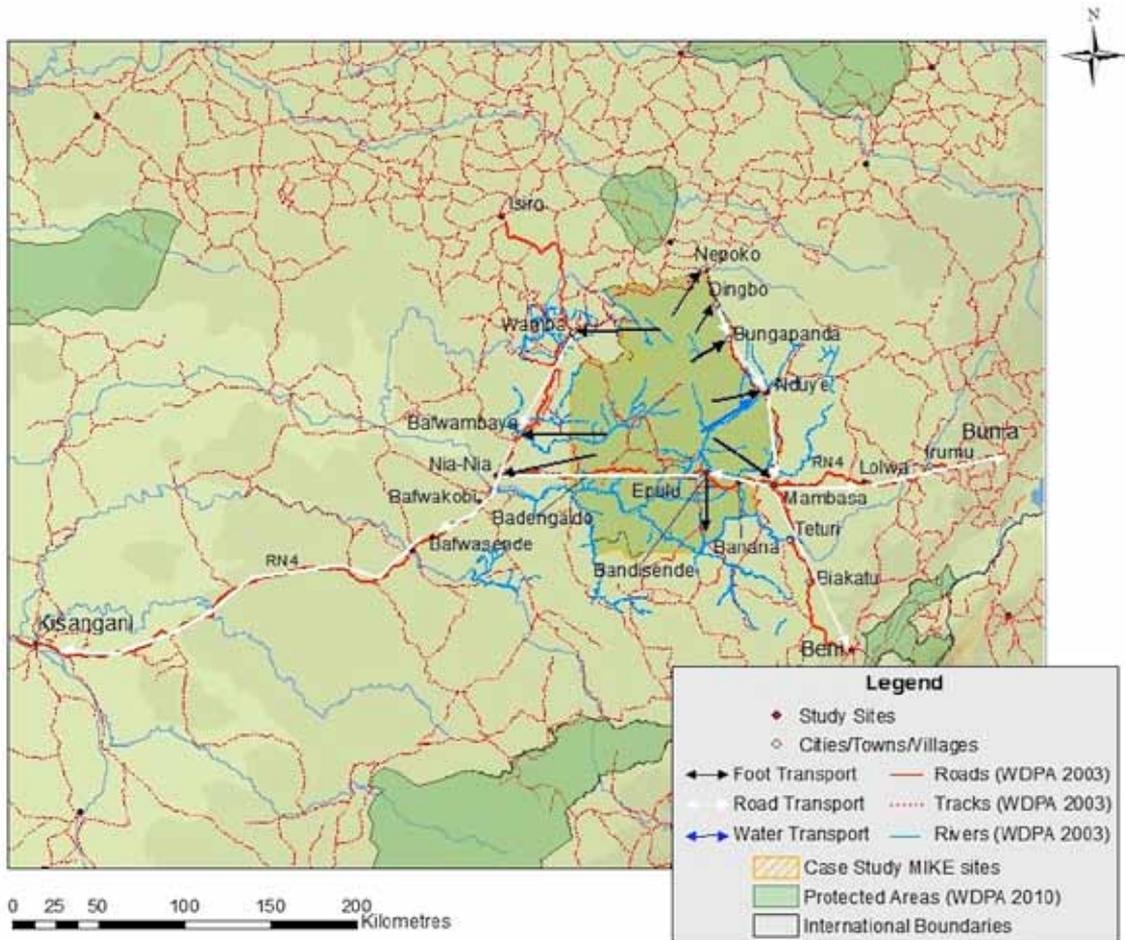
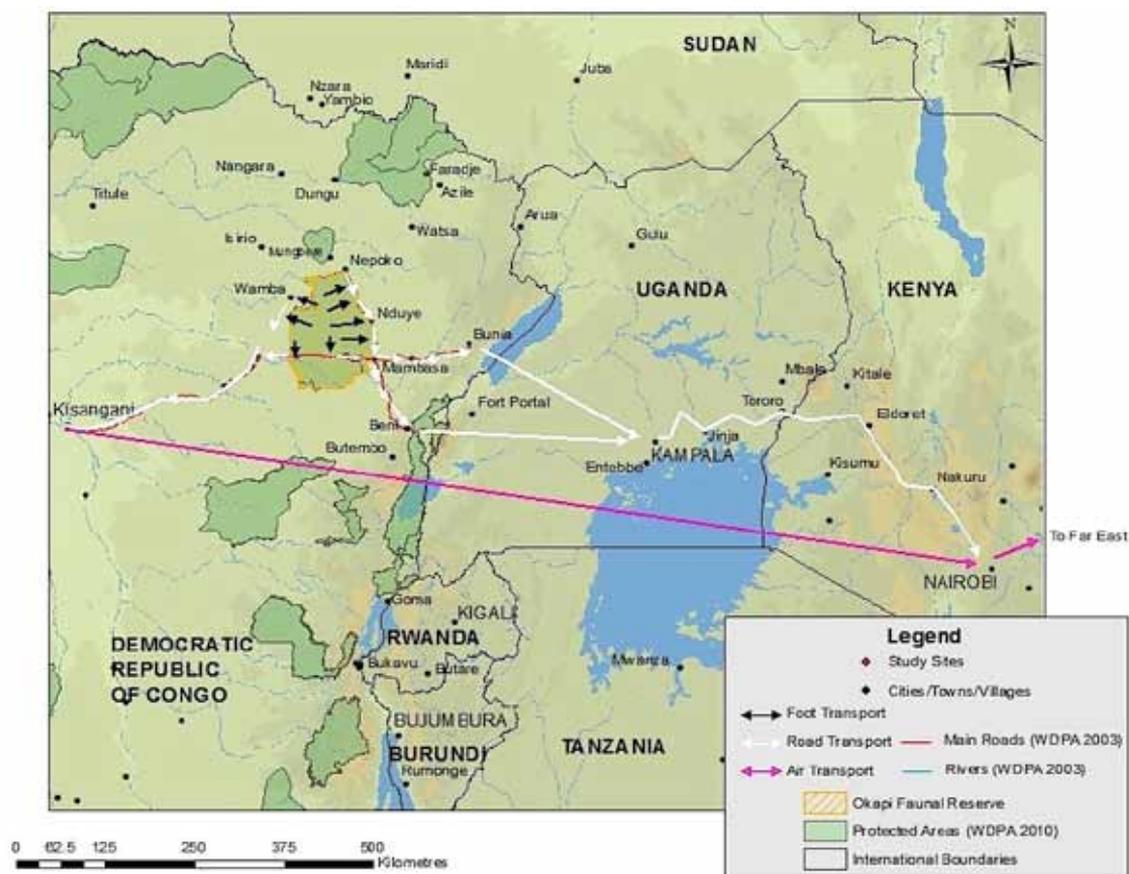


