Elephant Meat Trade in Central Africa

Summary Report

Daniel Stiles

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

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

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

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

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

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

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Cover photo: Daniel Stiles. This elephant baby could lose its mother because of tusks.

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Acronyms

AfESG	African Elephant Specialist Group
BBNP	Boumba Bek National Park
BIR	*Bataillon d'intervention rapide* (Rapid Intervention Battalion)
CAR	Central African Republic
CARPE	Central African Regional Programme for the Environment
CIB	*Congolaise Industrielle des Bois*
CIFOR	Centre for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Fauna and Flora
CBNRM	Community Based Natural Resource Management
CBFP	Congo Basin Forest Partnership
COMIFAC	Commission of Ministers in Charge of Forests in Central Africa
DRC	Democratic Republic of Congo
DSC	Dzanga-Sangha Complex
DSP	Dzanga-Sangha Project
ECOFAC	*Conservation et utilisation rationnelle des Ecosystèmes Forestiers d'Afrique Centrale* (Conservation and rational utilization of Forest Ecosystems in Central Africa)
ENRA	Enzymes Refiners Association
ETIS	Elephant Trade Information System, managed by TRAFFIC
FARDC	*Forces Armées de la République Démocractique du Congo* (FARDC) The DRC national army
FCFA	Franc of the Central African Financial Community
FMU	Forestry Management Unit
FSC	Forest Stewardship Council
GTZ	German technical development agency
IFO	*Industrielle Forestière d'Ouesso*
ICCN	*Institut Congolais pour la Conservation de la Nature*, the wildlife and protected areas management authority in the DRC
IUCN	International Union for Conservation of Nature
LAB	*Lutte Anti-Braconnage* (Anti-Poaching Combat, Cameroon)
LAGA	Last Great Ape Organization (Cameroon)
MIKE	Monitoring the Illegal Killing of Elephants (CITES programme)
MINFOF	Ministry of Forestry and Fauna (Cameroon)
MWFHF	Ministry of Water, Forests, Hunting and Fisheries (CAR)
NP	National park
OFR	Okapi Faunal Reserve
OSAPY	*Organisation d'Accompagnement et d'Appui aux Pygmées* (DRC NGO)
PA	Protected area

PALF	*Projet d'aide à l'Application des Lois sur la Faune* (Project to Assist Application of Wildlife Law, ROC NGO)
OKNP	Odzala-Kokoua National Park
RA	Research Assistant
RDS	Respondent-driven sampling
ROC	Republic of Congo
SSC	Species Survival Commission
TRIDOM	Tri Dja-Odzala-Minkebe (WWF conservation project)
TRAFFIC	The wildlife trade monitoring network, a joint programme of WWF and IUCN
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund (USA/Canada); Worldwide Fund for Nature (international)

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Executive Summary

Background

1. An initial assessment of the 2001-2009 carcass database of the CITES Monitoring the Illegal Killing of Elephants (MIKE) programme suggests that the trade in elephant meat, especially in the central African subregion, may be an important factor underlying the illegal killing of elephants. 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 management solutions.

2. In the forested countries of the central African subregion, a complex and interconnected variety of development activities take place, such as timber harvesting, mining, building of supporting infrastructure (e.g. roads, schools, clinics) and the inflow of foreign nationals. These attract an influx of immigrants seeking work, both national and foreign, who depend heavily on bushmeat for protein. With little law enforcement capacity and weak governance structures, there is a very real threat to many local elephant populations.

3. At present the primary factors and dynamics in the illegal offtake of elephants in Central Africa and, in particular, the use of not only ivory but also meat, are assumed but not well understood. A deeper knowledge of the scale and extent of the killing and how the ivory and meat markets are interlinked is urgently needed. Therefore gaining greater understanding of these trade dynamics could help to ascertain the key drivers behind the loss of elephants and other species.

4. African elephant range States of the Central African subregion comprise Cameroon, Central African Republic (CAR), Chad, Republic of Congo (ROC), Democratic Republic of Congo (DRC), Equatorial Guinea and Gabon.

5. CITES MIKE has requested the assistance of the IUCN/SSC African Elephant Specialist Group (AfESG) to implement the 'Elephant Meat Trade in Central Africa Project'.

Objectives

6. The overall objective of the study is to enhance knowledge of contemporary elephant meat market dynamics, patterns and trends in Central African countries by undertaking an elephant meat trade impact study. The results aim to establish a baseline data set of variables that can subsequently be monitored to assess trends in meat and ivory trade at the site level.

7. The findings of this study also aim to offer contributions to satisfy elements in CITES Decision 13.11 'Bushmeat', Decision 14.78 (Rev. CoP15), which concern updating information relating to the status of elephant conservation and the data that MIKE is collecting, and Decision 15.74, which is an evaluation of the need to revise CITES Resolution 10.10 (Rev. CoP 15) 'Trade in Elephant Specimens'.

Methods

8. Project resources did not allow research to be carried out in all seven countries. Therefore MIKE monitoring sites in four countries were selected on the basis of number and density of elephants, quality of monitoring data, available institutional support and extent of past bushmeat research to use as supportive data.

9. The sites selected were: Okapi Faunal Reserve (OFR) in DRC, Boumba-Bek National Park (BBNP) in Cameroon, Dzanga-Sanga Complex (DSC) in CAR and Odzala-Koukoua National Park (OKNP) in ROC.

10. A Methodology was developed to identify and define data variables to collect. Questionnaires were formulated to guide interviews of the principal actors involved in illegal elephant killing and product trading: hunters, middlemen, transporters, vendors and consumers. Data entry sheets were designed to organize and store data.

11. Investigations were carried out near the MIKE sites on elephant hunting and the products harvested (i.e. meat, tusks, skin, hair, etc.), the quantities transported and sold, the methods and routes taken, those involved and prices. The meat and ivory commodity chains were followed away from the MIKE sites to regional towns and finally to large cities such as Kisangani, Bangui and Brazzaville.

Bushmeat markets and restaurants were surveyed to collect data on elephant meat and when possible, ivory workshops and outlets were visited to gather data on the ivory trade.

12. Given the legally sensitive nature of this topic and in an attempt to be a non-threatening observer and participant, the research teams used respondent-driven sampling (RDS) to identify informants, i.e. volunteers. Through RDS, the research teams recruited hunter, middleman, transporter, market vendor and consumer informants. As a result of limited field time (4-6 weeks per country), the number and geographic distribution of informant types in each country were usually not adequate to represent statistically valid samples.

Results

HUNTERS

13. All 54 elephant hunters interviewed were commercial hunters, as distinct from subsistence hunters. They hunted for profit, not food. Only three (5.6%) of them killed elephants primarily for meat, one each in Cameroon, CAR and DRC. Ivory was the stated primary motivation for 49 (90.7%).

14. Well over half (59.2%) of elephant hunters said they were paid by others to kill elephants. These *commanditaires* are influential government or military officers, businessmen or even clerics. The *commanditaires* order the hunt and provide money, food and other goods to the lead hunter, who organizes the hunting party. The *commanditaire* also often supplies weapons and ammunition. In return, he receives tusks. The *commanditaires* are not interested in the meat, which is usually a by-product and an added incentive to the hunting party.

15. The two most common weapons used to hunt elephants are the AK-47 and the 12-gauge shotgun using manufactured bullets, followed by proper hunting rifles (e.g. .458, 10.75). Rarely, cable snares and homemade firearms are used.

16. Elephant hunts entail a much larger expense and work effort than commercial hunting of smaller game or subsistence hunting. Hunting parties are on average larger (mean of seven) and more time is spent on each hunt (mean of 15 days) than hunts involving other targeted game. Without the resource input and stimulus from *commanditaires*, it is likely that there would be many fewer elephant hunts, and consequently fewer elephants killed.

17. In the western Congo Basin, Pygmies are often both elephant hunters and trackers. In the east around OFR, Pygmies only track, they do not shoot elephants. Pygmies rarely hunt elephants on their own; they usually work on behalf of *commanditaires*.

18. Tusks are always taken from a kill and in 85% of hunts, elephant meat was also carried away. However, in three country case studies, no meat was carried away in 14%, 25% and 45% of hunts respectively. The two main explanations for no meat being taken were: (1) not enough porters were available to carry meat as well as tusks, or (2) the hunters feared detection and departed quickly after removing the tusks. When meat is taken, it is usually less than half of that available.

19. Elephant bushmeat is almost always sold smoked. Elephants are most often hunted far from roads, as elephants tend to avoid areas of human activity, and smoking delays spoilage. It takes two to three days to smoke the meat; so this must be done in a secure location to avoid detection.

20. In the vicinity of the MIKE sites, elephant meat prices were approximately equal to or somewhat higher than meat from other species. The further the distance from the source, the higher the price for elephant meat becomes and the differential between elephant and other meats increases. In regional towns and large cities, elephant meat was often among the most expensive meats found, being more expensive even than beef, goat and pork.

21. For the hunter, the economic potential of elephant meat often exceeds that of ivory. If all meat could be harvested and sold from an adult male (estimated to equal approximately 1,000 kg smoked) earnings would amount to US$ 1,000-5,000, or an average of about US$ 2,600. Only an elephant with very large tusks (>20 kg each) could provide that much from ivory. On average, hunters could earn much more from meat than from ivory from one elephant.

22. Many other products are taken from elephants for personal and commercial use: trunk, tail, skin, ears, feet, fat, bone marrow and possibly musth liquid (noted in Cameroon).

23. The carcass of a single adult elephant with large tusks could potentially earn hunters and/or their *commanditaires* well over US$ 10,000. Due to logistical and security constraints, full potential is rarely achieved.

MIDDLEMEN/TRANSPORTERS

24. Meat middlemen are often women, 17 being interviewed, while 12 male meat middlemen were interviewed. Although the primary purpose of an elephant hunt may be ivory, when bushmeat traders become aware of an expedition being mounted, they may visit the hunting camp to buy meat, or encounter the party upon its return at a road or in a village to make a purchase. Elephant meat disperses quickly to several middlemen, who take it to sell in local or regional markets and restaurants using a variety of means of transport (e.g. motorbike, rented car or public transport).

25. Middlemen convey relatively small amounts of elephant meat the long distance to large cities, as other bushmeats are plentiful, and transporting illegal elephant meat poses a risk. Authorities rarely seize the meat, as the middleman simply pays a small inducement to carry on.

26. Middlemen sometimes pay transporters to carry meat to urban markets using logging trucks, buses, commercial vehicles and even government or NGO vehicles.

27. Those who command ivory hunts usually resell the tusks to international traders, who export the tusks, or they resell them to ivory workshops. Larger tusks are exported while smaller, poorer quality tusks are sold for local use. Tusks are exported to West Africa (Nigeria, Ivory Coast, Senegal), to Sudan and Egypt, or to Kampala, Nairobi or Addis Ababa in transit to the Far East.

28. Middleman ivory selling prices varied from US$ 25 to 70/kg for <5 kg tusks, US$ 40 to 100/kg for 10-20 kg tusks and US$ 50 to more than US$ 120/kg for >20 kg tusks. Some craftsmen in Kisangani reported prices as high as US$ 250/kg, which could not be verified.

29. Elephant meat and ivory trade paths divide and have different commodity chains after leaving the hands of the hunter or the first middleman. Fewer than 10% of middlemen traded in both meat and ivory, all of them women.

VENDORS

30. Bushmeat vendors are usually women, with 49 interviewed, along with 13 men. Elephant meat is generally sold clandestinely in markets cut up into small pieces or in restaurants to known customers. It is also sold directly to subscribers or from the vendor's home.

31. Elephant meat was rarely seen in markets and restaurants compared to other bushmeats.

ELEPHANT MEAT PRICES

32. Hunters reported selling elephant meat to middlemen for US$ 1 to US$ 2/kg or directly to vendors or consumers for US$ 2 to 5/kg. Middleman elephant meat selling prices vary depending on distance travelled and location of selling point. Middlemen sold to vendors or consumers for US$ 2.60/kg to US$ 6.67/kg, although data quality is uneven. Market retail prices for smoked elephant meat varied from US$ 2.93/kg to US$ 13/kg, depending on type of outlet, with the average being approximately US$ 6.65/kg. Except in south-western CAR, it was usually the highest or among the highest in price of all meats seen.

EXTERNAL FACTORS

33. Based on observations and informants' responses, weak law enforcement, corrupt government and military officials and lack of means of earning a livelihood were found to be critical causal factors in elephant poaching, as well as in other forms of natural resource over-exploitation.

34. Most informants in this study cited abuses or collusion by the authorities in illegal wildlife exploitation activities. They expressed dissatisfaction regarding the way in which natural resources were managed. Poverty and lack of alternative sources of income were cited as primary reasons motivating illegal hunting and product trafficking.

35. Forestry concessions were another important indirect causal factor in elephant killing. The three case study MIKE sites in the western Congo Basin are virtually surrounded by forestry concessions, with consequent construction of logging roads, other infrastructure, truck transport, the promotion of bushmeat hunting by truck drivers and the influx of immigrants in search of employment, all of which creates a demand for bushmeat. Those without employment are attracted to poaching for meat, ivory and other trade products while immigrant shop owners finance ivory poaching. The OFR, however, is not affected by forestry concessions.

36. Other studies have shown that governments and NGOs working with logging companies can yield positive results when working to implement Forest Stewardship Council (FSC) guidelines. A good example of implementation of the FSC guidelines is the Buffer Zone Project (BZP) in northern ROC that has worked since 1999 with the *Congolaise Industrielle des Bois* logging company, WCS and the Congolese Ministry of Forestry Economy.

37. Mining is currently a minor causal factor around the western MIKE sites, attracting illegal artisanal miners near DSC and BBNP. Large mining developments are underway that will have a major impact on the entire western Congo

Basin subregion over the next two decades. Illegal mining has been taking place inside the OFR for almost 20 years, but it does not appear to stimulate elephant poaching. Miners do purchase elephant bushmeat, however.

38. The recent upgrading of public roads in the Cameroon, ROC and DRC study areas has promoted elephant killing by facilitating transport of illegal products.

39. Human population growth around protected areas is a major negative factor, as a growing population raises demand for bushmeat and the greater number of destitute people living near protected areas increases the number of those who will poach to survive.

40. Linked to population growth is the increasing conflict between humans and elephants as humans expand into elephant habitats in search of new agricultural land and forest resources. In some areas outside of PAs, the number of 'problem' elephants killed represents a considerable proportion of deaths from all causes. There are two main circumstances in which elephants are legally killed due to human-elephant conflict. The first is 'problem animal control' (PAC), which is carried out by the wildlife authorities in response to complaints by villagers of crop-raiding or other elephant depredations. The second is self-defence, in which local inhabitants will kill problem elephants that are threatening their lives and/or property. Meat from legitimate HEC killings does not appear to enter bushmeat trade networks, although research is needed on the question.

General Conclusions

41. Hunters that specialize in elephants are commercial hunters who primarily target ivory. They often work on behalf of wealthy *commanditaires* who subsidize elephant hunts with weapons, ammunition and supplies in exchange for tusks. Meat is an important by-product of these hunts, along with other parts from the elephant, and these non-ivory products are often part of the incentive for hunters and porters to participate in arduous elephant hunts. Elephant hunts tend to involve more work effort than subsistence hunts; elephant hunting parties are larger, travel longer distances and last longer than subsistence hunts. Illegal killing for ivory and meat are closely linked, but ivory is more often the primary motivation because (1) *commanditaires* subsidize the hunts in exchange for tusks, (2) tusks require less manpower to transport and (3) by unit weight, tusks provide a much higher return.

42. Elite urban consumers prize elephant meat for cultural reasons and they are willing to pay higher prices for it than for almost any other kind of meat. The main reason why more elephant meat is not consumed is lack of availability. Although elephant meat has significant economic potential for hunters, the commodity is underutilized because of manpower constraints in transport and fear of being detected by the authorities if hunting parties are too large or remain for too long in one place smoking meat.

43. Since demand for elephant meat exceeds supply, there is great potential for the trade to grow, particularly as other bushmeats become scarcer as a result of over-exploitation propelled by human population growth and lack of protein alternatives. The trade would almost certainly increase if logistical constraints were eased (e.g. roads were built offering easier access and exodus) and/or security concerns lessened (e.g. ecoguard patrols and road checkpoints decreased, or corruption of law enforcers increased).

Recommendations

Recommendations for policy and actions to reduce illegal elephant killing emerging from this study include:

1. The COMIFAC-CBFP strategy of focusing on defined landscapes and creating land-use zones and natural resource management plans should constitute the framework for policies and actions aimed at conserving elephants.

2. Access, user rights and the responsibility to sustainably manage wildlife resources should be transferred whenever possible to local stakeholders who have a vested interest in maintaining the resources and who can deliver sustainable solutions at the local level. Capacity of such empowered local communities should be strengthened to ensure that they have the ability to exercise these rights responsibly and with accountability.

3. Conservation and sustainable use of wildlife resources would be enhanced through the incorporation of traditional knowledge and modes of leadership into management and monitoring systems.

4. Commercial hunters are the proximate cause of elephant poaching in Central Africa and according to them, they would cease killing elephants if alternative sources of income were available to them. Elephant hunters are often known within their communities and to local law enforcement authorities. Special efforts should be made with these hunters to provide education, training and employment as an incentive to cease killing elephants. Concurrently, laws must also be more strictly enforced to arrest and punish hunters to deter illegal elephant killing.

5. *Commanditaires* (those who order and subsidize elephant hunts) and middlemen trading in elephant meat and ivory are intermediate causes of illegal elephant killing. Without their participation and often encouragement in killing elephants and rewarding hunters, elephant poaching would probably decline significantly. The relevant authorities, assisted as may be by NGOs (e.g. LAGA, PALF), need to do more to identify these middlemen and put a stop to their operations by publicizing their activities and taking them to court.

6. Consumers that purchase elephant meat in Central Africa and worked ivory of illegal origin are the ultimate cause of illegal killing of elephants, as they create the demand that economic motivation must supply. Education and public awareness programmes should be increased to create public consensus of the need to conserve elephants and also to generate stigma associated with buying elephant products.

7. The international community should sustain its efforts to encourage governments in Central Africa and elsewhere to practice good governance and effective rule of law and such efforts should even be intensified.

8. It is crucial to maintain large protected areas in Central Africa for elephant and other biodiversity conservation. Governments and international donors should consider establishing buffer zones around protected areas in which transportation and communications infrastructure will not be introduced. A real dilemma is the paradox created by, on the one hand, the need for economic development to decrease rural populations' dependence on natural resources for survival and, on the other hand, the consequences of increased economic activity: larger populations with increased means to impact negatively on biodiversity, including elephants. Development should therefore go hand in hand with effective conservation policy and actions.

9. Elephants and other protected species such as great apes congregate in forest clearings. These localities and the paths leading to them should receive concerted attention by forest ecoguards in protected areas and, if located in State forests, forestry concessions or communal lands, buffer zones should be created around them in which no human activities are allowed.

10. In cases where extractive industries operate, such as oil, logging or mining, governments and NGOs need to work with the private sector to promote best-use practices and the establishment of company regulations that promote sustainable forestry management under the Forest Stewardship Council. These include prohibiting bushmeat to feed workers and forbidding company vehicles to transport wildlife products.

11. National wildlife management agencies (e.g. MINFOF, ICCN) should be strengthened and field officers should be trained and equipped properly to allow them to carry out their duties. Staff should also be recompensed appropriately and in a timely fashion in

order to incentivize them, build morale and provide encouragement to carry out their duties.

12. Law enforcement monitoring should be improved within national wildlife management agencies in order to evaluate its effectiveness and take remedial measures where necessary.

13. Resources should be provided by national governments and international donors to permit comprehensive elephant censuses and monitoring programmes to be carried out in cooperation with national wildlife agencies and international organizations such as MIKE, WWF, WCS and the ECOFAC programme.

14. An elephant meat and ivory trade monitoring programme at the site level should be initiated under the auspices of CITES MIKE and in collaboration with the IUCN/SSC AfESG and TRAFFIC.

15. Recommendations regarding the trade in bushmeat made by concerned parties (e.g. IUCN, the Convention on Biological Diversity, the UN Food and Agriculture Organization, WWF, WCS, CIFOR) all aim for the sustainability of species offtake. Although illegal, the trade in meat and other body products of protected species such as the elephant should receive recognition as a special category that prohibits trade in meat and other parts. Policies and strategies in addition to law enforcement alone should be formulated to address the illegal hunting and product trade of these protected species.

16. Existing legislation in Central African countries should be reviewed and revised to remove ambiguities concerning elephant killing and product trade, and to update recent modifications made by decree by governments in respect of the protected status of the elephant.

Introduction

The Congo Basin forest is the second largest tropical forest in the world. (Photo: Dan Stiles)

Background

From the Mountains of the Moon to the Atlantic Ocean, 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 during most of this long period, but over the last century, human population has been rapidly increasing with improved health care and better nutrition (Bennett, 2008; World Bank, 2010a). Cincotta, et al. (2000) warned a decade ago that population growth would cause substantial human-induced environmental changes in biodiversity hotspots, of which the Congo Basin is one of the most important in the world (Myers, et al., 2000; Anon., 2005). Roads are penetrating previously inaccessible forests to prospect for oil and minerals or to log for timber (Wilkie, et al., 2000, 2001; Elkan, et al., 2006; Laurance, et al., 2006). These new roads and economic activities attract farmers, hunters and those searching for employment. Agricultural interventions in the form of cocoa, coffee and oil palm plantations destroy 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). Lack of good governance in Central African countries has exacerbated all of the aforementioned factors to result in negative impacts on biodiversity in general and mammals in particular (Nasi, et al., 2008; Yanggen, et al., 2010).

A growing body of evidence indicates that Africa is facing a dangerous resurgence in illegal elephant killing following a relative pause 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 (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 of elephant poaching. A more veiled issue is the trade in elephant bushmeat. Elephant bushmeat is potentially a major economic bonus which is available to

actors who may have little access to the proceeds from ivory.

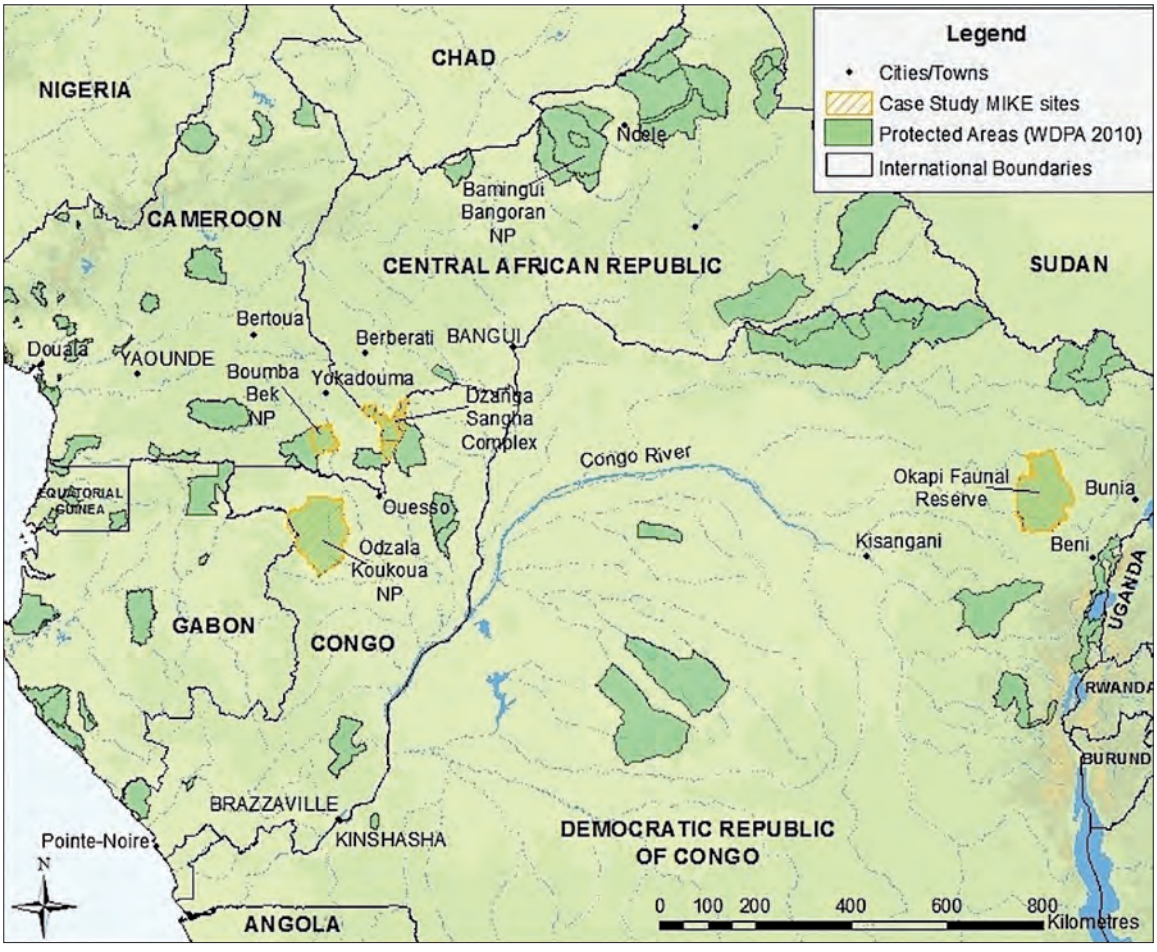
In addition, the consumption and trade of elephant meat may reflect underlying human-elephant conflict, with retaliatory killings or 'authorized' culls being a source of meat. In many Central African countries exaggerated claims of elephant crop raiding are used as a pretext for state sanctioned killing 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).

While elephant meat may be a by-product of the ivory trade, it could also be a primary driver of elephant kills in certain localities and of particular concern for conservation, given that elephants with small or no tusks will be targeted. While ivory syndicates aim for large accumulations intended for export, and thus focus on the last remaining major herds, elephant bushmeat could be attractive and even profitable when the number of elephants to be killed is far fewer and the value of the acquired ivory almost negligible.

An initial assessment of the 2001-2009 carcass database of the CITES-MIKE (Monitoring Illegal Killing of Elephants) programme indicates that the trade in elephant meat, especially in the Central African subregion, may be an important factor underlying the illegal killing of elephants (CITES, 2010a). The dynamics, scale and impact of the trade in elephant meat are not well understood and more information is required to assess the scale of the problem to improve the information in MIKE and the Elephant Trade Information System (ETIS) and to assist with the development of appropriate management solutions.

The IUCN/SSC African Elephant Specialist Group (AfESG) has been charged by MIKE with implementing a project to investigate the linkages between the elephant meat trade and larger social and economic dynamics at play, including, but not limited to ivory trade, logging (legal and illegal), mining, infrastructure development, global economic trends, law enforcement at the national and international level, and community forest governance.

Figure 1. Study areas and MIKE study sites



The project was carried out in four Central African countries: Cameroon, Central African Republic (CAR), Republic of Congo (ROC) and Democratic Republic of Congo (DRC). MIKE monitoring sites in each of the four countries were selected as samples of elephant meat and other product sources (**Figure 1**). The country case study reports (Randolph & Stiles, 2011; Neale & Stiles, 2011; Latour, 2011; Stiles, 2011) can be found online at http://www.african-elephant.org. A summary has been published as Stiles (in press).

The Central Africa subregion is of particular importance to elephant conservation because one of the two main variants of the African elephant is confined to the Congo Basin, which makes up a large part of Central Africa. Recent work with DNA has proposed that the forest elephant is a species distinct from the savannah elephant, and that they diverged between 2.4 and 5.8 million years ago (Murata, et al., 2009; Rohland, et al., 2010; Ishida, et al., 2011). This research supports earlier investigations that also concluded that African elephants were comprised of two separate species (Grubb, et al., 2000; Roca, et al., 2001), though taxonomic separation at the species level has been contested (e.g. Debruyne, 2005). West Africa hosts a type of elephant whose taxonomic status is still undecided, though Ishida, et al.'s (2011) work grouped the southern West African populations with forest elephants and the northern West African elephants with savannah elephants. Until further genomic studies confirm the taxonomic relationships between elephant variants, the forest elephant will be considered a subspecies of the African elephant and will be referred to as *Loxondonta africana cyclotis.* Forest elephants are particularly vulnerable to extinction by over-hunting due to their slow reproduction and behavioural traits (e.g. repeated use of forest trails and congregation in clearings) (Blake, et al., 2007; Fa & Brown, 2009).

The loss of the forest elephant to poaching would have a significant impact on the Congo Basin forest ecology. Recent research has demonstrated the crucial importance of elephants as seed dispersers and in maintaining the community structure of trees (Blake, et al., 2009; Vanthomme, et al., 2010). Elephants are a keystone species upon which many other species depend. As well as dispersing seeds, they create clearings in thick forests, which allows many other plant and animal species to thrive. The disappearance of the forest elephant would have devastating consequences on many other species and impact negatively on Congo Basin forests.

Objectives

The overall objective of the study is to enhance knowledge of contemporary elephant bushmeat market dynamics, patterns and trends in Central Africa and to determine the impact of elephant meat trade on elephant populations. Within this overall objective are the longer term objectives outlined below.

LONG TERM OBJECTIVES

To determine:

- the types of actors involved in killing elephants for meat and ivory respectively;
- the methods and work effort of those involved;
- the source locations, transport methods and routes used for trafficking meat and ivory;
- the final destination of meat and ivory and socio-demographics of the consumers;
- the commodity chain of meat and ivory respectively and the social networks involved;
- the economics of the trade: prices of meat and ivory, income generated, etc.;
- attitudes and motivation related to killing elephants of those involved in the trade: the hunters, transporters/middlemen, vendors and consumers;
- the relationship and functioning of elephant meat trade within the broader context of bushmeat trade in general;
- the influence of external factors on killing elephants and trade in its products, for example, logging (legal and illegal); mining; infrastructure development; law enforcement at the national and international level; community forest governance; and economic trends that affect demand;
- management solutions to control the illegal killing of elephants for meat.

The findings of this study also aim to offer contributions to satisfy elements in CITES Decision 13.11 'Bushmeat', Decision 14.78 (Rev. CoP15) concerning updating information relating to the status of elephant conservation and the data that MIKE is collecting, and Decision 15.74, which concerns an evaluation of the need to revise CITES Resolution 10.10 (Rev. CoP 15) 'Trade in Elephant Specimens'.

Study Sites

The CITES MIKE programme has established a set of monitoring sites in 30 of the 37 range States of the African elephant and in the 13 range States of the Asian elephant. These sites contain about 40% of all African elephants and 30% of all Asian elephants (CITES, 2010a). These monitoring sites consist of protected areas (national parks or reserves) and on occasion, associated areas in which relatively important elephant subpopulations are found (e.g. Samburu-Laikipia in Kenya). 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:

I. measuring and recording levels and trends, and changes in levels and trends, of illegal hunting and trade in ivory in elephant range States, and in trade entrepôts;
II. assessing whether and to what extent observed trends are related to changes in the listing of elephant populations in the CITES Appendices and/or the resumption of legal international trade in ivory;
III. establishing an information base to support the making of decisions on appropriate management, protection and enforcement needs; and
IV. building capacity in range States.

MIKE sites possess the best existing baseline and trend data relating to elephant killing and causes of death, although the quality and quantity of data vary considerably from site to site. A MIKE site with relatively high quality data, a high density of elephants and reasonably good access and security was selected in each of the four case study countries to represent a sample of a source area for elephant meat and other traded products. In addition, MIKE sites were selected where WWF, Wildlife Conservation Society (WCS) or the European Union's (EU) ECOFAC (*Conservation et Utilisation Rationnelle des Écosystèmes Forestiers d'Afrique Centrale*) conservation programmes were also being carried out, which provided additional data relating to elephants and other relevant variables.

From the source area, roads and human settlements were sampled at varying distances in an attempt to follow the movement of elephant meat and other elephant products. Because of local circumstances to be explained below, the sampling of settlements in which to conduct research was, however, not comparable in each country. The study sites comprise four levels: MIKE source site, trade sites <50 km from the MIKE site, regional town sites, and one large urban centre site distant from the MIKE site. The objective was to establish the commodity chains and transport routes of meat and ivory respectively.

