

# Elephants in Cote d'Ivoire—a warning for West African conservation

*Frauke Fischer*

Zoology III, Dept. of Tropical Biology and Animal Ecology, Theodor Boveri Institute Biozentrum, Am Hubland 97074, Würzburg, Germany; email: fischer@biozentrum.uni-wuerzburg.de

## Abstract

Cote d'Ivoire once hosted probably one of the largest elephant populations in West Africa. Despite early warnings, numbers have decreased rapidly within the last century, resulting in small, isolated patches of populations. While savanna elephants suffered more during peak times of the ivory trade, forest elephant numbers declined rapidly with the destruction of their habitat. It is most likely that elephant numbers in all habitats and sites dropped significantly during the last decade, making the long-term survival of elephants in Cote d'Ivoire questionable at the very least. Major elephant habitats in forest (Taï National Park) and savanna (Comoé National Park) remain intact, but potential immigration from other sites or even re-introduction of elephants would require a significant improvement in park management and nature conservation in Cote d'Ivoire.

**Additional key words:** savanna elephants, forest elephants, population trends, elephant conservation

## Résumé

La Cote d'Ivoire a probablement hébergé dans le passé une des plus grandes populations d'éléphants de l'Afrique de l'Ouest. Malgré le fait que de nombreux signaux d'alarme aient été tirés, le nombre des éléphants a rapidement diminué pendant le siècle dernier, ayant pour résultat actuel des populations isolées et réduites. Les éléphants de savane ont beaucoup souffert lors des pics atteints par la commercialisation de l'ivoire tandis que les éléphants de forêt ont été affectés par la destruction de leur habitat. Il est fort probable que le nombre d'éléphants dans tous les habitats a diminué de manière significative durant les 10 dernières années ce qui remet très sérieusement en question la survie de ces animaux en Cote d'Ivoire au long terme. De grandes superficies de forêts (Parc National de Taï) et de grandes superficies de savanes (Parc National de Comoé) qui pourraient servir d'habitat pour les éléphants sont encore intactes, mais de grandes migrations dans ces régions-là ou des réintroductions ne seront pas possible sans la mise en œuvre d'efforts importants concernant la gestion des parcs nationaux et la protection de la nature en Cote d'Ivoire.

**Mots clé supplémentaires :** éléphants de savane, éléphants de forêt, tendances de population, la protection des éléphants

## Introduction

In pre-colonial times Cote d'Ivoire once hosted probably one of the largest elephant populations in West Africa. Even though no estimates of the pre-colonial elephant population exist, we can assume that due to the area's vegetation structure, rainfall pattern and low human population density elephant numbers must have been tremendous. Applying Parker's model (1989) and

with an assumed forest cover of roughly half of the country's 322,460 km<sup>2</sup>, Cote d'Ivoire's savanna elephant population alone might once have been 165,000 to well over 300,000 animals, depending on the human population density. However, pre-colonial empires existed, and wars, ivory trade and habitat destruction due to cultivation might have had a greater impact on West Afri-

can elephant populations than on those in eastern and southern Africa, even well before the arrival of the Europeans (Barnes 1999). Despite these early negative effects, elephant numbers remained high until colonial structures were established in West Africa, resulting in the name Ivory Coast—Cote d'Ivoire—given by the colonial powers to the area in West Africa that was richest in elephants (or at least elephant tusks). Although the name may reflect to a certain extent the importance of Cote d'Ivoire's harbours for the international ivory trade, with part of the ivory coming from other areas, it hints of large elephant populations prevalent at that time.

### 19th century

Between 1850 and 1875 ivory exports from Africa increased fourfold (Barnes 1999); 1836 and 1908 were peak years of ivory exports from French West Africa (Roth and Douglas-Hamilton 1991) with most ivory probably coming from the larger savanna elephants north of the forest belt. This led to a rapid decrease in savanna elephant populations with less effect on the forest elephants at that time (Roth and Douglas-Hamilton 1991). The decline of forest elephants accelerated with the conversion of forest to agricultural land and an ever-increasing destruction of forest habitats.

### 20th century

Ivory exports from Africa peaked in the early 20th century, leading to a crash of the elephant population before World War I. Despite rising prices, ivory exports remained low, clearly indicating that elephants were being over-harvested as early as then (Roth and Douglas-Hamilton 1991). Roth and Douglas Hamilton (1991) estimated that during their study period between 1976 and 1984 elephants roamed over only 6–7% of their former range in West Africa, with savanna elephants suffering from greater range reduction than forest populations.