Figure 11. Movement of tusks from the OFR



trucks) or public transport companies (buses) and transported either west to Kisangani or east through Bunia to Kampala and on to Kenya or Ethiopia to be shipped to the Far East. There is an ICCN checkpoint near the bridge in Epulu, but the rangers do not look for ivory or other contraband for fear of reprisals by the military, who are usually connected in some way with the illegal commodities. Ivory is sometimes detected in eastern DRC by accident. For example, in August 2010 during the study period 116 tusks were seized when a truck heading to Kisangani from the north collided with another vehicle. Tusks were found inside empty jerry cans that had tumbled off the truck (Anon., 2010b). It was said earlier in this report that it appears that ivory transport is shifting from moving east to going west to Kisangani, based on informant reports. Further evidence was provided by a seizure of tusks made in September by the National Information Agency in a truck that was coming from Aru, near the DRC-Uganda border, heading to Kisangani (Radio Okapi, 2010).

Because of ivory seizures made elsewhere, it is known that ivory from the DRC transited Nairobi and Addis

Ababa in the past to go to China (Milliken, et al., 2009; TRAFFIC, 2010). In January 2011, for example, a Chinese citizen arriving from Kinshasa was apprehended in the Nairobi airport attempting to smuggle 12 tusks and 278 pieces of raw and worked ivory weighing 65 kg to China (Anon., 2011). He was connecting to a flight to Guangzhou. Whether this pattern will continue in future remains to be seen.

Other evidence that ivory from Central Africa, and most probably from DRC due to geography, enters Kenya, was a study of stable isotopes in ivory carvings seized in Kenya. The analysis showed that the ivory was from forest, not savannah, elephants (Cerling, et al., 2007).⁴

⁴ S. Wasser has been leading a research team that uses DNA obtained from elephant dung to 'fingerprint' elephant sub-populations to geographical areas. DNA from seized ivory can be matched to DNA in their reference database to determine the origin of the ivory (Wasser, et al., 2009). DNA from eastern DRC is missing from the database, so the PC obtained dung-collecting kits and instructions from Wasser and left the materials with ICCN in Epulu in the hope that they can provide the missing DNA data. This could be used to ascertain where ivory from OFP is going.

External Factors

Logging, illegal or legal, has had very little influence on elephant poaching in OFR. There are no logging roads or sawmills in, or in proximity to, OFR. Mining, on the other hand, has had considerable impact on poaching for bushmeat. The invasion by coltan miners in 2000-2001 and artisanal gold and diamond mining, which still occurs inside OFR, represent a market for bushmeat. This demand for meat probably does not drive elephant killing, however, because other species – much easier to hunt – are abundant. The mining camps rather offer an opportunistic place to sell elephant meat that is a by-product of hunting for ivory.

Rising international demand for ivory and consequent high prices, particularly in eastern Asia where booming economies have given consumers increased discretionary spending, have been driving elephant poaching in Africa. Unless this demand can be lowered through public awareness campaigns and rigorous law enforcement in countries such as China (including Hong Kong), Taiwan

and Thailand, there is little hope that elephant poaching can be significantly reduced.