The study sites in each country were:

Cameroon

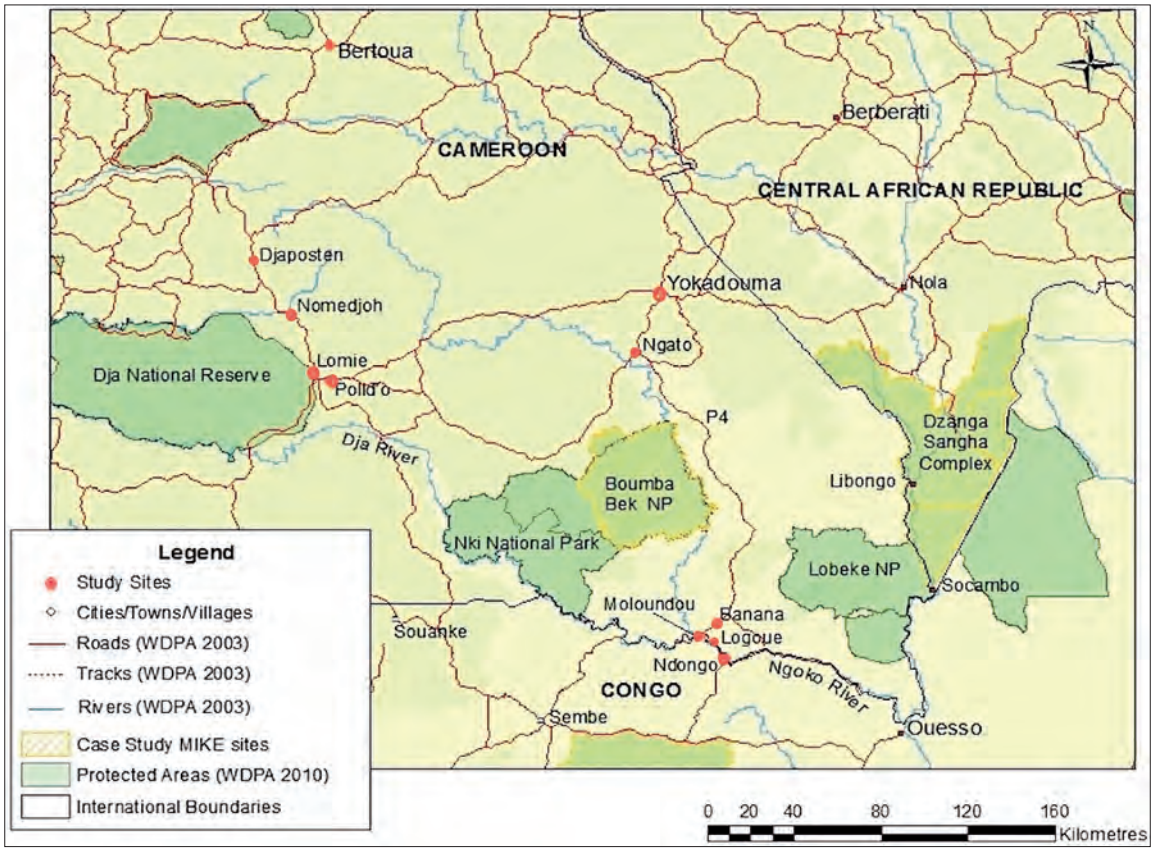
MIKE SITE –BOUMBA-BEK NATIONAL PARK (BBNP)
BBNP is located in the extreme south-east of Cameroon between latitude 2˚50' to 2˚95' north and longitude 14° 80' to 15° 20' east (**Figure 2**). It covers a surface area of 2,383km^2 and is located within the Boumba and Ngoko Departments of the East Region. The closest regional towns are Yokadouma, near the border with CAR, and Moloundou, on the border with ROC. WWF collaborates with the Cameroon Ministry of Forests and Fauna (MINFOF) to manage BBNP under the WWF-TRIDOM (Tri Dja-Odzala-Minkebe) project.

The temperature varies between 23˚C and 25˚C with an average temperature of 24˚C. Annual rainfall averages 1500 mm per year and relative humidity varies between 60 and 90%. The Dja Reserve system lies to the east of Nki National Park, which flanks Boumba-Bek National Park (BBNP). Lobéké National Park lies to the east of BBNP. BBNP contains semi-deciduous forest (98%) and *Raphia* wetlands (2%) (Letouzey, 1985).

There are 16 forest clearings (*bai*) in Boumba-Bek, with four currently monitored by MINFOF/WWF for large mammal activities. There are an estimated 831 plant species that measure 10 cm in diameter or more at chest-high level and more than 30 land mammal species (Ekobo, 1998). The wildlife species include the African forest elephant (*Loxodonta africana cyclotis*), forest buffalo (*Syncerus caffer nanus*), leopard (*Panthera pardus*), bongo antelope (*Tragelaphus euryceros*), forest duikers (*Cephalophus* spp.), primates (*Gorilla g. gorilla, Pan troglodytes, Cercopithecus* spp., *Colobus* spp. etc.), reptiles (*Crocodilus* spp., *Kinixys* spp., *Bitis gabonica* and *Dendroaspsis viridis*), and rodents (grasscutters and porcupines) (Ekobo, 1998).

Estimates for elephant population size within the park range from 318± in 2004 (Blake, 2005) to 800-1,000 in 2009 (Nzooh, 2009a), although these estimates are not precise and error limits are so large that comparisons are tenuous. Improved accuracy in elephant population estimations, more consistent elephant monitoring, the inception of park patrolling and fluctuating population due to elephant movements contribute to different estimates. There are also large seasonal differences. Ekobo (1995), using dung density counts along transects, found that in Lobéké NP, the long dry season elephant population

Figure 2. Boumba Bek National Park and study area in south-east Cameroon.



Oboul *bai* in BBNP, which is monitored by MINFOF (Photo: WWF)

estimate was 4,548, while in the short rainy and dry seasons it was 3,719 and 1,190 in the long rainy season (all ± 57%).[1] Elephants migrate seasonally east into the Dzanga-Sangha Complex area of CAR and back again. Satellite tracking indicates that elephants do not cross the Moloundou-Yokadouma road (Mike Loomis, in litt., 17 June 2011); thus elephant subpopulations from BBNP-Nki NP do not mix with those of Lobéké NP.

Approximately 33,200 people live around BBNP. The population is comprised of indigenous Baka (one of several Pygmy forest groups in Central Africa) and Bantus (Kounabembe, Bangando, Bakwele, Mbomam, Essel, Mbimo, Mpong-Mpong). The non-local population of logging company workers live in logging towns. Muslim merchants from northern Cameroon, neighbouring countries and Mauritania also inhabit the towns of the region.

The park is buffered by several hunting areas: to the north, the *Zone d'Intérêt Cynégétique à Gestion Communautaire* (ZICGC) or Community Hunting Zone No. 14, located in Forestry Management Unit (FMU) 10_018; to the south, the Sports Hunting Zone (ZIC) 38 in FMU 10_015; and finally to the east, the Community Hunting Zones Nos. 07, 08 and 09. ZIC 38 is a hunting block particularly active with foreign sports hunters.

HUMAN SETTLEMENTS

Villages near MIKE site – The villages and towns in which markets were visited and informants interviewed were located east of BBNP on the north-south Provincial Route 4 between Yokadouma and Moloundou, and on the western side of BBNP on the road from Lomié to Abong Mbang.

- Ngato village, lying 40 km south on the P4 from Yokadouma, is the headquarters for BBNP and an important transit point for elephant hunters and traders. WWF and MINFOF staff are based here. It is located on the north-east edge of BBNP.
- Logoué and Banana are small villages south-east of BBNP near Moloundou inhabited mainly by Baka.
- Djaposten, Polido'o and Nomedjo are villages inhabited by both Baka and Bantu located west of BBNP, north of Lomié.
- Lomié is a small town about 90 km west of BBNP.

REGIONAL TOWNS

- Yokadouma (population 13,287) is an important logging town in the East Province of Cameroon and it is a transit point for travellers from neighbouring CAR and ROC, being on the P4 linking Moloundou

[1] Nzooh (2009b), also based on dung density counts, reported Lobéké NP to have 2,091 elephants in 2002, 2,445 in 2006 and 1,715 in 2009, but with no information on the season of the counts, the estimates are of limited value in determining a trend.

on the ROC border with National Route 10 that leads to Yaoundé. It is located in the south-east, near the border with CAR and is the closest town to the Boumba-Bek headquarters and therefore a central transit and trading point for elephant products extracted from the park. Local Bantu (Mpo, Mpoman), Baka and numerous immigrant tribes, including Hausa from northern Cameroon and West Africa, make up the population.

- Moloundou is the principle town of the Moloundou District in the Boumba and Ngoko Department. The Moloundou District population is 22,882. Moloundou town's population was estimated at 3,200 (Defo, 2007), probably a low estimate. The town lies approximately 200 km south of Yokadouma and 60 km south of BBNP, on the border with ROC. The Dja River flows from the Dja Reserve and through Nki NP. It then forms the border of Cameroon, where it is known as the Ngoko River, to empty into the Sangha River at Ouesso, ROC. The Dja River is a major transport route used for ivory, meat and other wildlife products. The population is comprised of Bantu and indigenous Baka from Cameroon and neighbouring countries, including a substantial non-local Bantu population of logging employees. This is an important trading and launching point for elephant poachers.

LARGE URBAN CENTRE

- Yaoundé is the capital of Cameroon and the second largest city, after Douala, with an estimated population of 1.3 million (GeoNames, 2010). Yaoundé reflects the cultural and linguistic diversity of Cameroon with five major ethnic groups represented in and around the city (the Beti clan of the Ewondo tribe predominates). It is on the only train line in the country and is a central transit and trading point for agricultural, wild meat, timber and non-timber products from both forested and savannah zones. Several bushmeat markets are located there.

Central African Republic

MIKE SITE – DZANGA-SANGHA COMPLEX (DSC)

The Dzanga-Sangha Complex (DSC) is a 4,589 km^2 block of dense tropical forest located in the south-west of CAR (**Figure 3**). The complex is split into three management units: the Dzanga-Ndoki National Park, with two sectors: Dzanga (495 km^2) and Ndoki (727 km^2), and the Dzanga-Sangha Special Reserve (3,359 km^2). The DSC borders the Nouabalé-Ndoki National Park in ROC and the Lobéké National Park in Cameroon; together they form the Tri-National Sangha (TNS) conservation zone. All forms of exploitation are strictly prohibited in the parks, while subsistence hunting is allowed in the special reserve and there are sports hunting blocks in the complex.

The DSC and its management entity, the Dzanga-Sangha Project (DSP), were formed on 29 December 1990 by the CAR government (Remis & Kpanou, 2010). The DSP is run by government appointed nationals under the Ministry of Water, Forests, Hunting and Fisheries (MWFHF) and advised by representatives from WWF, and until recently, the German technical development agency (GTZ). Funding is provided by donor agencies, now primarily WWF.

The headquarters for the DSC is located just outside of the town of Bayanga, the largest town in the region with an estimated population of over 4,000 people. Originally Bayanga was a small fishing village, but after the arrival of a logging company and a road in the 1970s, the town experienced a rapid influx of people, putting increased pressure on the park.

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

The region supports a rich assemblage of wildlife. Ungulates include the African forest elephant (*Loxodonta africana cyclotis*), forest buffalo (*Syncerus caffer nanus*), bongo (*Tragelaphus euryceros*), sitatunga (*Tragelaphus spekei*), seven species of duiker (*Cephalophus* spp.) and two species of pig (*Potamochoerus porcus* and *Hylochoerus meinertzhageni*) (Fay, et al., 1990; Klaus-

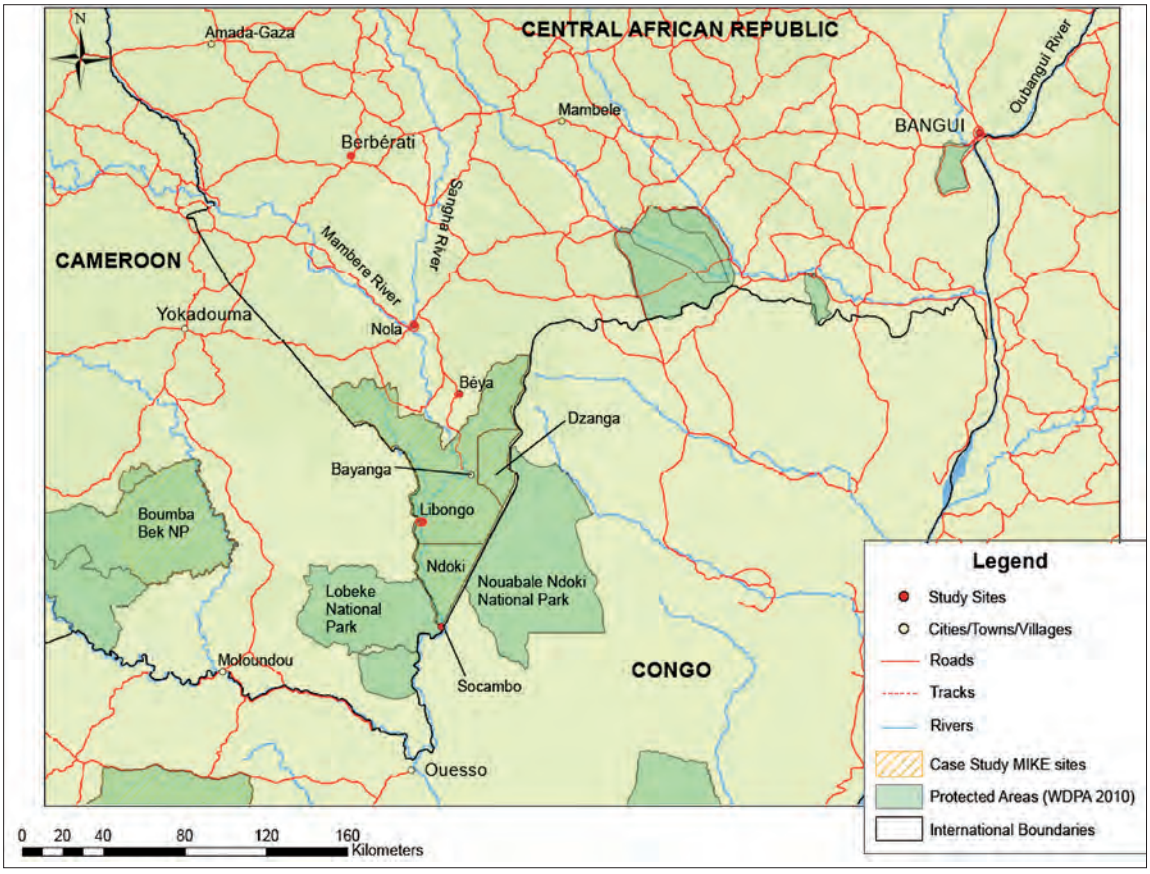


Figure 3. The Dzanga-Sangha Complex (DSC) and study area in south-west CAR

Hugi, et al., 2000). There are over 15 primate species such as the chimpanzee (*Pan troglodytes*), the near-endemic sun-tailed monkey (*Cercopithecus solatus*) and the black colobus monkey (*Colobus satanas*) (Noss, 1995). The park also supports large populations of western lowland gorilla (*Gorilla gorilla gorilla*). The area is also thought to host 379 species of birds of 66 different families (Green & Carroll, 1991).

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

Since the mid-1980s, the human population of the DSC has fluctuated with migrants attracted by forest resources, diamonds and employment in logging or conservation, but reached a high in 2004 of 10,000 (Remis & Kpanou, 2010). In 2005, Remis & Kpanou (2010) reported finding several hundred artisanal diamond miners and bushmeat hunters in the communal area adjacent to the DSC.

There has been extensive mammal census work in the area focused on the African forest elephant. Andrea Turkalo has spent over two decades conducting one of the longest continuous studies of elephant social organization and behaviour (Turkalo & Fay, 2001; WCS, 2010). Of particular importance are the forest clearings (*bais*), which draw in large number of forest elephants and other wildlife. During Turkalo's work, over 3,000 individual elephants were identified in a single *bai*, the Dzanga Bai.
Early elephant surveys in DSC (Carroll, 1986; Carroll,

Dzanga bai in the Dzanga-Sangha Complex (Photo: Andrea Turkalo)

1988; Fay & Agnagna, 1991) provided population estimates using elephant dung density. More recently, a survey team consisting of WWF-CAR technicians, advised by a WCS/MIKE team, completed an inventory of elephant dung, ape nests, and other ecological and human signs in the Dzanga-Sangha Complex over a period of 10 months (August 2003 - May 2004) (Blake, 2005).

The studies found a decline in average elephant dung density in DSC from 1986 to 2004, suggesting an elephant population drop, particularly in 2004. The elephant population estimates suggested a decline from approximately 1,750 in 1993 to 869 in 2004, although error limits were large. Additionally, while conducting the 2003-2004 survey, the team found 11 elephant carcasses, eight of which were killed for ivory, meat or both and one juvenile was killed solely for meat (Blake, 2005). All of the carcasses with one exception were found near or within the Dzanga sector. Blake (2005) concluded that the DSC elephant population was under serious threat by illegal poaching as well as loss of available range. Unfortunately, no comprehensive surveys of the area have been completed recently.

VILLAGES NEAR THE MIKE SITE

- Nola was identified during a stakeholder meeting with DSC staff as one of the most important source points for bushmeat near DSC and the surrounding forest zone. Nola is the capital of the Sangha-Mbaéré *Préfecture* and has an estimated population of 37,000 (Defo, 2007). Nola lies on the Sangha River, 104 km to the north of DSC. A lively market in the town centre acts as a focal point for bushmeat sales and distribution.

- Beya is a small town located at the junction of roads running to ROC and north to Nola. Beya is an important transfer point for bushmeat and other products moving out of the forest region and DSC as well as from ROC to the larger towns of Nola and Berberati.

- Libongo and Socambo villages in the East Region of Cameroon were identified by DSC staff based at the park headquarters in Bayanga; they are located along the Sangha River near the border of Lobéké National Park and CAR. These settlements are accumulations of people from different ethnic backgrounds who are working for, or searching for jobs with, nearby logging companies, notably the Italian logging company *Société d'Exploitation Forestière et Agricole du Cameroun*. The immigrants are important conduits for elephant and other bushmeat products harvested in CAR. In addition, many known poachers currently reside in these towns.

REGIONAL TOWN

- Berberati was chosen because it is a major centre of bushmeat and ivory trade. Berberati is located 220 km north of Bayanga and the DSC. It is the capital of the Mambéré-Kadéï *Préfecture* and is the third largest city in CAR with a population of 76,918 (2003 census). There are a total of six established markets (Central, Poto Poto, Baba Salao, Sambanda, Rosine, and Selon-moyen) that support at least 49 bushmeat stalls. Berberati is situated 90 km from the border with Cameroon along a major transportation route where goods, notably timber, are transported to Cameroon.

LARGE URBAN CENTRE

- Bangui is the capital and principal city of CAR. In 2007 the population of Bangui was approximately 800,000 inhabitants (Fargeot, 2008). Although it is 526 km from DSC, it represents the centre for market commerce and has a consumer demand for natural resource products from all over the country. A number of active bushmeat markets can be found in Bangui, most notably Market PK 12, the largest bushmeat market in CAR (Fargeot, 2008). Although elephant bushmeat from around the DSC currently does not appear to be transported to Bangui, it was deemed useful to investigate the demand for the commodity there for future reference and to collect data on elephant meat in a large urban setting.

Republic of Congo

MIKE SITE – ODZALA-KOUKOUA NATIONAL PARK (OKNP)

The OKNP (0°09'-1°35'N, 14°18'-15°21'E) spans two provinces: Sangha and La Cuvette Ouest (West Basin) (**Figure 4**). Created in 1935 with a surface area of 2,850 km^2, the park was extended to 13,545 km^2 in 2001, being by far the largest national park in ROC and the third largest NP in Central Africa, after Salonga and Okapi in DRC.

The northern boundary of the OKNP is delimited by the main road connecting two district towns, Mokeko (25 km south of Ouesso) and Sembé, along which there are 13 villages, eight of them with a population of over 100 inhabitants (Victor Mbolo, WWF, pers. comm., 2010). The eastern border goes south towards Etoumbi running alongside the national road (RN) 2 for about 55 km from Mokouangonda to Epouma (seven villages). At Mokouangonda, the RN 2 diverges to the north-east away from the OKNP, rendering the north-eastern boundary of the OKNP inaccessible by motor vehicles. The south-western boundary of the NP follows a secondary road connecting Ebana to Mbomo, which continues to Oloba on the Gabon border. From Mbomo to Oloba, the road is no longer suitable for motor vehicles. The recent renovation of the RN 2 makes access to the OKNP area easier and makes it possible to reach Ouesso from Brazzaville in one day.

South of the OKNP, the Mbomo District, along with the whole of forested northern ROC, has a low population density of approximately 0.5 inhabitants/km^2. The population has grown from 4,541 in the 1987 national census to 7,163 in 2010. The population of Cuvette-Ouest in total was listed at 72,999 in 2010 (ROC National Census, 2010). Four ethnic groups are represented: the Mboko, the Kota, the Mongom and the Bakola. They are slash and burn farmers and hunters, except the Bakola Pygmies, who are hunter-gatherers.

The whole northern ROC region lies in the Guineo-Congolian/Soudanian transition area (Dowsett-Lemaire, 1995a). The semi-deciduous forests of the OKNP are typical of the most widespread of the Guineo-Congolian forest (mixed moist semi-evergreen Guineo-Congolian rainforest), which stretch from south-east Cameroon and eastern Gabon and include the whole of the Congo Basin. The OKNP is a mixture of several relatively heterogeneous vegetation types. To the north is tropical moist forest, while to the south lies a zone of forest-savannah mosaic with gallery forests running along watercourses. Along the rivers are inundated forests with extensive swamp forests associated with the Mambili River floodplain. These inundated areas are also found to the north-west where swamps and seasonally flooded forests are the dominant vegetation types (Maisels, 1996). The OKNP contains wide areas of *Marantaceae* forest which are characterized by sparse tree cover and a dense layer of understory herbs in the families of *Marantaceae* and *Zingiberaceae*. The OKNP is also characterized by the presence of over 100 forest clearings ranging in size from less than 0.5 ha to some over 10 ha. These *bais*, rich in minerals, are dominated by herbs in the families of *Graminae* and *Cyperaceae* and attract high densities of large mammals, particularly elephants and gorillas. Forest paths have been created and used repeatedly by elephants, particularly in the *Marantaceae* forests (Vanleeuwe & Gautier-Hion, 1998).

The OKNP has an interesting mix of true forest species and savannah species: forest elephant, forest buffalo, hippopotamus, bongo, sitatunga, bushbuck, Bates pygmy antelope, eight species of duiker (including Grimms' duiker and Ogilbys' duiker), giant forest hog, red river hog, western lowland gorilla, chimpanzee, eight species of

Figure 4. Location of Odzala-Koukoua National Park and study sites in ROC

monkey, leopard, golden cat and spotted hyena. The bird community is diverse, with around 435 species of both savannah and forest habitats (Dowsett-Lemaire, 1995b). Of the larger reptiles, two crocodile species are known to be in the OKNP, with the presence of the Nile crocodile still an open question (Maisels, 1996).

Research and monitoring in the OKNP over the last two decades has demonstrated that the park contains an extraordinary abundance of forest elephants (Fay and Agnagna, 1991; Maisels, 1996; Vanleeuwe & Gautier-Hion, 1998; Querouil et al., 1999; Blake, 2006). Due to an excellent habitat with a profusion of *bais* and a high degree of isolation in the interior of the park, the OKNP contains very high densities of elephants compared to other sites in Central Africa. Elephants are found in large part far from human activity along the river valleys in the central part of the park. In 2008, Malonga, et al. (2009) estimated an elephant density in OKNP of 1.6 per km^2, which calculates to approximately 21,760±7,398 elephants. According to Blake (2006), the estimated forest elephant density in OKNP in 2005 was 1.0 km^2, and a total population estimate therefore of 13,545 ±3,252 individuals. There appears to have been an increase in elephant numbers inside OKNP between 2005 and 2008.

Since 1992, ECOFAC has carried out a conservation and development programme in the OKNP collecting data on elephant poaching and ivory trade (Nishihara, 2003). The programme closed down in June, 2010, at the beginning

A poacher seized by ecoguards in northern ROC
(Photo: C. Makoumbou, WCS)

of field work for this project. WWF-TRIDOM is based in Sembe to the north of OKNP and coordinates its work with Boumba-Bek in Cameroon.

VILLAGES NEAR THE MIKE SITE

- Mbomo, Diba and Lisanga are on the south-western edge of OKNP where many specialized elephant hunters reside along the RN 2 road. Mbomo is the Mbomo District administrative centre and former headquarters for the ECOFAC programme.

- Attention (54 km SW of Ouesso) is a village on the national road linked by a bush track to a big hunting and fishing camp at Lengoué.

- Liouesso (80 km SW of Ouesso) is close to the Lengoué River that is used to transport fish and bushmeat, including elephant meat. There are about 72 fishing camps along the river (Auzel, 2008) and hunting camps deeper in the forest. Several clearings frequented by elephants exist in this area.

- Mokouangonda (117 km SW from Ouesso) is the last collection point for traders coming from Ouesso.

- Miélékouka is north of OKNP on the Sembe-Ouesso road.

- Zoulaboth is on the same road to the north-east of OKNP.

REGIONAL TOWNS

- Ouesso is the fifth largest town in ROC with approximately 28,000 inhabitants. It is located about 90 km from the north-east corner of OKNP and is near the borders of both Cameroon and CAR. Ouesso is an active centre for bushmeat and ivory trade.

- Oyo and Mossaka on the Congo River, from which elephant products are shipped to Brazzaville.

LARGE URBAN CENTRES

- Pointe-Noire is the second largest city in ROC with a population of about 670,000; it is the main port and commercial centre of the country, with oil and fishing as the main economic activities. It is linked by rail with Kola to the north, near the Conkouati National Park (source of bushmeat), and to Brazzaville almost 400 km to the east.

- Brazzaville, capital of the ROC, with a population of about 1.1 million, has several bushmeat markets.

Democratic Republic of Congo

MIKE SITE – OKAPI FAUNAL RESERVE (OFR)

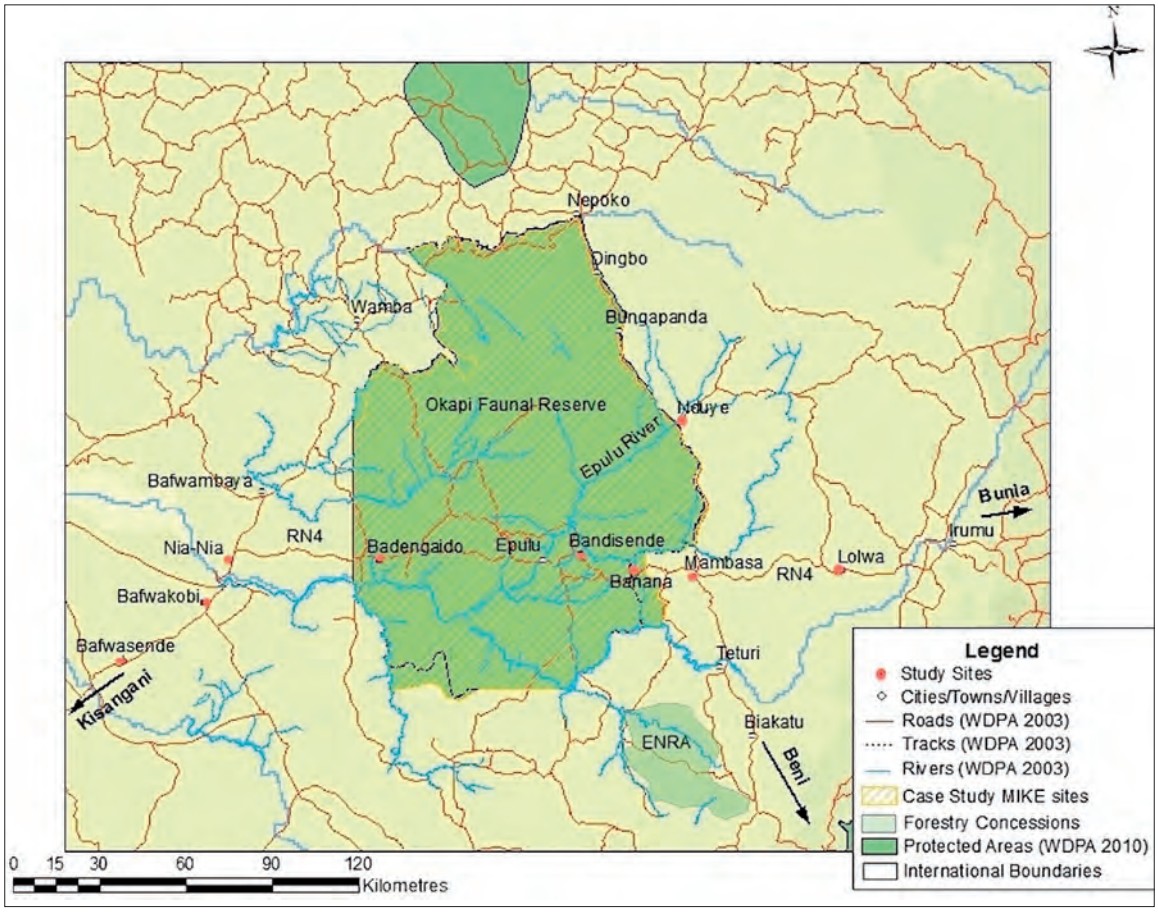
The OFR (coordinates 1°00'-2°42'N and 28°02'- 29°08'E) was established in 1992 by Ministerial Decree no. 045/CM/ECN/92 of 2 May (**Figure 5**). In 1996 the reserve was made a World Heritage Site and in 1997, because of armed conflict in the area, it was inscribed on the list of World Heritage in Danger sites, along with four other World Heritage sites in eastern DRC (Balongelwa, 2008). It is in the Orientale Province of DRC, with the provincial capital of Kisangani about 450 km to the south-west.

The OFR covers 13,726 km^2, although if a section yet to be confirmed by the government in the south-west corner is included, the area measures 14,139 km^2 (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 their 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 most important feature that attracts elephants and other large herbivores are clearings called *edo* (*bai* in the western Congo Basin).

Elephants have created small clearings in swampy areas for bathing or by digging for minerals, while four larger clearings of high importance have existed for centuries. The larger *edos* measure about 1.5 ha each in area and two of them are salt licks. These clearings tend to draw poachers because large game animals are attracted to them.

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 with 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. Tree height is typically 30-40m with a dense even

Figure 5. Location of the Okapi Faunal Reserve (OFR) and study sites in the DRC



canopy. Secondary forest occurs in areas that have been cultivated.

There are 52 mammal species including the okapi (*Okapia johnstoni*), endemic to the north-eastern DRC. The number of elephants in the forest was estimated in 1995 at about 7,375 (Blanc, et al., 2003), 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). Other species include the forest buffalo (*Syncerus caffer nanus*), bongo antelope (*Tragelaphus euryceros*), Sitatunga antelope (*T. spekei*), endemic water chevrotain (*Hyemoschus aquaticus*), African golden cat (*Felis aurata*), giant forest genet (*Genetta victoria*), the endemic aquatic genet (*Osbornictis piscivora*), leopard (*Panthera pardus*), giant ground pangolin (*Manis gigantean*), aardvark (*orycteropus afer*), pygmy antelope (*Neotragus batesii*), bush pig (*Potamochoerus porcus*), giant forest hog (*Hylochoerus meinertzhageni*) and great cane rat (*Thryonomys swinderianus*).

The Ituri Forest has one of the highest numbers of duiker species in Africa including blue duiker (*Cephalophus monticola*), black-fronted duiker (*C. nigrifrons*), white-bellied duiker (*C. leucogaster*), Peter's duiker (*C. callipygus*), Bay duiker (*C. dorsalis*), and yellow-backed duiker (*C. sylvicultor*). Thirteen primate species have been observed, the largest number known for an African forest, including red colobus (*Colobus badius*), Angolan black and white colobus (*C. angolensis*), Abyssinian black and white colobus (*C. guereza*), several guenon species (*Cercopithecus ssp.*), crested mangabey (*C. galeritus*), l'Houest's monkey (*C. l'houesti*), anubis baboon (*Papio Anubis*) and abundant chimpanzees (*Pan troglodytes*). Also present are Zaire clawless otter (*Aonyx congica*), brush-tailed porcupines (*Atherurus africanus*), 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.

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 Efe and Mbuti Pygmies, who number about 30,000. Pygmies 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 agricultural settlements located along roads. The Pygmies' main game species are small ungulates and primates; they do not traditionally hunt elephants (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 game and honey for cultivated starch foods to balance their diet. More recently, Pygmies exchange forest products 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., 2009a).

Until 2000, there were few permanent settlements in the forest, mostly along the roads, with some gold mining in the interior. The human population was relatively low, estimated in 1990 at 15,600 people and decreasing owing to the decay of the road system. But since the disturbances in North Kivu, urban Bantu immigrant 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. In 2000 and 2001, due to a brief ten-fold increase in the world price of coltan, there was an inrush of 4,000 coltan miners needing meat. With the accompanying Rwandan Interahamwe and Congolese Mai-Mai armed militias, they wiped out the animals around their camps, threatening the Mbuti and Efe Pygmy way of

Mbuti Pygmies hunt small game with nets in the Ituri Forest. (Photo: Dan Stiles)

life. 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., 2009a). These militias were cleared out of the OFR in 2005 by a joint operation of the DRC national army and the Institute in Congo for Conservation of Nature or *Institut Congolais pour la Conservation de la Nature* (ICCN), and 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, 2010a).

Due to chronic political instability to the south and east of the OFR there continues to be a steady influx of immigrants attracted by mineral resources such as gold, diamonds, coltan and cassiterite (tin) and organic resources comprised of timber, ivory and bushmeat. 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 m^3 of cut timber a year (Anon., 2009a). Much more 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 commercial agriculture has collapsed since 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., 2009a), which bisects the OFR east-west running from Bunia on the Uganda border to Kisangani.

VILLAGES NEAR THE MIKE SITE

- Mambasa is the administrative centre of Mambasa Territory in Ituri District and the base for a brigade of the *Force Armée de la République Démocratique du Congo* (FARDC), the national army. It is located a few kilometres east of the OFR at the crossroads of the RN 4 and the north-south road that runs along the eastern edge of the OFR and south to Beni, capital of North Kivu Province.

