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# Baseline Assessment of Chimpanzee and Elephant Populations in the Mano River Union Countries – Côte d'Ivoire, Liberia, Sierra Leone and Guinea (2007-2014)

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USAID FROM THE AMERICAN PEOPLE
STEWARD Sustainable & Thriving Environments for West African Regional Development
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**List of Acronyms**

CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora

ENNR – East Nimba Nature Reserve

FDBR - Foutah-Djallon Bafing Region

IUCN - International Union for Conservation of Nature

MPI-EVA – Max Planck Institute for Evolutionary Anthropology

MRU- Mano River Union

NP – National Park

OKNP – Outamba-Kilimi National Park

PZ- Priority Zone

STEWARD - Sustainable and Thriving Environments for West African Regional Development

UGFE – Upper Guinean Forest Ecosystem

UNESCO - United Nations Educational, Scientific and Cultural Organization

USAID - United States Agency for International Development

USFS/IP - United States Forest Service / International Programs

WCF – Wild Chimpanzee Foundation

## 1. Executive summary

The Mano River Union (MRU) Countries, (Côte d'Ivoire, Liberia, Sierra Leone and Guinea), are home to some of the last remaining chimpanzee (*Pan troglodytes verus*) and elephant (*Loxodonta africana*) populations of West Africa. Here we present the current status of both species and estimates of populations, where possible, and on data publicly available or made available for the purpose of this study. We further report on the status of chimpanzee and elephant populations in areas where the United States Agency for International Development (USAID) and the United States Forest Service/International Programs (USFS/IP) program STEWARD (Sustainable and Thriving Environments for West African Regional Development) is active. They are Priority Zone 1 (PZ1): Outamba-Kilimi National Park/Madina-Oula, Soya and Ouré Kaba (hereafter OKNP-Ouré-Kaba region) sub prefectures across Sierra Leone and Guinea and Priority Zone 2 (PZ2): Nimba Massif across Guinea, Liberia and Côte d'Ivoire. Both are transboundary areas, a key component of STEWARD's criteria. As part of their biomonitoring and evaluation program of their schemes in both zones, STEWARD requested the Wild Chimpanzee Foundation (WCF) to present an overview of the population status of both the chimpanzees and elephants over the past eight years (2007 to 2014). A follow-up field survey will be lead in the two Priority Zones to evaluate the impact of the STEWARD program, if sufficient funding is available.

Globally, the MRU countries have suffered a great decline in numbers of both these species and we call on donors and conservation actors to concentrate funds and efforts in these last areas that still harbor viable populations of chimpanzees and elephants to ensure their effective protection. The results of the present study show that with regard to the two priority zones of STEWARD, firstly there do not seem to be elephants present in the Nimba Massif on the side of Guinea and Côte d'Ivoire (Lauginie, 2007), but probably a few individuals still survive on the Liberian side (Junker et al, under review). It does hold though a relatively small population of chimpanzees of approximately 287 individuals (WCF, 2012a). The OKNP-Ouré-Kaba region on the other hand holds one of the highest known populations of chimpanzees in Africa with a population of possibly 1,111 chimpanzees, for which Outamba has one of the highest known densities of chimpanzees across Africa (1.21 individuals/km², 95% CI- 0.78-1.88, jBrncic et al., 2012) but only a very small population of elephants.

In addition, this study highlighted hotspot areas for the conservation and survival of chimpanzees and elephants in the MRU countries (defined as an area under protection and of outstanding conservation concern due to their relatively large size, large chimpanzee population/density and high probability of elephant occurrence). Seven hotspots for the conservation of chimpanzees and/or elephants are described, including the STEWARD PZs as well as five potential hotspot areas which are in need of further investigation. The data also show that hunting and habitat degradation, through agriculture, logging, mining and human encroachment, are the greatest threats to both the STEWARD Priority Zones as well as the other hotspot areas identified by this study.

Using the data amassed for the study, we prioritized different sites in need of conservation support based on numbers of chimpanzees, presence of elephants and surface area. The Foutah-Djallon Bafing-River

(FDBR) region in Guinea, with an estimated 4,717 (95% CI=3,760-5,918) chimpanzee population in 8,000 km² is the most important hotspot for chimpanzee conservation in West-Africa, followed by the transboundary area of Taï-Grebo-Sapo in Côte d'Ivoire and Liberia with a known population estimated at 272 (95% CI=134-485) elephants (the only known population in the study area) and a chimpanzee population estimated at 1,888 (95% CI=1,160-3,101) individuals. The third priority site is the STEWARD Priority Zone 1, with approximately 1,065 (95% CI=694-1,803) chimpanzees concentrated mainly in the Outamba area with 950 (95% CI=615-1,472) individuals. To ensure the long-term survival of these chimpanzee and elephant populations, efforts on providing concrete support for protected area management, land-use planning and law enforcement in the identified priority regions are needed. Globally, the MRU countries have suffered a great decline in numbers of both these species and we call on donors and conservation actors to concentrate funds and efforts in these last areas that still harbor viable populations of chimpanzees and elephants to ensure their effective protection.

## 2. Introduction

The USFS/IP, in collaboration with the MRU Secretariat, and with financial support from USAID is implementing the third phase of the STEWARD in Sierra Leone, Guinea and Côte d'Ivoire and Liberia. STEWARD's strategic objective is to implement a coherent regional program that addresses transboundary threats to biodiversity and the adverse effects of global climate change in priority zones in the Upper Guinean Forest Ecosystem (UGFE) (Sierra Leone, Côte d'Ivoire, Guinea and Liberia). As part of its bio-monitoring activities, STEWARD requested WCF to conduct an assessment of the population of chimpanzees and elephants in the four countries as a first step to formulating a more comprehensive program in this important area of work and to evaluate the impact of STEWARD-implemented activities over the last eight years.

The present report summarizes data that is either publicly available or made available for the purpose of this desktop study to give a comprehensive overview of the status of chimpanzees and elephants across the four MRU countries over the past eight years (2007-2014). Furthermore, it identifies major risks and threats to the existence of chimpanzees and elephants in the region.

The present report is divided into different sections. Section 3 provides an overview of the three concerned organizations (MRU, STEWARD and WCF). Section 4 provides a description of the study area, which includes all MRU countries, and more specifically of the two STEWARD priority zones, followed by an outline of the work completed by STEWARD in the priority zones in the past seven years. Section 5 details an overview of the current conservation status of both chimpanzees and elephants within the study area. Section 6 describes the methods used for the current study, while section 7 details the results of the study for each country. Section 8 describes the results in relation to the two STEWARD priority zones. Hotspots identified by the study are provided in section 9 (Note that these are protected areas of outstanding conservation concern due to their relatively large size, large chimpanzee population/density and high probability of elephant occurrence). Lastly, section 10 and 11 are the discussion and conclusion, respectively.

## 3. Description of organizations

The **MRU** countries are comprised of Côte d'Ivoire, Liberia, Sierra Leone and Guinea. The MRU is an intergovernmental institution of the four countries which aims to "strengthen their economies and coordinate development programs in the areas of peace-building, as a prerequisite to any development, trade promotion, development of industry, energy, agriculture, natural resources, transport and telecommunications, monetary and financial affairs in short, all aspects of economic and social life of the Member States" (MRU, 2014). The MRU Secretariat has partnered with STEWARD to implement cross-border programs for biodiversity since 2010.

**STEWARD**'s aim is to "implement a coherent regional program that addresses transboundary threats to biodiversity, capitalizes on regional opportunities to spread best practices, harmonizes policies and addresses the adverse effects of global climate change in priority zones of the Upper Guinean Forest Ecosystem (UGFE) (STEWARD, 2013). Supported by the USAID and the USFS/IP, their program is based on forest conservation and the development of sustainable livelihoods. Active since 2008 in the region, STEWARD focuses its efforts on two priority zones, 1. Outamba-Kilimi National Park / Madina Oula, Soya and Ouré Kaba sub prefectures across Sierra Leone and Guinea (OKNP-Ouré-Kaba region) and 2. Nimba Massif across Guinea, Liberia and Côte d'Ívoire, described in detail further below.

The **WCF**, founded in 2000 by Prof. Dr. Christophe Boesch has been conducting work throughout West Africa in areas holding the last remaining wild populations of West African chimpanzees. The WCF has two main objectives, one being the establishment of a "Pan-African Forest network for chimpanzees" to increase the protection of viable populations, and the other being the "Pan-African monitoring program" to guarantee their long-term survival. WCF bases its work on a three-fold philosophy of "Education-Conservation-Research", which involves local human communities around key sites, school children and scientists from European and West African countries to protect the last remaining wild chimpanzee populations in West Africa. The WCF seeks to reinforce the protection of key chimpanzee populations by reducing poaching and improving human/chimpanzee co-existence. The WCF has worked closely with the Max Planck Institute for Evolutionary Anthropology (MPI-EVA) in Germany to develop monitoring techniques of chimpanzees, other large mammals and anthropogenic activities, which are summarized in the IUCN guidelines (Kühl et al., 2008). Using this methodology, the WCF has conducted many chimpanzee and large mammal surveys across West Africa, including a national survey in Guinea (WCF, 2012a) and supported a nationwide survey in Liberia (Tweh et al., 2014).

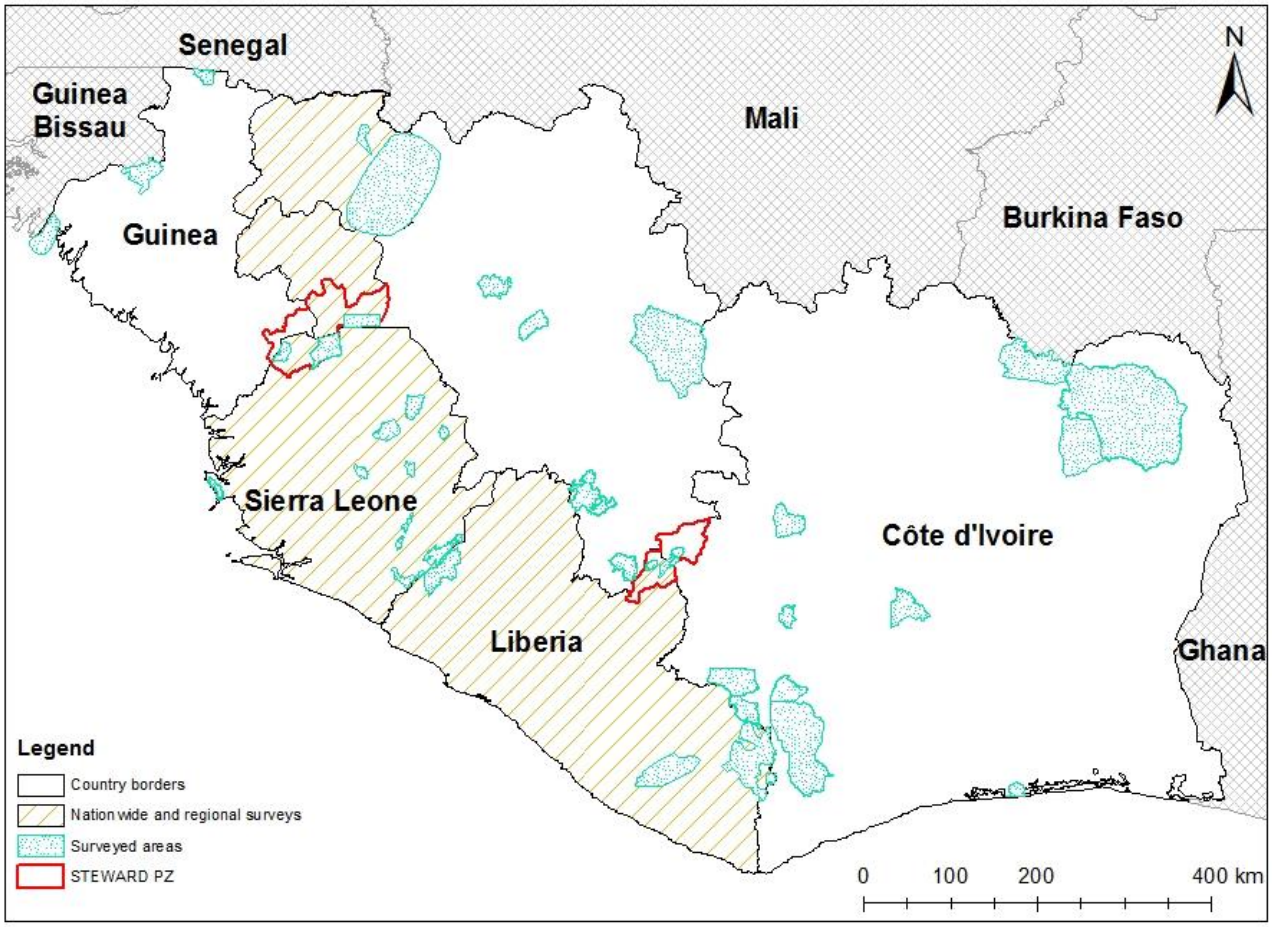
## 4. Study Area

The four MRU countries are located in the Upper Guinean Forest Ecosystem (UGFE), one of the world's 34 biodiversity hotspots (Mittermeier et al., 2004), together harbor the majority of the remaining 10% (126,500 km²) of the original extent of this ecosystem (Myers et al., 2000). The UGFE includes an estimated 9,000 plants (2,250 endemic), 514 birds (90 endemic), 551 mammals (45 endemic), 139 reptiles (46 endemic), 116 amphibians (89 endemic), adding to a total of 1,320 vertebrate species (270 endemic) (Myers et al., 2000). Many areas within the UGFE have been identified as priority zones for

the protection and conservation of chimpanzees and elephants by experts in the field (Kormos & Boesch 2003; Sebogo & Barnes, 2003). STEWARD identified two priority areas in which to develop its program: the Outamba-Kilimi National Park and Guinea Border area (OKNP-Ouré-Kaba region) and the Nimba Massif (see Figure 1). Their objectives were to 1) conserve biodiversity and improve rural livelihoods in critical transboundary landscapes in the UGFE; 2) produce harmonized policies and legal frameworks for natural resource management in a regional context; 3) contribute to sub-regional and national strategic plans on climate change in the MRU states. Both priority zones are important transboundary areas for the conservation of biodiversity (Kormos and Boesch, 2003; Sebogo and Barnes, 2003) and as such were chosen for the STEWARD program. However, additional (transboundary) areas are similarly, if not even more important for the conservation of chimpanzees and elephants across the MRU. Such areas will be discussed further in the report.