Poverty, endemic institutionalized corruption, civil strife, weak governance structures and lack of alternative means of livelihood in north-eastern DR Congo have made unmanaged exploitation of natural resources, including poaching for ivory, inevitable. Elephant poaching is only part of the larger picture of illegal logging and mining, invasions of protected areas and logging concessions, not to mention the abuse of local populations by those with power backed by the force of arms. Nothing long lasting can be achieved unless good governance and respect for the law can be established.



Photo 12. Vehicles are stopped at the ICCN checkpoint at Epulu, but not searched. (Photo: Dan Stiles)

Conclusions

Illegal elephant killing is occurring in the Okapi Faunal Reserve and surrounding forest, but at lower rates than in the recent past as a result of the government re-establishing control, supported by the international community in the form of the CBFP initiative and UN peacekeepers. The massive elephant slaughter that took place in the late 1990s and first half of this millennium as a result of armed conflict and instability has ceased. Elephant poaching currently is instigated largely by officers of the FARDC, but also by police and administration officials, religious figures and businessmen. The hunting is carried out by professional commercial poachers, assisted by family, friends and Mbuti trackers, and sometimes by soldiers based in Mambasa. The hunters usually use AK-47s and ammunition provided by the person ordering the hunt. The primary motivating factor is ivory.

The gross income in the first link of the commodity chain, the hunter, from a pair of tusks weighing between 5 and 15 kg each is approximately US\$ 160 - 1,680. The maximum that realistically could be gained from meat and other body parts of an elephant exceeds US\$ 3,000. The main explanation as to why elephants are killed more for ivory than for meat seems to be that it is simpler and more cost-effective for the people who order the hunts to gain from ivory. Tusks are easy to transport and keep track of and few people are involved. There is always a ready buyer. To smoke, transport and dispose of over a tonne of meat from one carcass and keep track of the earnings would involve the cooperation of large numbers of people and considerable effort. One hunter, with his meat-trader wife, was found willing to do this, but thus far no *commanditaires* were found who were interested in making the effort. The logistical and management problem is compounded when more than one elephant is killed on a hunting expedition, which is often the case. In addition, there is still abundant bushmeat available from other species, so there is no great need to target elephants for meat. They are expensive and time-consuming to hunt and as long as commercial hunters are subsidized they will continue to focus on ivory.

The situation could change if ivory becomes uneconomical by a drop in end-user price and/or consumer demand. If CITES were to establish a regulated, legal ivory trade system that would satisfy global demand, raw ivory prices would crash and *commanditaires* would cease ordering ivory hunts that had become uneconomical. This would apply Africa-wide,

not just in Central Africa. Since the elephant meat trade seems currently to be largely a by-product of hunting for ivory, this scenario should result in a severe decline in elephant poaching, at least until other bushmeat species became depleted by over-exploitation.

Elephant poaching, like other illegal natural resource exploitation, is driven by poverty, corruption, lack of good governance and weak law enforcement. No meaningful improvements to natural resource management can be achieved until these fundamental structural problems are addressed.

Policy Recommendations

The elephant poaching and product trafficking problem can best be tackled in the near term by working through the Ituri-Epulu-Aru Landscape process. The process is attempting to organize and manage natural resource utilization through the creation of land-use zones, each with its rules and regulations of natural resource exploitation. Wildlife hunting and product trafficking in DRC are controlled primarily by *Law no. 82-002 of 28 May 1982* and *Decree No. 014/CAB/MIN/ENV/2004 of 29 April 2004*. Forest use is governed by the national Forest Code (*Law n° 011/2002 of 29 August 2002*). The articles of these laws need to be integrated with the rules and regulations of the Landscape land-use zones. The ultimate objective should be that the local communities of the Landscape gain a decent livelihood from development of the CBNRMs and agricultural zones, so that they respect the integrity of the OFR and its wildlife.

National level

1. Law enforcement: The main people ordering illegal elephant killing are employees of the government. It is therefore incumbent upon the government in Kinshasa to ensure that its laws are enforced and that law-breakers are brought to justice, even if they are powerful administration or high-ranking military figures.
2. Economic development: The national government should become more involved in the CBFP initiative in eastern DRC and support strategies and activities through relevant ministries and agencies that aim to provide livelihoods to communities living around PAs that do not lead to over-exploitation of natural resources or that would attract additional immigration.
3. The rules and regulations related to land-use zones around OFR and other PAs that are established in



Photo 13. Elephant meat-smoking racks are abandoned after the hunters depart. MIKE site monitoring patrols should include racks as an indicator signalling elephant meat as a cause of illegal killing. (Photo: Karl Ammann)

- participation with local communities under the CBFP need to be formally recognized by national government.
4. The government should ensure that ICCN has the necessary financial, logistic and human resources to carry out its mandate.
 5. There is enormous potential for tourism development in the OFR. The government should stimulate this economic potential, which would provide employment and assist in lessening poaching by the presence of tourists.
 6. The Kisangani provincial office (and probably other provincial offices) of the Ministry of Arts and Culture should not be allowed to issue export permits for wildlife specimens that are protected from trade by national laws and CITES regulations.⁵
 7. The law needs to be amended to state clearly whether worked ivory can legally be sold. The DRC government has reported to CITES under Decision 13.26 (Rev. CoP14) '*Action Plan for the Control of Trade in Elephant Ivory*' that there is no domestic ivory trade, yet that is plainly not the case, as this study and La-grot (in prep.) have shown.