- Nduye is a village about 50 km north of Mambasa situated on the Epulu River, which runs through the OFR.

- Bandisende is a village on the RN 4 east of Mambasa in the OFR.

- Nia-Nia is a small town and Bafwakobi is a village located a few kilometres west of the OFR on the RN 4.

REGIONAL TOWN

- Bafwasende is the administrative centre of Bafwasende Territory, the largest in the DRC, in Tshopo District. It is located about 100 km west of OFR on the RN 4.

LARGE URBAN CENTRE

Kisangani is the third largest city in the 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, the DRC capital, 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 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.

The Kisangani central market where large quantities of bushmeat are sold (Photo: Dan Stiles)

Summary of Previous Activities on Bushmeat and Ivory

Yanggen, et al. (2010) presents an excellent summary of the type of work that has been carried out in and around the four MIKE study sites within the larger context of the Central African Regional Programme for the Environment (CARPE).

Cameroon

This study drew on ten bushmeat studies carried out in Cameroon since 1996 (Njiforti, 1996; Wilkie & Carpenter, 1999a; Ayeni, et al., 2001a; Ayeni, et al., 2001b; Bahuchet & Ioveva-Baillon, 1999; Fa, et al. 2006; Fa, et al. 2003; Willcox & Nambu, 2007; Abugiche, 2008; Tieguhong & Zwolinski, 2009; Wright & Priston, 2010), and on three recent studies on the extent of the bushmeat trade and its relationship to the forestry industry (Madzou & Ebanega, 2004; Makazi, 2004; Tieghuong & Zwolinski, 2009). Unpublished reports from WWF and MINFOF, and MIKE data from 2002 to 2010 were also reviewed.

Seven of these studies ranked the most hunted and marketed species (in numbers of animals and/or quantity of biomass) for the specific geographical areas under investigation. These studies are broadly representative of different lowland humid forest zones of Cameroon. According to the 1994 Cameroonian law, protected species (Class A and B, see definitions below) account for 42% of the animals most hunted. Though many of the studies were not located in south-east Cameroon *per se*, basic habitat, economic and social conditions are similar throughout the forested part of the country; thus the data are relevant to this study. A few studies in Yaoundé investigated the sources and sale points of wild meat (Bahuchet & Ioveva-Baillon, 1998; Edderai & Dame, 2006; Randolph, unpublished). Nchanji (2005) studied weapons and hunting methods used to poach elephants in south-west Cameroon.

Only one of these studies presented data specifically on elephant meat. Makazi (2004) investigated the bushmeat market in Socambo on the Cameroon-CAR border not far also from the ROC border. Amongst the meat he found for sale were one gorilla carcass, one chimpanzee carcass and 60 pieces (approximately 180 kg) of forest elephant meat. The average approximate sale price of elephant meat was reported to be US$ 1.33/kg for hunters in Socambo, US$ 1.67/kg for middlemen in Socambo and US$ 3.33/kg for vendors in the Ouesso, ROC market. Martin & Stiles (2000) found in an ivory survey in Central Africa in 1999 that there was, '…strong evidence that some elephant populations are being killed primarily for their meat. Of course, the tusks are removed for eventual sale, but the bushmeat trade largely drives these hunters. The elephant meat is dried, smoked, salted or kept fresh and then transported to the town and city markets within the country and to neighbouring ones.'

TRAFFIC (2002, 2004), based largely on the 1999 ivory survey conducted by Martin & Stiles (2000), stated that Cameroon had the largest unregulated domestic ivory market in Central Africa and was an important illicit international ivory trade centre. As a result and following a draft Action Plan for the Control of the Trade in African Elephant Ivory adopted at the 13th meeting of the Conference of the Parties to CITES (CITES, 2004), Cameroon began a programme to stem the trade in illegal ivory and wildlife products. With the support of the Last Great Ape Organization (LAGA), a wildlife law enforcement NGO, the government began to stem this illegal trade. Since its inception in 2003 through August 2010, LAGA has instigated 198 arrests for rare wildlife trafficking, including over 5 tonnes of ivory seizures, the arrest of a logging company manager and seizures of bushmeat, parrot, lion and great ape traffickers. Several elephant meat and ivory traffickers have been arrested and prosecuted (LAGA, 2009, 2010).

MINFOF conducts monitoring within PAs with its partner organization, the WWF. WWF has been working in the area since the mid 1990s in collaboration with CARPE, a long-term initiative launched by the United States Agency for International Development (USAID) to address biodiversity loss and deforestation in the Congo Basin. BBNP is part of the WWF-TRIDOM landscape, a collaborative conservation effort between Gabon, Congo and Cameroon, covering seven PAs in the three countries. The landscape includes the Dja National Reserve and Boumba-Bek and Nki NPs in Cameroon.

WWF has initiated a hunter informant programme, in which they establish rapport with community members across the landscape to act as informants on illegal wildlife and forestry activities. Hunter informants are sometimes part of hunting parties and inform on other members and locations of hunts, which can lead to seizure of products, fining, arrests and/or imprisonment. Other informants provide information on illegal sales and trading of products.

Operational since July 2007, the *Lutte Anti-Braconnage* (LAB), or Anti-Poaching Combat programme organized by MINFOF and WWF, has conducted raids to address poaching and illegal timber-cutting operations within the south-east region. Their teams combine national police and the *Battalion d'Intervention Rapide* (Rapid Intervention Battalion or BIR), a law enforcement branch responsible for protecting national security through activities such as illegal weapon seizure campaigns. They target places known for illegal forestry and hunting activities.

The MIKE programme has been monitoring elephant deaths in the BBNP since 2002 (CITES, 2010a). In the MIKE database for south-east Cameroon from 2002 to 2009, 48 elephant carcasses were documented for the Boumba-Bek area. Twenty one of these (43.8%) were deemed to have been killed illegally. MIKE representatives stated that a portion of the data was lost when there was a computer system failure (Luhunu, pers. comm., 2010). Therefore, these data do not present a complete picture of elephant kills and mortality in the region. Ivory, meat, sports hunting, natural death or problem elephant control were all listed as motives or causes for elephant deaths. Given the small sample size, it is not possible to articulate a baseline understanding of the temporal trends and motives in elephant kills.

CAR

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

Rieu (2004, 2005) found that smoked elephant meat was transported to Berberati markets by foot in chunks weighing 3-5 kg on average. In six markets over a period of six weeks, she weighed three elephant trunks for sale along with 12 elephant meat pieces averaging 5.2 kg each and 19 pieces averaging 942 g each. She did not report how much elephant meat she actually found, but said that it and hippo together accounted for 5% of all bushmeat sold. The smoked meat sold for an overall average price of approximately US$ 4.83/kg and was amongst the most expensive bushmeats sold in Berberati. The high price was linked to the danger in hunting elephants and the fact that it was a protected species. She concluded that elephant meat was in high demand and that this was so because it was more often bought by wealthy elites because of a cultural belief that associated the elephant with concepts of strength and virility. She found that 0% of poor people purchased elephant meat. Elephant meat (along with hippo meat) earned the highest profit of any bushmeat all along the commodity chain from hunter to retail vendor. She only found one elephant hunter in Berberati, linked to a local superior official in what is now the MWFHF.

Fargeot (2008) monitored the most important bushmeat market in Bangui (PK 12) from 2005 to 2008. Using a conversion ratio of 1 kg of smoked meat equalling 2.7 kg of fresh meat, he estimated that 59.5 tonnes of fresh elephant meat was sold during the period, about 1.5 % of the bushmeat total. Presumably, therefore, he observed 22 tonnes of smoked elephant meat. The average price was US$ 12.65/kg, the highest price by far of any meat being sold (the mean of all bushmeats was US$ 5.50/kg). He assumed the high price was due to elites wishing to show off their wealth, rather than to a demand exceeding supply.

The DSP has been monitoring biodiversity and managing the DSC since 1990. They have carried out a number of elephant population surveys since 2003 in cooperation with MIKE (Bokoto de Semboli, 2004, 2005, 2007), which has been conducting the monitoring of elephant mortality in the DSC since 2005 (CITES, 2010a).

In addition, studies have also been carried out to manage sports hunting and bushmeat hunting by local populations in an attempt to rationalize the two and to achieve sustainable game offtake and optimize economic returns from hunting wildlife (Roulet & Mamang-Kanga, 2008; Fargeot & Castel, 2009). Remis & Kpanou (2010) examined the ecological impacts of human activities on the key ungulates that are most often hunted in the DSC. The elephant was one of them. They found that elephants avoided human activity areas, supporting the findings of other studies (e.g. Blake, et al., 2007), and that they were most vulnerable to hunting in the integrally protected sectors far from human settlements.

ECOFAC has carried out elephant surveys and anti-poaching activities in northern CAR since the early 1990s (Delvingt & Tello, 2004; Bouché, 2010). Chardonnet & Boulet (2008) reported on elephant poaching activities in the Sangba evaluation zone, located between Bamingui-Bangoran and Manovo-Gounda-Saint-Floris NPs just south of Ndélé. Based on carcass counts, they estimated that 553 elephants were poached between January and May (the dry season) 2007, mainly by Sudanese and Chadian poachers who took the ivory and left the meat for the local population. The Sangba zone makes up about 30% of the area of northern CAR, but since elephants concentrate there, one cannot assume that the 30% represents that

proportion of the total poached. Ironically, the elephants feel safer in Sangba, even though it is comprised of hunting zones, because of anti-poaching patrols and tourism activities.

Martin & Stiles (2000) reported on an ivory market survey in Bangui in 1999 and Lagrot (in prep.) conducted a similar survey in 2007, although it was unpublished at the time of this project (Milliken, et al., 2009).

MIKE has been conducting the monitoring of elephant mortality in the DSC since 2005 attempting to document the annual proportion of illegal deaths and the causes (CITES, 2010b). Between January 2005 and September 2009, a total of 47 elephant carcasses were found in the DSC, of which 32 (68%) were poached or likely poached while one died from natural causes, one was killed as a result of human-elephant conflict and the motive for the kill was inconclusive for 13 carcasses.

IUCN began a project in early 2011 to establish a monitoring and evaluation system of the socio-economic benefits of the TNS project, which includes the DSC (http://www.iucn.org/fr/propos/union/secretariat/bureaux/paco/paco_cameroun/prg_prj_cameroun/paco_cam_prj_ftns/).

ROC

Since 1991, the Wildlife Conservation Society (WCS), in collaboration with the Government of ROC and international public and private-sector partners, has established three major site-based conservation projects across the Ndoki-Likouala landscape in northern ROC, implementing three different wildlife management strategies across contiguous zones: (1) integral protection of wildlife and their habitat in a core protected area – the Nouabalé-Ndoki National Park, (2) community-based conservation and management of wildlife and other natural resources in and around the swamp forests of the Lac Télé Community Reserve, and (3) wildlife management and conservation in several surrounding commercial logging concessions or Forestry Management Units (FMUs). The goal is to conserve ecologically functional populations of forest elephants, great apes and other focal species across the Ndoki-Likouala landscape. This is achieved through a 'landscape-species approach', which maps spatial ecological requirements conservation targets ('landscape species') and, based on their overlap with human land uses, identifies key threats to be addressed by conservation action. The Ndoki-Likouala monitoring programme has the primary objective of evaluating the impact of different management strategies on the density and abundance of landscape species (Stokes, et al., 2010). They found that logging roads were exploited by poachers and had a major negative impact on elephant distribution.

Eves (2006; Eves & Ruggiero, 2000) conducted a socio-economic and hunting economics study in association with WCS in the Nouabalé-Ndoki National Park area of northern ROC in 1995-1996. She found that elephant hunting had significant economic potential for villagers. Using semi-structured interviews over four months in 24 villages, she found that 273 elephants had been killed during this period. The number was conservative, as the count included only elephants killed between October 1995 and January 1996 by hunts originating in those villages, not organized outside. Elephants were hunted unselectively; thus return from tusks and meat was highly variable. Distance of a kill from the village was also a factor, as it affected the difficulty of meat transport – the greater the distance, the less meat was carried back. The average profit from an elephant hunt was US$ 400, a considerable sum at that time in northern ROC rural areas.

Eves (2006) concluded that, with the advent of increased logging activities, improved roads and a growing human population, bushmeat hunting would become unsustainable, unless strict legislative, law enforcement and conservation actions were undertaken, along with the development of economic alternatives to hunting.

Some studies have dealt with bushmeat trade in ROC using a regional approach (e.g. Delvingt, 1997; Wilkie & Carpenter, 1999). Others focused on the northern ROC, Wilkie, et al. (1992) in the Sembé-Ouessso area and Blake (1994) in the Kabo forest. Carpaneto (1994) provided considerable information about semi-traditional elephant hunting (techniques, cultural uses, financial value) in the OKNP. In 1995 ECOFAC conducted its first study on local hunting in villages on the edge of the park, providing quantitative data to assess its intensity, socio-economic contribution and impact on local wildlife (Vanwijnsberghe, 1996).

At the same time, WCS was monitoring hunting and bushmeat trade in logging concessions (Auzel & Wilkie, 2000) and studying the bushmeat trade in Ouesso surveying markets and hunters (Hennessey, 1995; Hennessey & Rogers, 2008). Furthermore, WCS initiated two socio-economic studies on urban trade of hunting products in Brazzaville, one of them on bushmeat (Malonga, 1996), producing detailed information about the commodity chain, quantities, species and incomes generated, and one on carved ivory (Madzou & Moukassa, 1996) updated in 1999 (Madzou, 1999).

Studies have also been carried out to monitor hunting and bushmeat trade in logging concessions (Auzel &

Wilkie, 2000; Wilkie, et al., 2000, 2001; Elkan, et al., 2006; Poulsen, et al., 2007, 2009; Mockrin, et al., 2011). Logging activities impact adversely on elephants and other wildlife in several ways: the work camps create demand for bushmeat, logging truck drivers encourage bushmeat hunting as a supplement to their income through participating in transport and marketing and logging roads create access to previously inaccessible forest areas.

Although ivory trade issues were discussed in most of the papers previously mentioned, a more complete analysis of ivory trafficking in Congo, as well as elephant hunting in and around northern protected areas, including the OKNP is presented by Nishihara (2003). An update on ivory markets should appear in Lagrot (in prep.).

WCS and ECOFAC have undertaken several socio-economic studies to better understand the sustainability of hunting and bushmeat and ivory trade and their value in supporting livelihoods. WCS, in the framework of the OKNP-PROGEP socio-economic programme (*Projet de Gestion des Ecosytèmes Périphériques* or Project for Ecosystem Management in Periphery Areas), is still monitoring the bushmeat flow of six key sites within the FMU of Ngombe, which is exploited by the Forest Industry of Ouesso (IFO), a logging company adjoining the OKNP. The monitoring, which includes an annual survey of local population food habits, is being conducted in Liouesso, Molanda, Ngombé site, Zoulabouth and Mokouangonda (Elende, 2009; Elende & Zoubabela, 2006).

Several reports have been published of elephant and great ape population surveys in the OKNP and adjacent areas within the context of the WWF-TRIDOM and ECOFAC projects, which provide useful elephant number and density data (Blake, 2006a; Kiminou, et al., 2007; Malonga, et al., 2007, 2009).

DRC

Various anthropological research projects were carried out in the 1970s and 1980s on Pygmies in the Ituri Forest (e.g. Hart, 1978, 2000; 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 offtake, land-use and settlement patterns. Since Pygmies did not traditionally hunt elephants, the research is of only indirect relevance to this study. None of the publications discuss trade in elephant meat or ivory.

Wilkie, et al. (1998) studied bushmeat offtake 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 busmeat offtake, utilization and trade around the Garamba NP, about 200 km north-east of the OFR during periods of armed conflict and peace time. 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.

In 2006, the Ituri-Epulu-Aru Landscape consortium began work on a land-use planning strategy that included bushmeat management, facilitated by the Congo Basin Forest Partnership (CBFP) (see www.cbfp.org). 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, consortium NGOs help 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., 2009; Brown, 2010).

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 Community Based Natural Resource Management (CBNRM) zones (Banana, Andekau and Bakwanza). Eleven agricultural zones covering 30,700 ha have been delimited with agreement from local communities and two more are in progress (Brown, 2010). This information is being used to guide

the land-use planning process, especially for community-managed forests.

The draft management plan calls for the commercial production of an ambitious range of products ranging from saw timber and other wood and non-timber forest products to bushmeat and fish. The income projected to communities could be substantial, particularly from saw timber (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).

Lokoka & Boundawana (2010) studied poaching and bushmeat offtake 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 out 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.

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. With international support, ICCN was able to temporarily reduce elephant poaching, 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) carried out a study on elephant poaching in the OFR area, supported by ICCN and the Inventory Monitoring Unit (IMU) of the WCS. 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.

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 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.

WCS currently has a monitoring and conservation project in OFR, but no data on bushmeat trade has been produced by it. Hart, et al. (2008) reported in a WCS publication that very little evidence for recent elephant poaching was found in a survey of OFR made between 2005 and 2007. Nevertheless, they concluded that the elephant population in the reserve had declined by almost half since a survey made in 1995 due to poaching that took place during the armed conflict period 1996-2004. Population surveys of ungulates suggested that offtake of antelopes was unsustainable. The use of firearms in hunting was rare; snares and Pygmy net-hunting were the principal methods used to capture bushmeat species. They found that there was confusion in the minds of some local people interviewed during the study as to what constituted legal versus illegal activities, especially hunting and purchase of bushmeat. Sanctions imposed for illegal activities were unknown. WCS recommended that an initial set of rules and regulations for management of the hunting and integral protection zones should be developed and communicated to local communities that occupied the reserve.

MIKE, in cooperation with ICCN, has been monitoring the illegal killing of elephants in OFR since 2003 (CITES, 2010a). Between 2003 and the end of 2008, 71 elephant carcasses were reported in the OFR to MIKE. Of these, 68 (95.8%) were thought to have been poached, whether for ivory, meat or both is not known. The OFR has the highest Proportion of Illegally Killed Elephants of any monitoring site in its programme.

National Laws related to Elephants

A concise summary is presented below of the national laws of each country relevant to elephant conservation, hunting and bushmeat trade. A more comprehensive review can be found in Appendix I. All four case study countries are Parties to CITES.

Cameroon
Elephants with tusks weighing more than 5 kg are classed as Class B species (Partially Protected), while elephants with tusks weighing less than 5 kg are Class A species (Fully Protected).

Cameroon law permits both the hunting of elephants with >5 kg tusks and the selling of the meat and trophies, as long as the required permits and licenses have been obtained. Laws also permit the capture and sale of bushmeat from unprotected species.

In early 2010, however, MINFOF announced that bushmeat could only be sold in designated markets that could be more easily monitored by government law enforcements agents. Bushmeat sold outside of the authorized markets would be considered illegal. The government also prohibited the transport of bushmeat to markets on trains, timber trucks and pubic transportation, and the announcement stated that the sale of the meat of protected species (specifically identifying the elephant) was completely prohibited (Ntaryike, 2010; Valk, 2010). The legal status of this public announcement is unclear, as current law contradicts it.

CAR
Prior to 1985, elephant hunting under certain conditions was permitted, but *Ordinance No. 85/005 of 30 January 1985* closed any type of elephant hunting anywhere in CAR. Unfortunately, the ordinance made no mention of elephant trophies or other products that might originate from natural deaths, self-defence killings or legal, administrative elephant killings. Nor did the ordinance change the classification of elephants from totally protected (A, with tusks <10 kg) and partially protected (B, tusks >10 kg) species. Sections of certain laws could be interpreted to support the trade in elephant meat and ivory, if specified procedures are followed and permits obtained. Although legislation is ambiguous on the question, all trade in elephant meat is treated as illegal in CAR, and laws relating to trade in ivory are ambiguous.

ROC
Elephants are totally protected in ROC. Killing an elephant (except for non-commercial situations as specified in law) or trade in its products is completely illegal.

DRC
Elephants are Class I, totally protected, and it is illegal to kill them (except for non-commercial situations as specified in law) or to trade in elephant products.

Methods

The methodology development was divided into four broad phases:

1. Study design
2. Case study field work
3. Data analysis
4. Report preparation

Study design

The country case studies were designed to include:

- Institutional support in each country
- Personnel (national experts, consultants, technical advisors and research assistants)
- Identification of data variables to collect
- Formulation of data collection methodology
- Selection of the data collection localities
- Budget
- Work plan
- Report format

Consultation with IUCN/SSC-AfESG and MIKE staff were made to produce a detailed planning document that included all of the above. Discussions with bushmeat experts in WWF, WCS, Zoological Society of London (ZSL), TRAFFIC and universities were carried out. This process took over two months. In the end, a comprehensive set of desired data variables was defined and questionnaires were designed to collect the data, both quantitative and qualitative.

Four different types of informants were identified to interview, with standardized questionnaires for each: hunters, transporters/middlemen, vendors and consumers. They are defined as:

Hunter: Hunters are individuals who hunt wild animals. They can be subsistence hunters, snaring, netting or shooting animals primarily to feed the family while practising another profession (e.g. farmer, shopkeeper), or they can be commercial hunters, those who hunt primarily to sell wildlife products (e.g. meat, ivory, hides).

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 directly from hunters, local traders or local markets, then return to urban areas to resell to vendors. Middlemen sometimes organize, arm and finance hunting expeditions to obtain certain items, usually ivory, 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, police or businessmen.

Transporter: Transporters carry elephant products from point to point on hire by hunters, middlemen or vendors. Transporters do not sell meat or ivory, which distinguishes them from middlemen.

Vendor: Vendors are individuals selling elephant products in markets, shops, restaurants, personal homes and on the roadside. Vendors generally proliferate in regional towns and large cities, where a large consumer base exists.

Consumer: Only bushmeat consumers were interviewed in this study. They buy elephant meat in the market place, restaurants or from itinerant hunters or middlemen for consumption. An ivory consumer would be a person who buys worked ivory from a workshop, retail outlet or online via the Internet.

Data collection localities consisted of settlements in the vicinity of MIKE monitoring sites and also included a representative sample of types of market centres (large urban, regional urban and small rural). It was hoped that elephant bushmeat commodity chains and the social networks operating them could be determined for each case study.

Case study field work

The study was coordinated by the Project Consultant (PC), who subcontracted team leaders to carry out field work and conduct preliminary data analysis in Cameroon, CAR and ROC. The PC supervised the DRC study himself, as no one could be found to do it in the time-frame designated.

The institutional support in the four country case studies was comprised of:

Cameroon – In Yokadouma, the WWF-TRIDOM project provided valuable information, maps and reports on their activities in Boumba-Bek and also the nearby PAs of Nki and Lobéké. In Yaoundé, the MIKE Central Africa Subregional office, WWF-Cameroon and LAGA shared helpful information.

CAR – The Director of Wildlife and Protected Areas in the MWFHF authorized the study and the WWF staff of the Dzanga-Sangha Project recommended research assistants, provided information and furnished transport to assist the study. The conservator (warden) of Dzanga-Sangha provided summary reports of activities and Excel versions of elephant carcass data. The Director of Wildlife and Protected Areas in the MWFHF also provided a number of background documents, including the DSP conservation plan and GIS mapping work completed by GTZ.

ROC – The International Conservation and Education Fund in Brazzaville provided office space, accommodation and help with finding research assistants, ECOFAC assisted with transportation, lodging and information, WCS in Ouesso provided office space and information and WWF-TRIDOM based in Sembe shared knowledge.

DRC – ICCN assisted with accommodation, personnel and information in OFR, Gilman International Conservation helped by providing an Internet connection and OSAPY made available research assistants and office backup in Kisangani.

The original project design called for two to three months in the field, but because of difficulties in engaging subcontractors to lead country case studies, field periods were reduced considerably to four to six weeks in each country.

Given the legally sensitive nature of this topic and in an attempt to be a non-threatening observer and participant in the study sites, the research teams used respondent-driven sampling (RDS) to identify informants. RDS has been shown to work well with secretive populations (Heckathorn, 1997, 2002). The research teams recruited hunter, middlemen and transporter, market vendor and consumer informants. As a result of limited field time, the number and geographic distribution of informant types were usually not large enough to represent statistically valid samples.

The data on most variables were collected through semi-structured interviews and observations based on questionnaires in French provided to the country team leaders by the PC. Informal interviews were conducted in natural settings, including markets, homes, restaurants and elephant meat and ivory sale points. RAs, trained in study questions, then utilized memory recall to ask particular questions during informal interviews. These were systematically recorded on hand-held voice recorders whenever possible, and in the DRC study, video recording was taken using a hidden micro-camcorder. Interviewing has been shown to yield reliable information on quantities, effort and spatial patterning of natural resource harvesting (Jones, et al., 2008).

Questionnaires developed for social science research are increasingly being used in the biological sciences when studying human natural resource utilization (Adams, 2007; White, et al., 2005). However, because of the clandestine nature of most wildlife trade, Barber-Meyer (2010) found that market surveys yield more valid results with repeated surveys over time and applying ‘occupancy’ methods to data analysis, which require repeated surveys. Repeat surveys obviously require more time and resources, which might be possible in future in this project. Also, with increased field time, participatory observation could be carried out that would yield much better quantitative data (e.g. Fa, et al., 2004; Field, et al., 2005; Rist, et al., 2010). Depending on recall alone from informants has shown that generational or personal amnesia can bias results through a phenomenon termed ‘shifting baseline syndrome’ when collecting quantitative data (Papworth, et al., 2010); thus the results presented here should be interpreted with caution.

Participant identity was protected to promote the formation of trusting relationships and to improve the percentage of truthful responses in data collected. Anonymity was ensured through the use of a secure data source and code-identification system for raw data. Informants were identified with a letter indicating their location, a second letter indicating their role in the trade and a number in the order they were interviewed, as follows:

Actors were identified as: H = hunter, T = transporter, M = middleman, V = vendor

Research sites were identified by their place name, for example: Y = Yokadouma, N = Ngato, M = Moloundou, Lo = Lomie, Ya = Yaoundé, B = Brazzaville, O = Ouesso, etc.

Code Type	Coding sequence	Example	Decoding
Hunter (H)	Locality Informant type Number	MH1	Moloundou hunter #1
Middleman (M)	Locality Informant type Number	BM3	Brazzaville middleman #3

Research assistants (RAs) often employed cover stories (e.g. university student studying elephant meat trade, elephant meat dealer, tour guide, etc.) to draw more candid information from informants in a very short time-frame, even though in some cases the RAs knew informants previously and could use that relationship to elicit truthful responses. Most interactions with informants spanned two hours to a few days. Data was periodically cross-checked when possible to verify and adjust variation by repeating the same questions with both the same informants and other informants in the same survey site.

Whenever possible, elephant and other meats were weighed in order to obtain price data, but not all country teams possessed scales and therefore most price per kg data are estimates, or are not presented at all.[2] Prices obtained in local currencies are converted to US Dollars (US$). Currency conversion rates varied during the research period, but the averaged rate for the FCFA in Cameroon, CAR and ROC of US$ 1 = FCFA 500 was used and in DRC US$ 1 = 900 CF was used.

[2] Four Pesola electronic scales were purchased prior to field work, but unfortunately, all of them ended up in Brazzaville and it was not possible to distribute them to the other countries.

Results

Since killing elephants and trading in their products is illegal in all of the case study countries, it was difficult to find informants willing to speak openly on the subject, so sample sizes are small and may not be representative of the total population of actor type (i.e. hunter, middleman, etc.) in each country. Even those that agreed to speak did not answer every question posed to them, nor, it is thought, did some informants answer truthfully to all questions they did answer. In addition, because of the limited time available in the field, it was not possible to spend the time necessary in each locality to create trust and to cross-check adequately all questions with multiple informants for consistency and accuracy.

No statistical tests were carried out on the data, as those collected are considered preliminary and incomplete. Multivariate regressions, correlations, cluster analyses and so on based on poor data can create an illusion that conclusions drawn from such data sets have credibility. If researchers are to increase the utility of scientific assessments for evidence-based policy, the information provided must be representative, authentic and technically accurate in order to provide credible and data-based scenarios for decision makers (Watson 2005). Target-based conservation is the most desirable and should be 'transparent, simple to convey and allow conservation progress to be measured' (Carwardine et al., 2009). Credible data are crucial to the policy-making process (Friess & Webb, 2011). It is hoped that future research based on what has been achieved in this pilot phase will provide more complete data sets with which to conduct analyses that can produce predictive models and iterative hypotheses to test.

In spite of these limitations, the quantitative data and qualitative information gathered do reveal a tantalizing snapshot of illegal elephant killing and trafficking of products derived from the activity.

Hunters

The number of elephant hunters that responded to questions numbered 11 in Cameroon, eight in CAR, 28 in ROC and seven in DRC, for a total of 54. The hunters were in all cases male and they ranged in age from 25 to 68. In each country, several different ethnic groups were involved, with none predominating, and very often Pygmies made up part of the hunting party. In north-western Congo Basin, Pygmies are sometimes the shooters, as well as being trackers and porters, but in north-eastern DRC, Pygmies did not hunt elephants; they were mainly trackers and porters.

Hunters were interviewed mainly in villages and towns and in CAR, in the capital Bangui, where they were encountered bringing bushmeat to market. In DRC some were interviewed on the site of an old elephant kill. No hunting camps were visited in the forest due to the short time-frame of the field work.

In CAR only two of the hunters interviewed actually hunted in the DSC MIKE site, and they were based in villages on the Cameroon side of the border, which is marked by the Sangha River. One was in Libongo and the other was in Socambo, the latter near the ROC border as well. The other six hunters were based in Bangui and hunted elephants in the north around the Bamingui-Bangoran National Park. All of the other hunters interviewed hunted in the sample MIKE site areas.

The hunters were asked if they were primarily subsistence hunters, i.e. targeting elephants and other game to obtain meat for home consumption, or commercial hunters, i.e. killing elephants to sell products obtained from the activity. They were also asked if they hunted full time as a profession or if they hunted part time and had other economic pursuits, and if they hunted for themselves or worked for someone else on command. **Table 1** presents the results.

Table 1. Types of elephant hunters interviewed

Country	Number	Subsistence	Commercial	Full Time	Part Time	Hunting for Self	On command
Cameroon	11	0	11	2	9	1	10
CAR	8	0	8	0	8	4	4
ROC	28	0	28	9	19	17	11
DRC	7	0	7	0	7	0	7
Total	**54**	**0**	**54**	**11**	**43**	**22**	**32**

The dichotomy in reality is not as distinct as **Table 1** would suggest. Although the table indicates that all of the hunters are classified as 'commercial', many said that they were also 'subsistence', as they did consume elephant meat and take some back to the home to share with family and friends. It is also common to secure other game animals for food on the hunt and to take back bushmeat. Since all of the hunters stated that their *primary* aim in hunting was to sell elephant products, they were typed as commercial hunters. In addition, several hunters said that sometimes they hunted elephants on their own initiative and other times they were hired to do so. The latter were all classified as hunting 'on command'; only hunters that always hunted for themselves were typed as 'hunting for self'. An unusually high proportion of hunters around OKNP in ROC hunted for themselves. The reason for this cannot at present be explained.

Table 2. Hunter's primary motive for killing elephants

Country	A	B	C	D	E	F	G	H
Cameroon		1			8			
CAR		1		3	4			
ROC		0		18	10			
DRC		1			6			
Total		**3**		**21**	**28**			

A - Meat for self, family
B - Sell meat for self
C - Sell meat on command
D - Sell ivory for self
E - Commanded to hunt for ivory
F - Protect crops, property or life
G - Cultural reason
H - Other

The majority of hunters (32, or 59%) work for people who are termed '*commanditaires*', in other words 'those who command to hunt'. Informants said that it is common in Central Africa for a highly placed or fairly affluent person to hire a hunting team to go after elephants, always for ivory. These *commanditaires* can be government officials, police or military officers, businessmen and even religious figures (pastors or priests). They often provide the hunters with weapons, ammunition, basic foodstuffs, drink and cigarettes, in effect, subsidizing the hunt. On completion of a successful hunt, the hunters turn the tusks over to the *commanditaire* and are allowed to keep meat and other trophies, plus the lead hunter is often paid a little money.

Those hunters who had other professions, such as farmer or shopkeeper, commonly hunted part time. This was the case for 80% of the hunters. In Cameroon and ROC, many of the part time hunters farmed cocoa and did not hunt during the harvest season. Only 20% of the hunters classified themselves as full time hunters, two in Cameroon and nine in ROC. None were full time in CAR or DRC.

Hunters were asked what their primary motivation was in killing elephants in an attempt to assess the relative importance of meat and ivory as causes of poaching. **Table 2** shows the results.

The majority of hunters responding (28 of 52, or 54%) stated that their primary motivation for killing elephants was that they were commanded to do so for ivory, while 21 (41%) said that they were after ivory for themselves; thus 94% of hunters primarily hunted for ivory. Some hunters, only in CAR and ROC, hunted ivory for themselves, an interesting difference with hunters in Cameroon and DRC, who all hunted for ivory on command. Only three (6%) hunters hunted elephants primarily for meat to sell, one each in Cameroon, CAR and DRC. No hunters killed elephants for meat on command or primarily for subsistence. All of the hunters who hunted primarily for ivory cited hunting for meat as the second most important motivation. A few indicated that self-defence (F) and cultural reasons (G) were of tertiary importance.

Overall, 46 (85.2%) of the hunters reported that some meat was taken on the last elephant hunt: six (54.5%) in Cameroon, six (75%) in CAR, 28 (100%) in ROC and six (85.2%) in DRC.