Roth et al. (1984) estimated the total elephant population in Cote d'Ivoire to comprise not more than 1790 savanna and 3050 forest elephants scattered throughout the country within 46 more or less isolated populations. The annual loss at that time was approximately 300 poached and 90 legally killed forest elephants, resulting in an estimated annual decline of 10%. Numbers declined further by the late 1980s when Merz and Hoppe-Dominik (1989) presented data on the remaining 20 isolated populations of for-

est elephants with a further 50% decline in numbers, and even further by the early 90s when the total number of both savanna and forest elephants had reached an all-time low of 63 to 360 elephants (speculative 666) in the entire country, existing in 24 populations (Blanc et al. 2003).

### Present situation

Today the situation is probably even worse, with only seven elephant populations confirmed, comprising approximately 270 elephants (table 1). The outbreak of civil war in Cote d'Ivoire in September 2002 negatively affected the management of certain protected areas and conservation in general (Fischer 2004), and although not quantified it can be assumed that the effect on the small population of elephants was negative if not catastrophic.

Cote d'Ivoire has eight national parks and 298 classified forests with the latter being sustainably managed (fig. 1). Within the last 50 years, however, large portions of classified forests have been clear-cut and converted to agricultural land. Very little intact forest habitat remains; it is largely in the east of the country in the Bossématié forest system and in Taï National Park (NP) in the south-west, which is treated as a protected area in this article. The forests are threatened by logging and agricultural activities, which will probably increase due to economic problems in Cote d'Ivoire, and the recent cessation of a long-term management and conservation programme funded by German development agencies.

Six of the eight national parks, Azagny, Comoé, Marahoué, Mont Sangbé, Mont Péko and Taï, are known to host elephants, some in extremely low numbers (see below). Elephants occurred both within and outside protected areas until the 1980s (Roth et al. 1984) but are now more or less restricted to the larger national parks and some forest reserves (see 'Elephants within protected areas' under Results). As earlier reports on elephants, shot or alive, gave imprecise point locations it is not always clear whether the animals occurred inside or outside protected areas. For example, elephants shot near Abidjan (Roth et al. 1984) might have lived either in Banco NP or outside this protected area.

The aim of this article is to contribute to the knowledge of the status of elephants in Cote d'Ivoire, giving the most updated information about this endangered, charismatic species in one of its former strongholds. I also raise additional awareness on the

Table 1. Population estimates for elephants in Cote d'Ivoire

Site	Population	Year	Method	Comment	Source
Comoé NP	1500	1977	aerial survey		Steinhauer-Burkhardt 1984
	1000–1500	1979	aerial survey		GTZ/FGU 1979
	1000	1979/80	aerial survey	+ 500 in adjacent areas	GTZ/FGU 1979
	200	1995	informed guess		personal observation
	10–20	2002	informed guess		personal observation
Marahoué NP	150	1979/80	no details given		Roth et al. 1984
	75 ± 25	1983	line transects from vehicle		Hoppe-Dominik 1989
	50	1991	informed guess		Blanc et al. 2003
	160	2002	mark-recapture/faecal DNA	MIKE census in 2002	N. Hunter in lit. World Heritage Centre
Taï NP	1800	1979	no details given		Roth et al. 1984
	1000	1979/80	no details given		Merz 1982
	800	1982	ground census (transects)		Merz and Hoppe-Dominik 1991
	100	1989	ground census (transects)		
		2000		MIKE census in 2002; results not yet available	
Azagny NP	60	1978	aerial survey		GTZ / FGU 1979
	60	1987	aerial survey		Douglas-Hamilton et al. 1992
	65	2003	line transects, dung counts		Nandjui Awo in lit. 2004
Haut Bandama GR	60	1979/80	no details given		Roth et al. 1984
	40	1990	no details given		Bouché 2002
	20	1996	other guess	No elephants seen during reconnaissance flight	Bouché 2002
Bossématié and other eastern CF	250	1979/80	no details given	Bossématié and Béki forests	Roth et al. 1984
	200	1988/99	ground census (transects)		Merz and Hoppe-Dominik 1991
Fresco CF	55	1994	informed guess	20 in Sogan-Tamin-Mabi-Yaja, 5 in Béki, 30 Bossématié	Caspary 1999
	60–80	1994	informed guess	Bossématié and Béki (5–6 elephants)	Parren et al. 2002
	150	1989	ground census (transects)	CF Songan only (?)	Merz and Hoppe-Dominik 1991
Haut Sassandra CF	20–30	1994	informed guess	CF Songan only	Parren et al. 2002
	150	1991	informed guess		Douglas-Hamilton et al. 1992
	very few	2004	informed guess		Kouadio in lit. 2004
	30	1997	informed guess		Kobon in Blanc et al. 2003
	30	2003	informed guess		Ouattara in lit. 2004