Local level

1. Land-use zoning under the CBFP programme should continue and extend to the north, west and south of the OFP. Local communities should continue to participate in creating and defining the zones.

2. The conservation objectives of the Landscape should be stated clearly and simply. Local populations should be educated that rules and regulations are means to ensure that conservation objectives are achieved.
3. CBFP Consortium partners, in collaboration with government and potential donors, should prepare a conservation and development plan that would include strategies that would control poaching and trafficking of bushmeat and ivory.
4. ICCN should be given high-level government support to allow it to carry out effective searches for ivory and bushmeat (and other illegal commodities such as timber) at its road checkpoints. If seizures were made on a regular basis, traffickers would soon cease their activities.
5. ICCN rangers and police should monitor bushmeat markets more effectively and apply existing laws to control the sale of protected species.
6. Public awareness and education should be carried out by the government in collaboration with NGOs to sensitize communities to the long-term negative consequences of unsustainable bushmeat offtake and loss of biodiversity in general.
7. The MIKE programme in OFR should be strengthened to enable a thorough census of the elephant population to be carried out as well as more effective monitoring and analysis of the causes of elephant deaths, including indicators of elephant meat harvesting (e.g. butchered carcasses, meat-smoking racks).

⁵ This practice is a holdover from pre-CITES ivory ban days when this ministry issued export permits and collected taxes on ivory exports (De Meulenaer & Meredith, 1989).

References

- Anon. (2008). *Document stratégique pour le Développement d'un Plan d'Utilisation des Terres dans la Concession Forestière de l'ENRA*. Kinshasa, DRC: WCS/ENRA.
- Anon. (2009). *Draft du Plan d'Aménagement du Paysage Ituri-Epulu-Aru*. Kinshasa: USAID, ICCN, CARPE, WCS, GIC, PACT.
- Anon. (2010a). 'DR Congo intensifies fight against ivory trafficking.' *Afrique en ligne*, July 19. [website] <http://www.afriquejet.com/news/africa-news/dr-congo-intensifies-fight-against-ivory-trafficking-2010071953013.html>. Accessed 20 July.
- Anon. (2010b). 'Congo police seize 116 elephant tusks, arrest 2 after truck crash in northeast'. *Associated Press*, 25 August, [website] <http://www.google.com/hostednews/canadianpress/article/ALeQM5hKkoaP7jLMtuUelsLWW5wK0zPvCw>.
- Anon. (2011). 'Chinese man sentenced for ivory possession (Kenya)'. *Kenya Broadcasting Corporation*, 20 January [website]<http://www.kbc.co.ke/news.asp?nid=68490>.
- Amboya Apobo, C. (2004). *Rapport sur le Braconnage d'Eléphant et sur le Commerce de l'Ivoire dans et à la Périphérie de la Réserve de Faune à Okapis (RFO), Ituri, RDC*. Kinshasa: ICCN and WCS.
- Baily, R. and Peacock, N. (1988). 'Efe Pygmies of northeast Zaire: subsistence strategies in the Ituri Forest'. In: I. DeGariné and G. Harrison (eds.) *Coping with Uncertainty in Food Supply*, pp. 88-117. Oxford, UK: Clarendon Press.
- Bakarr, M.I., da Fonseca, G.A.B., Mittermeier, R., Rylands, A.B. and Paenemilla, K.W. (2001). *Hunting and Bushmeat Utilization in the African Rain Forest: Perspectives Towards a Blueprint for Conservation Action*. Advances in Applied Biodiversity Science, Number 2. Washington, DC, USA: Conservation International.
- Balongelwa, P.C. (2008). 'Etat Actuel de la Conservation des Sites du Patrimoine Mondial en Péril de la RDC'. Unpublished document, Kinshasa, DRC: ICCN
- Barnes, R.F.W. (1996). 'The conflict between humans and elephants in the central African forests.' *Mammal Review* 26(2/3): 67-80
- Barnes, R.F.W. (2002). 'The bushmeat boom and bust in West and Central Africa.' *Oryx* 36(3): 236-242.
- Barnes, R. F. W., Blom, A., and Alers, M. P. T. (1995). 'A review of the status of forest Elephants *Loxodonta africana* in central Africa.' *Biological Conservation* 71:125-132.
- Bennett, E. (2008). *Hunting and Trade of Bushmeat in Central Africa: a review of conservation, livelihood and policy implications*. Washington, DC: WCS.
- Blake S, Strindberg S, Boudjan P, Makombo C, Bila-Isia I, et al. (2007). 'Forest Elephant crisis in the Congo Basin.' *PLoS Biology* 5(4): e111.
- Blanc, J., Barnes, R., Craig, G., Dublin, H., Thouless, C., Douglas-Hamilton, I. and Hart, J. (2007). *African Elephant Status Report 2007*. Gland, Switzerland: IUCN/SSC African Elephant Specialist Group.
- Brown, E., Mwinyihali, R., Hart, J. et al. (2008). 'Chapter 25: Ituri-EpuluAru Landscape.' In: *2008 State of the Forests*, pp. 351-360. Rome, Italy: FAO. [website] <http://www.fao.org/publications/>. Accessed 12 March 2011.
- CBFP. (2011). 'Congo Basin Forest Partnership.' [website] <http://www.pfbc-cbfp.org/home.html>. Accessed 10 March.
- Cerling, T., Omondi, P. and Macharia, A. (2007). 'Diets of Kenyan elephants from stable isotopes and the origin of confiscated ivory in Kenya.' *African Journal of Ecology* 45(4): 614-623.
- CITES (2010). *Monitoring of Illegal Hunting in Elephant Range States*. CoP15 Doc. 44.2(Rev.1). Geneva, Switzerland: CITES.
- Cobb, S. (ed.) (1989). *The Ivory Trade and Future of the African Elephant*. Ivory Trade Review Group, Lausanne, Switzerland: CITES.