Hunters were asked various questions about their last elephant hunt in an attempt to measure the work effort involved in such an undertaking. To collect this type of data for many hunting expeditions would take more time than was at the research teams' disposal, plus many of the informants had difficulty in recalling or estimating accurate responses. **Table 3** presents a summary of their responses with range and mean for each variable. More details not

Table 3. Sample cases of work effort involved in an elephant hunt*

Country	No. of respondants	Distance travelled (km)	Time on Hunt (Days)	No. in party
Cameroon	11	-	8-34 (16)	2-15 (5)
CAR	8	-	10-34 (17)	3-13 (8)
ROC	28	22-100 (53)	2-21(9)	2-6 (4)
DRC	7	30-262 (116)	3-21 (17)	5-18 (10)

* *The mean is in brackets ( ), rounded off to the nearest whole number.
- Insufficient data.

presented here were also gathered that shed light on work effort.

It is evident that a great amount of work and manpower are usually involved in an elephant hunt. The average time for one hunting expedition ranged from 9 to 17 days and usually more than 50 km was covered on foot in dense forest, with an average of four to ten people in the hunting party. Multiple elephants are usually killed during a single expedition, with nine reported as a maximum in ROC and seven in DRC.

The methods of hunting were similar in each of the countries. In the case of the commanded hunt, the *commanditaire* would contact one or two experienced elephant hunters to lead the hunt. He would give them instructions of what he wanted and they would negotiate the terms. The hunters would assemble a hunting party made up of trackers, usually Pygmies, assistant hunters and porters, the number depending on the goals of the hunt (number of tusks, quantity of elephant meat, other meat and other products). Recompense would be the food, drink and cigarettes while on the hunt, a portion of the hunted meat and usually a small amount of money. The ROC hunters could also keep one tusk of each elephant, usually sold to the *commanditaire*. This used to be the custom in DRC as well, but is no longer. When hunters worked for themselves, they had to finance the hunt out of pocket, which might explain why there were so many hunters (except around OKNP) working for *commanditaires*.

The hunting parties enter the forest on foot using paths from villages bordering the protected area. Villages normally have paths that are used by villagers to reach slash-and-burn shifting cultivation fields and to reach resources that they exploit by subsistence hunting and collecting. Since elephants rarely come near habitation sites, hunters have to go deep into the forest (>5 km) to find them. When they leave village paths they follow elephant trails to search for elephants. Occasionally, rivers are used to enter the forest by dugout canoe. Elephant hunters know from experience favoured places that elephants frequent, such as clearings (*bai*/*edo*), water points and mineral soil outcrops, and they usually try these places first. They set up a simple camp in the area they have decided to hunt in and use it as a base for a few to several days, depending on their goals and luck in the hunt. Hunters tend to reuse the same camp spots.

After the elephant kill and removing the tusks and, if it takes place, butchery and meat-smoking, the products are usually carried out by foot to a road. Sometimes middlemen (often women) who have been informed in advance enter the forest on a village path by foot or with a motorcycle or bicycle to buy meat and transport it to market. Depending on where the hunting party ended up, they might return the way they came back to the village they left from, where they often give meat or choice parts such as the trunk or liver to local leaders to maintain good will and villagers' complicity in the illegal hunting activity; or they might take the shortest distance to reach a road.

An RA interviews hunters at the site of an old elephant kill in the OFR. (Photo: R. Lokoka)

Once the hunting party reaches a road a variety of transport methods were recounted by informants:

- The *commanditaire* or his agent comes to pick up the tusks and other products;
- Hunters wait on the road for any passing transport, which could be a private vehicle, government vehicle, public transport, logging truck or even a UN or NGO vehicle (informants reported that government, UN and NGO personnel could occasionally be persuaded or bribed to cooperate);
- The hunting party divides up the products and individuals make their way home or to market however they can;
- Hunters working for themselves generally return to their home villages and hide the tusks until a buyer can be found, or until they take them to a town where they can sell them, using any transport available to them. Ivory traders are usually well known to hunters.

Hunters reported that tusks were the highest risk products to be caught with by the authorities.

[3] In early 2011, well after the termination of field work, there were reports of Sudanese elephant poachers travelling over a thousand km on camelback from northern CAR to the Berberati/Dzanga-Sangha area. Elephant meat was selling in profusion around Berberati and tusks were taken back to northern CAR. Government forces attacked them near Bayanga (Anon., 2011a).

Elephant meat

In Cameroon, the hunter who hunted primarily for elephant meat was also the one hunter who hunted for himself, not working for a *commanditaire*. In DRC the one hunter mainly after meat was doing it on behalf of his uncle, a businessman, and his wife was a bushmeat vendor. No information is available for the one meat hunter in northern CAR[3].

The amount of meat taken from elephant kills and its use was of critical interest to this study, but collecting such data after the fact based on memory proved difficult. Some informants responded with estimated weights, others with proportions of the elephant carcass and others by number of bundles or sacks carried away. With the latter, a weight per bundle or sack was estimated. If meat was sold, quantity and price data were also obtained. **Table 4** presents a summary of the data obtained from informants. The percentages represent an estimate of the proportion of the carcass taken. The numbers in brackets are the average quantity reported being taken for all recalled kills.

Very little of the elephant carcass is consumed on average by the hunting party at the kill site, with the maximum reported being about 5% of the animal in CAR, which consisted of three cases. In two of the kills there were 13 in the hunting party and in one there were 11, fairly large numbers. In all of these cases the hunting parties remained at the kill site to smoke meat for two to three days. The 12% (column A) reported for BBNP in Cameroon includes 2% consumed at the site and 10% carried away fresh to consume later and share with others, which consisted of a whole leg. The parts eaten at the kill site usually include the organs (heart, liver, kidneys, etc.), the flesh around the eyes, cheeks and sometimes the trunk or feet, which are much appreciated, along with meat.

Table 4. Utilization of meat from recalled elephant kills

Country	A	B	C	D	E
Cameroon[4]	0-12% (2.3%)	0-40% (10%, or ~ 100 kg)	0%	0-60% (8%, or ~ 80 kg)	5 (45%)
CAR	2-5% (3.5%)	0-165 kg (85 kg)	0%	0-630 kg (260 kg)	1 (13%)
ROC	~1%	0-10 kg (6 kg)	0%	10-300 kg (100 kg)	0
DRC	~1%	0-315 kg (82 kg)	0%	0-1000 kg (279 kg)	1 (14%)
Mean range	**1-3.5%**	**6-100 kg**	**0%**	**80-279 kg**	**0-5 (0-45%)**

A - fresh meat consumed by hunters/shared
B - smoked meat for personal/shared use
C - fresh meat sold
D - smoked meat sold
E - kills when no meat taken

Elephant meat is smoked prior to transport to conserve it and reduce weight. (Photo: Karl Ammann)

Smoked meat – The amount of smoked elephant meat carried away for home consumption or non-commercial sharing varied greatly, from none up to an estimated 400 kg, or the 40% of a carcass reported in one instance for Cameroon.[4] The next highest amount was 315 kg reported from OFR in DRC, but in general relatively small amounts of elephant meat were taken for personal use. From zero up to a tonne of smoked meat was reported as carried away to sell. A tonne of smoked meat (1,500 kg fresh) is considered about the maximum quantity that could be obtained from an average adult forest elephant. That particular case was in the OFR and the hunting party numbered 18. Informants reported that the quantities carried away to sell were in most instances larger than those carried for consumption, but the sample size is small and more research is needed in this area.

Fresh meat – It is of interest to note that there were no cases of fresh meat being carried away to sell (C in Table 4). The reason for this is related to the cause of the cases reported in which no meat was carried away at all (D). Because of the fear of being caught by the authorities, most elephant kills are made deep in the forest where the probability of detection is low. When the hunters feel safe, and depending on the number of porters available to carry meat, tusks and other gear, meat will be smoked to reduce weight and to preserve it. This takes on average two days or even three. Fresh meat will normally not be taken in any quantity, or at all, because in the hot, humid forest conditions, it goes bad fairly quickly, and transport out of the forest to market would result in trying to sell rotten meat. The cases in which no meat at all is taken are those when either (1) tusks are the target and there are not enough porters for meat or (2) the kill is made in a spot where the probability of detection is high, in which case the tusks are hacked out and the poachers depart quickly. These spots are usually near roads or settlements. There are therefore two main reasons why fresh elephant meat is rarely carried away from a kill: either the transport distance is too great and spoilage would occur, or fear of detection causes the hunters to depart quickly after taking the tusks. One can see in Table 4 that from 0 to 45% of the time in reported cases, no meat at all was taken (E).

A certain number of people in a hunting party are brought along as porters. When the meat is smoked, the chunks are divided up into 30-50 kg lots that are packed into backpacks made from rattan, other woody vines or branches to be carried out to a village or path-head on a

[4] It is proposed in this study that an adult forest elephant weighing 3,000 kg (Stephenson, 2004) could provide 1,000 kg of smoked meat. Studies of smaller wild and domesticated animals indicate that about 50% of live carcass weight is fresh meat and that 30-35% of this is lost in smoking (Christian Fargeot and Nathalie van Vliet, in litt., November 2010). Empirical studies have been carried out that support these estimates for elephants (Peter Lindsey, in litt., April 2011).

Table 5. Estimates of potential earnings from smoked elephant meat reported sold

Country	Range in kg	Price/kg (US$)	Total earnings (US$)
Cameroon	0-600*	2	0-1,200
CAR	0-630	2-3.33	0-2,098
ROC	10-300	2.40-3	24-900
DRC	0-1,000	1-5.55	0-5,550

* 60% of the carcass in Table 4, D.

road. In OKNP flour sacks were usually used.

Table 5 reports on estimates of income derived for smoked meat that hunters sold, based on what they reported as quantities (D in Table 4) and local prices.

The hunters did not provide a single figure as the amount in total that they earned from a single elephant kill, as the manner in which elephant meat is distributed amongst the participants and utilized by each is complex and not known in a quantitative sense by any single informant. A potential minimum-maximum estimate was therefore calculated using the quantity and price figures supplied by the informants. The minimum price was multiplied by the minimum amount of meat sold and maximum price multiplied by the maximum amount of meat reported sold to obtain the range of total potential earnings that hunters could have gained from the smoked meat they sold in each country sample.

OKNP in ROC seems an anomaly, as only 300 kg was the maximum reported to be carried away to sell. If it does represent the norm, the small quantity could be due to small hunting parties as a result of fear of detection, and/or the fact that most of the hunting parties were not subsidized by a *commanditaire*. **Table 3** shows that ROC does have the smallest average hunting party size (4), supporting this hypothesis. Looking at the other samples, anywhere from US$ 1,200 to US$ 5,550 could have been earned from smoked meat by hunters, a huge sum in rural Central Africa where poverty is extreme.

Other elephant products - 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 in eastern DRC believed to protect from lightning
- hide – leather (an Internet search found elephant skin boots selling for US$ 400-700 a pair), medicine and witchcraft
- ears – high quality drum skins
- feet – food, prized even more than the trunk; fabricated into receptacles
- spinal column marrow – medical, to treat rheumatism by massage and culinary, to use in cooking (DRC)
- fat – used in cooking
- musth hormone secretion – use unknown (Cameroon)
- dung – used in medicine in DRC

The hairs from an elephant's tail are used to make bracelets. (Photo: S. Latour)

No systematic data were gathered on the prices for these items, but in ROC the tail was said to sell for US$ 2-10, depending on size, and in DRC six tail hairs could be sold for US$ 1. The tail is always carried away. In Cameroon, skin sold for US$ 1 for a 5 cm square piece. Farmers bury it on the edge of their fields, as they believe it protects crops. Much more research is needed to quantify the trade in elephant products.

Ivory

Hunters were very reticent to discuss ivory in any detail. It was only in the DRC study where data on numbers and weights of tusks from a hunt were obtained. There were enough data to assemble a comparative picture of tusk prices by weight categories, but data are not complete. In addition, there was very high variability in answers that hunters gave for prices, so what is presented in **Table 6** should be considered as tentative and subject to further research. The mean prices are rounded off to the nearest US Dollar.

Table 6. Hunter prices for tusks (US$)

Locality	<5 kg		5-10 kg		10-20 kg	
	Range	Mean	Range	Mean	Range	Mean
BBNP	-	26	-	26	30-36	32
DSC	-	-	-	-	-	-
OKNP	5-24	12	10-40	20	20-40	31
OFR	5-30	16	15-30	29	25-80	56

Around BBNP many hunters said that they did not kill elephants with tusks weighing less than 10 kg each, but gave a price of US$ 26/kg for tusks smaller than 10 kg. Tusks greater than 20 kg were US$ 36-40/kg with a mean of US$ 39/kg. One middleman in Yokadouma said that he paid a hunter US$ 1,800 for 55 kg of tusks, or US$ 32.70/kg. The number and individual weights of the tusks were not reported, but the amount is consistent with hunters' responses for the price of 10-20 kg tusks.

Around OKNP tusks greater than 20 kg ranged from US$ 36-60/kg with an average of US$ 46/kg. The higher prices for 10-20 kg tusks in OFR is probably because >20 kg tusk prices were included by informants. The responding hunters in CAR did not know the weights of the tusks, but said that individual tusks could earn them between US$ 170 and 600 each.

In general, ivory at the hunter level seems cheapest in northern ROC and most expensive in north-eastern DRC, although much more research needs to be carried out to obtain conclusive data and the reasons for any price differences.

The main buyers of ivory, in the cases where hunters sold it themselves, were in northern ROC to West African (usually Malian) traders, in northern CAR to Sudanese, and in the single case in Cameroon, the hunter sold his tusks to a high-ranking government figure in Yaoundé.

Weapons

Cameroon – Most hunters said they used army rifles (said to be .458 and .450 calibre), and only one hunter used an AK-47 Kalashnikov automatic rifle, which was rented from the Congolese owner after the hunter's gun was seized by the authorities. Eight hunters used guns belonging to the *commanditaires* who ordered the hunting expeditions, and two used guns belonging to the safari hunting companies employing them to hunt elephants with foreign sports hunters. One hunter used his own gun (.458). The army guns may have been using the .458 SOCOM cartridge, which was designed for use with the American army M-16 (Wikipedia, 2010), as the Cameroon army does use the M-16 (along with other firearms), and informants said that the guns were supplied by army personnel on loan. AK-47s or other known military firearms cannot use a .458 cartridge, although various big game sport rifles can, which is probably what the two hunters working for a safari company used. It is not known what army rifle could have been the .450, cited by only one hunter; perhaps he was mistaken. He said that the gun used a .358 cartridge, which is only used by a lever-action Winchester or Browning rifle, which '…pokes big holes in targets and packs a lot of punch' (Wolf, 2008). It was most likely not an army rifle. One hunter also mentioned using a 10.75 calibre rifle, which was probably an old bolt-action Mauser. Nchanji (2005) and MIKE field reports noted that thick metal cables were also used to capture elephants. In south-western Cameroon, Nchanji (2005) found that the .458 was the most common firearm seized by the authorities, followed by the .404 carbine. Big game hunting rifles cost US$ 1,365-2,200. Home-made and imported 12-gauge shotguns using specially made bullets are also used in hunting elephants.

CAR – Informants stated that they used rifles with 10.75, .375 and .458 calibres, all presumably hunting rifles (the CAR army does not have M-16s). Four of these hunters owned their own guns, while three were lent weapons by the *commanditaires*. The hunter in Libongo, Cameroon, used an AK-47 supplied with ammunition by the *commanditaire*. Armed conflict has resulted in the

import and dissemination of weapons in CAR (Berman & Lumbard, 2008). Rieu (2004) reported .375s being used by elephant hunters. The rifles cost about US$ 900 each and one cartridge sold for US$ 20.

ROC - The most common weapon used to hunt elephants around OKNP in ROC was the AK-47 (19 out of 26). Three hunters reported also using a 10.75, probably a Mauser. Two said they used only a 10.75 rifle and four others used a 12-gauge shotgun with home-made bullets made from melted down lead shot. Two did not respond. Thousands of AK-47s were imported during the civil war in ROC during the 1990s and many of these have made their way into the hands of hunters (Demetriou, et al., 2001). Informants reported that Pygmies used spearheads fired from shotguns to kill elephants.

DRC – All seven hunters said they usually used an AK-47, all belonging to FARDC officers who lent them out with ammunition. Two said they also used a SMG, which is the acronym for sub-machine gun, but it is not known what type it was, and two used the term B52 in reference to a weapon. A search of the Internet yielded no gun by that name, except a .22 calibre Winchester 52-B, a weapon that would not kill an elephant. Perhaps it is a nickname for some other gun. One hunter also mentioned using an M-16 in addition to an AK-47. It is known that elephant hunters in eastern DRC also use 12-gauge shotguns with home-made bullets, as in ROC (Karl Ammann, pers. comm., 2010).

Military weapons such as the AK-47 and M-16 are not considered appropriate for hunting elephants, because the bullet calibres and weights are too small. Because of their small size, many bullets are needed to kill an elephant, as **Table 7** demonstrates in the case of ROC. Informants around OFR in DRC responded with how many AK-47 cartridges they used while on a hunt, ranging from 60 to 500, the number correlating highly with the number of days in the hunting expedition. These numbers were not always needed to bring down one elephant, as hunters often shot more than one elephant and many other types of animals as well. This was also true in ROC, which would reduce the cost in ammunition per elephant shown in the table.

There is a significant difference in the number of bullets needed to kill an elephant with a proper elephant gun (.375, .458 or 10.75 calibre) compared to a military weapon (5.56 or 7.62 calibre). A large-bore rifle can bring down an elephant even with one bullet, although two to five was more usual in this study. The cartridges of large-bore rifles are much more expensive, however, ranging from US$ 18 to 34 each, while AK-47 cartridges cost only US$ 0.17 to 0.70 each, even though hunters rarely paid for the latter themselves, receiving them from *commanditaires*.

Table 7 presents prices and other useful data on weapons.

Bullet calibres starting with a decimal point (e.g. .458) are a measure of the bullet diameter in inches. Those with the decimal point between numbers (e.g. 7.62, 10.75) are measured in mm. Generally, the thicker the bullet, the more effective it is, but cartridges of the same calibre can vary considerably in powder charge and bullet weight ('grain'). Larger calibre bullets with higher grain counts (>200) and powder load are more appropriate for big game.

Large-bore .458 rifle and ammunition (Photos: Google Images)

Elephant hunting weapons can be categorized into three general types: large-bore rifles, small-bore automatic military weapons and shotguns using home-made bullets. More research needs to be carried out to calculate the costs involved in an elephant hunt, for hunters working for themselves, hunters ordered to do so, and for the *commanditaires*.

In all countries in this study, the laws state that firearms must be accompanied by a permit and that hunting can only be carried out with a gun permit and hunting license for appropriate animals. These requirements are almost never met, although hunters with gun permits were encountered in Cameroon, but nowhere else.

Table 7. Weapons used to hunt elephants

Country	Type of gun	Owner Hunter/Other	Type of bullet	No. bullets per elephant	Price/bullet US$	Total cost/ elephant
Cameroon	AK-47	0 1	7.62			
	.458	1 8	.458	3-5	30-34	90-170
	M-16	?	?			
	10.75	0 1	10.75			
	Other	1 0	.358			
CAR	Rifle	4 3	.458 10.75	-	18-20	-
	AK-47	0 1	7.62	-	-	-
ROC	AK-47	11 7	7.62	18-60	0.20-0.70	3.60-42
	Rifle	7 0	10.75	2-4	20	40-80
	12-gauge	4 0	18-20	3-7	-	-
DRC	AK-47	0 7	7.62	-	.17-.28	-
	M-16	0 1	5.56	-	-	-
	Other	0 3	-	-	-	-

12-gauge shotgun with home-made bullets for elephants (Photos: WWF)

AK-47 Kalashnikovs and 7.62 mm cartridges (Photos: WWF)

Transporters/Middlemen

ELEPHANT MEAT

Transporters do not trade in meat, but are simply hired by hunters or middlemen to carry meat from point A to point B. They are usually paid money or receive a small consideration for their service. Only one meat transporter was interviewed, in Cameroon. He owned a car and used it to travel the P4 road to transport people and agricultural products to market. He sometimes transported elephant meat in bags to Yokadouma. He was caught once and had to pay a FCFA 50,000 fine (US$ 100) to WWF to release his car. No meat transporters were interviewed in the other countries and it was not clear from interviews with middlemen whether meat is ever sent unaccompanied with transporters. Middlemen almost always transport their meat themselves.

Once in a middleman's hands, the meat is transported by a wide variety of means, ranging from bicycles to buses, depending on the quantity of meat and distance to be travelled. Elephant meat is usually hidden or disguised, as in all case study countries it is subject to confiscation at checkpoints.

No middlemen were found that specialize in elephant meat, but rather it is included with other bushmeat in transport. The number of meat middlemen interviewed in each case study were five in Cameroon, nine in CAR, 14 in ROC and only one in DRC.

Cameroon

Two middlemen were interviewed in the rural area near BBNP (Ndongo and Polido'o), two were interviewed in Yokadouma and one in Yaoundé. All were female, except for a male who was the president of a bushmeat association in Yokadouma. Elephant meat is always smoked. None of them traded in ivory.

The one male middleman uses a hired car to buy meat along the road and transport it to Yokadouma, where he sells it to chop shops and market vendors for US$ 20 a *morceau*, or piece. The weight of a piece is not known with certainty, perhaps about 5 kg on average, according to RAs. One woman bushmeat trader in Yokadouma goes to villages near BBNP and Lobéké to wait for hunting parties to return from the forest. She transports the meat by hired car to Yokadouma where she sells it to chop shops and market vendors for US$ 20/piece. She said the work is risky and one can go to prison for three years if caught with illegal meat. Another female middleman operates to the west of BBNP and also uses a hired car to buy bushmeat and take it to Lomié to sell for US$ 20/piece. She also runs a restaurant and will sell it there to trusted customers. She normally pays hunters US$ 16/piece for elephant meat, so her profit margin is modest.

None of the middlemen said that they go in search of elephant meat only. Hunters are always out hunting for bushmeat, and if an elephant hunting party returns while they are visiting a village they will buy some or all of the meat, along with any other bushmeat. Trading is more active during the rainy season, March through November, and it is riskiest during the closed season, July to December, when hunting is illegal, and ecoguards seize meat at checkpoints. Bushmeat traders need to have several hundred dollars in capital to sustain a successful trade, and a certain percentage of this goes towards bribes.

Because of increased activity in the south-east brought on by the WWF-TRIDOM project and attention on poaching and illegal wildlife trade by other conservation NGOs and LAGA, more patrolling and seizures are being made. Middlemen reported that elephant meat is becoming more difficult to find and prices for it have been rising. Informers paid by anti-poaching programmes to report illegal bushmeat trade have also reduced trade of protected species such as the elephant and great apes. One middleman reported that a hunter she regularly buys from had recently been shot dead by the BIR.

CAR

Two men and five women were interviewed in Bangui and two women were interviewed in Berberati.

The middlemen in Bangui regularly made trips to the far northern CAR near Ndélé to purchase elephant and buffalo meat and transport this meat by public bus to Bangui for sale (from one to three trips/month). Only one of the middlemen informants indicated that they currently transport ivory. This woman informant is an unusual case, as she works hand in hand with her husband who is an elephant hunter carrying out hunting activities near Ndélé. She organizes the transport and sale of elephant meat and ivory acquired by her husband. Three of these middlemen reported buying elephant meat in Ndélé for US$ 3.33/kg and selling it in Bangui for US$ 6.67/kg. Transport costs from Ndélé to Bangui were reported to range from US$ 44 to US$ 80, with an additional US$ 4-18 for bribes.

All of the middlemen had strong relationships with hunters and buyers in Bangui and played an integral role in setting up the hunt, conducting hunting activities as well as transporting and selling the meat to other middlemen

and vendors operating in Bangui. Most of the middlemen indicated that they transport moderate quantities of elephant meat (25-50 pieces or 75 kg-150 kg) per trip, with the exception of the one woman who also trades ivory. She sells larger quantities of meat to vendors at the PK12 market, but specific quantities were not ascertained. Most of the middleman informants indicated that they traded in both elephant and buffalo meat with a strong preference for elephant meat because of high profit margins gained.

The two female middlemen interviewed in Berberati organized and carried out elephant hunts near Mambélé, the site identified by Rieu (2005) as an important source locality for bushmeat sold in Berberati. Both informants indicated that they transported elephant meat and ivory to Berberati for sale to established buyers. One woman is based in Berberati and travels to Mambélé to accompany elephant hunting operations, whereupon she transports meat and ivory back to Berberati. She preferred selling elephant meat in her restaurant to selling ivory because the elephant tusks were often very small. A second Berberati female informant accompanied hunts near Yamale and indicated that she had an established buyer in Berberati that purchased ivory from her and transported it to Cameroon to sell. Transport costs and bribes ranged from US$ 100 to 200 per trip.

ROC

Nine of the informants were male and five were female. Six were interviewed in villages around OKNP (Seka, Miélékouka and Zoulaboth), one was interviewed in Ouesso and seven in Brazzaville. Bushmeat, including elephant, moves in two main directions from around OKNP, either to Ouesso or south to Makoua and on to towns further south, and some to Brazzaville.

Meat travels to Ouesso by road or by boat on the Ngoko River, depending on where the hunting took place. When it is by road, bushmeat and ivory are often transported by official cars belonging to the people who have ordered the products and/or provided military weapons, so they can go through checkpoints unhindered. Most of the meat is sold in Ouesso, although some of it is flown to Brazzaville from the airport.

Bushmeat from the southern sector of OKNP is hidden in baggage and travels by big trucks or buses (*Océan du Nord*) straight to Brazzaville. Some middlemen also take advantage of the arrival of 'officials' in Mbomo (politicians or military) to transport the products of illicit trade to Brazzaville. These officials either personally consent to assist in this trade or facilitate it through their subordinates. No information was gathered on the proportions that might have been sold on the way to Brazzaville.

Brazzaville middlemen receive meat from the OKNP area, but also from other areas in northern ROC. This is often transported by river, with the Congo River constituting a main 'highway'. The bushmeat comes from the north and also from DRC, in particular from Salonga NP (Omari & Ibata, pers. comm., 2010). Very large boats called *baleinières* (whaleboats) have freezers on board and can transport huge quantities of fresh and smoked meat. Prohibited meat is well hidden in big trunks, which also contain tools, diesel fuel, etc. Many transactions between middlemen and suppliers (hunters or first middlemen) are made without even disembarking, in the middle of the river from a pirogue to the big boats.

All the transporters interviewed have regular suppliers and customers. They organize their trips and itinerary according to their suppliers and buy quantities of meat according to their subscribers or regular retailers' orders. If they have enough stock, they can also sell goods to infrequent customers. Middlemen in Brazzaville have restaurant owners as customers. They use public transport or governmental vehicles, if they are available. When travelling by bus, checkpoints are not an obstacle for middlemen as they conceal the meat well. If the meat is found by an ecoguard or the police, they bribe to continue on their way.

Preliminary data from only six middlemen informants reflected a buying price for elephant meat of US$ 2.40-3/kg and average selling price of US$ 3.55/kg, with a range of US$ 2.40-6, but further research is needed to confirm this. The six transported 25 kg to 100 kg of elephant meat each per trip, with an average of 47.8 kg, relatively small amounts. Only two of the meat middlemen reported also transporting ivory.

DRC

The one 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.

One other middleman who specialized in ivory sold elephant meat in Mambasa for US$ 2.60/kg and another sold it in Mambasa for US$ 5/kg. Reasons for the price difference are not known.

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 Transporters/Middlemen

Five ivory transporters and five middlemen were interviewed in Cameroon, three ivory middlemen were interviewed in CAR, none was found in ROC and three ivory transporters and two middlemen were interviewed in DRC.

Cameroon

The five ivory transporter informants were generally men in their 30s, otherwise employed as farmers (in Ndongo), with the exceptions of one hotel caretaker (Moloundou) and one Catholic priest (Socambo, interviewed in Yokadouma). Ivory sales were organized with a wide range of dealer types, including a brother jeweller in Yaoundé, a police commissioner in Lomié, a businessman in a Yokadouma hotel, an army officer in Yaoundé and a middleman in Moloundou. A Hausa trader in Moulondou was a well-known ivory middleman, but he could not be interviewed in the time available. Further information on middlemen was gathered from WWF and MINFOF staff.

Four of the transporters owned their own motorcycle and one owned his own car, which they used to provide transport for people and goods in the BBNP area. When hauling ivory for middlemen *commanditaires*, they invariably travelled at night and were paid from US$ 60 to US$ 200.

The five ivory middlemen were all males. Three were interviewed in Yokadouma, although one lived in Socambo (the priest), one was from Ndongo, a village near Moloundou, and the last was in Djaposten, a village between Lomié and Abang Mbang. All normally buy tusks directly from hunters. One acts as a go-between hunters and an army officer in Yaoundé who orders tusks. Three used hired transport and one transported tusks with his own motorcycle. One uses a pirogue to transport the tusks he buys inside BBNP to take them on the Dja and Boumba rivers to Moloundou, where he sells them to the *commanditaire* who ordered the hunt. The one in Djaposten has his own hunters whom he sends out to get tusks when he has buyers. He sells from his charcoal shop.

Only in one instance was ivory observed during the study. YM5 presented a small tusk weighing approximately 2 kg in Yokadouma, asking US$ 54 for the tusk, or US$ 27/kg. Ivory prices provided by other informants in Yokadouma indicated a 30-65% increase in the cost of ivory from 2005 to 2010, in response to higher demand and increasing legal and economic costs for trading in ivory. One middleman claimed that demand from urban buyers was much greater than the supply they could acquire.

CAR

In CAR, one ivory middleman was the woman who was also a meat middleman, working with her hunter husband to transport elephant meat and tusks from Ndélé in northern CAR to Bangui for sale. She made one to three trips a month. No further information was collected. The other two were also women, one of whom went to Mambélé and one to Yamale to buy meat and ivory from hunters and sell the commodities in Berberati. The one going to Yamale stated that she had a regular ivory buyer who took her tusks to Cameroon to sell. No middleman per kg prices were obtained for ivory for CAR, although one stated that she received US$ 600 for a pair of small tusks and US$ 1,400 for a pair of larger tusks.

ROC

It was not possible to approach middlemen specialized in ivory trade. According to NGO managers and other informed people, ivory obtained in the Ouesso area is taken to Cameroon across the Ngoko River. In Cameroon, road networks are more developed and it is easy to transport ivory either to Yaoundé or to the port of Douala for export. It is easier and safer to transport ivory to buyers in Cameroon, where demand is higher than in Brazzaville.

The known buyers of ivory in Mbomo include local merchants, the head of the gendarmes and some Malian traders. Middlemen also operate in Ouesso, some known to project RAs, but they respected the middlemen's wishes to remain anonymous.

DRC

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 private or government vehicles to be taken to where they would be stored and accumulated for further onward shipment. One person

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 transported the ivory from Bandisende to traders in North Kivu.

A middleman in Mambasa took ivory to Bunia where he exchanged 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 could be collected.

Other middlemen not interviewed were said by the OSAPY RAs to be FARDC officers, businessmen, government officials, UN 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 are shown in **Table 8**.

Table 8. Prices that middlemen received for ivory (US$/kg)

Locality	< 10 kg	10-20 kg	> 20 kg
Yaoundé, Cameroon	40	40-50	50-100
CAR*	< 30	> 35	-
ROC	-	-	-
Kisangani, DRC	30-70	80-100	>120

* CAR prices were based on US$ 600 for two small tusks (< 10 kg), which means the maximum price would have been US$ 30/kg if they weighed 10 kg each, and the amount US$ 1,400 gained for larger tusks (10-20 kg). If they weighed 20 kg each, the price would have been US$ 35/kg, so that would be the minimum for this class.

Ivory is smuggled by canoe on rivers in Cameroon, ROC and DRC (Photo: Karl Ammann)

Vendors

ELEPHANT MEAT

Cameroon

Three meat vendors were interviewed at the village level, one each in Djaposten, Polido'o and in Lomié, six in a regional town (Yokadouma) and 20 in the capital Yaoundé. Vendors in all locations normally purchased and sold elephant meat in pieces with weight ranging from 2 to 5 kg each, averaging about 3 kg, according to estimations made by RAs, in the absence of scales. Variables that appeared to impact on price were availability of elephants in the region (lower prevalence was correlated with higher prices) as well as recent law enforcement raids, which, according to vendors, led to an increase in prices. Market vendors in Yokadouma and Yaoundé most often sold whole pieces directly to elite restaurants or outside of the market to trusted individual customers.

Close to the MIKE site in Ngato village, no elephant meat vendors or selling points were identified. The handful of street-stall restaurants and the open-air market claimed not to sell elephant meat. A WWF survey of restaurants in Ngato also found no elephant meat being served (Fouda, 2009). Similar results were obtained in villages on the southern edge of BBNP.

Djaposten – The vendor here is also technically a middleman, as he accompanies hunters on the hunt, sometimes with family members. The hunters just take the ivory and leave, but he stays behind for two days to butcher and to smoke as much meat as can be carried back, then sells it from his house for US$ 20 per piece. In the past, before the WWF programme and the LAB, the hunters would take the meat, but now are too afraid to do so.