NP – national park; GR – game reserve; CF – classified forest; MIKE – Monitoring Illegal Killing of Elephants

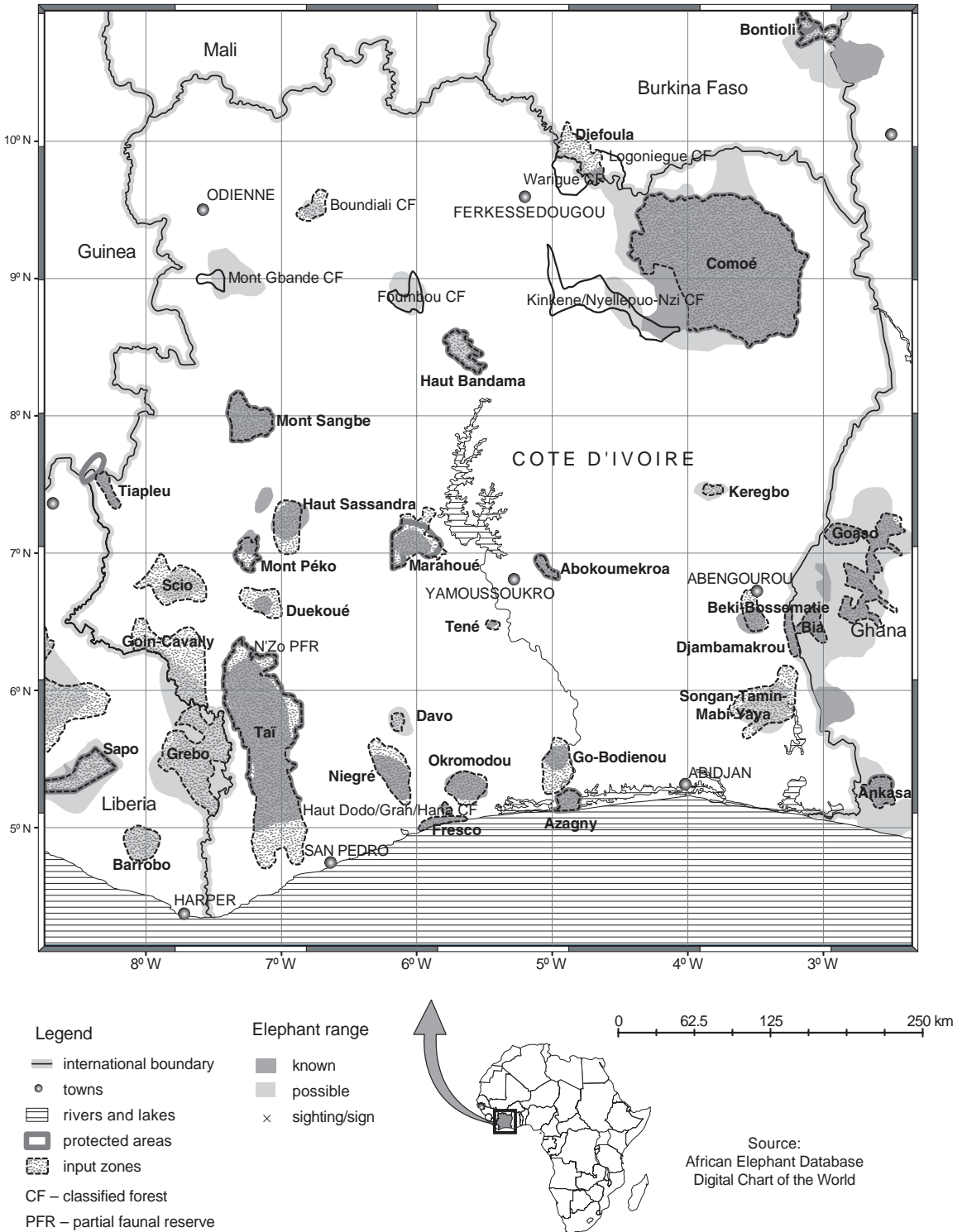


Figure 1. Some protected areas and elephant distribution in Cote d'Ivoire.