In the annual report from 2014, the activities led by STEWARD are provided in detail. We believe that key activities for the effective protection of chimpanzees and elephants include the ratification of forest and fire by-laws by six communities in Sierra Leone around PZ1; an improved agricultural scheme for 60 persons around PZ1 in Sierra Leone to prevent people from continuing slash and burn agriculture; the mapping and creation of a community forest in the Guinea border area of PZ1; and finally the development and support of 35 operational rice-fish farms around the Nimba Massif in Guinea, Liberia and Ivory Coast. Although no funds or activities appear to have gone directly into protected area management at sites known to harbor chimpanzee and elephant populations, local authorities in all four countries were trained in GIS.

**Figure 1. Map of the study area - MRU states and locations of chimpanzee nationwide/regional surveys and systematic local surveys across the study area. The map also highlights the two priority areas of the STEWARD program**




## 4.1. STEWARD PZ 1: Outamba-Kilimi and Guinea border area

The Outamba-Kilimi National Park (OKNP) is located in north-western Sierra Leone along the Guinean border and consists of savannah with open and closed savannah woodland, grasslands and gallery forests (Brncic et al., 2010). OKNP is classified as a dry ecosystem and represents an important eco-region and a centre of high biodiversity (Brncic et al., 2010). It harbours a minimum of 91 species of mammals (Grubb et al., 1998), including 11 species of primates, three of which are threatened (western chimpanzee, red colobus (*Procolobus badius*), sooty mangabey (*Cercocebus atys*)). OKNP is Sierra Leone's first and only national park (designated in 1995) besides the newly designated Gola Rainforest National Park (designated in 2010). Across the border in Guinea, about 30 km east of the town of Ouré-Kaba and just north-east of the OKNP lies the Ouré-Kaba region.This area includes two important classified forests (Soyah and Pinselly) as well as eight community forests, and 'guesstimates' from 2007 indicated that there were important populations of primates and other wildlife present in this area, although no detailed data were available due to the lack of a systematic survey (JGI, 2007, cited in WCF, 2012a).

### 4.2. STEWARD PZ 2: Nimba Massif

The Nimba Massif is shared between Côte d'Ivoire, Liberia and Guinea. All three of these countries have some of the Nimba Mountain range under protection, parts of which are classified as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site. The Mount Nimba Strict Nature Reserve is split into two distinct areas, the Reserve Naturelle Intégrale du Mont Nimba in Côte d'Ivoire (4,500 ha) and the Reserve de la Biosphere des Monts Nimba in Guinea (12,500 Ha). In Liberia, the East Nimba Nature Reserve (ENNR) was created in 2003 comprising 11,533 hectares. Overall, the area holds mountainous and rocky rainforest and is a unique landscape in the sub-region and harbors various key species, some of which are also endemic (e.g. the viviparous toad *Nectophrynoides occidentalis* and the sub species of the red-naped lark *Mirafra africana henrici*). Forest cover on the Ivorian side is relatively intact, though there is evidence of high pressure from the local populations in the periphery (Koechlin, 1998). Mining operations have been undertaken on the Liberian side which lead to important degradation of this unique habitat (Lamotte and Rougerie, 1998 cited in Lauginie, 2007). Moreover, mining operations on the Guinean side have led to a declassification of an enclave of 1,550 ha out of over 14,000 ha. We can we presume that the exploitation has put immense pressure on the forest and wildlife in this region, unless clear mitigation strategies have been put in place.

## 5. Overall conservation status of chimpanzees and elephants

Chimpanzees are listed as endangered (A4cd) on the IUCN Red List of Threatened Species (Oates, et al., 2008), in CITES Annex I, and as an endangered species under section 4 of the US Endangered Species Act. The species is one of the most threatened subspecies of the chimpanzee, having disappeared from two (Togo and Benin), and possibly three (Burkina Faso) West African countries already (Kormos and Boesch, 2003, Funwi-Gabga et al. 2013). Across the West African region, chimpanzees are threatened by hunting, deforestation, disease and the pet-trade, all the more aggravated by rapidly increasing human populations. Prior to the 2002 workshop on the West African Chimpanzee: Status Survey and Conservation Action Plan (Kormos and Boesch, 2003, Funwi-Gabga et a. 2013), relatively few in-depth surveys had been conducted, though estimates were made on a country level as to how many chimpanzees were present. Guinea was estimated to hold 8,100-29,000 chimpanzees (see Kormos et al., 2003), followed by 8,000-12,000 in Côte d'Ivoire (Marchesi et al. 1995; Herbinger et al., 2003), 1,000-5,000 in Liberia (Nisbett, et al, 2003; Teleki, 1989) and 1,500-2,500 in Sierra Leone (Teleki, 1989). Surveys done in the past eight years have allowed to update some of these estimates and are discussed in the results section.

Although the African elephant is only considered 'vulnerable' (A2a) to extinction by the IUCN Red List of Threatened Species (Blanc, 2008), as 'threatened' under the US Endangered Species Act and listed in Annex I of the CITES, the West African elephant population appears far more threatened by extinction than other population across the continent (Blanc et al., 2007), where the former was estimated to have lost up to 93% of its original population (Roth & Douglas-Hamilton, 1991). Furthermore, reports from Guinea suggest that elephants had possibly already been absent from certain areas of the country by as

early as the late 19th Century (see Leblan, 2014), more than likely due to the excessive ivory trade. The explosion of the trade in the 1980s had a devastating effect on West African elephants. For example, estimates in Côte d'Ivoire indicated that the country had lost more than 50% of its elephants to the trade within a mere 10 years (Merz & Hoppe-Dominik, 1991). Little to no recent systematic data was available for elephants in the MRU countries. The African Elephant Status Report (Blanc et al., 2007) provided estimates for each country, however, most of these were of low quality and thus total population numbers were classified as 'possible' or 'speculative'. The report states that in 2006, there were a possible 965 elephants in Côte d'Ivoire, 1,676 in Liberia, 215 in Sierra Leone, and 136 in Guinea.

# 6. Methods

Data was taken from publicly available records, unpublished reports and from questionnaires sent to elephant, chimpanzee and conservation experts who have worked in the MRU region in recent years. We only used data from the past eight years (2007 – 2014), so as to correspond to the years of STEWARD-led conservation activities. We chose to use data based on systematic surveys over other data in given sites when the former were available. Using Arc GIS 10, we plotted the locations of surveys, STEWARD priority zones and hotspots for the conservation of chimpanzees and elephants identified from the data of this study across the MRU countries. To identify hotspots, we used a ranking system that took into account chimpanzee abundance, elephant abundance and presence/absence, and the overall size of the area.

# 7. Results

## 7.1. MRU at a glance

In the past eight years, many detailed surveys have allowed for more robust estimates of chimpanzee population size and elephant distribution (i.e., presence-absence data). A full list of data and surveys discussed in this report is presented in Appendix 1 – List of data and survey reports used. Figure 1 (see page 7) shows the four MRU countries and depicts the nationwide/regional surveys that have been led in recent years, the objectives of which were to update the national status of chimpanzees in each country, identify their current threats, and identify priority zones for conservation defined as areas with higher chimpanzee abundance (Brncic et al., 2010; WCF 2012a; Tweh et al., 2014). A follow-up of a survey done on a national level (Marchesi et al., 1995) to estimate population trends was also led between 2006 - 2007 in 11 sites across Côte d'Ivoire (Campbell et al., 2008). This study showed that since 1989-1990, Côte d'Ivoire's chimpanzee population had declined by more than 90%. Results of this survey are discussed in chapter 7.2 in more detail. In Guinea, surveys conducted between 2010 and 2012 focused at the Fouta Djallon region (40,508 $km^2$), protected areas, and described biodiversity hotspots (WCF, 2012a). With an estimated 17,751 chimpanzees (95% CI= 8127– 40,575 chimpanzees) found in the FDBR region (WCF, 2012a), this survey confirmed the largest chimpanzee population in West Africa. .

Contrary to previous guesstimates, which, for Liberia, were relatively low (1,000 - 5,000 chimpanzees; Kormos et al., 2003), the results of the nationwide survey in Liberia showed that this country still holds the second largest and a widely distributed population of exclusively forest dwelling West African chimpanzees (7,008 chimpanzees; 95% CI= 2,974–8,559). However, the study also showed that chimpanzee density outside of protected areas was relatively low (0.058 individuals/km²; 95% CI = 0.034–0.097; Tweh et al., 2014).

The nationwide Sierra Leone survey in 2009- 2010, estimated a similarly widely dispersed population of chimpanzees including 5,580 individuals (95% CI= 3,052-10,446), with a similarly low density across the country outside protected areas of 0.03 individuals/km² (Brncic et al., 2010). Only two protected areas in Sierra Leone had a relatively high density of chimpanzees, namely Outamba and Loma (1.12 individuals/km² and 2.69 individuals/km², respectively, Brncic et al., 2010). Further discussion on these surveys is provided in the respective country chapters. In comparison, no comparable nationwide surveys have been conducted to provide population estimates for elephants in the four MRU countries.

## 7.2. Côte d'Ivoire

Numerous chimpanzee and elephant population surveys have been conducted across Côte d'Ivoire in the past eight years and are presented in Table 1 and the locations are shown in Figure 2. The data discussed below were extracted from the most recent data sets available, and mostly from systematic surveys that followed the IUCN monitoring guidelines (Kühl et al., 2008) and if not from recce surveys.

### 7.2.1. Chimpanzees

The presence of chimpanzees in the past eight years is confirmed in 11 areas across the country where the most important populations appear to be in Taï National Park (345 chimpanzees in 2014, 95% CI = 203- 585 chimpanzees, Number 11 in Figure 2, WCF/OIPR 2014) and in the Mount Nimba Integral Reserve (63 chimpanzees in 2010, 95% CI = 30- 130 chimpanzees, Number 8 in Figure 2; WCF, 2010a). Data from Mount Nimba Integral Reserve is based on a systematic survey over 45 km² along 13 km of line transects. In Taï National Park, an annual biomonitoring program was put in place since 2005, which uses the same survey design of 368 km of line transects evenly distributed across the park, which is 4,560 km² in size (WCF/OIPR, 2013). The annual systematic monitoring of the entire park allows park managers and project partners to receive detailed information on distribution, abundance and density of all large mammal species, habitat type and human threats and their trends over time, thus providing an effective tool for adaptively managing this protected area and improving patrols in priority sites where necessary (Kouakou et al. 2009, 2011, Campbell et al. 2011, N'Goran et al., 2012). In 2003, Kormos and Boesch estimated more than 4,500 chimpanzees to be present in the park based on data collected by Marchesi et al. (1995). After several years of biomonitoring, we know that Taï National Park now holds only slightly more than 300 chimpanzees (WCF/OIPR, 2013): a major decline in numbers in only 15 years. Furthermore, civil crisis and periods of no-funding for law enforcement patrols in the park has led to a further 36 % reduction of the population in a period of just three years (Kühl et al,. in prep.), although since 2012, the population appears to have remained stable (WCF/OIPR, 2013). Similarly in the classified forests of Goin-Débé and Cavally, west of Taï National Park, initial

surveys in 2007 and 2009, respectively, indicated a population of more than 250 chimpanzees in total, which dropped to less than 80 individuals only 2 years later (WCF, 2010b). These declines were largely due to the bushmeat trade and habitat degradation, but also due to the lack of continuous funding for core management activities in these forest areas.

Other types of surveys were done in some of the listed areas in Table 1. In 2013, rapid surveys were conducted in Azagny National Park, Marahoué National Park, Mont Péko National Park and Mont Sangbé National Park (WCF, 2013a). During these surveys, recces were walked in zones thought to harbor chimpanzee populations based on results from previous surveys (WCF, 2007; WCF, 2008; Herbinger and Lia, 2001a and b, respectively). Details on survey effort and area are provided in Appendix 1. Note that the most recent recce survey from 2013 found **no signs** of chimpanzees in the Marahoué National Park, an area that once probably held an important population of chimpanzees (Marchesi et al., 1995). In 2014, sightings of nests were made in the north-east of the country around Boundiale Classified Forest (H. Cohen, Pers comm). The 2002 West African Chimpanzee: Status Survey and Conservation Action Plan (Kormos et al., 2003) confirmed the presence of chimpanzees in 27 other locations, based on surveys done by Hoppe-Dominik in 1988 (Hoppe-Dominik, 1991) and Marchesi and colleagues in 1989-1900 (Marchesi et al, 1995). To the knowledge of the authors, no follow-up surveys were conducted in any of the other locations, other that Campbell et al (2008) who did surveys in 11 of the 27 sites. As such, for the other locations across Côte d'Ivoire we refrain from speculating about the presence or absence of chimpanzees in these sites. As for the results from Campbell et al (2008), they found a 90% decline in chimpanzee numbers across Côte d'Ivoire in a period of 17 years, So the probability to find chimpanzees is the other 16 places is very low.