Lomié - The female vendor informant in Lomié said that elephant meat had dropped in price per kg and that she could buy it for US$ 2/kg and sell it for US$ 6/kg. The reason given was that middlemen were afraid to be in possession of the meat and preferred to sell it cheaply rather than risk losing all profit should the meat be seized in LAB operations. She took the risk in order to care for her children. No restaurants or other vendors admitted selling elephant meat in Lomié.

Polido'o – The female vendor here runs a chop shop and buys a piece of elephant meat for US$ 20. She cuts it into 20 servings which she sells at US$ 2 each, making a 100% gross profit. She sells about 25 plates a day.

Yokadouma - The Yokadouma market had 16 tables and 15 women sellers, selling different kinds of bushmeat including red-tailed monkeys, forest antelopes, porcupines and pangolins. Four women sold in the market and one woman ran a restaurant, as did one man. They were between the ages of 30 and 55 and originated from Bantu south-eastern, forest-based ethnic groups. The bulk of the bushmeat (about 80%) was smoked and only a small proportion was sold fresh. Ngato village, the northern entry point for Boumba Bek, Mambele and villages along the Moloundou-Yokadouma road were identified as key source villages for elephant meat. This meat, 100% smoked, was only sold to well known customers in hidden corners outside the market. Five of the six vendors said that elephant meat was very popular with customers, but that it was difficult to find. More was available during the rainy season. They said that the scarcity was due to the LAB crackdown. The woman restaurant owner managed to buy elephant meat at US$ 10/piece and sold plates of it for US$ 2 each, selling about ten plates a day, when she had elephant meat. It is so popular that she informs known clients when she has it and it sells out quickly.

Yaoundé - Of the 15 open-air market places, 11 were determined to sell bushmeat, including vendors in three markets selling elephant meat. Buyers of protected species were primarily resellers (i.e., restaurant and hotel owners) and business people, but law enforcers and government officials also comprised about 12% of protected species buyers, pointing to a serious issue of complicity and participation of law enforcers in the trade. Class A species, such as chimpanzee, gorilla and elephant meats, were primarily sold outside of markets by market vendors. In total, Yaoundé markets had about 50 tables and 61 sellers selling bushmeat. Only three sellers admitted to selling elephant meat.

Of 185 restaurants, hotels and eating stalls in Yaoundé that sold wild meat, eight elite restaurants admitted selling elephant meat on command. Elephant meat was rare or unavailable in many of the restaurants, making it difficult to obtain weights and portion sizes for restaurants. Restaurant class greatly influenced average price per portion and portion size. A plate ranged from US$ 2 to 25. Elephant meat servings in restaurants were roughly twice as expensive as other wild meat servings due to its rarity, indicating high demand but low and irregular supply. Elephant meat vendors made a profit of approximately 90 to 100% from elephant meat sales, significantly more than the net benefit from other wild meat sales.

CAR

Bushmeat markets and restaurants were visited in the towns of Beya and Nola north of DSC, the regional town of Berberati and in Bangui. Because of severe time and manpower limitations, only snapshot data were gathered, which cannot be considered representative of what might prevail over a longer period of time.

Beya – Only restaurants were surveyed. The RA counted the number of dishes containing elephant meat as a proportion of all bushmeat dishes served over a period of three days, which was 6.3%. A plate cost US$ 1.

Nola – RA1 observed one piece of elephant meat on each of three different days on three different tables out of 16 tables selling bushmeat (156 total bushmeat pieces). The pieces weighed an estimated 3 kg, 4 kg and 2.5 kg respectively. The vendors bought the meat for between US$ 2.33/kg and US$ 2.50/kg and sold it for US$ 2.75 to US$ 3.20/kg, yielding a modest gross profit of 16-18%, although the sample is so small this result should be considered provisional. Only four out of 73 bushmeat dishes seen served in restaurants were elephant meat, 5.5%, each costing US$ 1 per plate.

Berberati – Three pieces of elephant meat (5.9% of total 54 bushmeat pieces) weighing 3.2, 3.6 and 3.75 kg each on three tables out of 14 tables were observed in Berberati over four days. The buying price was US$ 2.50/kg and selling price ranged from US$ 2.56 to 3.44/kg, averaging US$ 2.93/kg, yielding a gross profit margin of about 18%. Of 57 bushmeat dishes served in restaurants, only five (8.8%) were elephant meat, at US$ 1 per plate.

Only three chunks of elephant meat were found in the Berberati bushmeat market. (Photo: Linda Rieu)

Bangui – A bus had just arrived from Ndélé when the RA made his first visit to PK12 market. He observed 21 pieces of elephant meat on two tables being sold, weighing a total of 74 kg (average weight of 3.5 kg a piece). Elephant meat was much more expensive in PK12 than in south-west CAR, ranging from US$ 5.66 to 9.23/kg (mean = US$ 6.97/kg). A total of 14 out of 34 restaurants located near nine markets visited served elephant meat. Even though elephant meat was much more expensive in the market, a plate of it in a restaurant was still only US$ 1. Eight other markets where bushmeat is sold were visited (PK9, KM5, Miskine, Konbamta, Gobongo, Galabadja, Fouh, and Damala), but no elephant meat was seen.

Hodgkinson (2009) found the average price of elephant meat in the town of Bayanga was US$ 3.10/kg. This value is comparable to the average prices found in Nola (US$ 2.98/kg) and Berberati (US$ 2.93/kg) in this study.

Vendors were asked at what price they purchased elephant meat to determine what the profit margin would be. Although the sample is small, initial results indicate that only in Bangui do vendors make a high margin of profit on elephant meat, buying at an average of US$ 3.10/kg and selling at an average of US$ 6.94/kg. In Nola and Berberati the profit margin appears to be very slim, though much more research is needed. Related to this tentative finding is the fact that in comparing average selling prices of different bushmeat species, only in Bangui was elephant meat significantly more expensive than other bushmeat species. However, in south-west CAR, Rieu (2005) found in 2004 that smoked elephant meat sold at significantly higher prices than other bushmeats. Large pieces (~5 kg) sold at US$ 5.12/kg and smaller pieces (~1 kg) averaged US$ 4.54/kg, more expensive than other bushmeats. The lower price in 2010 is probably explained by the fact that Sudanese poachers were flooding the market with elephant meat in the Berberati area (Anon., 2011a).

ROC

Bushmeat markets were investigated in Ouesso, Pointe-Noire and Brazzaville.

Ouesso - Vendors and restaurant owners are very careful and buy protected species bushmeat directly from middlemen in their homes or wait for the merchandise at arrival points (Port de Libongo and the bus station). At the port, located on the Sangha River bank, totally protected species are hidden and sold only to people who give a predetermined password, while

unprotected species are openly displayed. There is one central retail market in Ouesso and two minor ones (TP and Diazi). The Port of Libongo can be considered as a wholesale market as it is the place where boats unload bushmeat, along with the bus station where middlemen arrive by public buses with bushmeat collected between Lango and Ouesso. The five markets were surveyed during 27 visits over seven days by two RAs. Seven different elephant meat vendors were seen, with one of them selling meat from home.

No elephant meat was seen at the Diazi or TP markets in seven visits each, at the Port market, two different vendors were found selling elephant meat twice and at the Central market, four vendors were found on four days out of six selling elephant meat. The average price in Ouesso for elephant meat from four vendors was US$ 7.99/kg, although the range was high (US$ 5.36/kg-11.11/kg). No restaurants were visited in Ouesso.

Pointe-Noire – There were four wholesale markets (Grand Market, Makayabou-Nkouikou, Mont Kamba and Mvou-Mvou) where retailers buy bushmeat and four retail markets (*Tié-Tié*, Miambazila, Mayaka and Faubourg). No elephant meat was found in any of them in 21 market visits over a week. Many vendors said they were afraid to sell protected wildlife meat since a well known hunter and elephant meat wholesaler, a DRC national, had been arrested five years previously. They also pointed out that since WCS began work in Conkouati National Park, there were more checkpoints and more arrests. The president of the bushmeat vendors association confirmed this account and added that elephant meat was still sold occasionally, but secretly. Two retailers also said that elephant meat came from Conkouati, from the border with Cabinda and from Moulenguibinza in Gabon.

Brazzaville – Twenty wholesale and retail markets were found that sold bushmeat. Elephant meat vendors were present 19 times representing 11 different individuals. Ouenzé market displayed the most elephant meat, with a total of 59 kg seen with six vendors selling it for US$ 11.06-14.81/kg (mean = US$ 13.05/kg). 'Total' market had the next most with four vendors selling 32 kg of elephant for US$ 8.33 to 15.38/kg (mean = US$ 11.26/kg). Poto-Poto market had one vendor selling 6.9 kg at US$ 15/kg and Mikalou had one vendor selling 4.8 kg at US$ 12.12/kg. One person sold elephant meat from home for US$ 16.67/kg. The overall average price was US$ 12.76/kg, the most expensive bushmeat seen.

During the July 2010 survey, vendors were seen regularly in Brazzaville markets with elephant meat clearly displayed on their tables. In August, a second market investigation found no elephant meat, even with the vendors previously identified, with one exception. The PALF director said that they had just arrested a retailer in the Marché Total who was selling a chimpanzee. PALF made the arrest the focus of media attention and the message was well disseminated, so vendors stopped selling protected species. That was a very good demonstration of the effectiveness of law enforcement, but it resulted in skewed data collection.

DRC

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 to 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 first vendor. Elephant meat was usually sold in large smoked chunks called *grume*.

In Kisangani, elephant meat in the Central Market sold for US$ 35 for a 7 kg *grume*, or approximately US$ 5/kg, about the same as the amount quoted in Mambasa. When cut up into small pieces and sold in ca. 100 gm piles, a pile would sell for CF 500, or US$ 0.56, about US$ 5.60/kg.

A vendor selling *grumes* of elephant meat in Mambasa, DRC (Photo: R. Lokoka)

There are at least seven markets in and around Kisangani that sell elephant meat. They are: Central Market, 11th Tshopo Market, 15th Tshopo Market, Iaté, Spiro, Kapalata (on the road to Buta) and 15th Market (15 km from Kisangani on the road to Isangi).

Much more research remains to be done on selling elephant meat.

Ivory vendors

The term 'ivory vendor' refers to those who sell worked ivory in retail outlets, which can be as informal as a pavement display to as upmarket as a luxury hotel boutique. Most worked ivory in Central Africa is sold in large crafts markets. Raw ivory is not normally sold openly in retail outlets because law enforcement in Central African countries pays much more attention to unworked tusks than to worked pieces. Tusks are traded in concealed environments. The degree to which ivory is displayed varies from country to country, depending on recent law enforcement efforts. Ivory vendors were investigated in Cameroon, ROC and DRC in this study, but not in CAR due to time constraints.

Cameroon

In Yaoundé the Centre Artisanat, or arts market, is located in the suburb of Tsinga. No ivory was displayed openly, although there were worked bone items resembling ivory. In 27 kiosks selling tourist knick-knacks, when asked, nine vendors revealed a few pieces of worked ivory hidden under shelves in sacks. In all, 88 pieces of ivory were brought out and shown to the project consultant. A 20-cm figurine on a tusk started at US$ 300, a 15-cm figurine started at US$ 200. The prices could be reduced by bargaining. There were a pair of poorly carved 38-cm tusks, polished tusk tips sold as paper weights, some poorly made bangles, thin figurines, bead necklaces and other mostly poorly worked jewellery items and figurines. Except for the two fairly attractive figurines priced above, the pieces looked like they had not sold because of their low quality, suggesting that better made replacements were not being supplied. The vendors said that no ivory was being worked currently in Yaoundé because of recent crackdowns. One vendor from Foumban, which is in the north-west of Cameroon, said that ivory was still being worked there. He said he had four additional ivory items at his home in Yaoundé. No ivory was found in any of the hotel boutiques or at the airport.

In the Briqueterie neighbourhood three ivory workshops were found, one of which had worked ivory at the time of the visit (July 2010), including rings, bangles and small animal carved objects.

In Douala, four ivory workshops and showrooms of worked ivory were found in Aqua, the economic centre of town, in Bonanjo, the administrative centre, and near the airport. At least 10 additional transient shops were also identified with worked ivory. These shops would open and close their ivory operation based on perceived threats from MINFOF law enforcers, who reportedly regularly raided shops in both Yaoundé and Douala. Ivory working and selling has gone underground rather than disappeared in the principal cities of Cameroon. In one of the main shops in Douala, more than 100 items weighing between 0.1 to 5 kg each were stored and presented to potential customers. Ivory customers in the Douala shops were roughly 60% Chinese, 20% European and 20% African. Ivory vendors in Douala sourced their ivory directly from the south, south-west and east regions. Other vendors established relationships with suppliers who delivered raw ivory to their workshops.

No ivory was found in Douala at the art market or in hotels. Certainly, the amount of ivory being worked and sold today in Yaoundé and Douala would be a small fraction of that seen by Martin & Stiles (2000) in 1999.

The small amount of ivory being consumed by the local market in conjunction with evidence for relatively important quantities of tusks being produced from poaching in the south-east, and illicitly imported from neighbouring countries, strongly suggests that most tusks are being exported. In fact, a tonne of raw ivory was seized in Douala in September 2009 being readied for export. The ivory was thought to originate in Cameroon and Gabon and was assembled by an organized network of smugglers that included Cameroonian government officials (LAGA, 2009). LAGA also tracked down a container with a false compartment that had been used to smuggle tusks to Hong Kong. DNA analysis of tusks seized in Hong Kong proved they had originated in Cameroon and Gabon (Wasser, et al., 2008). Ofir Drori, director of LAGA, has reported the arrests of several ivory traffickers and seizure of tusks and worked pieces (e.g. LAGA, 2009, 2010), which has driven traders underground.

ROC

The only handicraft market in Brazzaville, located next to the Marché du Plateau, was visited several times to look for prohibited animal products in general and ivory in particular. Only three bracelets made of elephant hair and a necklace with three ivory beads were found. The vendor refused to provide information about ivory and pretended that he was not the owner of the shop. No other ivory was observed, although it is possibly kept hidden, unless a customer requests it.

In Pointe-Noire at the Marché des Voiliers, the largest handicraft market in the city, elephant hair bracelets were displayed on tables. When requested, vendors brought out some small ivory objects hidden under the tables. On a second visit to the market, one table was found with 38 small pendants, three rings, two bracelets, two combs,

seven small elephant figurines and three small human figurines. The starting price for three 6-8 cm elephants was US$ 50. The pieces were very poorly worked. The ivory comes from the Kouilou region to the north of Pointe-Noire (Conkouati and Ntié-tié), the Niari region and Cabinda. Traffickers are Malaysian, Senegalese, Malian and from DRC. A jeweller was found selling ivory beads that were about 2 cm in diameter for US$ 16 each, an extremely high price.

No worked ivory was found in Ouesso, where there are very few tourists and no handicraft markets or shops.

DRC

No retail ivory vendors exist around the OFR as there are too few potential buyers. Four retail outlets were found 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 total of 377 ivory items were seen, consisting mainly of jewellery (291 pieces) and figurines or carved tusks (57 pieces). The starting prices were very low and the most expensive item was a genuinely old side-blown horn made from a tusk, priced at US$ 150. Most of the pieces had been manufactured in the last few years. Vendors said that local Chinese residents 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. None of these types were displayed at the time of the visits.

Three ivory and wood-working workshops were located on the premises of the kiosks that sold ivory and other crafts items. 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 affordable 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 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.

Large quantities of worked ivory were displayed with impunity in Kisangani. (Photo: Dan Stiles)

Consumers

Samples of people who eat elephant meat were interviewed in towns and cities in Cameroon, CAR and ROC with the aim of assessing the demand and preference for elephant compared to other meats. Time was not available for a consumer survey in DRC.

Cameroon

Elephant meat is reserved for select consumers as it usually costs more than any other meat in markets or on the menu in restaurants. Restaurant owners in Yaoundé stated that predominately elite Cameroonian business people and government officials as well as white foreigners consumed elephant meat. Given the secretive nature of its provisioning and sale, many customers who consume elephant meat have personal relationships with the restaurant owner. The restaurant owner alerts regular customers of the arrival of elephant meat. It is a high status meat, served at special occasions. The price comparisons with other meats in **Table 9** demonstrate that consumers are willing to pay more for elephant than for other meats. Elephant meat appears to be more expensive than other meats in Cameroon at the rural, regional and city levels.

CAR

In 2010 prices for elephant meat averaged around 3/kg in Nola and Berberati, although the samples were extremely small, and these prices were within the range of other bushmeats, suggesting that there was no preference for elephant. In Bayanga, south of Nola, Hodgkinson (2009) found that although elephant meat proved to be the most popular option amongst the protected species (81% of respondents saying they would eat it if offered in comparison to only 56% who would eat gorilla), other wild meat (fish, duiker, small monkey) and some domestic meats (beef and chicken) were preferred to elephant meat. Rieu, et al. (2007), however, stated that elephant meat, along with gorilla and chimpanzee meat, was equal in price or more expensive than other meats in south-west CAR and that it had a certain attraction for the wealthier segment of the population for cultural reasons. It is believed by some to have medical or magical properties that benefit the consumer.

In Bangui the price paid for elephant meat in bushmeat markets (US$ 6.94/kg) was considerably higher than the average price of other bushmeat (US$ 3.86/kg). This suggests that there is a consumer class that is willing to pay more for elephant meat in the capital city. This finding was also corroborated by Fargeot (2008) who found an even larger price gap between the selling price of elephant meat in bushmeat markets (US$ 14.17/kg) and that of other more commonly consumed bushmeats in bushmeat markets (US$ 5.50/kg).

ROC

One hundred and fifty consumers were interviewed in Brazzaville and 207 in Pointe-Noire. Every section of each city and each socio-economic category was sampled to obtain a representative cross-section of the population.

Brazzaville - Bushmeat is eaten by all of the sampled consumers, with a more frequent consumption by men, but 31% of men and 57% of women had never eaten elephant meat. When asked why, over half replied that it was because of a lack of availability and over a third said that it was for cultural or religious reasons. Only 10% said that it was because of taste. No one said that it was because of price or respect for the law. About 24% of men and 6% of women said that they ate elephant meat on a regular basis. Among Brazzaville people who do eat elephant meat:

- 57.6% eat it in town, 35.3% in the bush and 7.1% in town and in the bush;
- 63.1% buy the meat, 36.9% receive it as a gift from family or friends;
- 88.8% like eating this meat for its taste and 11.3% for a cultural reason.

Twenty-five restaurants were visited 32 times in total in Brazzaville. None of them had elephant meat or any other protected species meat on the menu. Most of them declared that protected species had to be ordered in advance, as it was too expensive to keep in stock. Only two of them said they could serve elephant meat on command.

Pointe-Noire – Quite a substantial proportion of the sample of men (77%) and women (80%) have never eaten elephant meat. Again, lack of availability was the main answer, but for only a third (33%) of the sample. Other frequent reasons were taste (27%) and culture/religion (24%). Less than 3% of men and 1% of women said that they consumed elephant meat on a regular basis. Among Pointe-Noire elephant meat-eaters:

- 36.4% eat it in town, 45.5% in the bush and 18.2% in town and in the bush;
- 56.8% buy the meat, 43.2% receive it as a gift from family or friends;
- 72.7% like eating this meat for its taste, 13.6% for religious/cultural reasons, 11.4% have no particular reason and 2.3% for health.

Although prices of other meats were not collected, the high average price of elephant meat in Ouesso (US$ 7.99/kg) and Brazzaville (US$ 12.76/kg) suggest that it is more expensive than other meats and therefore high in preference and demand.

DRC

In north-eastern DRC, elephant meat seems to be more expensive than other bushmeats and dried fish in the rural area and in Kisangani, but similar in price to beef and whole fish in Kisangani (**Table 9**). There was no time

Table 9. Average retail price of wild and domesticated meats, US$/kg

Country	Locality	Elephant	Duiker	Monkey	Beef	Chicken	Fish
Cameroon	Ngato/Lomie	**3.33-6**	1	1.50	-	-	-
	Yokadouma	**7.67**	2.25	3.25	4.40	6.67	2
	Bertoua	**10**	3	4.50	3.90	8	1.80
	Yaoundé	**7.50-13**	3.20	5	5.29	5.36-8	1.60
CAR	Nola	**2.97**	2.79	3.21	-	-	-
	Berberati	**2.93***	3.26	3.13	-	-	-
	Bangui	**6.94**	4.43	4.67	3.34	5	-
DRC	Mambasa	**5**	2.20	2.20	-	-	1.50
	Bafwasende	**-**	3	2.50	-	-	2.08
	Kisangani	**5.50**	2.02	3.36	6	3.60	4.95

* In 2004, Rieu (2005) documented an average price of US$ 4.83/kg for smoked elephant meat and US$ 4.08/kg for elephant trunk in Berberati (at 1 US$ = 540 FCFA).

available to carry out consumer surveys, but on price alone, elephant meat appears to be relatively high in preference and demand compared to other meats.

Prices

Prices were collected on other bushmeats and domesticated animal meats to compare to elephant meat, except in ROC. It is assumed that there is a degree of relationship between price and level of demand and preference, the higher the price, the greater the demand and preference. **Table 9** presents the results.

KNOWLEDGE AND OBSERVANCE OF LAWS

In all of the case study research sites, informants seemed very aware that elephants were a protected species and that it was illegal to kill elephants and trade in its products. Most hunters, middlemen and vendors of elephant meat and ivory had been arrested previously, fined, beaten and/or imprisoned, or at least knew someone who had been for breaking the laws related to elephants. The only area of ambiguity or misunderstanding seemed to be related to the working and trading of ivory. In three of the four countries (ROC excepted), current law allows for certain circumstances under which ivory can be worked and sold. In principle, it is possible to obtain a certificate of origin for legally obtained tusks and to work and sell the ivory under license. There are stringent articles under the respective national laws for marking and keeping records of the ivory. Law enforcement officials and those who attempt working and trading in ivory, however, do not seem to be conversant with the details of these laws. Recent crackdowns in Cameroon, CAR and ROC on ivory traffickers have forced the industry underground (Clynes, 2010; Wilkins, 2010; WWF, 2010; see reports on www.LAGA-enforcement.org). Only in DRC is worked ivory displayed openly in any quantity. Informants in Kisangani believed that ivory, once worked, became legal.

In spite of knowledge of the law, many rural people because of poverty feel impelled to take the risk to hunt elephants illegally and sell or supply their products. Others, who are relatively wealthy and/or powerful individuals – even those in government or the military– actually incite elephant poaching out of greed. These *commanditaires* order elephant hunts and provide money, weapons, ammunition and goods to poachers in return for tusks.

Analysis of ETIS data suggested that organized crime was involved in ivory smuggling in Cameroon and DRC, based on the number of large-scale ivory seizures involving these countries. In addition, all four countries in this study were perceived to have very low law enforcement efficiency and high rates of corruption related to ivory trade (Milliken, et al., 2009; CITES, 2010b).

Discussion

Due to the short period of time available for field work and the sensitive nature of the research subject matter, the number of informants that could be found willing to answer questions was relatively few. The four MIKE case study sites are also located in remote areas where roads are poor, transport is difficult, communications are almost non-existent and lodging is deficient. These logistical constraints also limited the data collection. In spite of the difficulties, the initial information that was collected at least offers tantalizing insights into the motivations that drive elephant poaching, the actors who are involved in illegal killing and trade and the operations of the social networks and commodity chains in the case study areas.

The most knowledgeable informants relevant to hunting elephants are those who organize and lead the hunting party. These are commercial hunters that specialize in elephants. All those interviewed had several years of experience in hunting elephants and had extensive knowledge of the forest areas where they habitually hunted. They knew the paths and waterways that could lead them to prime hunting spots, usually clearings where water and mineral salts could be found, favoured gathering spots for elephants and other large game such as buffalos and antelopes. The hunting party is usually also made up of one or two knowledgeable trackers, often Pygmies, and 'assistant hunters', who were usually family and friends of the lead hunter. These people also acted as porters. The lead hunters always killed elephants with firearms, which can be classified into three types: (1) small-bore military automatic rifles (e.g. AK-47), (2) large-bore hunting rifles (e.g. .458, 10.75) and (3) 12-gauge shotguns with home-made bullets. Pygmies in Cameroon, south-west CAR and northern ROC were also identified as elephant hunters, but not as leaders of the hunting party. The latter were invariably non-Pygmy, although with more research Pygmy lead hunters may be identified. In the OFR area of DRC, no Pygmies were found who shoot elephants, but they often accompanied a hunting party as trackers and porters.

In the Cameroon, CAR and DRC case studies, 82% of the hunters stated that their elephant hunting was driven by *commanditaires* ordering the hunt, with ivory being the main objective. The *commanditaires* provided weapons, ammunition, basic foodstuffs and other goods and remunerated the successful hunting party with a little money (to the lead hunter), and by allowing them to keep all meat and other products obtained on the hunt. The supplemental products included elephant tails, trunks, skin and other parts and non-elephant bushmeat, skins, etc. This mostly in-kind payment to hunting parties was sufficient, as the participants did not have to make any investment in capital, only their time. The recompense in meat to feed their families and surplus to sell was a welcome windfall to poverty-stricken rural inhabitants.

The OKNP area hunters in ROC differed significantly from the other hunters in that only 36% hunted for *commanditaires* to obtain ivory, while 64% reported hunting for themselves, 100% of those primarily motivated by ivory.

The reason for the apparent difference between ROC elephant hunters and the others cannot at present be ascertained, but it is hypothesized that two factors might explain the difference: (1) elephant numbers and density are higher in OKNP than in the other MIKE sites, hence successfully hunting elephants may require less effort and (2) many hunters around the OKNP own AK-47s and thus do not need a *commanditaire* to provide a weapon. AK-47 ammunition is very cheap compared to large-bore hunting rifles.

There appear to be certain differences between hunting parties that aim primarily for meat and those that target ivory. Differences in variables between middlemen and vendors of these two commodities increase the further down the commodity chain one travels.

Elephant Meat

Meat was the primary motivation for killing elephants for three of the 51 hunters responding (6% of the sample). It was the second most important motivation after ivory for 41 (80%) of the other hunters, meaning that for more than 86% of the hunters, meat was an important motivation for killing elephants. In two of the cases in which meat was the primary motivation (Cameroon and DRC), the hunting parties were the largest reported in their respective sample and they stayed out for periods longer than all but one of the hunts (15 days in Cameroon and 21 days in DRC). In CAR the primarily meat hunt was about average in terms of hunting party number and period. These results suggest that hunts that aim primarily for meat could be significantly larger and longer than those aiming for ivory, although further research is needed to test the hypothesis.

All of the hunters who said they hunted primarily for meat were self-motivated; none were commanded to do so. All of the hunters who said that they were commanded to hunt for meat as a secondary motivation were also commanded to hunt for ivory. In the total sample of hunters, none was ordered to hunt elephants for meat alone. In over 85% of the reported elephant hunts, some meat was carried away. Very little meat was carried away fresh; it was almost always carried away smoked. The presence of smoking racks at a kill site would indicate that meat was either a primary or secondary motivation for killing the elephant. Hunters sometimes sell the meat themselves directly to consumers, although in most instances they sell to middlemen.

All meat hunters and transporters interviewed were male. The genders of meat middlemen are shown in **Table 10**. It would appear that both males and females can act as middlemen in the meat trade, but a larger sample might reveal a more nuanced pattern. Over 90% of elephant meat market vendors were female.

Table 10. Gender of meat and ivory middlemen

Country	Meat Only		Meat + Ivory		Ivory Only	
	Male	Female	Male	Female	Male	Female
Cameroon	2	2	0	0	4	0
CAR	2	4	0	3	0	0
ROC	9	5	-	-	-	-
DRC	0	1	2	0	2	0
Total	**13**	**12**	**2**	**3**	**6**	**0**

The potential earnings from elephant meat were very high. Prices at the hunter level varied from US$ 1 to US$ 5.55/kg, with an average of roughly US$ 2.80/kg, although the sample data are not complete enough to derive an exact figure. An average adult forest elephant could probably provide 1,000 kg of smoked meat, which would on average gross the hunters well over US$ 2,500. Other parts of the animal would increase the income.

More research needs to be conducted before middlemen and vendor profits from elephant meat can be determined, but earnings seem to vary greatly. Transporting elephant and other protected meats from forest areas to urban markets posed a relatively high degree of risk, as did selling these meats in the marketplace and in restaurants. Based on informant responses, fear of being apprehended by the authorities was greatest in Cameroon, followed in order by ROC, CAR and lastly DRC. Only in Cameroon was seizure of the meat and arrest a possibility; in the other case studies, informants indicated that they could bribe their way clear, although some or all of the meat could be confiscated.

The very low price of elephant meat servings in many restaurants (US$ 1-2) seems contradictory when market prices were high. It can possibly be explained by the fact that smoked elephant meat appears to expand by rehydration when cooked with liquid. Observations made in south-west CAR suggested that 100 g dry put into a stew expanded to about 300 g, although more research is needed on the question.

The consumer surveys provided initial data that strongly suggested that elephant meat was in fairly high demand, but in short supply. This was reflected in price, where elephant meat was amongst the most expensive everywhere surveyed, except in south-west CAR in 2010 (in 2004 elephant *was* the most expensive (Rieu, 2005)). Potential earnings by hunters from meat are therefore very high, but this economic potential does not appear to be realized, except in a few isolated cases. In 13% to 45% of hunts in three of the four case studies, no meat at all was taken. In cases where meat was taken, it was often less than 50% of the meat available. Based on informants, there appear to be two main explanations for this pattern:

1. Logistics – Elephants are usually killed far from roads. A porter can carry a load of 30-50 kg on foot, depending on the porter's strength, terrain and distance. Transporting 1,000 kg of elephant meat would require an absolute minimum of 20 porters, not even taking into consideration tusks, other products of the hunt, weapons, etc. Often more than one elephant is killed on a hunt. It simply is rarely feasible to have the manpower necessary to carry out all of the available meat.

2. Security – a.) Elephant meat needs to be smoked to preserve it for market and to reduce the carrying weight. The time needed to stay in one spot while smoke is billowing into the air raises the probability of detection by the authorities. Many hunters are not

An elephant carcass in Dzanga *bai* with tusks removed and chunks of meat hacked out (Photo: WWF)

willing to take the risk. b.) Anti-poaching programmes have enlisted informants in hunting areas to alert wildlife authorities about illegal hunting and trafficking of protected species. The larger the hunting party, the greater the probability that one of them could be an informer. For this reason, hunting parties in Cameroon and ROC at least are becoming smaller (see **Table 3**); hence less meat can be carried.

The initial information from this study suggests that logistical difficulties and security concerns constrain elephant poaching for meat. Consumer demand exists that could drive increased illegal elephant killing for meat if either one or both of these constraints were to be mitigated.

Ivory

Ivory trading is not a new phenomenon to the Congo Basin. Little is known about the history of ivory carving in the sub-region, but when the Portuguese first arrived on the west coast of Cameroon and in the Congo in the early 16th century, they found rich artistic traditions of sculpture, mostly in wood, although including small ivory fertility and fetish figurines, ancestor images, amulets and larger side-blown horns. The Portuguese and later the Belgians and French stimulated Central African ivory carving by their interest in acquiring ivory pieces. Craftsmen began producing carved tusks, figurines and busts, Christian religious objects and more utilitarian items such as salt cellars, utensil handles and so on. It is speculated that increased ivory carving activity was facilitated by the invention or borrowing of new types of tools (Meauzé, 1968; Woodhouse, 1976; Grönig & Sellar, 1999). By the late 1880s, Central Africa was producing high quality ivory sculpture, as in the photo of the carved tusk from the Loango Coast of ROC (Edwards, 2008).

By the end of the 19th century, Europe was importing thousands of tonnes of African tusks every year, clearly an unsustainable quantity, which resulted in steep price rises for the 'white gold' (Milner-Gulland & Beddington, 1993; Spinage, 1994; Meredith, 2001; Walker, 2009).

Except for the coastal strip, the Congo Basin

remained largely unknown to the outside world and little raw ivory was obtained from the region until the 19th century. Based on an estimation of carrying capacity and surface area, Milner-Gulland & Beddington (1993) ventured that there were 1.4 million forest elephants in 1814 in the Congo Basin. In the late 19th and early 20th centuries with European colonization (and personal ownership, in the case of the Congo by King Leopold of Belgium), administration was put in place, roads were built, towns and Christian missionary stations were established and river traffic was developed, all of which resulted in a great increase in the exploitation of natural resources, including ivory.

Figure 6 shows an estimate of the volume of ivory exported from four Central African countries between 1891 and 1988, although there are no data for the period 1948-1965 (Barnes, 1996).