desperate situation of elephants in parts of West Africa and send out a plea for conservation action for elephant populations in West Africa that are still healthy or at least exist in viable population densities.

## Materials and methods

I collected anecdotal information on the elephant population in Comoé National Park during my scientific work there between 1993 and the outbreak of civil war in September 2002.

Additionally I visited other elephant sites in Cote d'Ivoire during that period—Taï NP, Abokouamékro Game Reserve, Marahoué NP, the Bossématié forest reserve system—and talked to researchers who conducted scientific or conservation work in these and other areas. Data collection did not follow a standardized protocol but was rather informal. Information on present and former elephant densities in Cote d'Ivoire was derived from the literature.

## Results

### *Elephants outside protected areas*

Elephant populations mentioned by Roth and Douglas-Hamilton (1991) that existed in Bouaké and Dimbroko Districts as well as around Odienné and Korhogo have been extinct for many years, as are elephants close to Abidjan (Roth et al. 1984; pers. obs.). During my stays in Cote d'Ivoire (about 60 months between 1993 and 2004) hardly anyone mentioned the presence of elephants outside protected areas, and when mentioned, the elephants were said to be adjacent to protected areas. I assume that it is unlikely that any elephant population still exists outside protected areas, although it cannot be ruled out that the populations mentioned here sometimes leave protected sites. However, I assume these incidents are rare.

### *Elephants within protected areas*

#### COMOÉ NATIONAL PARK

Comoé NP, included in the World Heritage Site's Danger List in 2003, is West Africa's largest savanna park. The predominant vegetation type (wooded savanna with scattered forest islands and gallery forest), the annual rainfall (1000–1500 mm) and the permanent water supply of its major rivers make this park high-quality elephant habitat. There is no hu-

man encroachment, no livestock keeping, no illegal logging and no plantations within the 11,500 km<sup>2</sup> of the park. However, poaching of all larger mammals is severe and has had catastrophic effects on its mammal populations (Fischer and Linsenmair 2001; Fischer et al. 2002).

Elephants must have been very common both before and after the park was established. Local assistants told me that elephants came to the village frequently and drank from the well during the dry season in the late 1960s and early 1970s. There were no incidents of agricultural damage caused by elephants between 1993 and 2004 and hence no legal killing of problem animals. Elephant poaching was however common during that time. Elephants targeted included juveniles with very small tusks, hunted for ivory and meat.

Three elephant carcasses (fig. 2) and one of a wounded calf (fig. 3) were found between 1993 and 1995, all animals that had obviously escaped poachers but died of severe wounds later. The real number of elephants killed by poachers during this time was probably much higher but could not be assessed accurately. Due to poaching, elephants were very shy and fled as soon as they became aware of human presence. Nevertheless, sightings of up to 120 elephants were made as late as 1997 (K.E. Linsenmair, pers. comm.) and elephant tracks and traces frequently seen (pers. obs.). From 1998 direct observation of elephants was extremely rare with only reported sightings after 1999, made by villagers in the southern part of the park close to the village of Gorowi. These sightings consisted of 11–15 animals, and probably always the same elephant group. Tracks and traces were hardly ever seen in the study area of approximately 200 km<sup>2</sup> by researchers from the University of Würzburg after 1999. Even at wallows, salt licks and drinking sites in the gallery forest, which had been the major attraction points of elephants earlier (pers. obs.) no signs of elephants were seen here after 2000.

The seasonal movements of elephants that are supposed to have occurred earlier (GTZ/FGU 1979) could not be determined by Steinhauer-Burkhart (1984) and definitely had come to a complete stop afterwards.