### 7.2.2. Elephants

Few robust data are available that would allow for estimating elephant population status in Côte d'Ivoire (Table 1). The biomonitoring data from the Taï National Park (WCF/OIPR, 2013) showed that the park holds the potentially most important population of elephants in the country, with an estimated 148 individuals (95% CI = 90– 243 elephants). This population has remained relatively stable over the past 10 years. In the neighboring classified forests of Goin-Débé and Cavally, past reports indicated the presence of elephants in the two forests, where this population may potentially even link up to the Cavalla River Forest in Liberia (Awo, pers. Comm., cited in AfESG, 2013). However, no signs of elephants were found in four studies carried out in both forests between 2007- 2010 (WCF, 2010b). In 2008, Marahoué National Park had an estimated population of 24 elephants (WCF, 2008), as compared to an estimate in 2002 of 159 elephants (Eggert, 2004). Additionally, during the 2013 rapid survey, only 8 old signs of elephant presence were found, including three carcasses (WCF, 2013a). In Mont Péko National Park, only two presence signs of elephants were detected during the rapid survey. Azagny National Park is likely to still hold a small population of elephants, with 24 observations of signs of presence made during the 2013 rapid survey (WCF, 2013a). Other likely small populations of elephants are located in the Comoé National Park, confirmed by recent images caught on camera traps in the adjoining area of GEPRENAF (Tickle, A. *Pers. Comm.*), although no elephants were observed in the same area during the aerial surveys of 2010 and 2014 (WCF/OIPR 2010b and 2014b). No signs of

elephant were ever recorded inside Mount Nimba Integral Reserve, (Lauginie, 2007) and so we are confident that elephants are absent from this area. Despite intense habitat degradation other small populations may still survive in some areas, such as the Bossematié Classified Forest (Lapuente J. Pers. comm). Nonetheless, these populations are highly threatened as the habitat is disappearing because of the encroachment of cocoa farmers (Lapuente, J. *Pers. Comm*.). Many recent reports in Côte d'Ivoire have highlighted the pressure on elephants with an increase in conflicts with farmers (Ministère des Eaux et Forêts, Cote d'Ivoire, *Pers. Comm*).

**Figure 2. Map of Côte d'Ivoire showing locations of chimpanzee- and elephant surveys conducted since 2007 from which we could extract data for this report**

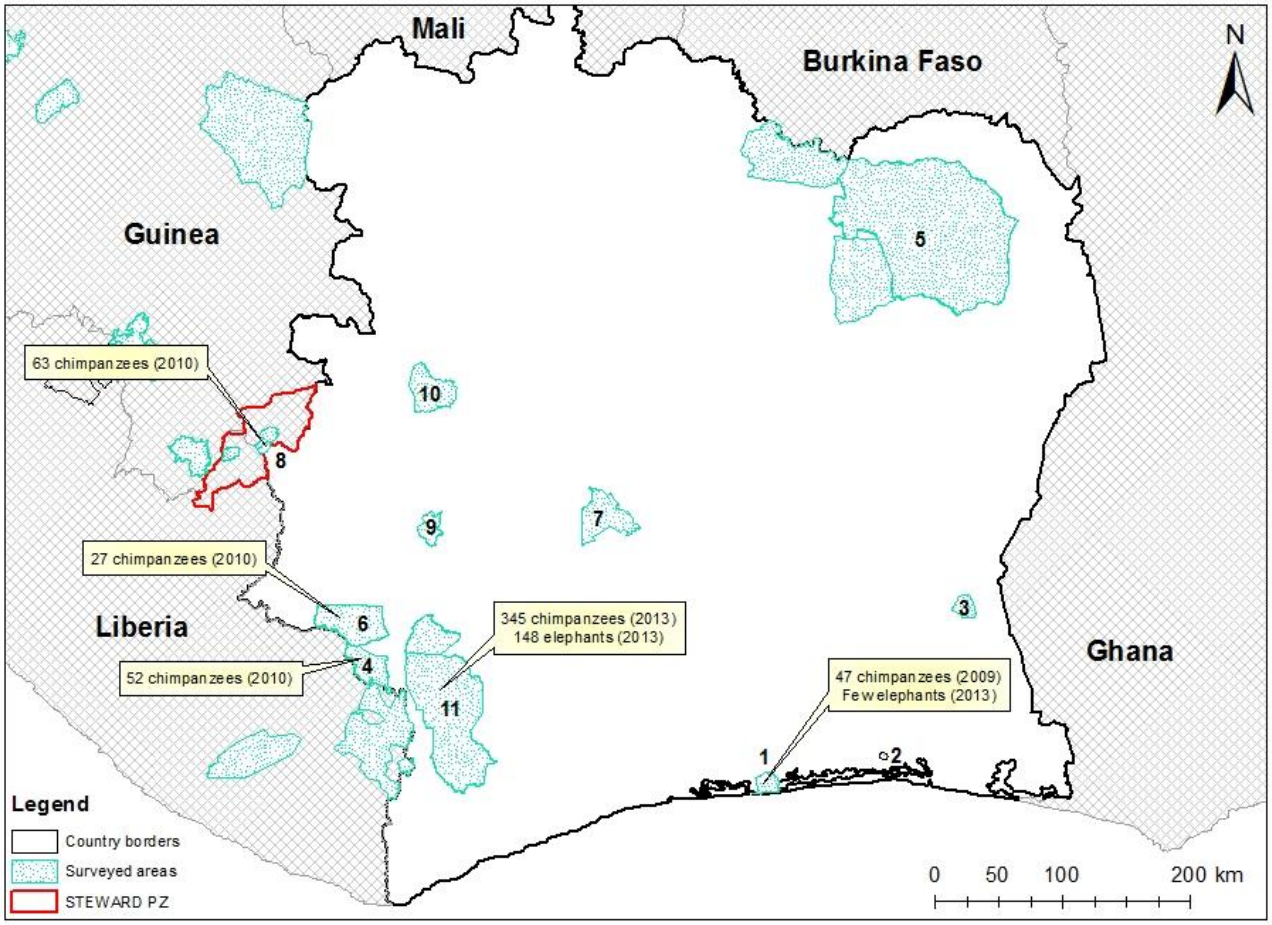


**Table 1. Chimpanzee and elephant encounter rates and population estimates for surveyed areas in Côte d'Ivoire between 2007 and 2014 (N/A stands for not-applicable, i.e. the observations were not sufficient to calculate population estimate or the survey method did not allow for this; "-"stands for no signs found during survey ). (All data taken from WCF 2007, WCF/OIPR 2008, 2009a WCF 2010a, WCF 2010b, WCF 2013, WCF/OIPR 2014)**

| N° | Surveyed Area | Year | Chimpanzees | | | | Elephants | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | |
| | | | | | Min | Max | | | Min | Max |
| **Côte d'Ivoire** | | | | | | | | | | |
| 1 | Azagny National Park | 2007; 2013* | 1.20 | 47 | 18 | 125 | 1.00 | N/A | N/A | N/A |
| 2 | Banco National Park | 2008 | 0.03 | 12 | N/A | N/A | 0.00 | - | - | - |
| 3 | Bossématié Classified Forest | 2010* | 0.10 | N/A | N/A | N/A | 1.32 | N/A | N/A | N/A |
| 4 | Cavally Classified Forest | 2010 | 0.49 | 52 | 28 | 96 | 0.00 | - | - | - |
| 5 | Comoé National Park | 2009, 2014 | 0.40 | N/A | N/A | N/A | 0.00 | - | - | - |
| 6 | Goin Débé Classified Forest | 2010 | 0.14 | 27 | 13 | 57 | 0.00 | - | - | - |
| 7 | Marahoué National Park | 2013* | 0.00 | - | - | - | 0.30 | N/A | N/A | N/A |
| 8 | Mount Nimba Integral Reserve | 2010 | 9.31 | 63 | 30 | 130 | 0.00 | - | - | - |
| 9 | Mount Péko National Park | 2013* | 0.40 | N/A | N/A | N/A | 0.20 | N/A | N/A | N/A |
| 10 | Mount Sangbé National Park | 2013* | 0.70 | N/A | N/A | N/A | 0.00 | - | - | - |
| 11 | Taï National Park | 2013 | 0.49 | 345 | 203 | 585 | 1.68 | 148 | 90 | 243 |

*data is based on rapid surveys

### 7.2.3. Anthropogenic threats

All surveys conducted over the past eight years, also recorded data on anthropogenic threats, with encounter rates ranging from 0.15 signs of human activity/km to 19.05 signs/ km (Table 2). Although hunting intensity is high across Côte d'Ivoire, human encroachment on protected areas is one of the main causes of chimpanzee population decline, due to the recent 50% increase in human population (Campbell et al., 2008). Clear patterns emerge from Mont Peko and Marahoué National Parks where the majority of forest was destroyed for agriculture, mainly cocoa plantations (WCF, 2013a).

**Table 2. Encounter rates of anthropogenic threats in surveyed areas in Côte d'Ivoire between 2007 and 2014 ("-" means no information available). (All data were extracted from WCF 2007, WCF/OIPR 2008, 2009a WCF 2010a, WCF 2010b, WCF 2013a, WCF/OIPR 2014)**

| N° | Surveyed Area | Year | Encounter rate | | |
|---|---|---|---|---|---|
| | | | Anthropogenic Pressure against Flora (signs/km) | Anthropogenic Pressure against Fauna (signs/km) | Overall Anthropogenic Pressure (signs/km) |
| **Côte d'Ivoire** | | | | | |
| 1 | Azagny National Park | 2009; 2013* | 1.4 | 2.26 | 3.66 |
| 2 | Banco National Park | 2008 | 4.71 | 1.51 | 6.22 |
| 3 | Bossématié Classified Forest | 2010* | - | - | - |
| 4 | Cavally Classified Forest | 2010 | 2.02 | 1.87 | 3.89 |
| 5 | Comoé National Park | 2009 | 0.29 | 0.43 | 0.72 |
| 6 | Goin Débé Classified Forest | 2010 | 2.45 | 1.81 | 4.26 |
| 7 | Marahoué National Park | 2013* | 14.02 | 0.87 | 14.89 |
| 8 | Mount Nimba Integral Reserve | 2010 | 0.15 | 2.46 | 2.61 |
| 9 | Mount Péko National Park | 2013* | 13.46 | 5.58 | 19.04 |
| 10 | Mount Sangbé National Park | 2013* | 5.77 | 0.8 | 6.57 |
| 11 | Taï National Park | 2013 | 0.33 | 1.60 | 1.93 |

In conclusion, Côte d'Ivoire was once believed to hold one of the most important populations of chimpanzees, inhabiting a variety a different habitats, ranging from tropical forests to open savannahs. Human encroachment has increased into many of these areas, in turn resulting in significant declines of chimpanzees and elephants. Campbell et al. (2008) estimated a > 90% decline in Côte d'Ivoire's chimpanzee population over a period of only 17 years with some areas potentially absent of chimpanzees. It is evident that conservation efforts must be stepped-up in the few remaining areas with the chimpanzee populations to ensure their long-term survival in this country.

## 7.3. Liberia

Detailed surveys for elephants and chimpanzees across Liberia are few and far between (Table 3). To our knowledge, four areas have been surveyed systematically in the past eight years: Sapo National Park, proposed Grebo and Gola National Parks and West Nimba Reserve, (Figure 4). In addition to this, a nationwide survey for chimpanzees between January 2011 and May 2012; (described in more detail in section 7.1) was carried out. During this survey elephant presence was also recorded on line transects. Prior to these surveys, information on chimpanzee status was mostly based on opportunistic direct or indirect observations of their presence and reports of chimpanzee presence by hunters and other members of local communities (see Nisbett et al. 2003). The data that we show in this report were extracted from systematic surveys that followed the IUCN guidelines (Kühl et al., 2008) for chimpanzees and elephants.

### 7.3.1. Chimpanzees

Tweh et al. (2014) confirmed chimpanzee presence widely across the country, with most of their populations located in two large forest blocks in the southeast and northwest of Liberia (Figure 3). Interestingly, some populations appear to be found outside of Protected Areas or even proposed protected areas. Three of the detailed surveyed areas are located in these two forest blocks. Details on survey effort and area are provided in Appendix 1. Sapo National Park in southeast Liberia (Figure 5) holds the most important population with an estimated 1,079 (95% CI= 713– 1633) chimpanzees present (WCF, 2010c). In neighboring Grebo National Forest, which is also a 'Proposed National Park', 412 chimpanzees (95% CI= 216– 787 chimpanzees) were estimated to be present in 2012 (WCF, 2012b). Continued annual monitoring in the proposed park area of the forest has shown a relatively stable population (247 chimpanzees, 95% CI= 155– 396; WCF, 2014a). A survey was also conducted in the Proposed Gola National Park (located in the northwestern forest block of the country) between April 2011 and July 2012 (Hillers, unpublished data, cited in Tweh et al., 2014). The researchers found a chimpanzee population of approximately 94 individuals (95% CI = 39-225). A fourth systematic survey was lead in the West Nimba Nature Reserve, another proposed protected area of Liberia. The data collected during this survey, however, did not allow for estimating chimpanzee population size due to the low nest encounter rates (WCF/ACBCI, 2012). Surveys have been done in recent years in the East Nimba Nature Reserve, and signs of presence of probably 3-4 chimpanzee communities were detected (Junker J. Pers. comm.). The 2002 West African Chimpanzee: Status Survey and Conservation Action Plan (Kormos et al., 2003) cites 29 confirmed sites where chimpanzees were assumed to be present. The nationwide survey shows signs of chimpanzee presence in these areas and chimpanzee abundance estimates were calculated based on the nationwide spatial chimpanzee abundance model (GLM) (Junker et al. in review) (Figure 4). These areas were ranked from 1 to 21 by the author in terms of chimpanzee abundance, mammal diversity and their IUCN weight and tree diversity. The priority 1 for Liberia according to this model is located to the north-west of Sapo National Park, thought to hold more than 1,000 chimpanzees. This area corresponds quite well to the original limits of the Krahn-Bassa and Gibi National Forests. Currently, this area is under no protection and it is thus of the utmost

importance to investigate further to see how to protect this area and possibly link it to Sapo National Park.