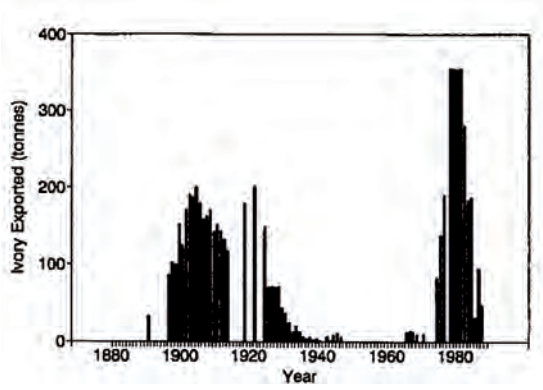


Figure 6. The volume of ivory exported from Central African Republic, Congo, Gabon, and Chad between 1891 and 1988 (Source: Barnes, 1996)

Note the huge jump in exports beginning in the 1970s. In the 1970s and 1980s economic development, particularly in ivoryphilic Asia, was driving quickly rising demand for ivory and increases in price, which in turn caused an upsurge in elephant poaching, as legal supplies could not satisfy demand (Barbier, et al., 1990). Poaching became particularly rife in Central African nations, where governmental institutions were weak and corruption was high (Milner-Gulland & Beddington, 1993; Meredith, 2001). The estimated Congo Basin elephant population had fallen by some estimates from 1.4 million in 1814 to only 172,400 in 1989 (Barnes, et al., 1995). The 1989 number was thought to be about one-third of the continent's total estimated elephant population, which some assessments put at an approximately 50% reduction since 1979 (Douglas-Hamilton, et al., 1992; Michelmore, et al., 1994), although the figure has been contested.
In 1989 the Ivory Trade Review Group (ITRG), working under the auspices of the IUCN 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. Part of the ITRG's work was to review how much raw ivory had been exported in the decade prior to 1989. **Table 11** shows the results for the four countries in this study.
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. Of the 2,648 tonnes of raw ivory that were exported from the DRC, approximately 73% of this was undeclared and illegal, much of it smuggled to the ROC, CAR, Burundi and Uganda for onward export. This amount constituted an estimated 36% of all raw ivory that was exported from Africa in this 10-year period. Export records indicate that only 704.9 tonnes were exported.

Table 11. Estimates of ivory exported from case study countries, 1979-1988

Country	Cameroon	CAR	ROC	DRC	Total
Tonnes	36.7	1,097.9	954.7	704.9	2,794

Source: Cobb, 1989.

The ITRG concluded that 'Cameroon has a significant position in international ivory trading in western and central Africa.' They found that Cameroon acted as an entrepôt for tusks smuggled in from neighbouring countries and exported to Nigeria, Europe, the Middle East and Asia (Cobb, 1989). Cameroon's ivory export records for the decade preceding the CITES ivory trade ban are incomplete, but importing countries record receiving 36.7 tonnes of tusks between 1979 and 1988, a relatively small quantity compared to other African countries. It is likely that much more than this was smuggled out and therefore not in the records (Cobb, 1989).

The CAR was not surveyed in the ITRG study, but **Figure 6** indicates that it also experienced a great rise in ivory exports during the 1970s and 1980s. Cobb (1989) stated that 1,097,900 kg of ivory was exported 1979-1988.

Importing countries declared receiving 954.7 tonnes of raw ivory in the decade 1979-1988 from ROC, the fourth largest quantity on the continent (Luxmoore, et al., 1989). Meredith (1989) points out, however, that some of this originated in the DRC. Meredith (1989) stated that investigations indicated that high-ranking personnel

were involved in illegal ivory exports. Large quantities of ivory were smuggled out of northern ROC to the CAR or overseas via the Brazzaville airport 'by well organized gangs', facilitated by government officials.

The total volume of exported ivory from the four case study countries was almost 2,800 tonnes between 1979 and 1988. Since only larger tusk sizes were usually exported, the average tusk weight was probably somewhere in the vicinity of 10 kg, which would mean the exported ivory represented the deaths of more than 150,000 elephants over ten years from these four countries alone.

The ITRG found an active local ivory industry operating in Cameroon, ROC and DRC in 1989, with virtually no government regulation controlling the origin of the raw ivory used or exports of worked pieces. Several thousand ivory carvers were working throughout the Congo Basin and ivory factories aimed at supplying local and foreign demand were established in the 1980s in ROC and DRC with Chinese investment (Cobb, 1989). This local industry caused the deaths of an unknown additional number of elephants.

The combination of the impacts of ivory exports, both legal and illegal, and local ivory industries largely explains the great decline in Central African elephant populations in the two decades preceding the CITES international ivory trade ban, although a reduction of habitat due to human encroachment contributed to it as well (Parker & Graham, 1989, 1990; Barnes, 1996). Other factors affecting elephant population decline were sport hunting and hunting for meat, but their impact relative to ivory are unknown (Barnes, 1996).

From the time of the ivory trade ban, which came into effect in most countries in 1990, Central Africa has continued to be active in smuggling ivory out of the subregion, as an ETIS analysis of ivory seizures has demonstrated. **Table 12** shows the number of seizure cases and total weights of ivory involved recorded by ETIS (Milliken, et al., 2009; CITES, 2010b).

Table 12 clearly illustrates that the countries themselves have done little since the CITES ivory trade ban to police illegal ivory exports. CAR, ROC and DRC have reported only a handful of ivory seizures in their countries in over 20 years. Overall, 880 cases of ivory seizures have been reported, over 90% made outside of the country of origin. Almost 38 tonnes of ivory have been seized originating in the four countries. The ETIS analysis also found that over 61% of the ivory seizures by weight has occurred in the recent period since 1999, indicating that illicit ivory trade

Table 12. Frequency and weights of ivory seized, 1989 to early 2010

Country	Frequency In	Frequency Out	Total weight seized Kg
Cameroon	65	238	17,681
CAR	6	41	1,839
ROC	7	119	2,852
DRC	6	398	15,562
Total	**84**	**796**	**37,934**

Source: CITES, 2010b

flows are currently a major problem in these four countries. This situation holds as well as for the other three Central African countries (Gabon, Equatorial Guinea and Chad). These totals underrepresent the real flows of ivory out of these countries, as many shipments successfully reach their destination (CITES, 2010b).

An ivory market survey to assess the impacts of the CITES ivory trade ban in Africa was carried out in 1999 (Martin & Stiles, 2000) and a broader analysis of the trade ban was made in 2004 (Stiles, 2004). These studies included Central African countries. The 1999 survey and 2004 analysis concluded that ivory market scale and activity had declined considerably after 1989 in Central Africa. Where comparable data were available, raw ivory prices had dropped, the estimated weight of worked ivory seen for sale was less and the number of retail outlets selling worked ivory, carvers and workshops had all decreased. The main cause was the drop in consumer demand for ivory in Japan, Europe and the USA resulting from the negative publicity associated with buying ivory generated by the CITES trade ban, and the effectiveness of the ban itself. There was still little problem in smuggling ivory out, but getting it into Western countries and Japan had become more difficult.

Ivory carvers and vendors in Central Africa stated in 1999 that local domestic markets were moribund, but they were still functioning. Central Africa remained one of the main sources for raw and worked ivory exported to West Africa and Angola and of raw ivory to Sudan, Egypt and eastern Asia, China in particular. Cameroon was still an important entrepôt for the onward trafficking of tusks from other Central African countries (Martin & Stiles, 2000).

In 2010 the present study paid little attention to the ivory markets, but raw ivory prices obtained seem to suggest that demand in relation to supply has risen moderately since 1999, but it is still lower than in 1989. **Figure 7**

presents the trend in prices for tusks over 10 kg in weight in three of the countries, based on prices collected in Yaoundé, Bangui and Kinshasa. Prices were not collected in Brazzaville. The price spreads were averaged and the GDP Inflator Index was applied to the 1989 and 1999 prices to make them equivalent to the 2010 price (http://cost.jsc.nasa.gov/inflateGDP.html).

Preliminary information gathered in Yaoundé, Douala, Brazzaville and Kisangani suggests that the number of retail outlets, ivory objects for sale and carvers are significantly below those seen in 1989 and moderately below those seen in 1999. 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 (Milliken, et al., 2009). In 1999, Martin & Stiles (2000)

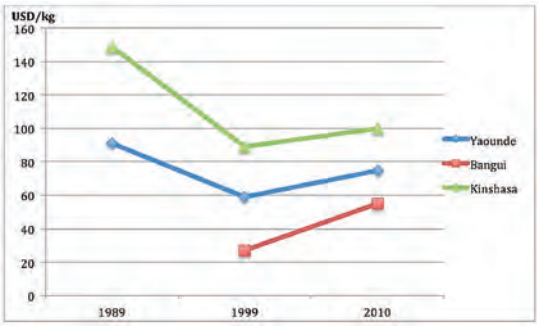


Figure 7. Inflation-adjusted average prices in US$ for >10 kg weight tusks in Cameroon, CAR and DRC 1989-2010 (Sources: Cobb, 1989; Martin & Stiles, 2000; this study)

found 3,324 ivory pieces displayed in the Bikeko market estimated to weigh 285 kg. The number of pieces were fewer by 20% in 2009, but the weight had increased by 17%, suggesting that the average weight of ivory objects had increased. Twenty six tables sold ivory in Bikeko in 1999, but Milliken, et al. (2009) did not report the number. The scale of the ivory market does not appear to have been significantly different in 2009 than in 1999.

In Cameroon and ROC worked ivory openly displayed and ivory workshops had gone largely underground since 1999. The two were still in the open in DRC, and no information on market scale or openness is available for CAR in 1989 or in 2010.

Although hard data are scanty, hunters and middlemen in this study reported that tusk prices have been rising in recent years, which increases motivation to hunt elephants. For example, hunters around BBNP stated that in 2005, they received US$ 36/kg for >10 kg tusks and in 2010, they could get US$ 60/kg. In towns around the OFR, hunters said that average tusk prices for all sizes had risen from US$ 15/kg in 2000-2005 to over US$ 30/kg in 2010. Amboya (2004) reported even lower prices for the OFR area in late 2004, with an average of US$ 12/kg for all size tusks. Around OKNP, >10 kg tusks earned the hunter an average of US$ 24/kg (adjusted for inflation) in 1996 (Vanwijnsberghe, 1996) and in 2010 they obtained an average of US$ 31/kg.

Hunters explained higher prices as due either to greater risk or to increased demand, often from East Asian buyers in Central African urban centres. The average size of hunting parties had been decreasing in Cameroon and ROC because of risk, which caused hunters to concentrate more on ivory and bring back less meat than they would have liked due to a lack of transport manpower. Informants knew of East Asian ivory buyers in Yaoundé, Brazzaville and Kisangani. In Brazzaville, the Asian buyer was based in Kinshasa, just across the Congo River.

In 1999 the Bikeko ivory market in Kinshasa had 26 tables displaying 3,324 pieces of ivory. In 2009, the number on display had dropped to 2,650, but the average size per piece had increased. Market scale was largely unchanged (Photo: Dan Stiles)

Ivory brings in much more return than meat in terms of unit weight. For example, a four-man transport load of 200 kg of ivory could bring the hunter or *commanditaire* US$ 10,000 at US$ 50/kg, while the same load of meat would return only a maximum of US$ 500. This fact largely explains why poaching networks concentrate on ivory.

Figure 8 shows the total earnings that could be made from meat and ivory from a small, medium and large sized elephant respectively, based on average prices for elephant meat and ivory obtained in this study, assuming

all meat and both tusks were taken. A small elephant of juvenile age could yield US$ 1,216, a medium size elephant (adult forest elephant) could provide US$ 4,640 and a large elephant (adult savannah elephant) could deliver US$ 14,000 into the hands of the hunter or his commanditaire. The elephant is no doubt the most lucrative animal in Africa to hunt, after the adult rhinoceros.

Most elephant hunters are subsidized by *commanditaires*, which is an additional motivation to hunt elephants, as investment costs for hunters are low. Many hunters hunt during the rainy season when alternative agricultural work is lacking. When asked what might cause them to stop hunting elephants, many hunters and middlemen responded that they would be willing to quit if alternative employment could be found.

CITES Resolution Conf. 10.10 (Rev. CoP15) 'Trade in elephant specimens' and CITES Decision 13.26 (Rev. CoP14) 'Action plan for the control of trade in elephant ivory' both call for CITES parties to regulate their domestic ivory markets and to combat elephant poaching and illegal ivory trade. The four countries in this study have shown little progress in implementing these CITES appeals.

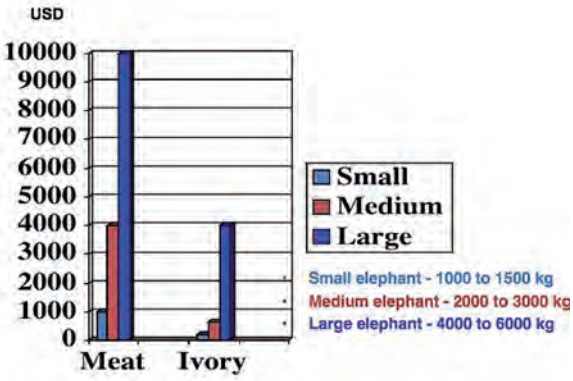


Figure 8. Potential earnings from meat and ivory from different sized elephants

Social Networks and Commodity Chains

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) to the middleman (which could be several along the way) to the retail vendors and to final consumer. There are also other actors involved with the primary actors, such as guides, porters, longer distance transporters and facilitators (e.g. government or military collaborators). To tackle the problem of illegal elephant killing and trade of its products, the actors in these networks must be identified, and then the key figures dealt with in the most effective way possible in the circumstances.

There will be somewhat different social networks involved in each hunt, but the main actors often remain the same over a period of time, particularly the lead hunters, *commanditaires* and other middlemen. It was not possible to identify a full network of actors in the time available, but schematic representations can be proposed of what such networks would look like for both meat and ivory trading. These are presented in **Figures 9** and **10**. The relative significance of the actor is indicated by the size of the node and the importance of the relationship by the thickness of the line connecting them.

The elephant meat social network begins naturally enough with the hunter (H), who is immediately associated with co-hunters, guides and porters. Once the elephant is killed, butchered and the meat smoked, the hunter may come into contact with local meat vendors (LV), who in turn sell the meat to local consumers (LC). The hunter and those around him will also consume a portion of the meat. Depending on circumstances and the amount of meat carried away, the hunter may sell a portion of the meat to a middleman (M). Some of this meat might be given to regional (i.e. rural) authorities (RA) such as village chiefs, local police or ecoguards to co-op their complicity in the illegal trade. In the case of hunters who are primarily after ivory and working for a *commanditaire*, some meat (the trunk and liver were specifically mentioned) will be given. The middleman, possibly assisted by transporters, will then sell the meat on to other middlemen or vendors/restaurants (UV/R) in towns, who in turn sell to the consumer (UC). Local authorities (LA) may also receive meat in the form of 'gifts' or 'tariffs' or, if the relationship is antagonistic, it is the LA who seizes the meat and possibly arrests the actor.

Figure 10 pertains to hunting parties that are only targeting tusks, and not commercial meat. Fresh meat or organs might be eaten at the kill site, but meat will not be smoked nor smoked meat carried away, explaining the hypothesized more restricted number of actors associated with the hunter. The middleman or urban middleman was – in 86% of the cases in Cameroon, CAR and DRC combined – also the *commanditaire*. In cases involving a *commanditaire*, the relationship with the hunter involved reciprocity. Guns, ammunition, food, money, etc. moved from M/UM to the H and ivory returned from the H to the M/UM. In cases in which hunters were working for

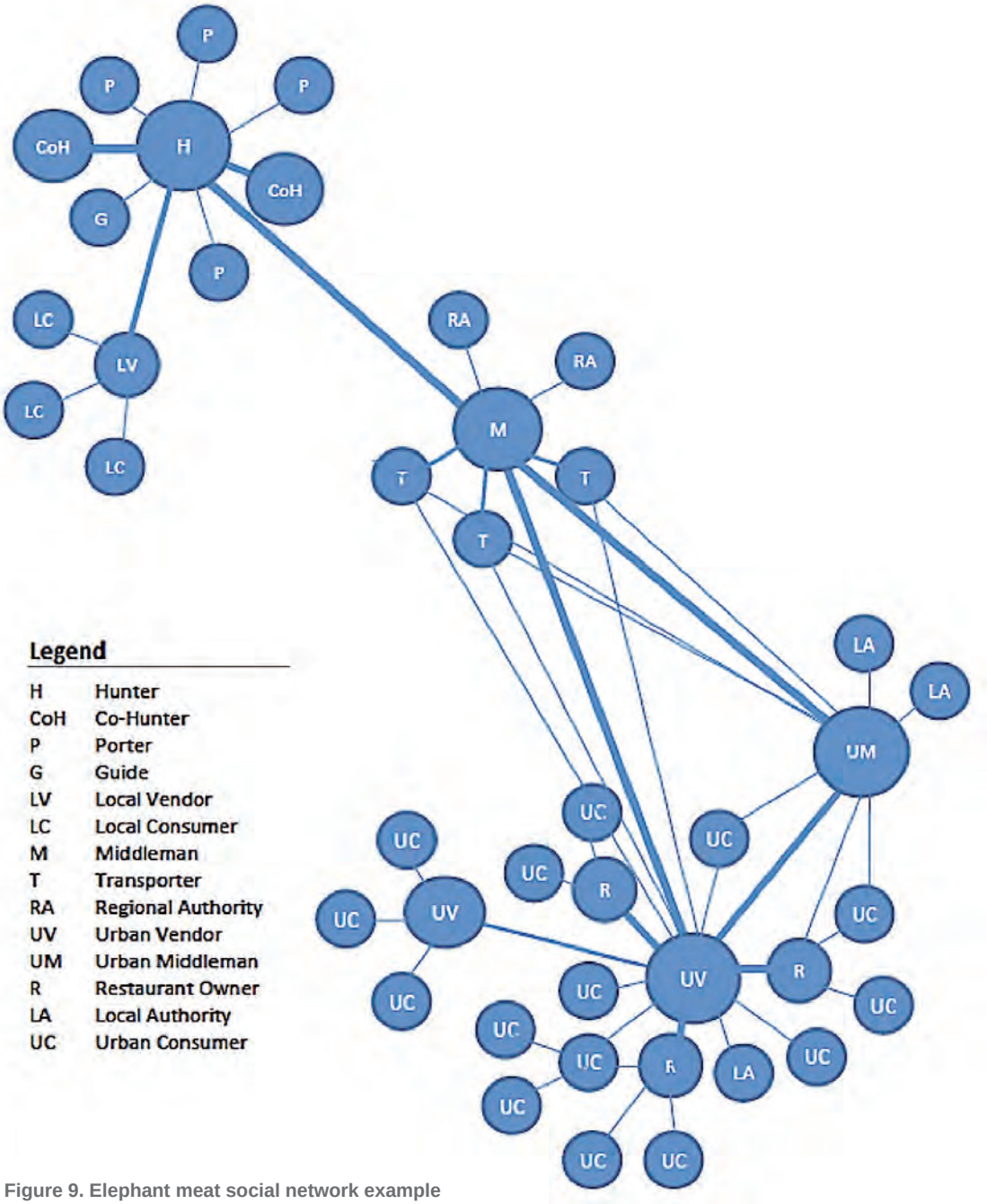


Figure 9. Elephant meat social network example

themselves, the hunters sold tusks, and possibly other trophy items (e.g. tails, skin), to middlemen. No hunters in the four samples sold directly to urban or international middlemen.

Rural middlemen (M) and town/city middlemen (UM) often had collaborative relationships with government (G) or law enforcement/military (LA) figures to facilitate their operations, or they were such figures themselves and used subordinates to assist them. In some cases, raw ivory was transformed into worked ivory by the M or UM, who in these instances were in fact ivory craftsmen or workshop owners. Worked ivory that is produced in rural areas is not sold to consumers there, but is transported and sold to urban middlemen (UM) or vendors (UV), who sell it on to local residents (LC) or foreign visitors (IC). The

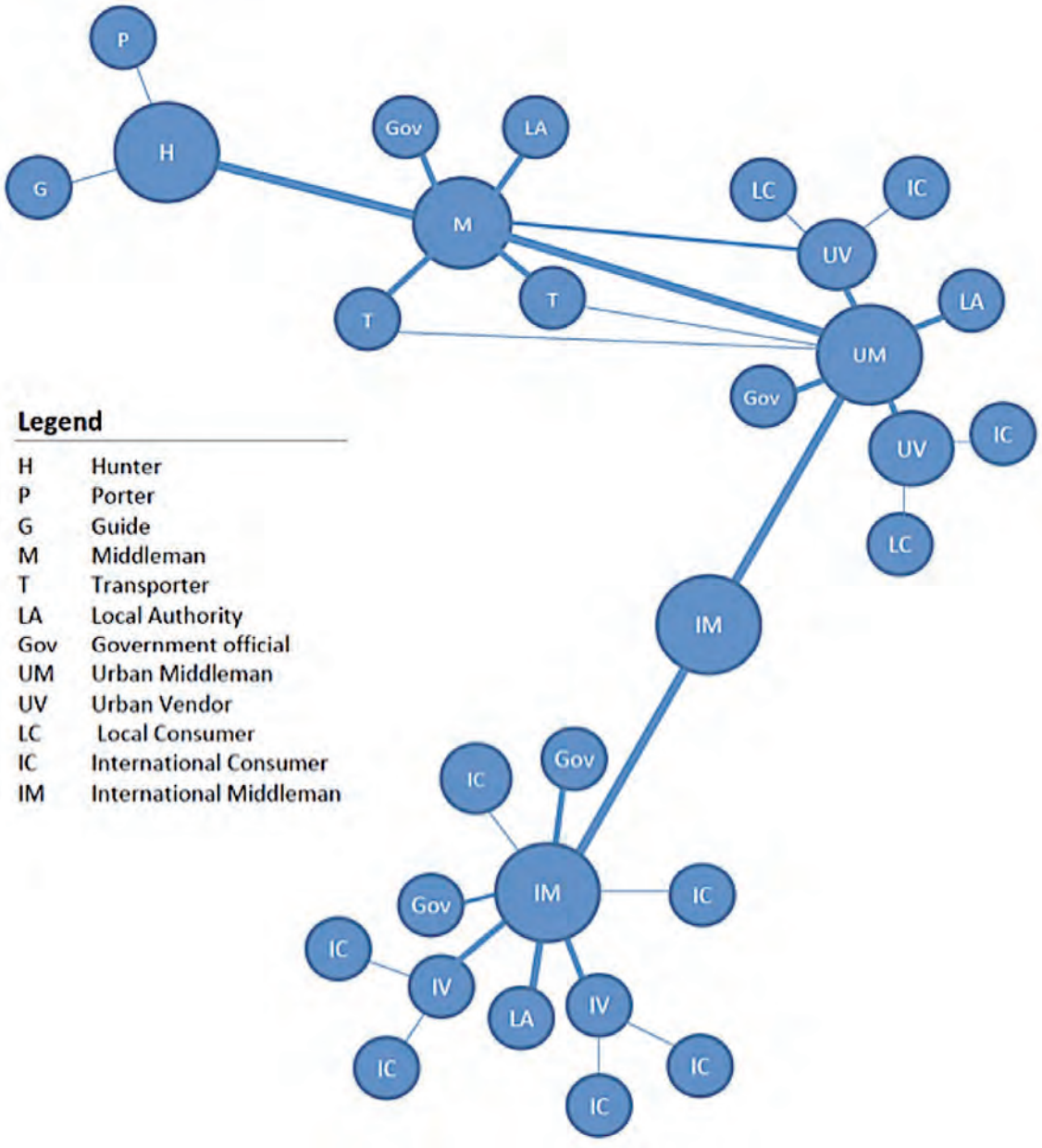


Figure 10. Ivory social network example

raw ivory that is not used in local manufacturing, which is hypothesized to be the majority, sometimes along with worked ivory, is sold to middlemen who have connections in foreign countries (IM). They smuggle it out to other African countries and/or to eastern Asia, Europe or North America to foreign IMs based abroad (Milliken, et al., 2009; TRAFFIC, 2010b).

Two main differences between the networks for elephant meat and ivory are the number of associates linked to the respective hunters – there are more with the meat hunter – and the international actors connected to the ivory network. Not enough is known at present about the international aspect of the elephant meat trade to create an international

node.
A hypothesis to test is that most of the meat is disposed of by the hunter (H) and first middleman (M) to either local consumers (LC) or urban vendors (UV). If this is the case, it would necessitate aiming strategies and actions early on in the network chain, i.e. at the hunter and first middleman, to control the meat trade, as this is the point at which most of the meat is concentrated. Beyond those two actors the minority proportion of elephant meat becomes highly dispersed and therefore more difficult to control. Meat trading networks seem to be composed primarily of local nationals of the countries in which they conduct trading operations.

In the case of ivory, initial information suggests that tusks are initially dispersed via many hunters and transporters and are subsequently concentrated with a few *commanditaires* (M/UM) and international middlemen (IM). *Commanditaires* receive tusks as in-kind recompense for their patronage of the hunt. A hypothesis is that such actors sponsor many hunts and accumulate the tusks before selling them on. In-country seizures of large consignments of tusks in Cameroon, ROC and DRC support this hypothesis, but more research is needed (e.g. Dandjouma, 2005; Fouda, 2007; LAB, 2010; Anon., 2010; LAGA, 2009, 2010; TRAFFIC, 2010a).

Initial research also suggests that important ivory trading social networks for M/UMs are made up of Hausa or other Muslim communities who have a historical, widespread trading tradition and presence in West and Central Africa and that IMs are either these same Muslim actors or East Asians (Chinese of various nationalities, Japanese and Koreans) who have taken up residency as businessmen or diplomats in Central African countries.

Figure 11 presents the commodity chains for elephant meat and ivory. This conceptual construct focuses on the commodities and how they move through the trade chain, while the social networks in **Figures 9** and **10** focus on the actors who move the commodities. With meat, the hunter can supply rural middlemen, markets or consumers directly, while with ivory the hunter only supplies a middleman (who is often his *commanditaire*). The meat consumer can be supplied by the hunter, a middleman or buy at a bushmeat market or restaurant. The ivory consumer, or end user, will buy worked ivory only at an ivory outlet (including the Internet). The ivory commodity chain involves fewer actors and is more linear than the meat chain, which has many possible permutations of actors as meat moves from hunter to consumer.

Cowlishaw et al. (2005) and De Merode & Cowlishaw (2006) present two examples of studies that utilized a commodity chain approach to the study and analysis of bushmeat marketing. The latter study is very relevant to the situation in the Congo Basin, particularly in the north-eastern DRC, as it centred on Garamba National Park, located only 200 km from the OFR. They investigated the effects of armed conflict on bushmeat hunting and trade at the village and urban levels of protected versus unprotected species. They found that the trade in protected species, such as elephant meat, was very rare at the village level regardless of peace or war conditions. This was because village chiefs were opposed to the hunting and selling the meat of protected species in local markets. Much more protected species meat was sold during peace time in urban markets, and during war time the quantity increased five-fold. Elephant meat made up a substantial proportion of the illegal meat sold (37% during peace time and 40% during war time) in the urban market.

The difference between village and urban patterns was because in peace time the commodity chain that supplied the urban markets was controlled by military officers who facilitated the illegal hunting of protected species, but also restricted the number of actors able to hunt. In war time, the departure of the military officers transformed the commodity chain into an open-access system that was exploited by a large number of lower-ranking soldiers.
In the rural bushmeat markets, protected species made up only a small proportion of total sales and this was unaffected by armed conflict because the commodity chain that supplied the rural markets was under the control of the traditional authorities who discouraged illegal hunting. This suggests that the chiefs have the potential to be valuable collaborators in the management of a regulated bushmeat trade, even in the absence of effective national government (de Merode & Cowlishaw, 2006).

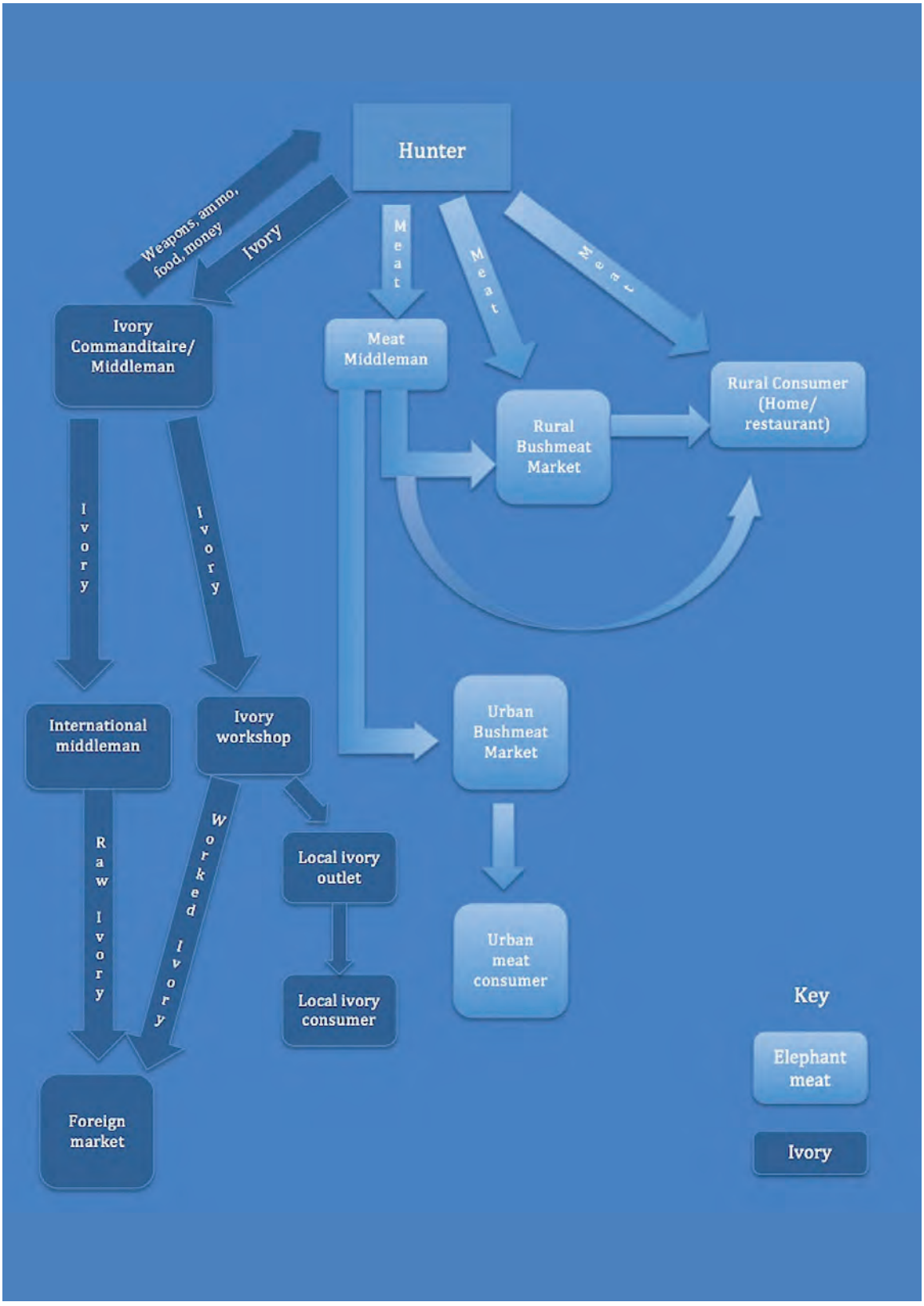


Figure 11. Commodity chains for elephant meat and ivory

Transport Routes and Methods

ELEPHANT MEAT

The most common method of transport for hunters in the forest was foot, following elephant trails, although occasionally river transport by dugout canoe was used. Elephant meat and non-ivory products were generally dispersed very quickly, as they were first divided up amongst the hunting party members and then transported to homes, to other consumers or to middlemen. If there was surplus elephant meat, it would be transported, either by the hunter or middlemen, along with other bushmeat taken on the hunt by a variety of means (e.g. bicycle, motorcycle, private car, public bus, logging truck) on roads to market centres. **Table 13** presents the market centres mentioned by informants to which elephant meat was transported from the meat source sites to be distributed and/or sold.

Cameroon – The BBNP area in south-east Cameroon is the only one of the case studies sites that did not report elephant meat being utilized in some fashion in villages <10 km from the source. This could be due to inadequate sampling, or alternatively to the fact that ecoguard and LAB patrols have increased the risk of being caught with protected species to such a degree that meat is immediately smuggled out of the area. Elephant meat from BBNP was transported south to Moloundou by river and by road, north on the P4 to Yokadouma and then by road, either west on a logging road to Lomié and onward to Yaoundé via Abong Mbang, or north and then north-west to Bertoua. More research is needed to establish what proportions of elephant meat are sold and consumed in the respective villages, towns and cities and what quantities are transported further along the commodity chain. Other sources for elephant meat also exist in the vicinity of BBNP: Nki NP and Lobéké NP. The Dja National Reserve to the west probably also feeds elephant products to the Lomié area and from there north to Abong Mbang.

CAR –There are several sources for the elephant meat seen for sale in the CAR case study. Only one of them is the MIKE monitoring site of the Dzanga-Sangha Complex. Elephant meat taken here passes by road through Bayanga and north through Beya and Nola to Berberati. It appears that elephant meat from DSC travels no further, although additional research is needed to confirm this. Elephant meat consumed in Berberati also originates in the Mambélé forest area about 100 km south-east of Berberati and Amada Gaza to the north-west. Commercial

Table 13. Locations where elephant meat was transported from forest source sites and sold

Source site	Villages	Distance km*	Towns	Distance km	Cities	Distance Km
BBNP	Logoué Banana Djaposten Nomedjoh Polido'o	80 S 70 SE 130 NW 120 NW 90 W	Lomié Yokadouma Moloundou Bertoua Abong Mbang	100 W 65 N 75 S 190 NW 180 NW	Yaoundé	420 NW
DSC	Bayanga Beya	0 N 45 N	Nola	100 N	Berberati	220 N
Bamingui			Ndélé	50 E	Bangui	490 S
OKNP	Miélékouka Biessi Epouma Mokouangonda Lebango Liouesso Etoumbi	0 N 0 N 20 E 10 E 0 S 20 E 20 S	Mbomo Makoua Ntokou	0 S 75 SE 125 SE	Ouesso Brazzaville	75 E 600 S
OFR	Nduye Banana Bungapanda Bandisende Bafwakobi	0 E 0 SE 0 E 0 55 W	Mambasa Nia Nia	5 SE 40 W	Bunia Beni Kisangani	150 E 100 S 440 W

* N – north; S – south; E – east; W – west distance in km from MIKE site.