#### MARAHOUÉ NATIONAL PARK

Marahoué NP (1010 km<sup>2</sup>) is located in the transition zone between savanna and evergreen forest. No recent



Figure 2. Elephant carcass in Comoé National Park, Cote d'Ivoire, in 1996.

elephant counts were made before the 2002 MIKE (Monitoring Illegal Killing of Elephants) counts, but during my visit to the park in 1997 local people reported several sightings of elephants, and tracks and traces were easily found. Large parts of the park were taken over by agriculturists with violent encounters between game wardens and farmers in 2001. Increase in human–elephant conflict is likely, in which case the elephants are sure to lose. Lack of funds made it impossible to manage the park after civil war broke out in 2002. The elephant numbers that Roth et al. gave in 1984 were significantly more than in the count shortly after that by Hoppe-Dominik (1989), and by 1991 the numbers were even fewer (Blanc et al. 2003).

A MIKE team counted the remaining elephants in the park in July 2002 and estimated the population to be 160 in July 2002 with a confidence interval of 149–177 (N. Hunter 2005 in lit.).

#### TAÏ NATIONAL PARK

Taï NP is the last protected Haut-Guinean forest block in Cote d'Ivoire, covering 3300 km<sup>2</sup> plus a 200-km<sup>2</sup> buffer zone. It is contiguous to the N'Zo faunal reserve (730 km<sup>2</sup>). Elephant numbers decreased steeply in Taï NP despite the large amount of foreign aid pro-

vided for well over a decade by different non-governmental organizations and government sources (Blanc et al. 2003). Logging, poaching, farming and illegal gold mining threaten the future entity of the park (World Heritage Centre 1989; pers. obs.). A big problem is the influx of refugees from Liberia and the back-and-forth movements since 2002 of Ivorian refugees, caused by civil war in Cote d'Ivoire.

According to Roth et al. (1984) elephants in Taï NP were hunted mainly for their ivory but hunting for meat can also be assumed. Elephant poaching declined or even stopped altogether for several years, but the situation deteriorated recently given the desperate situation of the many refugees in the area. A MIKE team conducted an elephant survey in Taï NP in 2002 and results will be available soon.

#### AZAGNY NATIONAL PARK

Azagny NP in southern Cote d'Ivoire covers 190 km<sup>2</sup>. The area was historically difficult to reach but it might also have contained only relatively small areas of suitable elephant habitat. A. Nandjui (2005 in lit.) conducted an elephant survey in the park in 2003 and estimated about 65 elephants lived in the park.

**BANCO NATIONAL PARK**

Close to the city of Abidjan is Banco NP, which measures 30 km<sup>2</sup>. Elephants are supposed to have been extinct here for almost a century (GTZ/FGU 1979) but the two to nine elephants killed close to Abidjan every year from 1975 to 1980 (Roth et al. 1984) might well have come from this park and adjacent areas. Today elephants are definitely extinct in the park and its surroundings.

**HAUT BANDAMA GAME RESERVE**

The numbers given by Roth et al. (1984) and Bouché (2002) show a steady decrease of elephants in the Haut Bandama reserve. Although there have been no counts recently it is unlikely that the number of elephants has increased significantly since the last estimate in 2002.

**BOSSÉMATIÉ FOREST SYSTEM**

Close to the city of Abengourou, 1 to 22 problem elephants were killed annually between 1975 and 1980. An additional 30–60 elephants were poached in that area every year during the same period (local former hunters, pers. comm. 2004) leading to a steep decline in the elephant population in that zone. Today exact numbers do not exist, but the reserve forests near Abengourou host fewer than 60 elephants. No incidents of poaching have been observed during the last 10 years, but direct observations during standardized monitoring procedures became increasingly rare after 1999 (Goor 2004). Elephants were still present in the forest reserves of Bossématié, Songan, Tamin, Mabi and Yaya in late 2004 (pers. obs.). There were no reports of crop-raiding elephants (Parren et al. 2002) and Theuerkauf et al. (2001) showed that elephants even avoided villages and plantations. To ensure the long-term survival of this population of forest elephants Parren et al. (2002) suggested creating corridors to connect elephant populations in Cote d'Ivoire with suitable habitat in Ghana to enhance interbreeding of the sub-populations living on both sides of the border.