**Figure 3. Map showing the spatial distribution of chimpanzees across Liberia taken from Tweh et al., 2014 (Red dots show signs of presence of chimpanzees recorded during nationwide survey, highlighting the extent of chimpanzee presence outside Protected areas of proposed protected areas)**

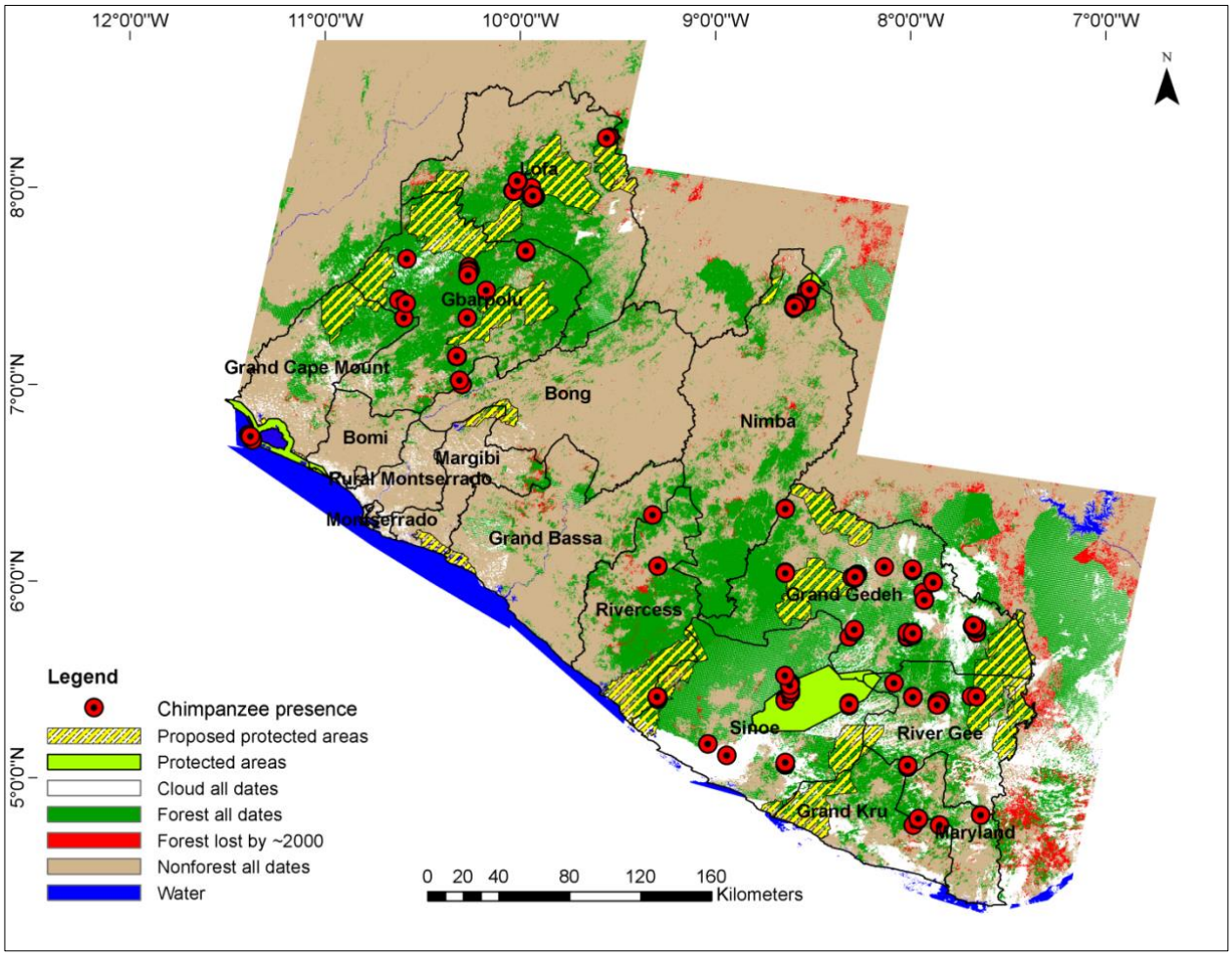
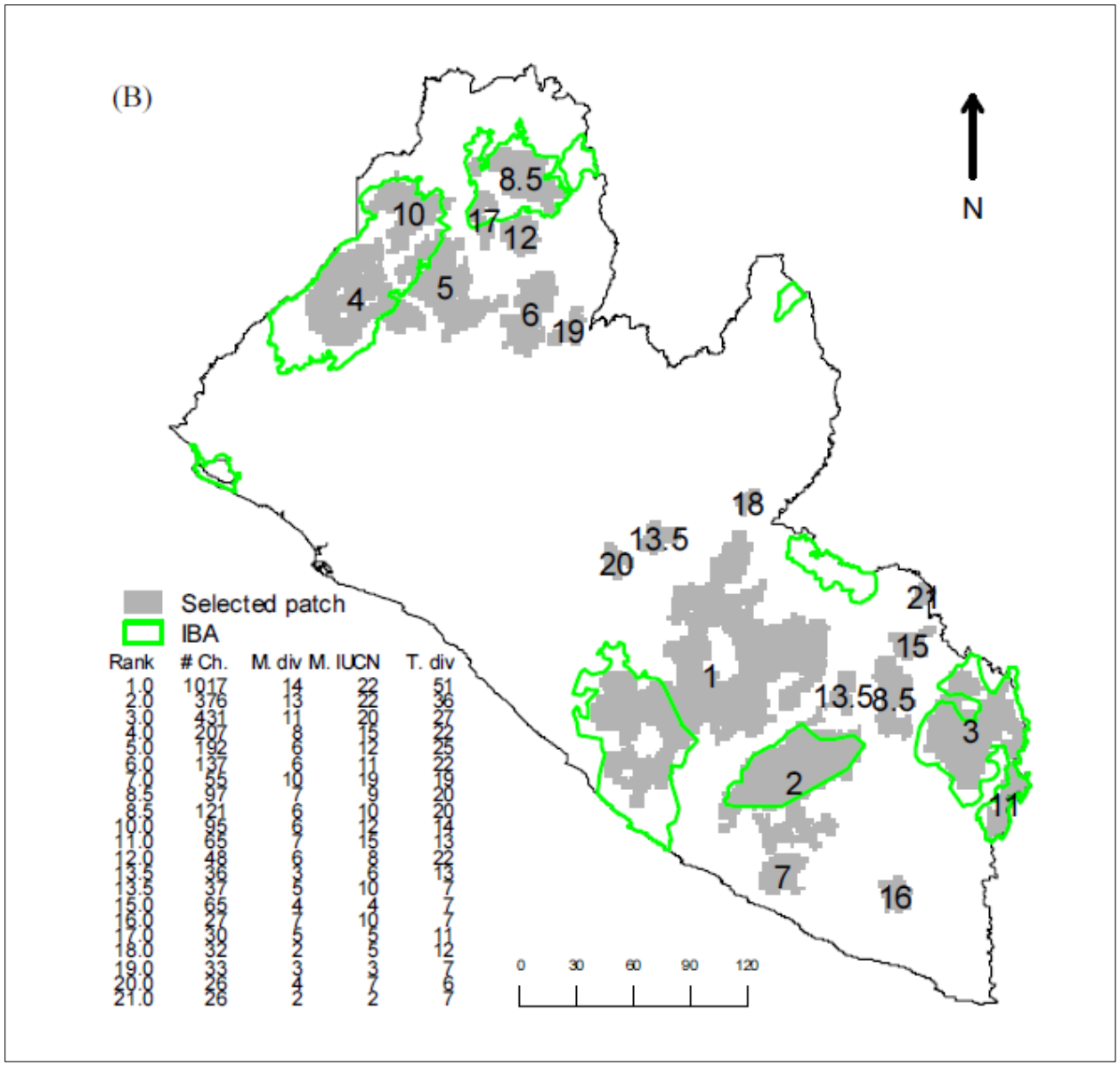


**Figure 4. Chimpanzee's presence and abundance ranked in 21 different patches in Liberia as produced by a spatial model analyses based on GLMs and human impact and environmental variables of the nationwide survey (Junker et al. in review)**




| Rank | # Ch. | M. div | M. IUCN | T. div |
|---|---|---|---|---|
| 1.0 | 1017 | 14 | 22 | 51 |
| 2.0 | 376 | 13 | 22 | 36 |
| 3.0 | 431 | 11 | 20 | 27 |
| 4.0 | 207 | 8 | 15 | 22 |
| 5.0 | 192 | 6 | 12 | 25 |
| 6.0 | 137 | 6 | 11 | 22 |
| 7.0 | 55 | 10 | 19 | 19 |
| 8.5 | 97 | 7 | 9 | 20 |
| 8.5 | 121 | 6 | 10 | 20 |
| 10.0 | 55 | 6 | 12 | 14 |
| 11.0 | 65 | 7 | 15 | 13 |
| 12.0 | 48 | 6 | 8 | 22 |
| 13.5 | 36 | 3 | 6 | 13 |
| 13.5 | 37 | 5 | 10 | 7 |
| 15.0 | 65 | 4 | 4 | 7 |
| 16.0 | 27 | 7 | 10 | 7 |
| 17.0 | 30 | 5 | 5 | 11 |
| 18.0 | 32 | 2 | 5 | 12 |
| 19.0 | 33 | 3 | 3 | 7 |
| 20.0 | 26 | 4 | 7 | 6 |
| 21.0 | 26 | 2 | 2 | 7 |

### 7.3.2. Elephants

Unlike for chimpanzees, no nationwide survey has been undertaken specifically for the elephant population of Liberia. Nonetheless, since 2007, we can confirm the presence of elephants in Sapo National Park (Boafo and Sani, 2011), proposed Gola National Park (Hillers, 2013), East Nimba Nature Reserve (Junker, J. et al, under review) and proposed Grebo National Park (WCF, 2014a). Moreover, during the nationwide survey, only a few signs of presence of elephants were recorded in different areas of the country (Fig 5). Only the study in Sapo National Park had collected sufficient data to estimate population size (124 individuals, 95% CI= 44 – 242 elephants, Boafo and Sani, 2011), with a density of 0.2 individuals/ km² (Table 3). To our current

knowledge, Sapo National Park is thus more than likely to hold the highest population of elephants in Liberia, though the western border with Guinea would need to be investigated further to confirm this.

**Figure 5. Map of Liberia showing locations of chimpanzee- and elephant surveys conducted since 2007 from which we could extract data for this report**

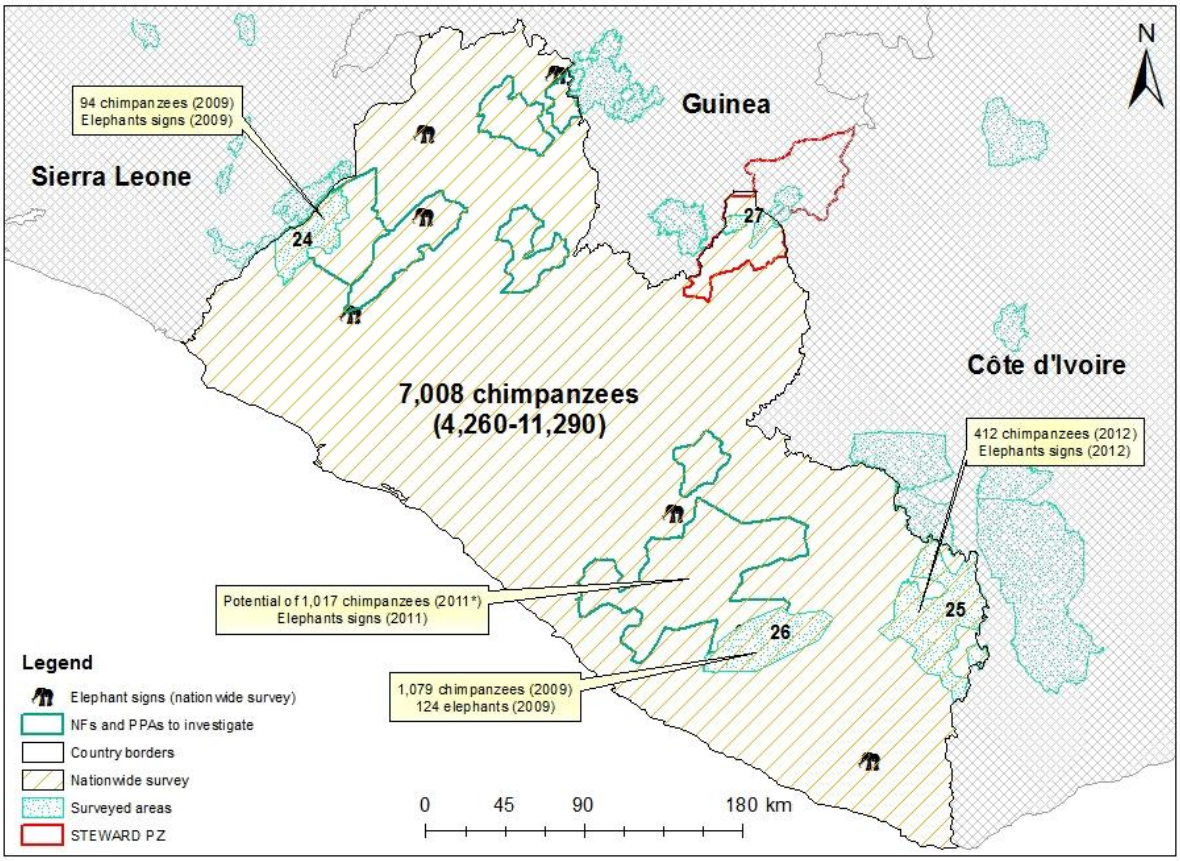


**Table 3. Chimpanzee and elephant encounter rates and population estimates for surveyed areas in Liberia between 2007 and 2014 ("-" stands for data not available, N/A stands for not-applicable, i.e. the observations were not sufficient to calculate population estimate or the survey method did not allow for this;). (All data were extracted from WCF 2010c, WCF 2011, WCF 2014a, Hillers, 2013, Tweh et al., 2014)**

| N°. | Surveyed Area | Year | Chimpanzees | | | | Elephants | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | |
| | | | | | Min | Max | | | Min | Max |
| **Liberia** | | | | | | | | | | |
| 21 | Gola National Forest | 2013* | - | 94 | 39 | 225 | - | - | - | - |
| 22 | Grebo national forest | 2012 | 0.11 | 412 | 216 | 787 | 0.26 | *15* | N/A | N/A |
| 23 | Sapo National Park | 2009 | 5.07 | 1079 | 713 | 1633 | 1.69 | 124 | 44 | 242 |
| 24 | West Nimba Forest | 2010 | 0.47 | N/A | N/A | N/A | 0.47 | N/A | N/A | N/A |
| Liberia nationwide | 2010-2012 | 0.13 (logging) 0.04 (NTFP extraction) | 1.32 (gun & snare hunting) | 1.49 | Liberia nationwide (unprotected) | 2010-2012 | 0.13 (logging) 0.04 (NTFP extraction) | 1.32 (gun & snare hunting) | 1.49 | Liberia nationwide (unprotected) |