- De Merode, E. and Cowlshaw, G. (2006). 'Species protection, the changing informal economy, and the politics of access to the bushmeat trade in the Democratic Republic of Congo.' *Conservation Biology* 20 (4): 1262–1271.
- De Merode, E., Homewood, K. and Cowlshaw, G. (2004). 'The value of bushmeat and other wild foods to rural households living in extreme poverty in Democratic Republic of Congo.' *Biological Conservation* 118: 573–581.
- De Merode, E., Smith, K., Homewood, K., Pettifor, R., Rowcliffe, M. and Cowlshaw, G. (2007). 'The impact of armed conflict on protected-area efficacy in central Africa.' *Biological Letters* 3: 299–301.
- De Meulenaer, T. and Meredith, M. (1989). 'The ivory trade in Zaïre.' In: S. Cobb (ed.) *The Ivory Trade and Future of the African Elephant*. Ivory Trade Review Group, Lausanne, Switzerland: CITES.
- Dublin, H. and Jachmann, H. (1992). *The Impact of the Ivory Ban on Illegal Hunting of Elephants in Six Range States in Africa*. Gland, Switzerland: WWF.
- ECODIT. (2010). *Evaluation of the Central Africa Regional Program for the Environment – Phase II*. Washington, D.C., USA: USAID.
- Fa, J. and Brown, D. (2009). 'Impacts of hunting on mammals in African tropical moist forests: a review and synthesis.' *Mammal Review* 39(4): 231–264.
- Hart, J. (1978). 'From Subsistence to Market: A Case Study of the Mbuti Net Hunters.' *Human Ecology* 6(3):325–353.
- Hart, J., Beyers, R., Grossman, F., Carbo, M., Dino, S. and Kahindo, F. (2008). *La Réserve de Faune à Okapis: La distribution et fréquence de la grande faune et des activités humaines, avec une évaluation de l'impact de 10 ans de conflit : 1996 – 2006*. IMU Report no. 9. Kinshasa: Inventory and Monitoring Unit, Wildlife Conservation Society.
- Hart, T. (2009). 'How many elephants are left in D.R. Congo?' 1 February, <http://www.bonoboincongo.com/2009/02/01/how-many-elephants-are-left-in-dr-congo/>.
- Hart, T.B. and R. Ducarme. (2005). 'Forestry and conservation during a war fought over land and resources in the Democratic Republic of Congo.' *ETFRN News* 43-44: 42-44.
- Hart, T.B. and Hart, J.A. (1986). 'The ecological basis of hunter-gatherer subsistence in African rain forests: the Mbuti of eastern Zaire.' *Human Ecology* 1:29-55.
- Human Rights Watch. (2005). *The Curse of Gold*. New York, USA: Human Rights Watch.
- Jones, J., Andriamarivololona, M., Hockley, N., Gibbons, J. and Milner-Gulland. (2008). 'Testing the use of interviews as a tool for monitoring.' *Journal of Applied Ecology* 45: 1205-1212.
- Karsenty, A. (2010). *Large-Scale Acquisition of Rights on Forest Lands in Africa*. Montpellier, France: CIRAD and Washington, D.C., USA: Rights and Resources Initiative.
- Lagrot, J.F. (in prep.). *Ivory market survey in Central Africa: Case studies in Gabon, Central African Republic, Republic of Congo & Democratic Republic of Congo*. Paris, France: TRAFFIC Europe-France.
- Laurance, W. F., Croes, B.M., Tchignoumba, L., Lahm, S.A., Alonso, A., Lee, M., Campbell, P. and Ondzeano, C. (2006). 'Impacts of roads and hunting on Central African rainforest mammals.' *Conservation Biology* 20:1251–1261.
- Lokoka, R. and Boundawana, M. (2010). 'Lutte contre le commerce de bushmeat et le braconnage dans la Réserve à Faune d'Okapis en RDC.' Unpublished report to CARPE, Kisangani, DRC: Organisation d'Accompagnement et d'Appui aux Pygmées.
- Makana, J.-R., Madidi, J. and Bikumbu, H. (2006). *Pre-harvest forestry and botanical inventories in ENRA logging concession in the Ituri Forest Landscape, northeastern Congo Basin Rainforest (Democratic Republic of Congo)*. Kinshasa, DRC: CTFS/WCS.
- Martin, E. and Martin, C. (2010). 'Russia's mammoth ivory industry expands: what effects on elephants?' *Pachyderm* 47: 26-35.
- Martin, E. & Stiles, D. (2000). *The Ivory Markets of Africa*. Nairobi, Kenya: Save the Elephants.