The remaining forest elephant habitat in the Bossématié forest system has been under great risk ever since a long-term develop-



Figure 3. A juvenile elephant killed by poachers in the southern Comoé National Park, Cote d'Ivoire, in 1993.

ment project financed by German aid agencies terminated in 2004. The lack of national funding and the demand for tropical timber is likely to lead to intensive logging in the area to generate income in the dwindling economy of Cote d'Ivoire. Long-term survival of the elephants is hence threatened by the potential destruction of their habitat in the near future.

#### **HAUT SASSANDRA FOREST RESERVE**

The elephant population in Haut Sassandra Forest Reserve has been stable during the last seven years. Updated information is not available for sites that hosted elephants earlier and that were listed in 2003 by Blanc et al.

## **Discussion**

### ***Data quality and knowledge gaps***

Data quality among sites differed substantially. The best data came from the MIKE census in 2002 for Marahoué NP and from A. Nandjui for Azagny NP in 2003 (A. Nandjui 2005 in lit.). Some good recent guesses are probably those for Comoé NP. This emphasizes the need to perform comprehensive elephant counts for all sites that still contain or recently contained elephant populations. We need data on population densities, sex and age ratios as well as reproduction rates to complete the picture of the current situation of the Ivorian elephants and properly evaluate the status of each population. Elephant research between 1950 and the late 1990s showed a strong bias for work in eastern Africa, followed by that in southern and Central Africa with only 5.2% of the published studies conducted in West Africa. An overall decrease of elephant publications began in the late 1980s (Bossen 1998). This again emphasizes the importance of elephant studies in West Africa.

### ***Estimation of elephant population densities and trends***

Elephant numbers in Cote d'Ivoire have decreased at alarming rates since the first population surveys were conducted, and warnings that this species might be lost were put forward in 1984. Roth and Douglas-Hamilton (1991) referred to Comoé NP as one of the most important elephant ranges in West Africa and called for its improved management and protection as vital for the long-term survival of savanna elephants

in the region. Despite this strong statement made by Roth et al. as early as 1984 no efforts were made to protect the park and its elephants, leading to a further decrease with only 10–20 animals estimated to be remaining in the park today.

The only population that seems to have increased is in Marahoué NP. However, I believe that this is due rather to the inaccuracy of earlier counts than to a substantial increase in numbers. Elephant poaching in the park was rare in the late 1990s (pers. obs.), which might have allowed for a certain regeneration of the population, but human encroachment was severe, with land being used in ways that are not compatible with elephant presence.

Although the size of a viable elephant population is unknown (IUCN 2003a), Cote d'Ivoire might not host even one population that would survive for long or have the potential to increase significantly. While Sukumar (1993) suggested that a viable population of Asian elephants had to contain 100–200 animals, depending on its structure, numbers given by Vucetich and Waite (1998), independent of the species in question, are much higher. Despite this uncertainty, elephant populations in Cote d'Ivoire may be too small and too isolated from each other to ensure their regeneration. They are additionally threatened by a complete lack of recolonization events and by synchronous trends towards decreasing numbers in all subpopulations, which has been stated by Barnes (1999) as a major negative effect for recovery of elephant populations in West Africa. Even though the size of the remaining populations is largely unknown, the Marahoué NP population is probably the only one containing more than 100 individuals.

### ***Management implications***

Small elephant populations in dense vegetation are almost impossible to count precisely (Barnes 2002) which makes trend detection in all Ivorian populations largely impossible. Dung counts and genetic analysis of faeces are the most promising techniques to apply (Barnes 2001). Even if effective conservation measures are taken immediately, which is doubtful due to the political situation in the country at the moment, elephant numbers might be too small and the population structure too imbalanced to allow for population regeneration.

With the possibility that there are two African elephant species (Roca et al. 2001), conservation fo-



cus should be laid on the forest elephant *Loxodonta cyclotis*. Although elephants are probably not essential for the future existence of the remaining West African forests, they play an important ecological role in the succession dynamics of these forests (Hawthorne and Parren 2000). In general, little is known about their ecological role in West Africa, where they function as 'landscape architects' and seed dispersers of economically and environmentally important plants. Given this lack of knowledge and taking into account the fact that many tree species are long lived, the ecological disaster resulting from their dying out might not emerge until well after their extinction.