### 7.3.3. Anthropogenic threats in Liberia

The nationwide survey done in Liberia showed that at the time of the survey, hunting appeared to be the most severe and common threat to wildlife across the country (Tweh et al., 2014). It is likely, however, that the development of large-scale mining, logging, and industrial agricultural concessions will have devastating effects on both the chimpanzee and elephant populations across the country, if these activities are not controlled and managed sustainably (Tweh. et al. 2014). Table 4 shows the available data related to anthropogenic threats in the surveyed areas, with hunting pressure notably high.

**Table 4. Mean encounter rates of anthropogenic threats in surveyed areas in study areas in Liberia between 2007 and 2014 ("-" stands for data not available). (All data were extracted from WCF 2010c, WCF 2011, WCF 2012b, Hillers, 2013, Tweh et al., 2014).**

| N° | Surveyed Area | Year | Encounter rate | | |
|---|---|---|---|---|---|
| | | | Anthropogenic Pressure against Flora (signs/km) | Anthropogenic Pressure against Fauna (signs/km) | Overall Anthropogenic Pressure (signs/km) |
| **Liberia** | | | | | |
| 24 | Gola National Forest | 2013 | - | - | - |
| 25 | Grebo national forest | 2012 | 0.94 | 2.34 | 3.28 |
| 26 | Sapo National Park | 2009 | 0.86 | 0.386 | 1.25 |
| 27 | West Nimba Forest | 2010 | 5.49 | 4.51 | 10.00 |
| | Liberia nationwide (unprotected) | 2010-2012 | 0.13 (logging)<br>0.04 (NTFP extraction) | 1.32 (gun & snare hunting) | 1.49 |

In conclusion, recent data show that Liberia holds the largest population of exclusively forest-dwelling West African chimpanzees and the second largest (after Guinea) population of chimpanzees in West Africa (Tweh et al. 2014). However, more than 70% of the chimpanzees in Liberia occur outside of protected areas and their long-term survival is threatened by hunting, as well as future plans for extensive resource development (Junker et al., under review). For example, bushmeat surveys in two counties (Grand Gedeh and River Gee) in Liberia showed that 72% of the total animal protein consumed daily by humans in these areas consisted of bushmeat (WCF, 2013b). Greengrass (2011) noted the capturing of 82 chimpanzees in two camps near Sapo National Park - a remarkably high number in human communities that previously stated that eating chimpanzees is a taboo in the area. In comparison, hunting of elephants was not reported for more than two decades in the communities approached by Greengrass around the Sapo National Park, though some elephant hunters were reported in Sapo NP in 2010 (J. Junker, *Pers. Comm.*) and local hunters in the north-west of Liberia reported that some elephant hunters were present in the area in 2010 as well (*J. Junker, Pers. Comm.*).

## 7.4. Sierra Leone

We are aware of only a few research projects that were conducted on chimpanzees and elephants in Sierra Leone over the past eight years. Therefore, all data we present in this report for Sierra Leone is based on a detailed nationwide survey led by the Tacugama Chimpanzee Sanctuary (Brncic et al., 2010) in 2009- 2010 (Table 5). Within protected areas, survey effort was higher than outside protected areas, but the entire country was surveyed using a systematic transect design and data were collected following Kühl et al. (2008). Data on elephants were also collected during the survey when these were observed. Details on survey effort and areas surveyed are provided in Appendix 1.

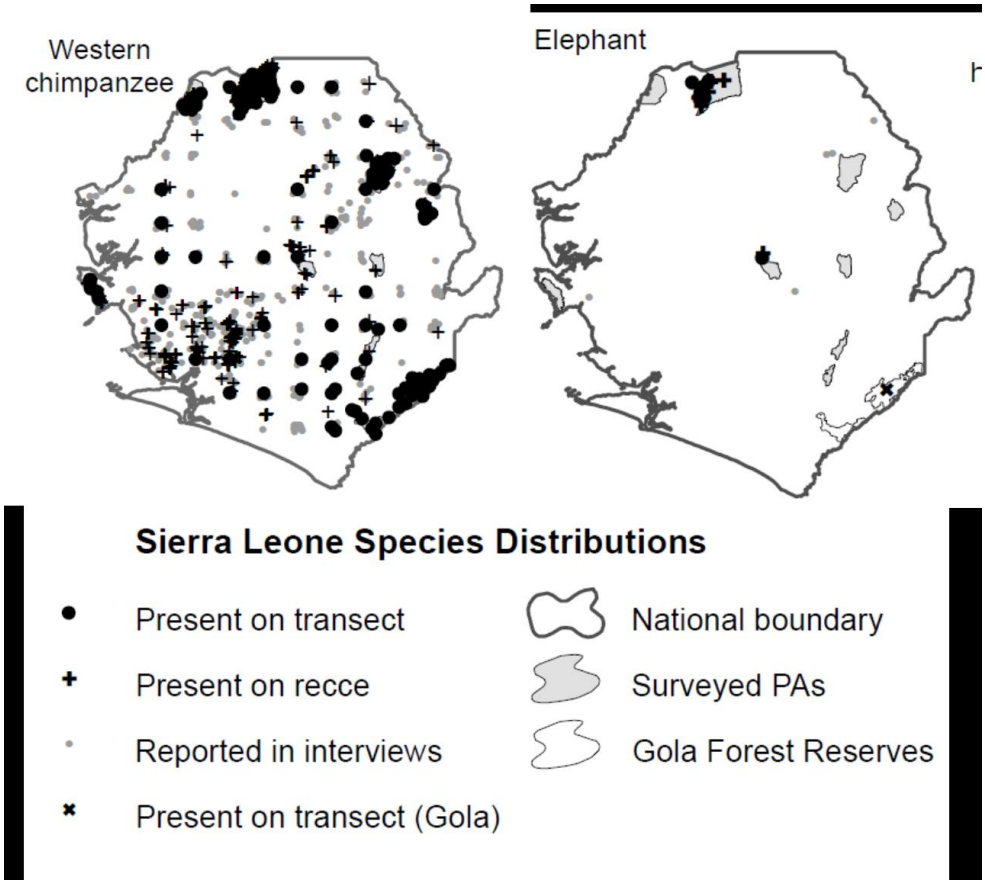
### 7.4.1. Chimpanzees

The presence of chimpanzees can be confirmed in five different protected areas in Sierra Leone (Figure 7), with the largest populations found in Loma Forest Reserve (1,065 individuals, 95% CI= 572– 1,986 individuals) and OKNP (1,025 individuals, 95% CI= 658– 1,596; Brncic et al., 2010). Total chimpanzee population size in Sierra Leone was estimated at 5,580 individuals (95% CI= 3052– 10,446 individuals). Thus, Loma Forest Reserve and OKNP are home to 37.5% of the remaining chimpanzee population in the country, making these two areas priorities for future chimpanzee conservation (Brncic et al, 2010).

More than half (54.8%) of Sierra Leone`s chimpanzee population are located outside of protected areas. The encounter rate for chimpanzees outside of protected areas was estimated at 0.39 nests/km over an area of 69,363 $km^2$ (Brncic et al., 2010). These results show that chimpanzees are distributed throughout most of Sierra Leone, but outside of protected areas, their density drops drastically to 0.03 chimpanzees/ $km^2$ as compared to 0.67/$km^2$ inside forest reserves. Although protected areas had higher chimpanzee densities than unprotected areas, none of the protected areas had chimpanzee densities comparable to the Loma Forest Reserve (2.69 individuals/$km^2$) and the OKNP (0.97 individuals/$km^2$), which were recorded to have the highest densities in the entire country (Table 5).

In the 2002 West African Chimpanzee: Status Survey and Conservation Action Plan (Kormos et al, 2003), only nine sites were confirmed to have chimpanzees present, all of which were surveyed during the nationwide study. The location of the observation of chimpanzees and elephants are presented in Figure 6 (taken from Brncic et al., *In press*). It shows how signs of presence of chimpanzees were recorded all over the country recorded on 29% of the transects done in non-protected areas. In Outamba where the majority of chimpanzee signs were encountered, 93% of the transects surveyed presented chimpanzee signs.

**Figure 6. Maps showing the core distributional range area for chimpanzees population in Sierra Leone base on the nationwide survey data from 2010s (Brnic et al, accepted)**




### 7.4.2. Elephants

The Elephant database (AfESG), estimated total elephant population size for the country at 195 elephants distributed across four protected areas (Bagbe River Forest, Gola East Forest Reserve, Gola North Forest Reserve, OKNP). However, these estimates were partially based on data as old as 1987 (Grubb et al., 1998) and/or non-systematic data/informed guesses (Barnes et al., 2006). As far as we know, the study by Brncic et al. (2010) is the only study that recorded recent information on elephant distribution and abundance in Sierra Leone. The data collected confirm elephant presence in OKNP and allow for estimating an elephant sign encounter rate of 0.2 signs/km. Unfortunately, data were insufficient to calculate a population estimate for this area. The authors estimate that it is a few individuals, highly threatened as it was reported that in 2009, several elephants were killed inside Outamba (Brncic, 2010). Signs of elephants were recorded on 2% of the transects in the Non-Protected areas, all of which were located next to Kangari Hills (Brnic et al, accepted). The authors evaluate the population size to be only a few individuals living in the Kangari Hills (Brncic, 2010). There were no other signs of presence found during the nationwide survey, however interviews with local populations reported that

elephants were still present in other areas (Figure 6). Lastly, unlike on the Liberian side, no signs of elephants were observed over the past 8 years inside the Gola Forest on the Sierra Leonean side of the border (Hillers, *Pers. Comm.*).

**Figure 7. Map of Sierra Leone showing locations of chimpanzee- and elephant surveys conducted since 2007 from which we could extract data for this report**

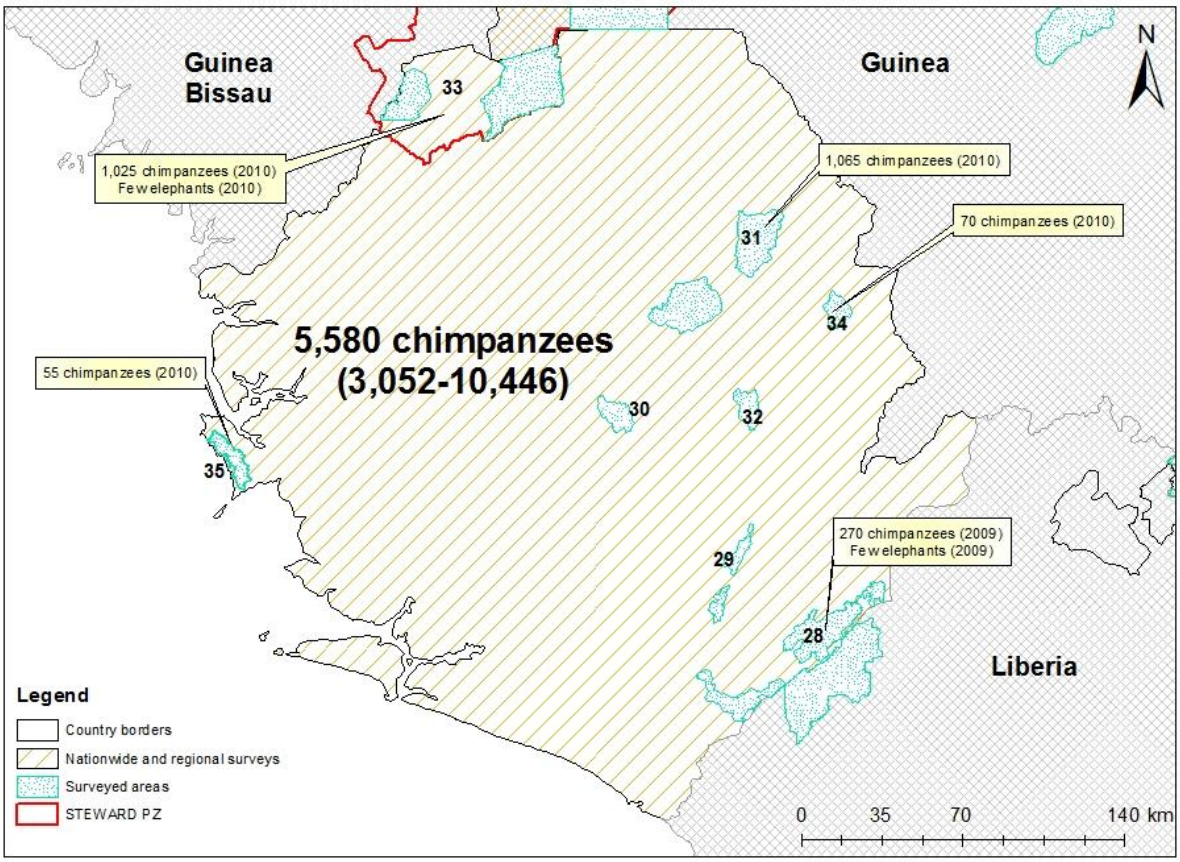


**Table 5. Chimpanzee and elephant encounter rates and population estimates for surveyed areas in Sierra Leone between 2007 and 2014 (N/A stands for not-applicable, i.e. the observations were not sufficient to calculate population estimate or the survey method did not allow for this; '-"stands for no signs found during survey). (All data were extracted from Brncic et al., 2012)**