Logging trucks are a common means of transport for bushmeat and ivory in the Congo Basin. (Photo: John Poulsen, WCS)

logging takes place in the Mambélé area and hunters and middlemen make use of logging roads and logging trucks to transport bushmeat to market. Some elephant meat from this area may also be transported to Bangui, but further research would be needed to confirm this. The market study in Bangui made as part of this project showed that at least for the PK12 market, the elephant meat sold there originated in the north around the Bamingui-Bangoran NP and it was transported from Ndélé south by road to Bangui, almost 500 km distant.

ROC – Little if any elephant meat appears to be transported to the north of OKNP to Cameroon or west to Gabon. Ouesso is a small city that requires a considerably large supply of bushmeat to meet its needs. Elephant meat travels from the northern sector on the road that goes east to Ouesso and it goes from the OKNP eastern sector by river and the RN 2 road north-east to Ouesso. Some meat is flown from Ouesso to Brazzaville. Elephant meat that originates in the logging concessions north of OKNP and around Ouesso is transported first on logging roads and subsequently on public roads to Ouesso. Elephant meat from the OKNP southern sector goes by road to Makoua, whereupon it takes the RN 2 south to Brazzaville. Bushmeat taken from east of OKNP and the Lake Télé PA goes mostly by river to Mossaka on the Congo River and then south by boat to Brazzaville.

Figure 12 presents a summary map of what is currently known of elephant meat transport from the MIKE study sites in western Central Africa. Not shown are transport routes from other areas.

DRC Elephant meat from the OFR is carried by foot or canoe to roads on the margins of the reserve, where it is transported by motorbike or vehicle either to Mambasa or Nia Nia. The unsold portion then travels by public transport, commercial truck or by government, UN or private vehicle on the RN 4 from Mambasa east to Bunia or south to Beni. Meat from Nia Nia goes by the RN 4 through Bafwasende to Kisangani (**Figure 13**).

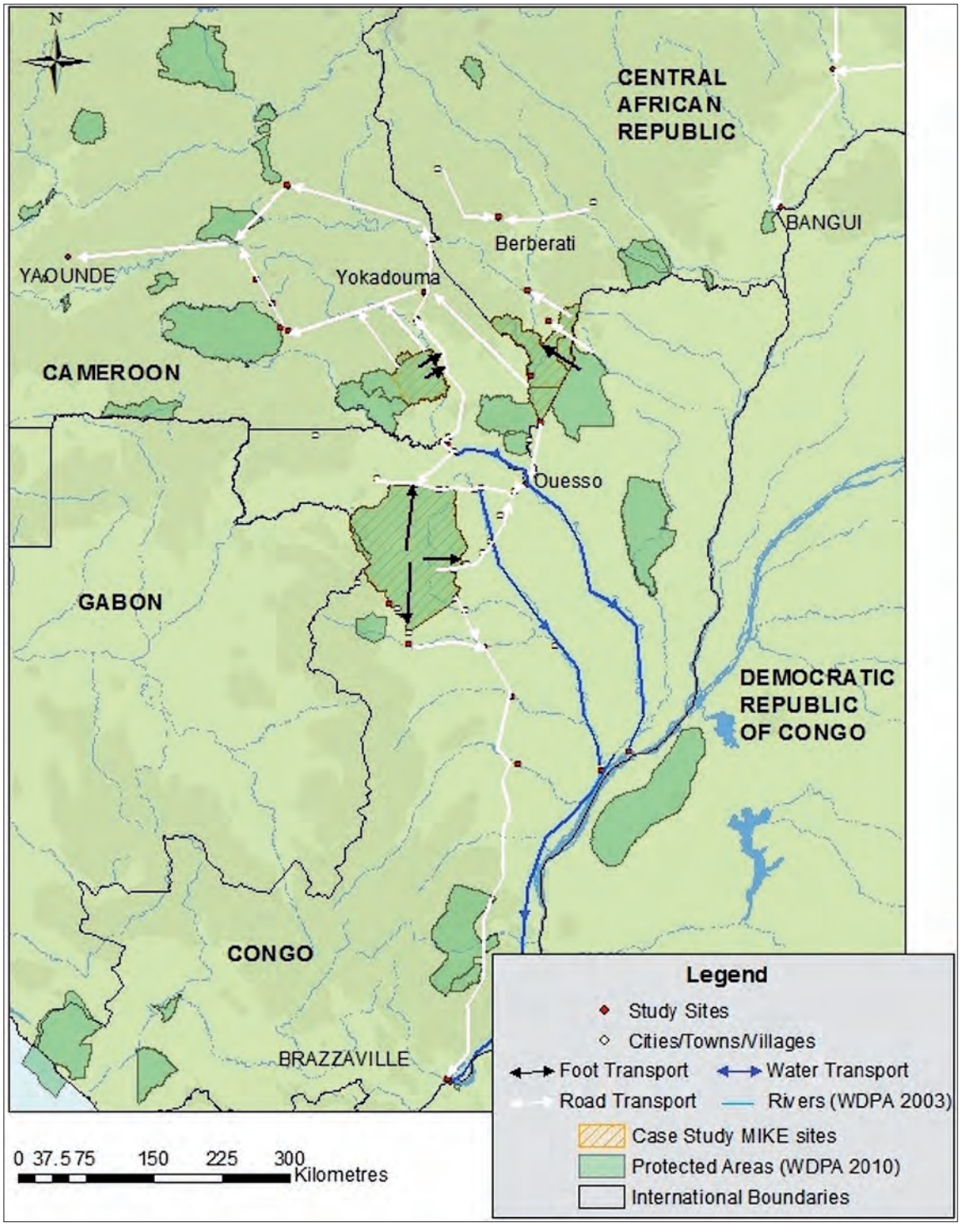


Figure 12. Elephant meat transport routes from MIKE study sites in western Central Africa

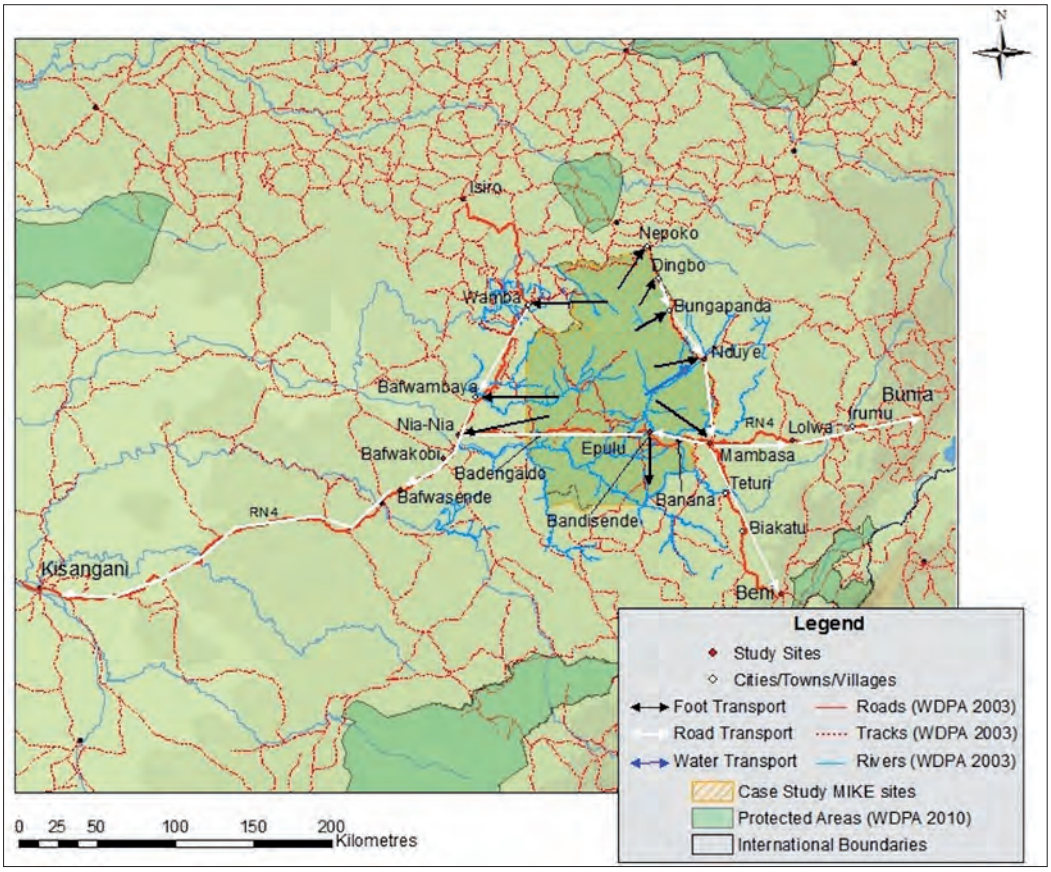


Figure 13. Elephant meat transport from the OFR to market

Ivory

Very little detail was collected on methods and routes of transporting ivory due to the sensitive nature of the topic and reticence on the part of actors to reveal their operations. Tusks are obviously concealed when they are transported, but more needs to be learned about whether they are cut up to assist concealment, how this might influence pricing, how much transport is abetted by those in government or law enforcement and so on.

Because transport routes near the forest source locations are so limited, commercial elephant meat and ivory necessarily travel over the same roads and rivers to reach the regional urban centres. In these localities, ivory diverges from meat as tusks, whether whole or cut into sections, are either taken by *commanditaires* or purchased by middlemen. The key places where ivory congregates first before onward transport to usual destinations are presented in **Table 14**.

The cities indicated as destinations are usually not the final destination where the ivory will be transformed into the objects that are sold retail. Nairobi and Addis Ababa, for example, are merely transit points that have been identified by seizures for onward transport to East Asia. Douala is also a well-known entrepôt from which ivory is smuggled to West Africa, North America and East Asia.

The contiguous forest area that includes Minkébé National Reserve in Gabon, OKNP, Nouabélé-Ndoki NP in northern ROC, DSC and the south-east Cameroon PAs (BBNP, Nki, Lobéké, Dja) contains a significant proportion of the remaining population of forest elephants (Blanc, et al., 2007; Blake, et al., 2007). Most of the ivory that originates in this single area from the illegally killed elephants moves through a variety of forest paths, tracks, roads and rivers to reach three cities: Brazzaville, Yaoundé or Douala. A relatively small proportion of the ivory is worked in these cities and the rest is smuggled out, mainly to East Asia and West Africa, along with some of the worked ivory. **Figures 14** and **15** present what was learned in this study about ivory transport routes.

Table 14. Locations where ivory congregates and transits after leaving source areas

Ivory Source	First Assembly Location	Transit Points	African Destination
BBNP	Yokadouma Moloundou	Bertoua, Abong Mbang Yokadouma, Bertoua	Yaoundé, Douala Yaoundé, Douala
DSC	Berberati, Yokadouma	Bertoua	Yaoundé, Douala
OKNP	Ouesso Sembe, Moloundou	Makoua, Ntokou Yokadouma	Brazzaville Yaoundé, Douala
OFR	Mambasa Nia Nia	Bunia, Beni, Kampala Kisangani	Nairobi, Addis Ababa Nairobi, Addis Ababa

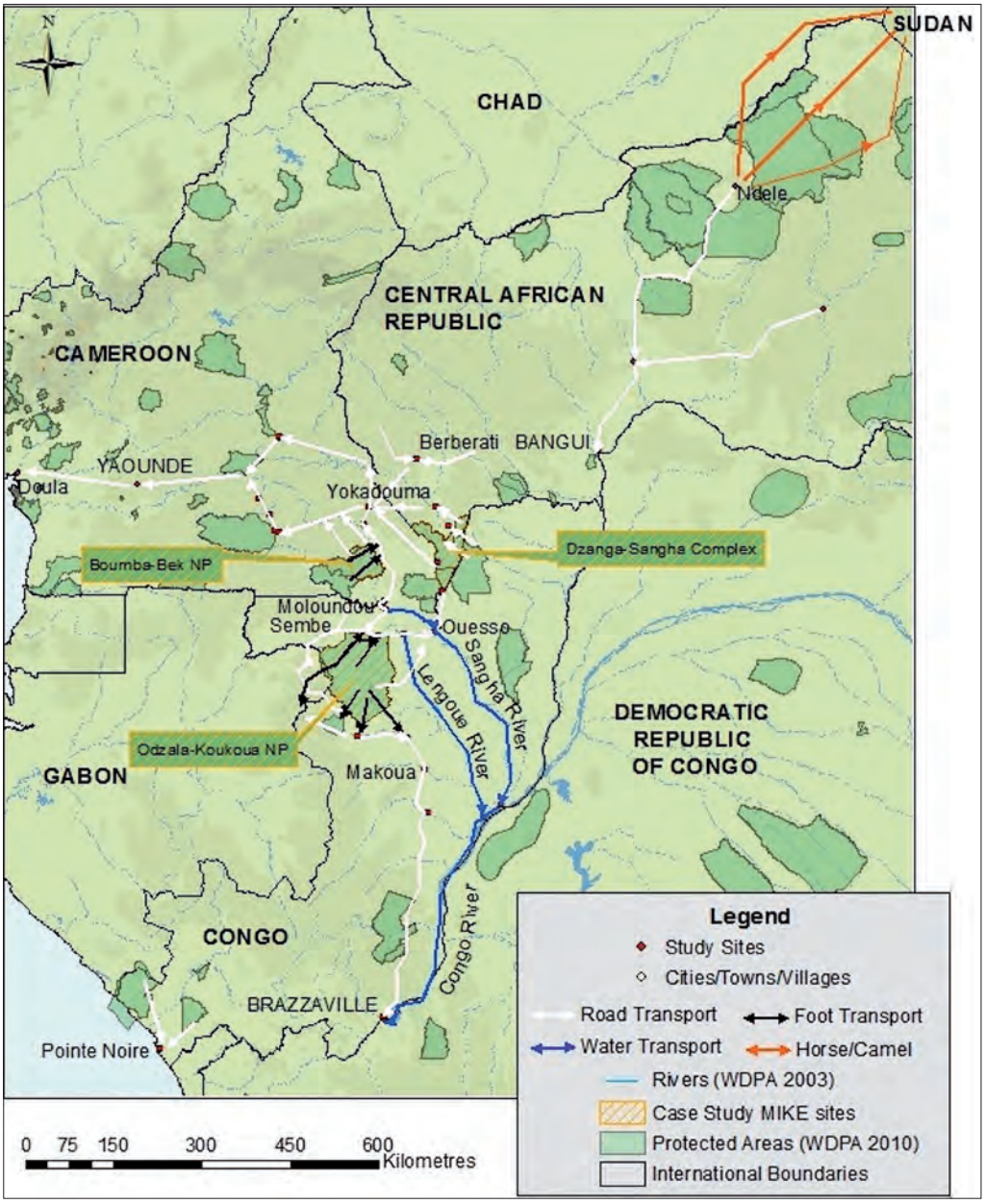


Figure 14. Ivory transport routes and means from the western Central Africa study sites.

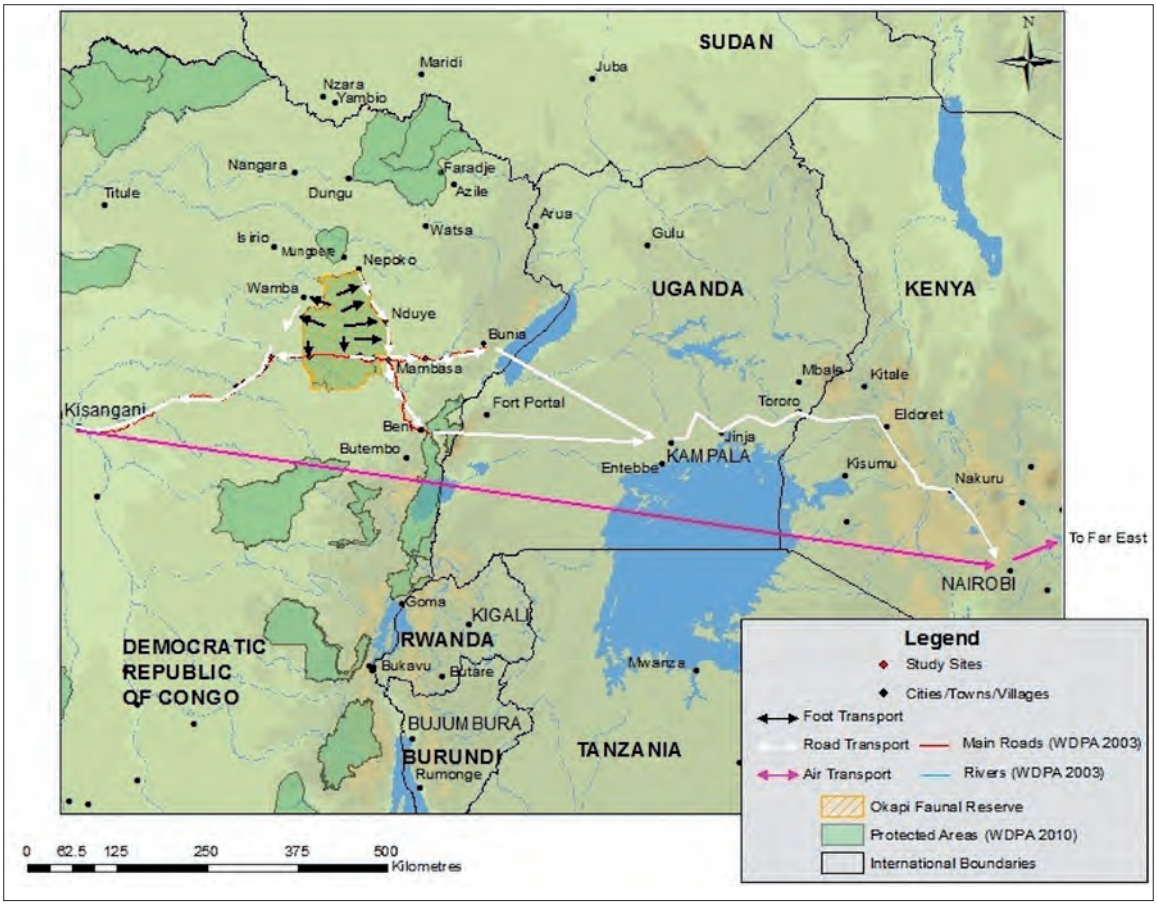


Figure 15. Ivory transport routes and means from the OFR

Influence of External Factors on Elephant Killing

One of the long-term objectives of this project is to determine the influence external factors have on elephant killing and trade in its products. External factors include logging (legal and illegal), mining, infrastructure development, law enforcement at the national and international level, community forest governance and economic trends that affect motivation and demand. Taken as a whole, the effects of external factors as drivers of elephant poaching constitute a vast subject area that will require considerable research to unravel with any degree of detail. However, initial research in this project and work already undertaken by MIKE allow the following observations to be made:

LOGGING

Figure 16 shows the location of legal forestry concessions in relation to PAs in western Congo Basin and **Figure 17** shows them in eastern Congo Basin near the OFR. The MIKE sites in this study in western Congo Basin are virtually surrounded by logging concessions. The presence of logging activities has been demonstrated to have profound negative impacts on elephants (and other species) in several ways. Logging companies construct roads to reach the interior of logging areas along with camps to house the labour needed for timber-cutting, transport of logs and catering of camp personnel. Roads allow access by hunters and farmers, the company personnel creates demand for meat, the possibility of employment attracts many more people than are actually employed to the logging areas and the logging trucks offer an easy and previously unavailable form of transport of bushmeat out of remote forest areas. Wilkie, et al. (2000, 2001), Laurance, et al., (2006), Blake, et al. (2007, 2008) and Poulsen, et al., (2009) have highlighted the dangers posed by logging concessions to elephants. Elephant population surveys in Central Africa ascertained that elephants avoid logging roads and human activities, which concentrates them in PAs (Blake, 2005; Blake, et

al., 2008; Remis & Kpanou, 2010)[5]. Forest elephants are increasingly confined and constrained by roads throughout the Congo Basin, and this is reducing effective habitat availability, isolating populations and increasing elephants' vulnerability to hunters. The protected areas become, in effect, hunting zones for poachers after ivory and meat (Blom, et al., 2005; Blake, et al., 2008; Remis & Kpanou, 2010; Fa, et al., 2006). The initial results of this study support this conclusion, as hunters reported taking most of their elephants from within PAs.

Minnemeyer (2002) concluded that, at most, 35% of Central African forests remained in large, low-access forest that had yet to be allocated for logging. Unmapped logging roads were offering access for hunters to many areas of forest that had previously been considered as 'low-access'. Her estimate was based on data that dated to more than ten years previous to this study; thus the situation is even worse today.

To counter the negative impacts of logging on biodiversity, the Forest Stewardship Council (FSC) was established in 1993, which set out principles and guidelines for timber companies to follow that would result in minimum impacts on wildlife, including elephants (IUCN/ITTO, 2006). Companies that follow the guidelines can be certified by the FSC, and this allows them to gain wider access to markets and sell their products at higher prices. A good example of implementation of the FSC guidelines is the Buffer Zone Project (BZP) in northern ROC that has worked since 1999 with the *Congolaise Industrielle des Bois* (CIB) logging company, WCS and the Congolese Ministry of Forestry Economy (Elkan, et al., 2006; Poulsen, 2009; Mockrin, et al., 2011). The project worked in three forestry concessions adjacent to Nouabélé-Ndoki NP. The objectives were to protect Nouabélé-Ndoki NP from hunting pressure occasioned by logging operations and increased immigration, sustainably manage the wildlife and mitigate the negative effects of logging. For example, contacts between BZP personnel and CIB crew leaders concerning increased incidences of elephant poaching led crew leaders to crack down on their own employees (Poulsen, 2009). The FSC is an important example of how private-sector partnerships for conservation can function in extractive resource zones (ERZs) (see below).

The only legal logging in the OFR area of DRC is the ENRA concession 25 km south-east of the nearest boundary of the reserve (**Figure 17**). Little tree cutting for timber takes place within the OFR and Hart, et al. (2008) did not even include logging in his list of threats to the reserve. ENRA staff and logging roads appear to have little

[5] Van Vliet & Nasi (2008) and Poulsen, et al., (2011), however, are exceptions. In a Gabon logging concession Van Vliet & Nasi (2008) found that elephants were equally found close or far from roads and do not seem to be affected by hunting activities. Poulsen, et al., (2011) found in northern ROC that more elephants were found in logged and hunted forest than in unlogged, unhunted forest. Both studies found that elephants tended to be attracted to secondary forests where there was a diversity of food resources, regardless of roads.

Logging towns increase bushmeat and elephant poaching by constructing access roads, creating a demand for meat by employees and attracting immigrants in search of work (Source: Poulsen, 2009)

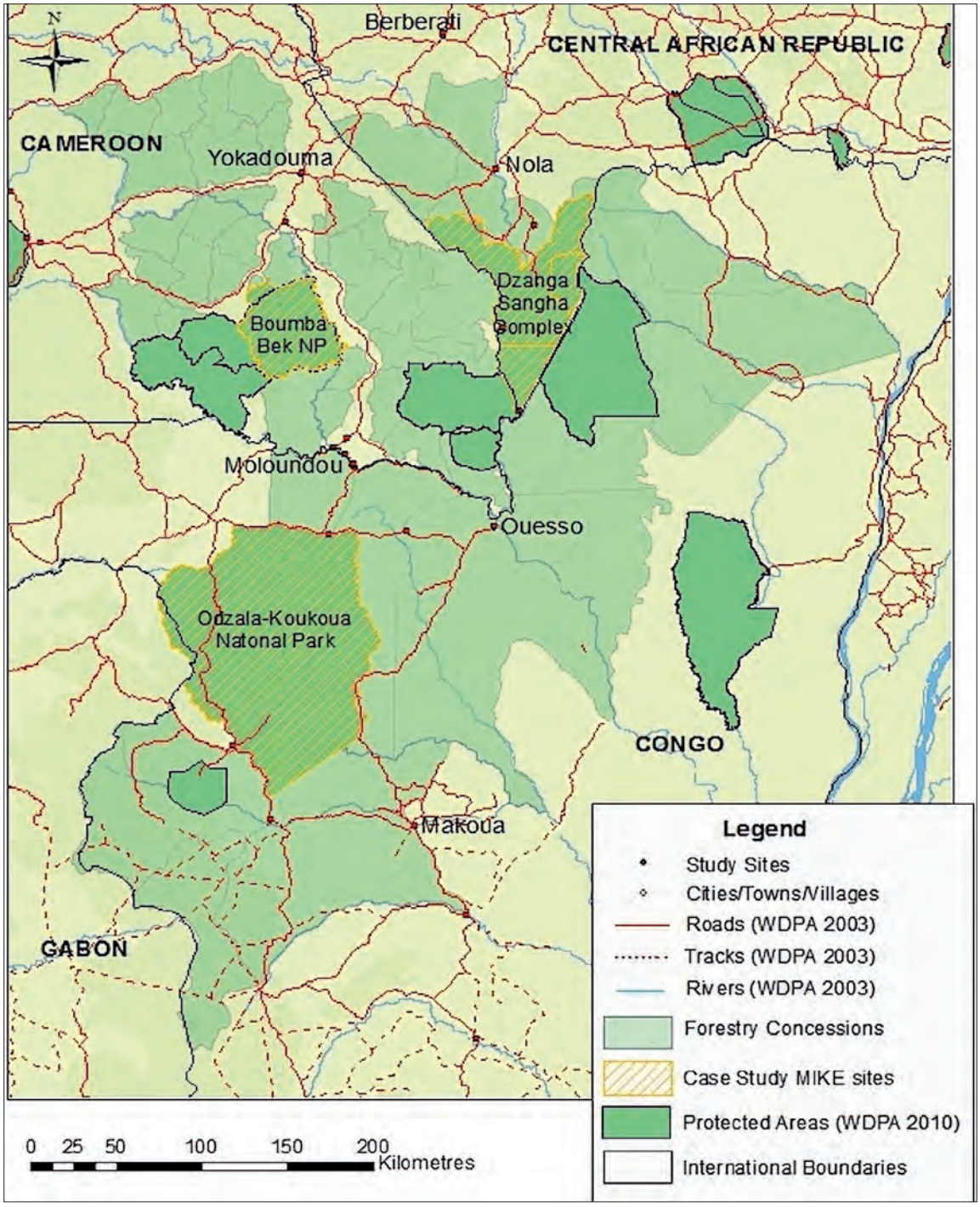


Figure 16. Forestry concessions in western Central Africa (Source: Morgan & Sanz, 2007

impact on the OFR elephant population at present. Illicit tree cutting to provide logs to illegal timber mills does pose a potential threat to elephants, however, as the artisanal saw mills are located in forest areas not far from the OFR. They attract young men as labour, who might poach in their spare time, and paths are cut into the forest for log extraction, which facilitate movements by hunters in the same way that logging company roads do, although on a smaller scale. The DRC government has given away more than 15 million ha of forest to international logging companies since 2002 and the Ituri area will probably soon be targeted (CNN, 2007).

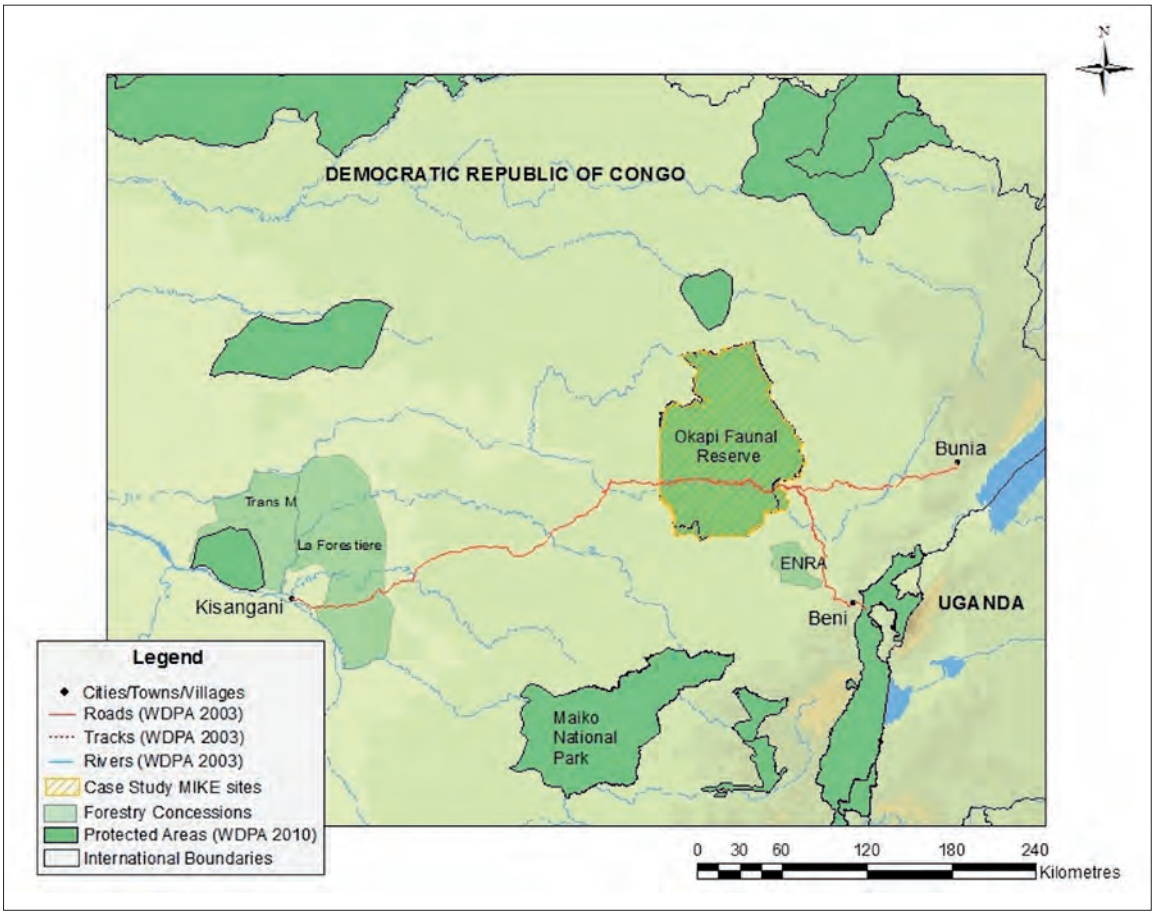


Figure 17. Forestry concessions near the OFR, DRC

MINING

An enormous new iron ore mine is planned by Comibel of China for Bélinga in north-eastern Gabon, estimated to need 15,000 workers. It will destroy large tracts of forest and increase demand for bushmeat, and could affect neighbouring Cameroon and ROC (Bennett, 2008; Jansson, 2010). The iron ore deposits extend into ROC and southern Cameroon, posing the threat of future mining activities and associated problems.

The south-east Cameroon region is gearing up to become a major mining area as well, which will have profound negative impacts on biodiversity and elephants (Anon., 2009b; WWF-CARPO, 2009). Several mining permits have been issued for a locality near Lomié (east of Dja Reserve), for an area on the northern periphery of BBNP and Nki, for places actually inside parts of BBNP and Lobéké NP and in various logging concessions (Anon., 2009b; WWF-CARPO, 2009). More than 2,000 feasibility test pits completed by mining companies already are beginning to create hazards for wildlife. One of the main interventions to threaten biodiversity currently is the GeoCam cobalt-nickel-manganese project at Nkamouna, in which mineral reserves were projected to be 54.7 million tonnes, requiring 20 years of mining to extract (Anon., 2011b). Another major hazard is the South Korean C&K Mining Mobilong diamond mine, that announced that it would provide 1,500 direct and 5,000 indirect jobs, as well as build roads, schools, hospitals, etc. (Musa, 2010). Artisanal mining in diamond-bearing alluvial deposits is already destroying forest and stimulating poaching (Anon., 2009b).

Significant diamond deposits within the DSC in CAR have attracted a wave of immigrants (Mogba, et al., 1996). The main source of food in the mining camps is bushmeat from animals trapped within the reserve. The DSC management has carried out missions with the police and gendarmes to disband these mining camps, without much success. Many of the enforcement officers, the local political elite and a significant portion of the population are profiting from diamond mining, and are thus not willing to uphold the laws creating the protected area (Carroll, 1998). The diamond mining has degraded some forest clearings and miners and hunters have chased off elephants and other wildlife (Roulet & Mamang-Kanga, 2008).

There has been considerable small-scale mining in and around the OFR, but the activity has decreased since militias and other occupants have been cleared out of the reserve. No large roads were built, but a few gold and diamond camps persist and hunters reported that the miners do buy elephant meat (Amboya, 2004; Anon., 2009a).

To mitigate the negative effects of mining, the same approach as taken with logging concessions should be undertaken (Aviram, et al., 2003).