The situation for savanna elephants looks even worse. While restoring and improving habitat through different management schemes as proposed by the IUCN Conservation Strategy (2003a) is important for many areas, doing so is of minor concern for the savanna habitat of the elephant (mainly Comoé NP). The park's single problem was and is poaching, with the habitat not only for elephants but for all large mammals being still intact. Because it is large, Comoé NP could host a large and viable elephant population provided it were truly efficiently protected and managed. The human footprint map of Cote d'Ivoire ([http://wcs-old.atlasworks.com/media/file/hf\\_IvoryCoast1.pdf](http://wcs-old.atlasworks.com/media/file/hf_IvoryCoast1.pdf)) shows that human impact in the north-east of the country (except for poaching) is moderate to low. Since there is so little genetic difference among African savanna elephants (Roca et al. 2001) and elephant habitat is still intact, Comoé NP could one day become a site for reintroducing elephants from other parts of Africa. Management and protection of the park would need to be improved considerably and genetic distinctiveness taken into account (see Eggert et al. 2002 for details). Eggert et al. (2002) suggested the existence of three elephant species in Africa with western savanna elephants forming a distinctive group. If this is true, protecting and conserving the remaining West African savanna elephants becomes a much higher priority.

Transborder protected areas between Cote d'Ivoire and neighbouring countries were suggested by Soulemane (2002) to reduce human–elephant conflict and by Parren et al. (2002) to improve interbreeding of subpopulations with neighbouring Ghana. Such cooperative approaches are important to achieve maximum benefit of pooled resources and secure elephant ranges that span international borders (IUCN

2003a). Additionally they might be the only measure that can prevent elephant extinction in Cote d'Ivoire since local elephant populations are too small to ensure their own long-term survival without input from other areas. Transborder protected areas can also ensure elephant survival during times of civil strife, as happened in the 1990s when 300 elephants moved from Togo to adjacent areas in Benin and Burkina Faso (Ph. Bouché, pers. comm.).

A detailed action plan for two transborder protected areas in southern Cote d'Ivoire with Liberia and with Ghana has been proposed by IUCN (2003b) but not yet implemented, and similar proposals exist for a transborder protected area between Comoé NP and Forêt Classée et Réserve Partielle de la Faune de la Comoé Léraba in Burkina Faso (Oliver Hamerlyck, pers. comm.).

The establishment of bio-corridors with areas in Burkina Faso and Ghana should be considered, not only to enable elephants to repopulate Comoé NP but also to connect metapopulations of other large mammals.

A national elephant conservation strategy for Cote d'Ivoire was discussed during a workshop in Abidjan in December 2003, but the results are not yet freely available.

### **Legal situation**

Although hunting female and young elephants became illegal in 1965 and elephant hunting was completely banned in 1974 in Cote d'Ivoire (Roth et al. 1984) problem elephants could still be killed. Roth et al. (1984) claimed that around 90 elephants were legally killed every year between 1975 and 1980 despite the very low frequency of crop damage they caused. Even though agricultural damage by elephants was little as they largely avoided cacao and coffee plantations (Theuerkauf et al. 2001), farmers still complained about rare incidents of crop damage by problem elephants to get hunting permits (Soulemane 2002).

Despite the legal ban on domestic ivory trade in 1997, raw and worked ivory products could be found throughout the country even much later (TRAFFIC 2003; pers. obs.). Cote d'Ivoire not only exported ivory but was a major importer of elephant tusks until 1980 (Roth and Douglas-Hamilton 1991).

## Underlying forces

The human population in Cote d'Ivoire increased about sixfold between 1950 and 2004; during the same period almost 90% of the forest disappeared (Bryant et al. 1997). And during the entire period, elephant numbers decreased even faster than the available habitat shrank. While the increase in human population is assumed to have slowed down (from over 3 to 2.1%) due to the HIV/AIDS epidemic (CIA World Fact Book 2004) destruction of natural habitats is likely to increase due to heavy dependence of the local economy on the production of cocoa and coffee, most of which is produced on sensitive elephant habitat. Due to economic problems after the outbreak of civil war in 2002, nature conservation, which was weak and a low priority even before the civil strife, will probably be of even less importance in the near future. The negative effects that occurred in Comoé NP (Fischer 2004), despite its low human population pressure, will most likely be more severe in the southern parts of the country that contain higher human population densities.