| N° | Surveyed Area | Year | Chimpanzees | | | | Elephants | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | |
| | | | | | Min | Max | | | Min | Max |
| **Sierra Leone** | | | | | | | | | | |
| 28 | Gola Forest Reserve | 2010 | 0.82 | 270 | 159 | 468 | - | - | - | - |
| 29 | Kambui Hills Forest Reserve | 2010 | 0.20 | N/A | N/A | N/A | - | - | - | - |
| 30 | Kangari Hill Non-Hunting Forest Reserve | 2010 | 0.00 | - | - | - | - | - | - | - |
| 31 | Loma Forest Reserve | 2010 | 8.27 | 1065 | 572 | 1986 | - | - | - | - |
| 32 | Nimini Hills North Forest Reserve | 2010 | 0.00 | - | - | - | - | - | - | - |
| 33 | Outamba-Kilimi National Park | 2010 | 6.08 | 1025 | 658 | 1596 | 0.60 | N/A | N/A | N/A |
| 34 | Tingi-Hills Non-Hunting Forest Reserve | 2010 | 1.91 | 70 | 22 | 213 | - | - | - | - |
| 35 | Western Area Peninsular Forest Reserve | 2010 | 1.11 | 55 | 15 | 209 | - | - | - | - |
| | Nationwide (unprotected) | 2010 | N/A | 2040 | 1073 | 3864 | - | - | - | - |

### 7.4.3. Anthropogenic Threats

Quantitative data on anthropogenic threats were presented for the different areas in Sierra Leone in Brncic et al., accepted. Kambui Hills shows the highest overall levels of anthropogenic pressure with 7.3 signs/ km (Table 6), with 64% being logging signs within the reserve followed by the Western Area Peninsula and Kangari Hills. The Outamba part of the OKNP, is by far, the less threatened area with an encounter rate of all anthropogenic activities of 0.12 signs/km, whereas as Kilimi presented 1.12 signs/km (see Table 6).

**Table 6. Encounter rates of anthropogenic threats in surveyed areas in study areas in Sierra Leone between 2007 and 2014 ("-" means no data was available). (All data were extracted from Brncic et al., accepted).**

| N° | Surveyed Area | Year | Encounter rate | | |
|---|---|---|---|---|---|
| | | | Anthropogenic Pressure against Flora (signs/km) | Anthropogenic Pressure against Fauna (signs/km) | Overall Anthropogenic Pressure (signs/km) |
| **Sierra Leone** | | | | | |
| 28 | Gola Forest Reserve | 2010 | - | - | - |
| 29 | Kambui Hills Forest Reserve | 2010 | 6.75 | 0.55 | 7.30 |
| 30 | Kangari Hill Non-Hunting Forest Reserve | 2010 | 2.66 | 1.46 | 4.12 |
| 31 | Loma Forest Reserve | 2010 | 0.97 | 0.65 | 1.62 |
| 32 | Nimini Hills North Forest Reserve | 2010 | 1.05 | 0.4 | 1.45 |
| 33 | Outamba National Park | 2010 | 0.1 | 0.02 | 0.12 |
| | Kilimi National Park | 2010 | 1.06 | 0.06 | 1.12 |
| 34 | Tingi-Hills Non-Hunting Forest Reserve | 2010 | 1.18 | 0.53 | 1.71 |
| 35 | Western Area Peninsular Forest Reserve | 2010 | 5.96 | 0.55 | 6.51 |
| | Nationwide (Unprotecte) | 2010 | 2.19 | 0.89 | 3.08 |

In conclusion, Sierra Leone holds an important population of chimpanzees, with Loma and Outamba-Kilimi Protected Areas holding large populations. Only OKNP and the Kangari Hills probably harbors a small population of elephants and further studies have to be conducted to determine their exact status. Hunting and habitat degradation through increased agricultural practices are the key threats to the survival of Sierra Leone's chimpanzees, even if some of the protected areas currently still have some of the highest densities of chimpanzees in Africa (Brncic et al., 2010).

## 7.5. Guinea

One large regional study has been completed in the Republic of Guinea along with surveys in protected areas and forest reserves across the country (WCF, 2012a). The results from this survey provide the basis of the results presented below. Data were also contributed by Leblan (*Pers. Comm*.). The data we present stem from the most comprehensive surveys performed in the region. Furthermore, these surveys also followed the IUCN survey guidelines (Kühl et al., 2008). Details on survey effort and exact survey locations are provided in Appendix 1.

### 7.5.1 Chimpanzees

The presence of chimpanzees can be confirmed in ten different national parks, forests and reserves in Guinea with the most significant population of > 17,700 chimpanzees across the Foutah-Djallon region (Figure 8). This population of 17,700 chimpanzees at an average density of 0.22 individuals/km$^2$ is the largest remaining population of chimpanzees in West Africa. A detailed survey in 2014 revealed a large chimpanzee population (4,717; 95% CI= 3,760- 5,918 chimpanzees) in the Foutah-Djallon Bafing River (FDBR) region within the Fouta Djallon region, making this a top priority for chimpanzee conservation in West Africa (Table 7) (WCF, 2014b). Other forests that contain significant populations of chimpanzees include Haut-Niger National Park, which is estimated to have a population of 420 chimpanzees (95% CI= 250– 727 chimpanzees), whilst Koumbia is estimated to contain 296 chimpanzees (95% CI= 164– 532 chimpanzees). One other forest of note that has maintained a small population of chimpanzees in a very small area is the Mount Nimba Integral Reserve (125 km$^2$) with an estimated population of 166 individuals in 2009 (95% CI= 81-342 chimpanzees; WCF 2012a). Table 7 shows others areas where either few or no signs of chimpanzees were found in the 2012 survey. Additionally, Leblan (*Pers. Comm.* 2014) found signs of chimpanzee presence in the west of the country at the border with Guinea Bissau, in and around the Tristao Island. In the 2002 West African Chimpanzee: Status Survey and Conservation Action Plan report, 96 sites were confirmed to have chimpanzees present (see Kormos et al., 2003), and the nationwide survey confirmed that in most of these locations, chimpanzees were still present in 2012.

### 7.5.2 Elephants

To our knowledge, few extensive surveys were conducted to gather data on elephant populations in Guinea. The elephant database (AfESG, 2013) noted that some elephants could occur in the area of Ouré Kaba, but the 2012 regional survey did not confirm this (WCF, 2012a). It is likely that there are now very few elephants left in Guinea, which is also supported by the findings that the only evidence of elephant presence was in Ziama Classified Forest (WCF, 2012a). This detailed survey in Ziama (WCF, 2012a) (1,167 km$^2$) consisted of 156.5 km of transects that yielded an encounter rate of 1.53 elephant signs/ km and an estimated population of 64 individuals (95% CI= 37- 110 elephants) (Table 7). As for the rest of the regional area of the Foutah-Djallon, on more than 800 km of transects, not a single trace of elephants was detected, even in the Tristao Highlands that were previously surveyed by Leblan and assumed to harbor a small population of elephants (*Pers. Comm.*, 2014).

**Figure 8.Map of Guinea showing locations of chimpanzee- and elephant surveys conducted since 2007 from which we could extract data for this report**

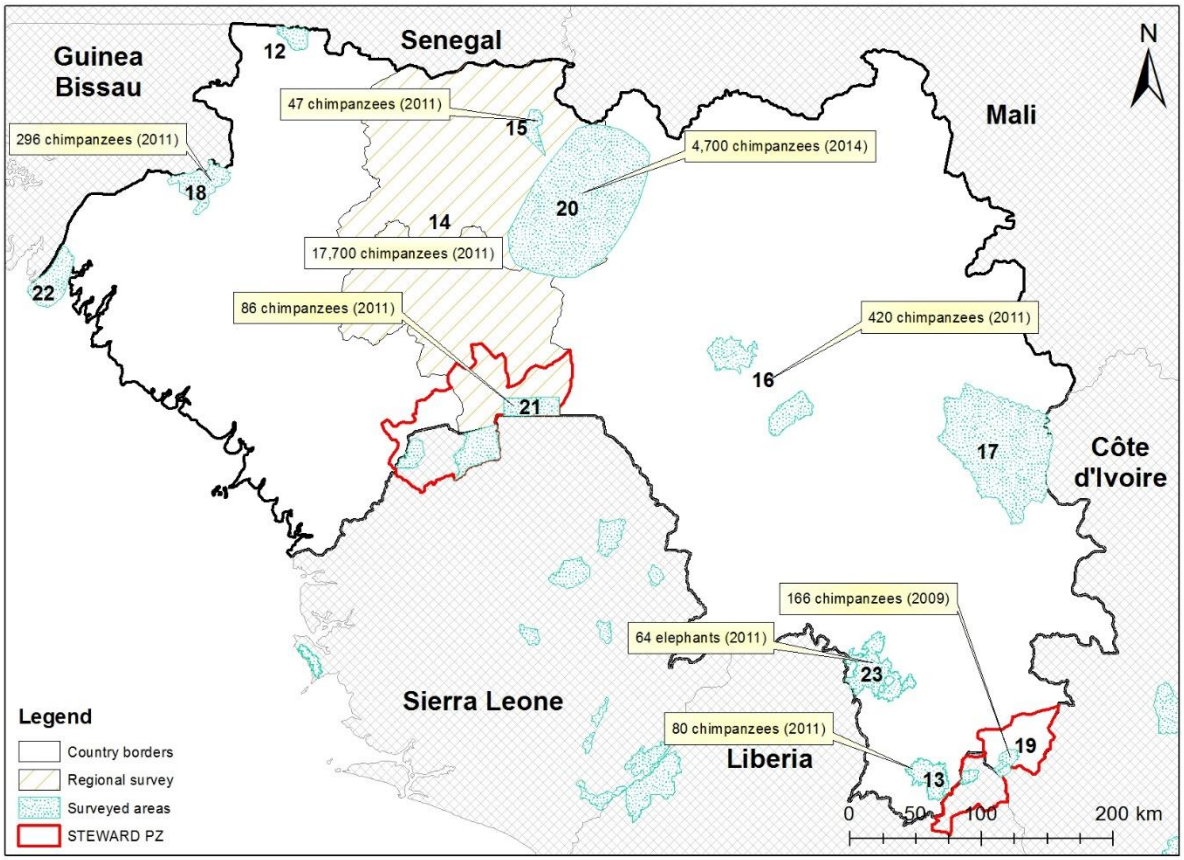


**Table 7. Chimpanzee and elephant encounter rates and population estimates for surveyed areas in Guinea between 2007 and 2014 (N/A stands for not-applicable, i.e. the observations were not sufficient to calculate population estimate or the survey method did not allow for this); '-"stands for no signs found during survey) (All data were extracted from WCF, 2012a, except Tristao island, taken from Leblan, pers comm. and the Bafing River Region, taken from WCF 2014b).**

| N° | Surveyed area | Year | Chimpanzees | | | | Elephants | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | | Encounter Rate (signs/km) | Population Estimate | Confidence Interval | |
| | | | | | Min | Max | | | Min | Max |
| **Guinea** | | | | | | | | | | |
| 12 | Badiar National Park | 2012 | 0.03 | 0 | N/A | | 0.00 | - | - | - |
| 13 | Diecke Classified Forest | 2012 | 0.30 | 80 | 25 | 253 | 0.00 | - | - | - |
| 14 | Foutah-Djallon Regional Survey | 2012 | N/A | 17700 | 8000 | 40000 | 0.00 | - | - | - |
| 15 | Gadha-Woundou Classified Forest | 2012 | 2.19 | 47 | 25 | 95 | 0.00 | - | - | - |
| 16 | Haut-Niger National Park | 2012 | 2.34 | 420 | 250 | 727 | 0.00 | - | - | - |
| 17 | Kankan Fauna Reserve | 2012 | 0.00 | - | - | | 0.00 | - | - | - |
| 18 | Koumbia | 2012 | 3.37 | 296 | 164 | 532 | 0.00 | - | - | - |
| 19 | Mount Nimba Integral Reserve | 2012 | 5.70 | 166 | 81 | 342 | 0.00 | - | - | - |
| 20 | Ouré-Kaba | 2012 | 1.45 | 86 | 36 | 207 | 0.00 | - | - | - |
| 21 | Region of Foutah-Djallon-Bafing | 2014 | 6.54 | 4717 | 3760 | 5918 | 0.00 | - | - | - |
| 22 | Tristao Island | 2014* | - | - | - | - | 0.00 | - | - | - |
| 23 | Ziama Classified Forest | 2012 | 0.04 | <20 | N/A | | 1.53 | 64 | 37 | 110 |

**Leblan, Pers Comm*

### 7.5.3. Anthropogenic Threats

We present rates of anthropogenic pressure for eight of the ten forests that were included in the regional survey in Guinea (Table 8). The areas in which the highest number of human signs (hunting, farming, etc) were encountered were the Ziama Classified Forest (3.94 signs/ km) and the Mount Nimba Integral Reserve (3.94 signs/ km; WCF, 2012a). In Mount Nimba Integral Reserve, the encounter rate for signs of hunting was much higher than the corresponding rate for pressure against flora (making up 70% of the total number of human signs encountered). This is the only forest in Guinea where encounter rates of hunting signs was much higher than for logging and NTFP extraction, suggesting that hunting pressure is very high and likely to be unsustainable in the Mount Nimba Integral Reserve. Ouré-Kaba, on the other hand, had the lowest human sign encounter rate of all surveyed areas in Guinea, with an overall encounter rate of only 1.21 human signs/ km. Note that no data is provided on overall anthropogenic pressure for the regional survey in Foutah-Djallon, as the survey was completed in a mosaic of villages and forests and as such is not comparable to the survey data from the protected areas.