- Martin, E. and Vigne, L. (2011). *The Ivory Dynasty: A report on the soaring demand for elephant and mammoth ivory in southern China*. London, UK: Elephant Family, The Aspinall Foundation and Columbus Zoo and Aquarium.
- Michelmore, F., Beardsley, K., Barnes, R. F. W. and Douglas-Hamilton, I. (1994). 'A model illustrating the changes in forest elephant numbers caused by poaching.' *African Journal of Ecology* 32:89-99.
- Milliken, T., Burn, R.W. and Sangalakula (2009). *The Elephant Trade Information System (ETIS) and the Illicit Trade in Ivory*. CoP15 Doc.44.1, Annex. Geneva, Switzerland: CITES.
- Mubalama, L. and Mapilanga, J.J. (2001). 'Less elephant slaughter in the Okapi Faunal Reserve, Democratic Republic of Congo, with Operation Tango.' *Pachyderm* 31: 36-41.
- Nasi, R., Brown, D., Wilkie, D., Bennett, E., Tutin, C., van Tol, G., and Christophersen, T. (2008). *Conservation and use of wildlife-based resources: the bushmeat crisis*. Montreal, Canada: Secretariat of the Convention on Biological Diversity, and Bogor, Indonesia: Center for International Forestry Research (CIFOR), Technical Series no. 33.
- TRAFFIC (2010). *TRAFFIC Bulletin Seizures and Prosecutions, March 1997-March 2010*. Cambridge, UK: TRAFFIC International.
- UNESCO (2010). 'Okapi Wildlife Reserve'. [website] <http://whc.unesco.org/en/list/718>. Accessed on 13 September 2010.
- Van Vliet, N., Nebesse, C. and Nasi, R. (2010). 'The dynamics of bushmeat trade in the market of Kisangani'. Paper delivered at the XXIII IUFRO Congress, 23-28 August 2010, Seoul, Korea.
- Wasser, S., Clark, B. and K. Laurie. (2009). 'The ivory trail.' *Scientific American* July: 68-76.
- Wilkie, D. (1989). 'The impact of roadside agriculture on subsistence hunting in the Ituri forest of Zaire.' *American Journal of Physical Anthropology* 78:485-494.
- Wilkie D.S. and Carpenter J.F. (1999). 'Bushmeat hunting in the Congo Basin : an assessment of impact and options for mitigation.' *Biodiversity and Conservation*, 8 (7): 927-955.
- Wilkie, D. and Curran, B. (1991). 'Why do Mbuti hunters use nets? Ungulate hunting efficiency of bows and nets in the ituri rain forest.' *American Anthropologist* 93:680-689.
- Wilkie, D.S., Curran, B., Tshombe, R. and Morelli, G.A. (1998). 'Managing bushmeat hunting in the Okapi Wildlife Reserve, Democratic Republic of Congo.' *Oryx* 32: 131-144.
- Wilkie, D., Shaw, E., Rotberg, F., Morelli, G. and Auzel, P. (2000). 'Roads, development, and conservation in the Congo Basin.' *Conservation Biology* 14: 1614-1622.
- Wilkie, D.S., Sidle, J.G. and Boundzanga, G.C. (1992). 'Commercial logging and commercial hunting in northern Congo: how are they linked?' *Conservation Biology* 6(4):570-580.
- World Bank (2011). *Rising Global Interest in Farmland: Can It Yield Sustainable and Equitable Benefits?* Washington, DC, USA: World Bank.