## Outlook

Elephants in Cote d'Ivoire occur more or less exclusively inside protected areas. However, a complete lack of management in the largest legally protected area—Comoé NP—and weak protection of other national parks in which elephants occur, means the survival of this species even inside protected areas in Cote d'Ivoire is doubtful. National parks like Marahoué and other sites such as the Bossématié forest system are threatened by human encroachment, increasing agriculture and in Bossématié even logging of the entire elephant habitat.

Since the relatively large population (200 animals estimated in 1997) in Comoé NP collapsed later, elephants are most likely at the brink of extinction all over Cote d'Ivoire with little chance of survival due to ongoing habitat destruction (for forest populations), hunting (for savanna populations) and genetic effects such as inbreeding and sex imbalance for both forest and savanna populations.

## Conclusions

Although the elephant is the national emblem of Cote d'Ivoire, with a powerful political party using it as its symbol and the national football team called Les

Eléphants de Cote d'Ivoire, no effort has been made to protect the remaining elephants in the country at any time. Elephants are depicted in the logos of many Ivorian companies, and elephant sculptures and illustrations are found in plenty in handicraft markets, yet most Ivorians are little aware or concerned that elephants are about to vanish from their country. The loss will be realized only after the species becomes extinct. However, Cote d'Ivoire should not be blamed alone; despite their permanent presence in the country no major international NGO has actively worked to protect Ivorian elephants within the last decade despite early warnings from several different sources.

Although pleas for action to save the elephants of Cote d'Ivoire were made as early as 1984 (Roth et al. 1984), no measures have been taken, resulting in the probable extinction of the species in one of its former strongholds in the near future. One lesson learned is that the time to act might be running out for other sites as well and that immediate action should be taken for those locations that contain viable elephant populations in West Africa. The political situation in Cote d'Ivoire went from stability to civil strife within a very short time, which resulted in even further deterioration of the conservation situation in the country and its major national park (Fischer 2004). This should be a warning example for other areas that might be politically stable at the moment and still have relatively high numbers of elephants.

The last strongholds for savanna elephants in West Africa are the 'W'-Arli-Pendjari-Oti Mandouri-Keran (WAPOK) ecosystem in Benin, Burkina Faso, Togo and Niger (Bouché et al. 2004a), the Nazinga Ranch in Burkina Faso (Bouché et al. 2004b) and to a lesser extent Mali's Gourma area and Mole NP in Ghana (Blanc et al. 2003; Brice Sinsin, pers. comm.). The WAPOK ecosystem hosted 4600 elephants in 2003 with 71.5% of this population counted in Burkina Faso, 26.6% in Benin and 2% in Niger (Bouché et al. 2004a). According to Ph. Bouché (pers. comm.) the 940-km<sup>2</sup> Nazinga Game Ranch contains the highest density of elephants in West Africa with an estimated 550 animals and an average annual increase of 3.8% between 1989 and 2003. The above-mentioned sites have to be of highest conservation priority, with the poor example of Cote d'Ivoire kept in mind. It is alarming to note that the elephant population in Mole NP decreased between 1993 and 2004 (Ph. Bouché, pers. comm.).

Since future efforts will be concentrated on areas that have populations of more than 100 elephants

(IUCN 2003a), Cote d'Ivoire will no longer be a focus country for elephant conservation, with small populations like the Comoé elephants most likely facing extinction soon.

To establish efficient conservation programmes for forest elephants Blake and Hedges (2004) asked for sound data collection to fill knowledge gaps and for continued monitoring of existing populations to ensure future existence. I support their request and ask that it be expanded to include West African savanna elephants. Intensive data collection on population structures and trends should be carried out before priorities are set and populations with the highest probability of long-term survival determined (IUCN 2003). However, data collection should go hand in hand with anti-poaching and other management measures as elephant populations can be depleted within a short time if left unattended (Merz 1982; pers. obs.). Any of these activities will probably have to focus on areas outside Cote d'Ivoire, most likely the WAPOK, Gourma and Mole protected-area systems. Remaining elephant populations must be managed and protected across political and habitat borders, as has been suggested for the jaguar (*Panthera onca*) by Sanderson and colleagues (2002).

I want to emphasize the importance of the remaining elephant populations in West Africa and plead for combined efforts to prevent these populations from undergoing the same fate as the elephants in Cote d'Ivoire. Elephants are charismatic animals, and their drastic decrease in numbers in West Africa should be used to attract more scientific and conservation activities to this geographical area.

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