**Table 8. Encounter rates of anthropogenic threats in surveyed areas in study areas in Sierra Leone between 2007 and 2014 ("-" means no data was available). (All data taken from WCF, 2012a).**

| N° | Surveyed Area | Year | Encounter rate | | |
|---|---|---|---|---|---|
| | | | Anthropogenic Pressure against Flora (signs/km) | Anthropogenic Pressure against Fauna (signs/km) | Overall Anthropogenic Pressure (signs/km) |
| **Guinea** | | | | | |
| 12 | Badiar National Park | 2012 | 2.49 | 0.06 | 2.55 |
| 13 | Diecke Classified Forest | 2012 | 1.45 | 1.6 | 3.05 |
| 14 | Foutah-Djallon | 2012 | - | - | - |
| 15 | Gadha-Woundou Classified Forest | 2012 | 1.51 | 0.3 | 1.81 |
| 16 | Haut-Niger National Park | 2012 | 2.74 | 1.14 | 3.88 |
| 17 | Kankan Fauna Reserve | 2012 | 1.51 | 0.07 | 1.58 |
| 18 | Koumbia | 2012 | 1.52 | 0.03 | 1.55 |
| 19 | Mount Nimba Integral Reserve | 2012 | 1.2 | 2.74 | 3.94 |
| 20 | Ouré-Kaba | 2012 | 1.15 | 0.06 | 1.21 |
| 21 | Region of Foutah-Djallon-Bafing | 2014 | 0.35 | 2.88 | 3.23 |
| 22 | Tristao Island | 2014 | - | - | - |
| 23 | Ziama Classified Forest | 2012 | 2.04 | 1.9 | 3.94 |

In conclusion, Guinea by far holds the largest population of West African chimpanzees in the sub-region, with a conservation priority in the FDBR region, which harbors the largest continuous chimpanzee population across mostly unprotected areas. Habitat degradation appears to be the greatest threat to the survival of chimpanzees across the country. Efforts must therefore be made to ensure improved management of areas holding chimpanzee populations.

Unfortunately, Ziama Classified Forest seems to harbor the last population of elephants in Guinea.

## 8. STEWARD Priority zones

For the second phase of the project, we will present spatial distribution analysis results from the data collected between 2009 and 2011 in the two PZ areas and compare it directly with the data that will be collected in 2015. We will also take into account the field activitieis led by STEWARD around PZ1 and PZ2 to evaluate the impact on the state of the chimpanzee and elephant populations. Due to the absence of elephants in PZ2 (except for some signs found in Liberia) and the limited data for PZ1, no comparison on the population status of elephants in these two areas was possible. Nonetheless, we stress the need of a chimpanzee survey to allow for an evaluation of the status of this species within the two priority zones. The same methodology will be followed for upcoming field studies in 2015 to ensure that the data will be directly comparable with previous data sets.

### 8.1 PZ1 – Outamba-Kilimi National Park and Guinea border area

During the nationwide survey in Sierra Leone (Brncic et al., 2012), a total of 49 transects, each 2 km in length, were placed systematically across the OKNP (29 in Outamba and 20 in Kilimi), running East to West. Between February and March 2010, data were collected along these transects following the IUCN 'Best Practice Guidelines' (Kühl et al., 2008). More details on methodology used during this survey can be found in the Sierra Leone National Chimpanzee Census Report (Brncic et al., 2012). In total, 524 nests were found on nearly all of the 29 transects in Outamba, whereas only 72 nests were found on 5 transects (25%) in Kilimi. Of these, 36 nests were not included in the final analysis after the researchers realized that those nests were located outside of the boundary of the park. After analysis in Excel and Distance, the results showed a relatively high encounter rate of nests in Outamba of 8.9 nests/ km (95% CI= 6.71– 11.83 nests) and a much lower encounter rate in Kilimi of 1.9 nests/ km (95% CI= 0.61– 6.41 nests). Densities in Outamba and Kilimi were 1.21 individuals/ km² (95% CI= 0,78– 1.88 individuals/ km²) and 0.27 individuals/ km² (95% CI= 0.08– 0.9 individuals/ km²), respectively; with numbers of chimpanzees estimated at 950 (95% CI= 615–1472 chimpanzees) for Outamba and 70 chimpanzees (95% CI= 22– 246 chimpanzees) for Kilimi. This adds up to a total population estimate of 1,025 chimpanzees (95% CI= 658– 1596 chimpanzees) in the Outamba-Kilimi National Park in 2010. This corresponds to a period shortly after STEWARD started to be active in the area and can therefore be taken as baseline data for the Sierra Leone side of PZ1.

It is important to note that STEWARD completed some biodiversity studies in two community forests in PZ1, Sumata and Kortoh, located between the Outamba and Kilimi areas of the national park (Garriga, 2014). This was completed in 2014 and therefore cannot be used as baseline data. However, the results confirm the presence of chimpanzees in both forests, based on observations of nests made along 8.5 km of recces.

On the Guinean side of PZ2, an area of 490 km² was surveyed along 47.6 km of transects (WCF, 2012a). The area begins about 30km east of the town of Ouré-Kaba to north-east of the OKNP in Sierra Leone. Much like the study in OKNP in Sierra Leone, the data were collected following Kühl et al. (2008). The density of chimpanzees was estimated at 0.17 individuals/ $km^2$ (95% CI= 0.07– 0.42 individuals/ $km^2$), and the total population was estimated at 86 individuals (95% CI= 36– 207 chimpanzees). Although the density seems relatively low, this appears to be quite common in an agro-pastoral landscape as found across most of the Foutah-Djallon region of Guinea. An encounter rate of 1.45 chimpanzee signs/ km was also calculated. However, as mentioned before, no signs of elephants were found during this survey.

### 8.2 PZ2 – Nimba Massif.

A survey was carried out on the Guinean side of the Nimba Massif, led by WCF in 2009 and on the Côte d'Ivoire side in 2010 (WCF, 2010a). These results will be used in this report as the dates correspond to the start of STEWARD activities in this region.

On the Guinean side of PZ2, 47 km of transects were surveyed in the Mount Nimba Integral Reserve (an initial 70 km were planned to be surveyed, but accessibility was low due to alpine altitudes). The encounter rate for all chimpanzee signs on transects was 5.7 signs/km, which is relatively high in comparison to other areas in Côte d'Ivoire. Chimpanzee density was calculated at 1.33 individuals/ km² (95% CI= 0.64– 2.74 chimpanzees/ $km^2$) and the total population was estimated at 166 chimpanzees (95% CI= 81– 342). The data showed that the chimpanzees appeared to be more abundant west of Seringbara, near the mining concession. No signs of elephants were found during the survey, nor any other known survey (WCF, 2012a, Lauginie, 2007).

On the much smaller Côte d'Ivoire side of PZ2, only 13 km of transects were surveyed. Using the same methods as on the Guinean side of PZ2, WCF (2010a) found a high density of chimpanzees (2.7 individuals/ km²; 95% CI= 1.1– 6.3). The population on this side of PZ2 was estimated at 63 individuals (95% CI= 30– 130). Thus the entire area of PZ2 was assumed to harbor a total population of 229 chimpanzees (95% CI= 111-472)

Many conservation NGOs are operating on the Liberian side of PZ2 around the Arcelor Mittal Limited Liberia (AML) mining concession, which is already extracting Iron Ore in the West Nimba. In Guinea, SMFG is actively extracting within the Mount Nimba. However, to our knowledge, there is no new systematic information available for the East Nimba Nature Reserve. Nonetheless, sightings of chimpanzee nests have been made and we can make a guesstimate of 50 chimpanzees in 3-4 groups (J. Junker, *Pers. Comm.*). The area was highly degraded through mining activities by the mining company LAMCO from 1963 to 1989. Therefore, we proposed not to consider the Liberian side of the Mount Nimba in the second phase. Nonetheless, further research into the extent of activities implemented in the Mount Nimba area will be looked into in the second phase as well as the efforts led by the mining companies in the area.

## 9. Identified hotspots for the conservation of chimpanzees and elephants in the MRU countries

From the data available for this study, we identified seven hotspot conservation priorities for chimpanzees or for chimpanzees and elephants. In addition, we identified five areas in need of further investigation (Figure 9), either due to lack of data or lack of detailed data on the ground. For the selection of conservation priorities, we considered transboundary areas which included two or more different protected areas in different MRU countries, as well as other non-transboundary areas for which elephant and/or chimpanzee density could be determined. A ranking system was developed to prioritize each area (Table 9) based on known chimpanzee and/or elephant abundance, chimpanzee abundance or elephant presence/absence (in cases where no abundance data were available), and the overall size of the area.

For elephants: The only area with a known density was given the ranking 1 (i.e. the only area that had a high-enough density so that population size could be estimated). Areas with few signs of elephant presence (i.e., elephants are known to be present but at very low densities) were given the ranking 0.5. Areas with no signs of elephant presence were given the ranking 0.

For chimpanzees: Given that chimpanzees are more widely distributed across the MRU countries and at higher densities, the ranking scale was slightly different. A ranking of 2 was given to the area with the highest abundance of chimpanzees (FDBR) and all other rankings for other sites were calculated as a proportion of this.

For the surface area of the identified zones, we used a similar ranking system as with chimpanzees. The largest area (Taï-Grebo-Sapo Forest Complex - TGSFC) with a surface area of 8,103 km² was given the highest ranking of 1. All other rankings for the other sites were calculated as a proportion of this.

Using this ranking system, we identified the FDBR Region in Guinea as the number one hotspot for conservation across the MRU countries. It harbors a population of over 4,700 chimpanzees in a relatively large area (8,000 km²) composed of various classified forests, making it the largest known continuous population of West African chimpanzees. The human population in this area is relatively low and the area is still relatively unaffected by human impact (see WCF 2014b), although extensive agriculture and hunting remains a threat to chimpanzees in this area. The Guinean Government is currently promoting the concept of creating a protected area here to ensure the survival of these chimpanzees and other wildlife species. As such, this area should be regarded as a high priority for support to conservation. There would be still potential to investigate further north according to the first results of this survey as well as investigate the southern part of Mali in this area to develop a transboundary area.

According to the data available for this study, the only area that held both viable populations of chimpanzees and elephants was the transboundary zone of the Taï-Grebo-Sapo Forest Complex (Ranked 2), with an estimated 1,888 chimpanzees (95% CI=1,160-3,101 individuals) and 272

elephants (95% CI=134-485 individuals). No other region within the 4 MRU countries has anywhere near this number of elephants. Both the Liberian and Ivorian Governments are working together to ensure a harmonized cross-border management of the complex, by prioritizing the management of the five protected areas (Taï National Park, Cavally Classified Forest, Goin-Débé Classified Forest, Sapo National Park and Proposed Grebo National Park) that compose the complex (including the creation of one new national park) and where feasible creating landscape corridors to safeguard the forest in the region  Other areas in this region of the MRU would need further investigation and could potentially be linked to these by corridors, like the Krahn-Bassa National Forest just west of Sapo National Park or the area west of the Proposed Grebo National Park. Both these areas seem to hold important chimpanzee populations and by being incorporated in the context of this Forest Complex, could increase the stability of the chimpanzees and elephants population in this area. Junker and colleagues also found both the Sapo NP and the Proposed Grebo NP to be of great importance for conservation, ranking 2 and 3 respectively.

The 3rd identified hotspot is the transboundary area between Sierra Leone and Guinea (OKNP in Sierra Leone, and possible community forests and the Ouré-Kaba area in Guinea), which corresponds to the Priority Zone 1 of STEWARD. It holds more than 1,000 chimpanzees at one of the highest known densities in Africa (Brncic et al., 2010) and a small (unknown) elephant population. To ensure the survival of these wildlife populations, practical and scientific support to park management is needed, as is the creation of corridors and protected areas on the Guinean side of PZ. Regular biomonitoring should be conducted to monitor if the populations of chimpanzees are increasing or decreasing.

Of the other four conservation priorities identified in this study, Loma Forest Reserve in Sierra Leone deserves special attention as it has a very high chimpanzee population of > 1,000 individuals in a relatively small area (395 km²), whilst the other areas act as refuges for < 500 chimpanzees each. However, there is no evidence that elephants living in any these areas, except possibly the Kangari Hills.