Appendix 1. Questionnaires

CHASSEURS

1. Nom d'enquêteur _____ 2. Code de personne interviewée _____
3. Date _____ 4. Lieu de l'entrevue _____
5. Coordonnées de carte _____ 6. Lieu de naissance _____

Démographiques

Âge (approximatif) _____
Sexe: Male / Femelle _____
Profession(s) _____
Chasseur pour soi-même ___ ou pour commanditaire _____
Si commanditaire, qui _____
Ville/Village ou vous habitez actuellement _____
Groupe ethnique _____

Etat civile: Marié / Marié polygame / Célibataire / Veuve

Religion : Protestant / Catholique / Musulman / _____ Autre (spécifier)

L'abattage le plus récent

Site: a. Région _____ b. Aire protégée la plus proche _____
c. Village le plus près _____ d. Distance au village _____ km
e. Description du site de l'abattage _____
f. Date de l'abattage _____
g. Quantité de viande consommée sur place _____

Encercler les items (viande, ivoire) transportés:

17. Viande/ivoire transporté de _____ (site spécifique) à _____
18. Durée du voyage de trouver, de tuer, de boucaner et de transporter la viande/l'ivoire _____ jours
19. Distance approximative du trajet _____ km
20. Nombre et type de participants:
a. _____ membres de famille
b. _____ Amis de votre village
c. _____ Amis d'un autre village(s)
d. _____ Autre (spécifier): _____

21. Méthode de chasse: _____

Type fusil: _____

Type cartouche: _____

Nombre de cartouches utilisées: _____

Coût d'une cartouche: _____

Type câble: _____

Autre: _____

22. Si chasse au fusil, qui est le propriétaire de l'arme: _____

23. Ranger les causes de l'abattage d'éléphant : (1 = plus important, 2 = 2^{ème} plus important, etc)

- a. ____ ivoire
- b. ____ viande
- c. ____ protéger la vie/les champs cultivés (conflit humain-éléphant)
- d. ____ culturel _____ (description)
- e. ____ autre _____ (spécifier)

24. Type et quantité d'autres animaux pris pendant le voyage:

- a. A vendre : _____
- b. A consommer : _____
- c. A partager : _____
- d. Pour usage culturel : _____
- e. Pour médecine : _____
- f. Autre but (spécifier) : _____

25. Ranger les modes de transport selon fréquence d'usage (1 = le plus, 2 = 2^{ème}, etc.)

- a. ____ bus/car
- b. ____ voiture particulière (propriétaire _____)
- c. ____ véhicule gouvernemental (spécifier _____)
- d. ____ véhicule de société/organisation (spécifier _____)
- e. ____ moto
- f. ____ vélo
- g. ____ à pieds
- h. ____ canoë

26. Quantité de viande d'éléphant transportée: _____ kg total

- a. ____ kg au marché
- b. ____ kg vendus sur la route
- c. ____ kg vendus à un abonné
- d. ____ kg au foyer familial
- e. ____ kg à partager avec autres foyers amis
- f. ____ kg à vendre à un étranger

27. Quantité d'ivoire transportée : nombre de pointes _____
kg total _____

28. Nombre de porteurs _____

29. L'acheteur de l'ivoire _____

30. Autres pièces d'éléphant transportées/utilisées _____

- a. _____ kg/nombre au marché
- b. _____ prix kg/pièce
- c. _____ kg/nombre vendus à une personne connue Qui _____
- d. _____ kg/nombre vendus à une inconnue
- e. _____ kg/nombre transporté au foyer
- f. _____ kg/nombre donnés comme cadeau Qui _____

Sites de vente de produits d'éléphant par le chasseur

31. (marché, bureau, domicile, restaurant, gargote, etc.)

Description du site	Localisation du site	Type de produit vendu	Acheteur

Motifs économiques de la chasse aux éléphants

32. Prix d'un kg de viande (approximatif) _____ CFA / kg

33. Autre rémunération pour la viande _____

34. Prix d'un kg d'ivoire: pointe <5kg _____ FCFA; pointe 5-10 kg _____ FCFA
pointe >10 kg _____ FCFA

35. Autre rémunération pour l'ivoire _____

36. Autres produits vendus ou utilisés _____

37. Rémunération _____

TRANSPORTEURS/GROSSISTES

1. Nom d'enquêteur _____

2. Code de personne interviewée _____

3. Date _____

4. Ville/Village de l'entrevue _____

5. Coordonnées de carte _____

6. Lieu de naissance _____

Démographiques

7. Âge (approximatif) _____

8. Sexe: Male / Femelle

9. Profession(s) _____

10. Travailler pour soi-même ____ ou pour commanditaire ____

11. Si commandité, par qui _____

12. Ville/Village où vous habitez actuellement _____

13. Groupe ethnique _____

14. Etat civil: Marié / Marié polygame / Célibataire / Veuve

15. Religion: Protestant / Catholique / Musulman / _____ Autre (spécifier)

16. Depuis quand transportez-vous/vendez-vous la viande/l'ivoire? _____

Encercler les items (viande, ivoire) transportés.