INFRASTRUCTURE DEVELOPMENT

Infrastructure development consists mainly of roads, rail, airports and air transport, and communications. Upgraded roads in the ROC (RN 2) and DRC (RN 4) have increased road traffic and the ease of moving trade goods, including bushmeat and ivory, from the OKNP and OFR areas to Brazzaville and Kisangani/Bunia/Beni respectively. The better condition of roads in Cameroon was cited by informants as an important consideration for moving ivory from south-western CAR and northern ROC to the P4 road and onwards to Yaoundé.

No railroad lines run near any of the case study MIKE sites, but the rail lines that run between north-eastern Cameroon and Yaoundé and between Brazzaville and Pointe-Noire in ROC are known to transport bushmeat. It is not known if they carry elephant meat.

The only internal air traffic uncovered involved bushmeat that was flown from Ouesso to Brazzaville. Ivory originating in the MIKE sites and surrounding areas is probably flown out of urban airports (Yaoundé, Douala, Brazzaville and Kisangani) internationally, but the quantities are unknown. Future research will also be aimed at discovering whether elephant bushmeat is flown from airports and, if so, what the destinations are. Chaber, et al. (2010) estimated that 273 tonnes a year of bushmeat was flown on Air France alone from West and Central Africa to Paris. CAR, Cameroon and ROC were the main sources of this bushmeat, although DRC had a very small sample size and would be expected to be a large bushmeat source based on what is known of the bushmeat trade in the country (de Merode, et al., 2004). The estimated annual arrival of bushmeat in Paris from Cameroon was 190.84 tonnes, from CAR 49.4 tonnes and from ROC 30.16 tonnes. Only one elephant trunk was found in the sample. Trader prices for bushmeat quoted in Paris were between US$ 27 and US$ 40/kg, twice that of Parisian supermarket domestic meat prices (Chaber, et al., 2010). Harris and Karamehmedovic (2009) reported that elephant meat has been seen openly for sale in New York, USA, catering to the local African residents.

Communications development is beginning to influence bushmeat trade in important ways. In south-east Cameroon, for example, informants said that mobile phones were used to arrange transport pick-ups of meat and ivory. This was not possible in most areas around the other MIKE sites, as there was no local network and no one had a satellite phone. If wireless phone companies extend their networks, this means of communication could facilitate elephant poaching and product transport considerably. Interpol has already begun to investigate and take measures against the use of mobile phones and the Internet in poaching and illegal wildlife trade (Orengo, 2010).

FOREST GOVERNANCE

Each case study country has forestry laws that provide the legal framework for managing forest resources, including elephants. These operate in tandem – sometimes in conflict – with traditional land tenure rules, which are usually based on kinship networks and relationships. Laws are in transition in most Central African countries as legislation from the colonial era and post-colonial period are under review and amendment, influenced by current conservation initiatives. The Commission of Ministers in Charge of Forests in Central Africa (COMIFAC) has emerged as a strong centralizing institution to gather together all of the various international, national and NGO forest conservation programmes under one umbrella. The Congo Basin Forest Partnership (CBFP) acts as a facilitator to promote cooperation between the various COMIFAC participants to implement forest governance guidelines established by COMIFAC's Convergence Plan.

Forest zoning and land-use in Central African countries are complex, with many different categories and applicable laws. Large tracts of forest land are increasingly being turned over by governments to foreign private enterprises for natural resource exploitation. The fact that the legal and economic circumstances are not always well comprehended by all parties is a problem that needs to be addressed by comprehensive legislation reform (Karsenty, 2010).

The main strategy of the CBFP partners to achieve good forest governance involves defining large-scale landscapes in which to implement land use planning. There are currently 12 landscapes in the Congo Basin covering 839,128 km^2. Landscape level planning defines different types of land-use zones: protected areas (PA), whose main purpose is the conservation of natural resources; community-based natural resource management (CBNRM) areas where communities have some form of natural resources use rights; and extractive resource zones (ERZ),

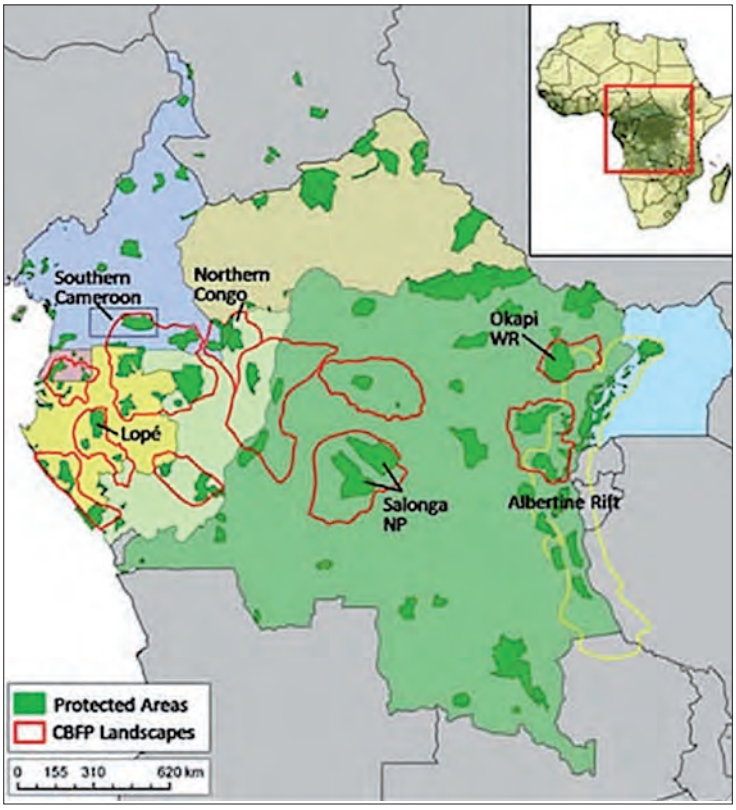


Figure 18. The BBNP and OKNP are in the landscape labelled 'Southern Cameroon', the DSC is in the Northern Congo landscape and the OFR is in the landscape labelled 'Okapi WR'.

which include forest concessions, large-scale private plantations, mines, safari hunting zones, and energy and transportation infrastructure. Each of the MIKE study sites belongs to a CBFP landscape, but the land-use zoning and planning are still in an early phase (de Wasseige, et al., 2009; ECODIT, 2010). **Figure 18** shows their locations.

PAs are managed largely by government wildlife and forests agencies, CBNRM areas are, or in principle will be, managed by local communities, and private-sector companies operating in ERZs are subject to management plans that they formulate following government guidelines and laws. To date, the Ituri-Epulu-Aru Landscape in DRC in which the OFR is found appears to be the most advanced (ECODIT, 2010; Brown, et al., 2009; Brown, 2010; Anon., 2009a).

Currently, forest governance has deficiencies in the areas of the four MIKE study sites, but if the COMIFAC plan implemented by the CBFP partners succeeds, natural resource management should improve considerably and devolve management responsibilities historically held by the State on to local communities in the CBNRM zones and to private enterprise in the ERZs.

GOVERNANCE

The MIKE (2010a) analysis found that 'national government effectiveness', or good governance, as measured by the World Bank Worldwide Governance Indicators (World Bank, 2010) was highly correlated with elephant poaching. The World Governance Indicators measure six different aspects of governance, namely: government effectiveness, voice and accountability, political stability and absence of violence, regulatory quality, rule of law and control of corruption. Government effectiveness captures 'perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies' (Kaufman, et al., 2010). All four case study countries obtained a negative score for this variable in 2009, which means that government effectiveness is poor relative to other countries. With the combined index, 1 is the country with the worst governance out of 200. Cameroon ranked 13, CAR 33, ROC also 33 and DRC 6. This places these four countries in the bottom 17% of countries measured for governance.

RULE OF LAW AND CONTROL OF CORRUPTION

These two variables, also included in the Worldwide Governance Indicators, measure 'the extent to which agents have confidence in and abide by the rules of society, and in particular, the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence' and 'the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests' (Kaufman, et al., 2010).

All four of the case study countries scored very poorly for these variables, which corroborates the information provided by informants that government and law enforcement agents actively promote and benefit from the proceeds of illegal elephant killing.

LAW ENFORCEMENT

Monitoring adherence to laws and rules and penalizing infringements when they are detected is an essential part of successful conservation and natural resource management (Leader-Williams & Milner-Gulland, 1993; Rowcliffe, et al., 2004; Gibson, et al., 2005). Penalties may take various forms, from fines, prison terms and social sanctioning to even a shoot-on-sight policy, depending on the enforcement system (Messer, 2010; Keane, et al., 2008). Several studies of illegal hunting have shown that reducing the effort devoted to enforcement (e.g. lowering investment in equipment and training, or reducing patrolling effort) increases the number of poaching incidents and is deleterious to conserving wildlife populations (Jachmann & Billiouw, 1997; De Merode, et al., 2007).

But compliance by the populace is at the heart of the law enforcement issue, and many factors influence the decision of individuals of whether to comply or not, including economic situation, attitudes, social conventions and perception of the risk level in cost versus gain (Keane, et al., 2008). The question of which natural resource conservation law enforcement policies to formulate and enforce in low-income countries such as in Central Africa is particularly difficult to resolve, as people with few economic prospects may have little to lose by engaging in poaching, depending on the penalties (Messer, 2010). This project has demonstrated that effective law enforcement of poaching, illicit transport of bushmeat and ivory, and the selling of elephant products is deficient in the four case study countries.

This study has shown that the potential economic gains from elephant meat and ivory are very high compared to other legal and illegal opportunities in Congo Basin forest zones. For most forest-dwellers, particularly unemployed recent immigrants attracted by logging or mining, the opportunity costs of poaching are practically nil. In addition, elephants cause negative economic costs for forest zone farmers by destroying crops, knocking down fruit and cash crop trees, and harming both human life and property. Farmers make up a significant proportion of forest peoples, and farming is seasonal, leaving periods when labour requirements are low. To counter by law enforcement alone these positive and negative factors that all drive elephant poaching has proven thus far problematic. The case studies in this project have shown that stricter law enforcement implementation (destruction of hunting camps, arrests, seizures of weapons, meat and ivory, etc.) can reduce elephant poaching, but without outside support, it cannot be sustained. As long as there remains great incentive to poach as a result of high elephant meat and ivory prices, unrealistic increases in enforcement effort would be necessary to reduce poaching to an acceptable level (Milner-Gulland & Leader-Williams, 1992).

The only way to achieve long-term change in the current situation in respect of law enforcement would involve lowering the incentives to poach elephants (particularly the prices of meat and ivory), raising the economic costs to poachers by eliminating the *commanditaires* who subsidize hunts, and increasing the perceived risk and real penalties of poaching through better equipping and training law enforcers and increasing the penalties for poaching. These should all be done within the context of raising the opportunity costs of poaching through developing livelihood alternatives in the form of agriculture, community-based timber and non-timber forest product trade devised under sustainable management regimes, and creating small businesses (e.g. brickmaking, carpentry, fish farming). A good forest governance regime is critical to achieving these goals.

COMIFAC has proposed a strategic framework for a Wildlife Trade Enforcement Action Plan 2011-2016 in which the principal goal is stated to be: 'National and subregional wildlife law enforcement effort is increased significantly, effective deterrents to wildlife poaching and trade are implemented, and poaching and illegal wildlife trade prosecution is increased and monitored throughout Central Africa by 2016'. Elephant poaching and product trade make up an important part of the plan, involving the IUCN/SSC AfESG, MIKE and ETIS.

HUMAN POPULATION GROWTH

Population growth exacerbates many of the problems associated with natural resource exploitation in the Congo Basin. **Figure 19** presents the trend in population number and density from 1950 to that projected in 2050. If the density and overall number projected are realized, it is difficult to imagine, given the present state of governance and economic development, how biodiversity will be able to survive the increase.

HUMAN-ELEPHANT CONFLICT (HEC)

Linked to population growth is the increasing conflict between humans and elephants as humans expand into elephant habitats in search of new agricultural land and forest resources. In some areas outside of PAs, the number of 'problem' elephants killed represents a significant proportion of deaths from all causes (e.g. Kahindi, et al., 2009). There are two main circumstances of legally killed elephants due to HEC. The first is 'problem animal control' (PAC), which is carried out by the wildlife authorities in response to complaints by villagers of crop-raiding or other elephant depredations. The second is

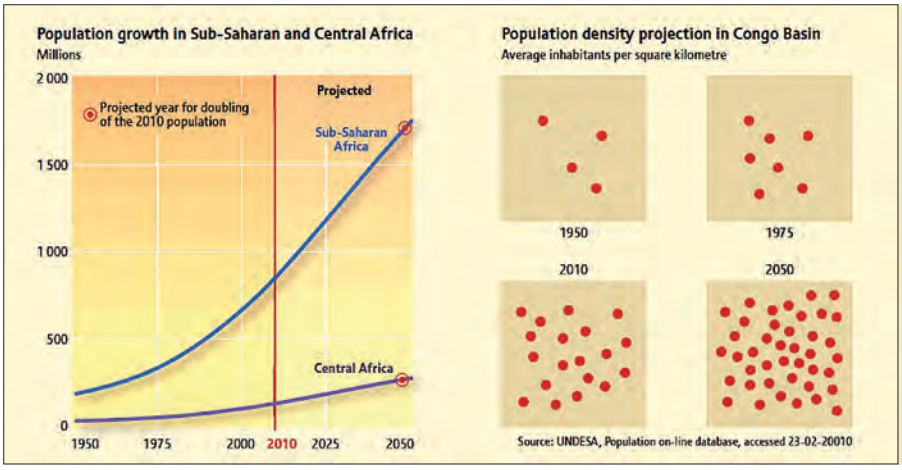


Figure 19. Population growth in the Congo Basin, 1950-2050 (Source: Nellemann, et al., 2010)

self-defence, in which local inhabitants will kill problem elephants that are threatening their lives and/or property. All of the countries in this study permit by law the killing of elephants in self-defence. Focused research would need to be carried out to determine what proportion of HEC killings were unjustified, i.e. performed on non-threatening elephants in order to acquire meat, tusks, etc. MIKE data collection forms include HEC as a killing motivation, but since in this study all sites were PAs, the cause of death data did not often report HEC as a motivation in a review conducted of data sheets in the four MIKE monitoring sites. Informants, however, did report that elephants outside of PAs are killed because of HEC and the meat is distributed to local inhabitants. Meat from legitimate HEC killings does not appear to enter bushmeat trade networks, although research is needed on the question.

MACROECONOMICS AND ECONOMIC TRENDS

On the elephant product supply side, many informants cited poverty as the main reason why they poached elephants. Central Africa has the lowest Gross Domestic Product of any subregion of Africa (**Figure 20**). An analysis by MIKE (CITES, 2010a) found that one of the most important predictors of levels of poaching in elephant range States was the Human Development Index. The Human Development Index, calculated by the UN based on a number of economic, social and political variables, ranked Cameroon as 131, CAR as 159, ROC as 126 and DRC as 168 out of 169 countries (UNDP, 2010). The highest ranked is 1, the lowest is 169. These rankings indicate that these four Central African countries belong in the bottom quartile of the world's nations in terms of socio-economic development. Along with the GDP evidence, Central Africans are amongst the poorest and most deprived people on Earth, certainly an important factor driving elephant poaching.

On the ivory demand side, economic development over the past two decades, particularly in East Asia, has provided new wealth to millions of people who have a cultural affinity for elephant ivory. China's manufacturing boom has created a large and growing number of *baofahu* – literally, the 'suddenly wealthy'. Their buying habits and tastes are reshaping global trade flows. Many of the raw materials needed to feed China's industrial boom have to be imported from other countries and today China is the biggest driver of markets in commodities such as copper, oil, coal and iron ore – and ivory.

The highest proportion of ivory seizures is for ivory destined for the Far East, and the number and size of the ivory seizures has been growing over the past decade (CITES, 2010b). The demand for ivory in China, Thailand and other eastern Asian countries is the single most important driver of elephant poaching (Stiles, 2004, 2009).

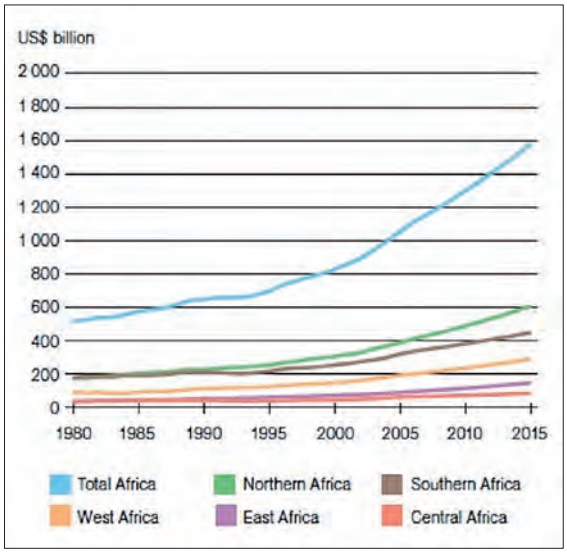


Figure 20. Regional Gross Domestic Product in Africa (Source: UNDP, 2010)

Conclusions and Recommendations

The initial phase of this project has largely achieved the immediate objectives set out at the beginning, which were to:

- establish institutional support and working relationships with cooperating governmental and international and national organizations involved in biodiversity conservation in the case study countries;
- identify international consultants, national experts, technical advisors and field assistants that can contribute usefully to project goals;
- test the methodology under field conditions with a view to refining the methods and data variables in order to produce improved results in future;
- identify the priority data collection localities;
- produce a set of quantitative and qualitative data that will present an initial depiction of the causes and circumstances of illegal elephant killing in the project sites;
- generate the information necessary to plan a well-focused project second phase in which all of the parameters for successful research are in place; and
- establish a baseline data set from which to monitor elephant meat and ivory trade.

The baseline data set is not complete, however, and more work will be required to fill the gaps and to confirm many of the initial findings. The methodology and data entry system have been revised to enhance the effectiveness of data collection and analysis based on the experience gained in this project phase. Sophisticated statistical analyses were not carried out on the data collected in this study because it was not felt that the data sets were sufficiently representative of the respective variable populations to yield valid results. A longer period of field work will be required to achieve the long-term objectives. The bushmeat hunting study of Rist, et al. (2010), carried out over a 15-month period in Equatorial Guinea, represents an example of the expertise, time and effort needed to obtain statistically valid data for hunters. Similar input would be needed to acquire the data for middlemen, vendors and consumers.

Initial results were obtained for the long-term objectives. Hunters that specialize in elephants are commercial hunters who primarily target ivory. They often work on behalf of others who subsidize elephant hunts with weapons, ammunition and supplies in exchange for tusks. Meat is an important by-product of these hunts, along with other parts from the elephant, and these non-ivory products are often part of the incentive for hunters and porters to participate in arduous elephant hunts. Elephant hunts tend to involve more work effort than subsistence hunts: elephant hunting parties are larger, travel longer distances and last longer than subsistence hunts.

Elephant meat represents potentially larger gross economic returns per elephant than ivory, but ivory brings in several times the income possible from meat in terms of unit weight (US$/kg), thus there is a rational economic explanation of why ivory is more important than meat as the primary causal factor motivating the killing of elephants.

Many consumers, particularly in urban areas, prize elephant meat and they are willing to pay higher prices for it than for almost any other kind of meat. The main reason why more elephant meat is not eaten cited by consumer informants, corroborated by bushmeat vendors, is lack of availability. Although elephant meat has significant economic potential for hunters, the commodity is underutilized because of manpower transport constraints and fear of being detected by the authorities if hunting parties are too large or remain too long in one place smoking meat.

Since demand for elephant meat is high, there is great potential for the trade in its meat to increase as other bushmeats become scarcer as a result of over-exploitation propelled by human population growth and lack of protein alternatives (Brown & Fa, 2007). The trade would almost certainly increase if logistical constraints were eased (e.g. roads were built offering easier access and egress) or security concerns lessened (e.g. ecoguard patrols and road checkpoints decreased or corruption of law enforcers increased).

The goals of researchers, wildlife managers and policy makers concerned with bushmeat in general differ in important aspects from those concerned with elephant meat. The former accept the reality that bushmeat constitutes a legitimate and crucial part of the economy and diet of forest dwellers, and the ultimate goal is sustainable use. The elephant, on the other hand, is a fully protected species in most countries, with the exception of legal sports hunting in a few, and the killing and trading in its products is illegal. In those countries, policies and strategies related to killing and trade in its meat will not aim at sustainability, but rather at maximum restriction.

Recommendations

Recommendations for policy and actions to reduce illegal elephant killing emerging from this study include:

1. The COMIFAC-CBFP strategy of focusing on defined landscapes and creating land-use zones and natural resource management plans should constitute the framework for policies and actions aimed at conserving elephants.

2. Access, user rights and the responsibility to sustainably manage wildlife resources should be transferred whenever possible to local stakeholders who have a vested interest in maintaining the resources and who can deliver sustainable solutions at the local level. Capacity of these empowered local communities should be strengthened to ensure that they have the ability to exercise these rights responsibly and with accountability.

3. Conservation and sustainable use of wildlife resources would be enhanced through the incorporation of traditional knowledge and modes of leadership into management and monitoring systems.

4. Commercial hunters are the proximate cause of elephant poaching in Central Africa and according to them, they would cease killing elephants if alternative sources of income were available to them. Elephant hunters are often known within their communities and to local law enforcement authorities. Special efforts should be made with these hunters to provide education, training and employment as an incentive to cease killing elephants. Concurrently, laws must also be more strictly enforced to arrest and punish hunters to deter illegal elephant killing.

5. *Commanditaires* (those who order and subsidize elephant hunts) and middlemen trading in elephant meat and ivory are intermediate causes of illegal elephant killing. Without their participation and often encouragement in killing elephants and rewarding hunters, elephant poaching would probably decline significantly. The relevant authorities, assisted as may be by NGOs (e.g. LAGA, PALF), need to do more to identify these middlemen and put a stop to their operations by publicizing their activities and taking them to court.

6. Consumers that purchase elephant meat and worked ivory of illegal origin are the ultimate cause of illegal killing of elephants, as they create the demand that economic motivation must supply. Education and public awareness programmes should be increased to create public consensus of the need to conserve elephants and also to generate stigma associated with buying elephant products.

7. The international community should sustain its efforts to encourage governments in Central Africa and elsewhere to practice good governance and effective rule of law and such efforts should even be intensified.

8. It is crucial to maintain large protected areas in Central Africa for elephant and other biodiversity conservation. Governments and international donors should consider establishing buffer zones around protected areas in which transportation and communications infrastructure will not be introduced. A real dilemma is the paradox created by, on the one hand, the need for economic development to decrease rural populations' dependence on natural resources for survival and, on the other hand, the consequences of increased economic activity: larger populations with increased means to impact negatively on biodiversity, including elephants. Development should therefore go hand in hand with effective conservation policy and actions.

9. Elephants and other protected species such as great apes congregate in forest clearings. These localities and the paths leading to them should receive concerted attention by forest ecoguards in protected areas, and if located in State forests, forestry concessions or communal lands, buffer zones should be created around them in which no human activities are allowed.

10. In cases where extractive industries operate, such as oil, logging or mining, governments and NGOs need to work with the private sector to promote best-use practices and the establishment of company regulations that promote sustainable forestry management under the Forest Stewardship Council. These include prohibiting bushmeat to feed workers and forbidding company vehicles to transport wildlife products.

11. National wildlife management agencies (e.g. MINFOF, ICCN) should be strengthened and field officers should be trained and equipped properly to allow them to carry out their duties. Staff should also be recompensed appropriately and in a timely fashion in order to incentivize, build morale and provide encouragement to carry out their duties.

12. Law enforcement monitoring should be improved within national wildlife management agencies in order to evaluate their effectiveness and take remedial measures where necessary.

13. Resources should be provided by national governments and international donors to permit comprehensive elephant censuses and monitoring programmes to be carried out in cooperation with national wildlife agencies and international organizations such as MIKE, WWF, WCS and the ECOFAC programme.

14. An elephant meat and ivory trade monitoring programme at the site level should be initiated under the auspices of CITES MIKE and in collaboration with the IUCN/SSC AfESG and TRAFFIC.

15. Recommendations regarding the trade in bushmeat made by concerned parties (e.g. IUCN, the Convention on Biological Diversity, the UN Food and Agriculture Organization, WWF, WCS, CIFOR) all aim for the sustainability of species offtake. Although illegal, the trade in meat and other body products of protected species, such as the elephant, should receive recognition as a special category in which trade is prohibited. Policies and strategies should be formulated to address the illegal hunting and product trade of these species.

16. Existing legislation should be reviewed and revised to remove ambiguities concerning elephant killing and product trade, and to include recent modifications made by decree by governments in respect of the protected status of the elephant.

Elephants are hunted both for their tusks and their meat. (Photo: Karl Ammann)

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Appendix I. National Laws Relevant to Elephants

Cameroon

Cameroon acceded to CITES on 5 June, 1981. The main laws that govern wildlife are:

- *Law No. 94/01 of 20 January 1994* to lay down Forestry, Wildlife and Fisheries Regulations;
- *Decree No. 95/466/PM of 20 July 1995* to lay down the conditions for theimplementation of Wildlife Regulations;
- *Order No. 0648/MINFOF of 18 December 2006* to set the list of animals of classes A, B and C; and
- *Order N° 0649/MINFOF* to lay down the distribution of animal species whose killing is authorized as well as the latitude of killing per type of sports hunting permit.

The 1994 Forestry Law regulates the hunting and sale of forest animals, collectively referred to as 'bushmeat' in much of sub-Saharan Africa. The areas in which hunting may take place in Cameroon are termed 'hunting zones' in Section 24(1) and are further categorized into game reserves, hunting areas and game ranches. Section 78 of the Forestry Law addresses the Protection of Wildlife and Biodiversity, with section 78(1) classifying all animal species in Cameroon into three classes (A, B and C), with conditions for their exploitation.

Class A species are totally protected and may not be killed (except as provided for in section 82 and 83 of this law). Class B species are partially protected and may be hunted, captured or killed subject to the grant of a hunting permit. Section 76 of the law states that any person found in any place, at any time, in possession of a whole or partial class A or B protected animal, is considered to have captured or killed the animal. For certain class A trophy animals, a certificate of origin specifying specific characteristics of the animals and the registration number of the trophies is required to enable the identification of animal products. Export of wild animal products and meat requires a certificate of origin and export permit.

Cameroon forest elephants (*Loxodonta africana cyclotis*) and savannah elephants (*Loxodonta africana africana*) both fall under a unique classification according to *Order 0648/MINFOF of 18 December 2006*. Elephants with tusks weighing more than 5 kg are classed as Class B species (partially protected) while elephants with tusks weighing less than 5 kg are Class A species (fully protected).

Class A 'trophy animals' are also distinguished from Class A 'bushmeat' products within the law, as permits for trophy sports hunting of Class A species are provided to specialist, large game 'tourist' hunters, while local hunters are not permitted to hunt Class A species. Cameroon has an annual CITES export quota for elephant trophies of 160 tusks (80 elephants). Cameroon was given a quota of 160 tusks (80 elephants) in 2009; all 80 were allocated to sports hunting operators.

Hunting permits cost approximately US$ 600 and can be issued for January to June (the designated hunting season) for certain areas, by region. There are quotas for each permit. CITES gives the quota annually for endangered species. The Ministry of Territorial Administration is in charge of controlling the illegal circulation of arms, working in collaboration with BIR/LAB. MINFOF is responsible for controlling ivory, bushmeat and wildlife products.

Section 9(2) of the 1994 law states that certain forest products, such as ebony, ivory and other forest products of particular interest shall be classified as special. Section 9(3) states that extraction of special products shall be laid down by decree. Section 100 states that a license is required to transform ivory into local crafts and to store processed ivory. If anyone is found in possession of processed ivory, it is up to that person to prove, if need be, that the elephant concerned had tusks that each weighed more than 5 kg.

Decree No. 95/466/PM issued 20 July 1995, by the Prime Minister laid down the conditions for the implementation of wildlife regulations, which included regulations on protected area management, environmental impact surveys that should accompany any mining, agro-pastoral or industrial project near protected areas, as well as

quotas for various wildlife species authorized for hunting. Under this decree, hunting and fishing are forbidden within national parks. Local populations using traditional collection, trapping and hunting techniques have user rights to hunt class C species in permitted zones (i.e., community forests, communal or private forests) outside of integral ecological reserves, national parks and sports hunting zones (referred to as game ranches in this document).

Section 45 of the decree states that citizens or residents can obtain collection licenses from MINFOF that would allow them to collect and commercially utilize carcasses and ivory of Class B species (i.e. elephants with tusks >5 kg). The license is valid for one hunting season. The trading of elephant meat and ivory is therefore legal, if the trader can obtain a 'collection license'.

Section 58 states that hunters with permits must declare any meat or trophies still in their possession to MINFOF after the expiration of the permit, or the possession will be deemed illegal. It would seem therefore, that legal hunters may possess bushmeat and ivory indefinitely with a simple declaration.

Section 62(1) states that meat from animals killed during official battues or for safety reasons shall belong, in part, to the affected population and in part to the volunteer hunters. Section 62(2) states that the trophies of the animals referred to in Section 62(1) above shall belong to the services in charge of wildlife. However, if a hunter kills an elephant with a hunting permit, he may own the trophies on condition that he pays the related fees.

Cameroon law, therefore, permits both the hunting of elephants with >5 kg tusks and the selling of their meat and trophies, as long as the required permits and licenses have been obtained.

CAR

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

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

Under this ordinance, elephants with tusks less than 10 kg each are listed as Class A species and unconditionally protected; those with tusks weighing more than 10 kg are listed as class B.

Ordinance No. 85/005 of 30 January 1985 closed any type of elephant hunting anywhere in CAR. It has been completely illegal since that time to hunt elephants. A review and analysis of sports and village hunting in the Dzanga-Sangha area did not list the elephant as a hunted species (Roulet & Mamang-Kanga, 2008), but Fargeot & Castel (2009) listed elephant bushmeat as a utilized resource in a discussion of village hunting management.

Unfortunately, *Ordinance No. 85/005* made no mention of elephant trophies or other products that might originate from natural deaths, self-defence killings or legal, administrative elephant killings. *Ordinance No. 84.045,* Article 77 states that found trophies (e.g. tusks) of A or B list animals must be turned over to the nearest Forestry post or to the Department of Hunting in Bangui. Article 91, however, implies that tusks from an elephant killed in self-defence could be registered with the authorities and be legally owned. Articles 84-89 in *84.045* allow legal ivory working and selling by registered carvers. All raw ivory must be marked and registered and annual reports must be filed with the government indicating from where

and how much ivory was obtained during the year and what stocks remained as of 31 December of a given year. Until this law is amended, it appears that if ivory carvers can offer evidence that tusks they own predate 1985, or were obtained after that date from elephants killed in self-defence, and if they were able to register the tusks, the ivory would be legal to work and sell. Presumably, any worked ivory predating 1984 would be legal under any circumstances.

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

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

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

Ordinance No. 94.006 established a mandatory permitting process to sell hunting products costing about US$ 20 per year. It must be associated with a license issued by the Revenue Service (US$ 70 per year). If the vendor, transporter or middleman cannot pay for these two documents, however, he/she can pay for a provisional authorization at MWFHF road checkpoints to sell hunting products, called a Laissez-passer (US$ 10 for three months maximum, non-renewable).

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

ROC

The ROC acceded to CITES on 31 January 1983. Hunting and activities linked to the commercialization and utilization of wild species are regulated by *Law No. 37-2008 of 28 November 2008* on 'Wildlife and Protected Areas', which abrogates the previous *Law No. 48/83 of 21 April 1983* on 'Conditions of Conservation and Exploitation of Wildlife'. Animal species are classified as totally protected, partially protected or other. The elephant was classified as 'partially protected' in 1984, but by *Act no. 114-91 of 24 June 1991*, the killing of elephants was made illegal and in the same year, *Act no. 32/82* conferred total protection on the elephant.

Totally protected species cannot be killed nor can any part of them be eaten, sold, bought or possessed. Exceptions to killing a totally protected animal are self-defence, scientific use as permitted by the responsible ministry and administrative killing of dangerous animals as authorized by the ministry.

The import, export, detention and transport of wild animals or their trophies are strictly prohibited throughout the national territory, except for special exceptions for scientific research or reproduction purposes.

The possession and movement of totally protected species, their trophies or their hides are subject to obtaining a certificate of origin. If a totally protected animal is killed in self-defence, the trophy must be turned over to the competent technical service for onward transmission to the responsible ministry. The meat should be distributed by the authorities in conformance with local custom.

Killing of an elephant or trade in its products is therefore completely illegal in ROC.

DRC

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.

Totally protected species may not be harmed in any way, except in the cases of government-sanctioned scientific research, the higher interests of the government (undefined) or self-defence. Trophies (e.g. tusks) are property of the State and if found or obtained from killing in self-defence, must be turned over to an appropriate government official within 30 days. Any person found with a Class I animal, alive or dead, or any of its products, is considered to have captured or killed it, unless proof to the contrary can be provided. Tusks held in storage by the government must be marked and details of them recorded in a registry. All illegally owned trophies are prohibited from being worked, and any illegal trophy or worked form of the trophy is prohibited from export.

The meat of animals killed in self-defence or administratively cannot be sold. It must be freely distributed to residents in the immediate vicinity. Concerning unprotected species, anyone desiring to exploit commercially wild animals or their products must obtain a licence and pay a tax. These persons must meet certain requirements.

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

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.

The national Forestry Code (*Law nº 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.

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