17. Viande/ivoire transporté de _____ (site spécifique) à _____

18. Voie utilisée (route publique, route de concession forestière, route de mine, piste, rivière, etc.)

19. Durée du voyage _____ jours

20. Distance approximative du trajet _____ km

21. Nombre et type de participants:

a. _____ membres de famille

b. _____ Amis de votre village

- c. _____ Amis d'un autre village(s)
 d. _____ Autre (spécifier): _____

22. Dates d'approvisionnement de viande/ivoire : mois de _____ de l'année _____

23. Dates de vente de viande/ivoire : mois de _____ de l'année _____

24. Ranger les modes de transport selon fréquence d'usage (1 = le plus, 2 = 2^{iem}, etc.

- a. ___ bus/car
 b. ___ voiture particulière (propriétaire _____)
 c. ___ véhicule gouvernemental (spécifier _____)
 e. ___ véhicule de société/organisation (spécifier _____)
 f. ___ moto
 g. ___ vélo
 h. ___ à pieds
 i. ___ canoë

25. Quantité de viande d'éléphant transportée: _____ kg total

- a. ___ kg au marché
 b. ___ kg vendus sur la route
 c. ___ kg vendus à un abonné
 d. ___ kg au foyer familial
 e. ___ kg à partager avec autres foyers amis
 f. ___ kg à vendre à un étranger

26. Quantité d'ivoire transportée : nombre de pointes _____
 kg total _____

27. Nombre de porteurs _____

28. L'acheteur de l'ivoire _____

29. Autres pièces d'éléphant transportées/utilisées _____

- a. _____ kg/nombre du produit au marché
 b. _____ prix kg/pièce
 c. _____ kg/nombre vendus à une personne connue Qui _____
 d. _____ kg/nombre vendus à une inconnue
 e. _____ kg/nombre transporté au foyer
 f. _____ kg/nombre donnés comme cadeau Qui _____

Sites de vente de produits d'éléphant par le transporteur/grossiste

30. (marché, bureau, domicile, restaurant, gargote, etc.)

Description du site	Localisation du site	Type de produit vendu	Acheteur

Motifs économiques

31. Prix d'un kg de viande (approximatif) _____ CFA / kg

32. Autre rémunération pour la viande _____

33. Prix d'un kg d'ivoire: pointe <5kg _____ FCFA; pointe 5-10 kg _____ FCFA
pointe >10 kg _____ FCFA

34. Autre rémunération pour l'ivoire _____

35. Autres produits vendus ou utilisés _____

36. Rémunération _____

Fluctuations de prix de vente de viande de l'éléphant

37. Prix mensuel / kg

Jan Fév Mar Avr Mai Juin Juillet Août Sept Oct Nov Déc

38. Prix à long terme

1990 prix moyen / kg _____ CFA 1995 prix moyen / kg _____ CFA 2000 prix moyen / kg _____ CFA 2005 prix moyen / kg _____ CFA

Fluctuations de prix d'ivoire

39. Prix à long terme

1990 prix moyen / kg _____ FCFA 2000 prix moyen / kg _____ FCFA 2005 prix moyen / kg _____ FCFA 2008 prix d'une pointe de 5-10 kg _____ FCFA

Détaillantes

1. Nom d'enquêteur _____ 2. Code de personne interviewé _____
3. Date _____ 4. Ville/Village de l'entrevue _____
5. Coordonnées de carte _____ 6. Lieu de naissance _____

Démographiques

7. Âge (approximatif) _____
8. Sexe: Male / Femelle
9. Profession(s) _____
10. Comment et avec qui avez-vous été initiée au commerce de viande d'éléphant? _____
11. Ville/Village ou vous habitez actuellement _____
12. Groupe ethnique _____
13. Etat civil: Marié / Marié polygame / Célibataire / Veuve
14. Religion: Protestant / Catholique / Musulman / _____ Autre (spécifier)

Source de viande/ivoire

15. Décrire le vendeur de viande/ivoire et l'endroit de l'achat _____

16. Quantité de viande obtenue par semaine _____ kg, par mois _____ kg

17. Prix d'achat de viande _____ FCFA

18. Quantité d'ivoire obtenue par semaine _____ kg, par mois _____ kg

19. Prix d'achat d'ivoire: pointes <5 kg _____ FCFA; 5-10 kg _____ FCFA; >10 kg _____ FCFA

Fluctuations de prix de vente de viande de l'éléphant

20. Prix mensuel / kg

Jan Fév Mar Avr Mai Juin Juillet Août Sept Oct Nov Déc

21. Prix à long terme

1990 prix moyen / kg 1995 prix moyen / kg 2000 prix moyen / kg 2005 prix moyen / kg

_____ CFA _____ CFA _____ CFA _____ CFA

Fluctuations de prix d'ivoire

22. Prix à long terme

1990 prix moyen / kg 2000 prix moyen / kg 2005 prix moyen / kg 2008 prix d'une pointe de
5-10 kg

_____ FCFA _____ FCFA _____ FCFA _____ FCFA

Sites de vente de produits d'éléphant par la détaillante

23. **(marché, bureau, domicile, restaurant, gargote, etc.)**

Description du site	Localisation du site	Type de produit vendu	Acheteur



**INTERNATIONAL UNION FOR
CONSERVATION OF NATURE**

WORLD HEADQUARTERS
Rue Mauverney 28
1196 Gland, Switzerland
mail@iucn.org
Tel +41 22 999 0000
Fax +41 22 999 0002
www.iucn.org