The Ziama Classified Forest in Guinea, with its 64 elephants, it is probably the only other area that may hold viable populations of both chimpanzees and elephants, other than the TGSFC. That said, it is possible that this elephant population is restricted to the Ziama Classified Forest alone, having moved away from more densely human populated areas (Spinage 1073 and Verschuren, 1982, as cited in Leblan 2014). Nonethelss, Ziama Classified Forest forms part of a transboundary area with the Proposed Wonegizi Protected Area in Liberia, where signs of elephants were found during the Liberian nationwide survey (Junker, J. Pers. Comm.). As such, we classify this zone as one of the five hotspot areas for further investigation. Other hotspots in need of further investigation include the large transboundary area known to harbor nearly 300 chimpanzees, namely the Kogon-Korubal and Nunez region shared between Guinea and Guinea-Bissau. Secondly, information are needed on where exactly within the Foutah-Djallon region in

Guinea conservation efforts should be focused, and where new protected areas should be established to ensure the survival of the largest chimpanzee population in West Africa.

**Figure 9. Identified hotspots for the conservation of chimpanzees and elephants and identified zones in need of further investigation**

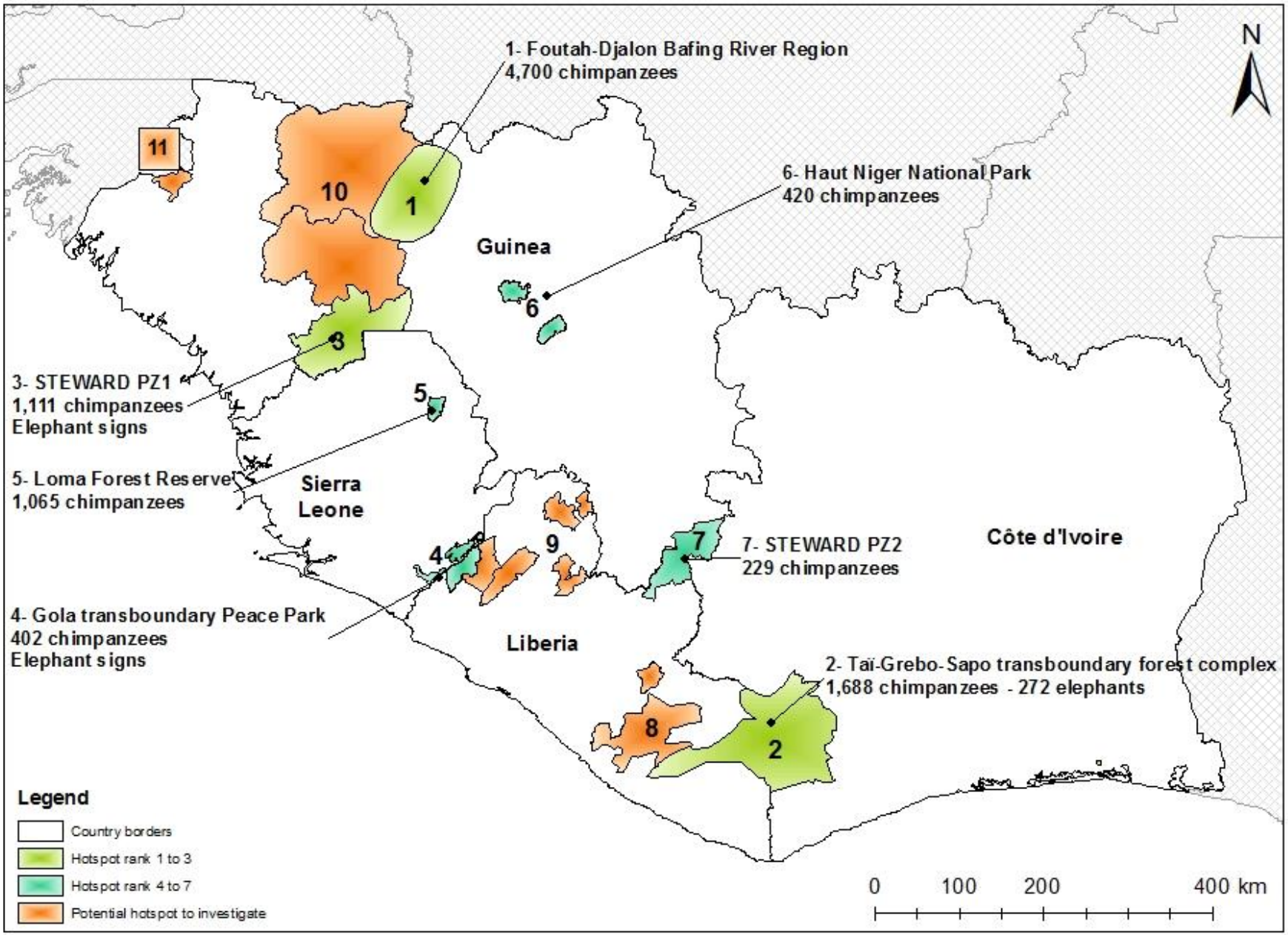


**Table 9. Ranking system of identified hotspots for the conservation of chimpanzees and elephants and zones to be investigated further.**

| NAME | Elephant abundance | Chimpanzee abundance | Area ($km^2$) | Elephant ranking (1= abundance known; 0.5 = few presence signs 0= no elephant signs) | Chimpanzee ranking (2= largest population; all other figures proportional to largest population | Area rank (1= largest area; all other figures proportional to largest area) | Sum of rank values | Hotspot Rank |
|---|---|---|---|---|---|---|---|---|
| Foutah-Djalon Bafing River Region | 0 | 4700 | 8000 | 0 | 2 | 0.99 | 2.99 | **1** |
| Taï-Grebo-Sapo Transboundary Forest Complex | 272 | 1688 | 8103 | 1 | 0.72 | 1 | 2.68 | **2** |
| STEWARD PZ1 : OKNP/Ouré Kaba Transboundary Complex | Few | 1111 | 1177 | 0.5 | 0.47 | 0.15 | 1.12 | **3** |
| Gola Transboundary Peace Park | Few | 402 | 1935 | 0.5 | 0.17 | 0.24 | 0.91 | **4** |
| Loma Forest Reserve | 0 | 1065 | 396 | 0 | 0.45 | 0.05 | 0.5 | **5** |
| Haut Niger National Park | 0 | 420 | 1229 | 0 | 0.18 | 0.15 | 0.33 | **6** |
| STEWARD PZ2: Transboundary Nimba Massif | 0 | 229 | 170 | 0 | 0.10 | 0.02 | 0.14 | **7** |
| Krahn-Bassa-Gibi National Forest | Unkown | ~ 1017* | 6453 | To be investigated further | | | | **8** |
| Transboundary Area Ziama/Wonegisi/ Wologisi | > 64 | ~ 150* | 1795 | To be investigated further on the Liberian side | | | | **9** |
| Transboundary Area Kogon, Korubal and Nunez | Few | > 296 | > 992 | To be investigated on the Guinea-Bissau side | | | | **10** |
| Foutah Djallon Region | 0 | 17700 | 40508 | More surveys needed to define finer-scaled hotspot areas for chimpanzees | | | | **11** |

** Estimates for chimpanzees were not determined with Distance, but estimated from the nationwide survey based on a spatial model for Wonegisi/Wologisi and the area including the national forests of Krahn-Bassa and Gibi (Junker, J, Pers. Comm).*

## 10. Discussion

Across the four MRU countries, few efforts have been made in the past to ensure an effective conservation strategy for both West African chimpanzees and elephants. The West African Chimpanzee: Status Survey and Conservation Action Plan (Kormos et al., 2003), compiled under the auspices of the Great Ape Specialist Group of the IUCN, presents detailed information on the presence of chimpanzees across all countries, using data made available from 72 researchers and conservationists who have been/still are active in the region. Following on from that, a Regional Action Plan for the Conservation of the West African Chimpanzee was prepared by Kormos and Boesch (2003), highlighting priority areas within the Upper Guinean Forest Ecosystem for their conservation. Similarly, the African Elephant Specialist Group of the IUCN compiled an African Elephant Status Report in 2007, which was updated in 2013 (AfESG, 2013). Action plans regarding the conservation of elephants have also been prepared, such as the Action Plan for the Management of Transfrontier Elephant Conservation Corridors in West Arica (Sebogo & Barnes, 2003) and the Strategy for the Conservation of West African Elephants (AfESG, 2005). Building on this, we have amassed data available from the past eight years (2007 to 2014) to update the current status of chimpanzees and elephants across the four Mano River Union countries.

Campbell et al (2008) estimated a decrease of over 90% of the national chimpanzee population in a period of just 17 years, in Côte d'Ivoire alone. Trend estimates in the other three MRU countries are lacking as previous detailed nationwide surveys with which more recent data could be compared to, were never carried out. Nationwide surveys have recently been conducted for the first time in Sierra Leone and in Liberia (Brncic et al, 2012, Tweh et al, 2014) and a regional survey in the Foutah Djallon in Guinea covered more than 40,508 $km^2$ (WCF, 2012a). If repeated in the future, results of these surveys could allow for the estimation of temporal and spatial chimpanzee population trends across the MRU countries. For elephants, the results of this study clearly demonstrate that there is a lack of robust data allowing for accurate elephant distribution maps or population estimates in the MRU countries. Nonetheless, it is clear that elephant populations across the region are generally small, fragmented and in some cases isolated. They are also under much pressure from habitat destruction and poaching, and Roth and Douglas (1999) estimated that over the past century, West Africa lost 93% of its elephant population. Reports from Guinea suggest that elephants were already absent from certain areas in Guinea as early as the late $19^{th}$ century (see Leblan, 2014), which was mainly ascribed to the flourishing ivory trade of that era. For the purpose of this study, it was impossible in some cases to use the elephant population status as the basis for future impact evaluations of STEWARD-led activities in the two priority zones, since elephants were absent from the Nimba Massif (though a few signs were located on the Liberia side, Junker, *Pers. Comm.*). Although a small population of elephants likely inhabits the OKNP, the exact size of this population is currently unknown and thus monitoring future population changes in this area will be impossible. This lack of information hinders the implementation of site-specific conservation management actions (AfSGE 2005) and therefore biomonitoring efforts to systematically collect baseline information

to estimate elephant population size in this area is urgently needed. Nonetheless, Sebogo and Barnes (2003) suggest that transboundary populations of elephants account for more than two thirds of savanna and more than half of all forest elephants in West Africa , highlighting the need to continue to manage and protect these populations in across borders rather than within arbitrarily-defined political boundaries. The African Elephant Specialist Group previously identified the Tai-Grebo-Sapo Forest Complex as a priority for conservation (Sebogo & Barnes, 2003), which is supported by the results of this study, which ranks this area the top priority for elephant conservation within the MRU countries. This could also include the Krahn-Bassa Forest to the west of Sapo, which needs to be further investigated, as it could be that elephant populations there also link up with the elephant populations of the TGSFC (Junker, J. *Pers. Comm*.). However, elephants present in STEWARD PZ 1 did not seem to cross the border to the Guinean side, as no observations of elephants were made on the Guinean side of this area in recent years.

Fortunately, extensive work in recent years has allowed for precise population estimates of chimpanzees in the two STEWARD priority zones and thus can be used in the future to evaluate the impact of the activities implemented by STEWARD. Until now however, these activities did not directly aim at protected area management within the two priority zones. Key conservation activities known to have direct positive impact on the protection of chimpanzees and probably also elephants and other species include the permanent presence of researchers or ecotourism guides, as well efficient and long-term law enforcement through anti-poaching patrols (see Kongden et al., 2008, Campbell et al, 2011, Tranquili et al, 2011, N'Goran et al, 2012, Kablan et al., in prep).

Lack of continued funding across the MRU countries has been one of the many reasons that have led to the massive decline in both chimpanzee and elephant populations, with the Taï National Park being a clear example of this (Kühl et al., in prep). Lack of funds, political and economic instabilities, resulting in little management and few patrols, in the MRU countries may have been the ultimate drivers of chimpanzee and elephant population declines over the past 20 years, which in turn lead to ineffective or non-existing management strategies to protect these species.

The study showed that the most important chimpanzee population (in terms of size) in the MRU region occurs in the Eastern Foutah Djallon and the Western Upper Guinea Ecosystem, along the Bafing River –Water source of the of the Senegal River-, in the FDBR). This area is about 8,000 km² in size and composed of semi-mountainous, moderately human inhabited and relatively well preserved landscapes of wooded savannahs. This area is home to the largest continuous chimpanzee population in West Africa. However, chimpanzee habitat is threatened by human activities, especially agriculture, logging, mining and poaching. It is therefore vital to develop a program for sustainable agriculture, effective law enforcement and a population monitoring program to predict and counteract future population declines and ensure the long-term survival of our closest living relatives.

The second most important chimpanzee population occurs in the transboundary region of the Taï-Grebo-Sapo Forest Complex. It is composed of five protected areas, all of which act as refuges for chimpanzees and three of which have known presence of elephants (Taï and Sapo National Parks having the only known populations of elephants in the MRU countries). The area is under immense pressure from hunting and human encroachment. Conservation planning in the region is a priority to ensure forested corridors that link protected areas and to support to the Governments of Liberia and Côte d'Ivoire in implementing effective management strategies in the different protected areas and the corridors in-between.

## 11. Conclusion and Recommendations

West Africa has one of the highest rates of deforestation in the world. This calls for coordinated conservation actions across transboundary regions to reduce this trend and to promote the importance of the remaining natural areas (IUCN, 2009). In the past ten to 15 years, several experts have come together at numerous meetings and workshops to prepare action plans to guide conservation management decisions for the survival of chimpanzees and elephants. When considering the amount of conservation work conducted in the MRU countries since then, only a few of the conservation recommendations drafted in these reports were in fact implemented and put to action on the ground. It would be important to bridge this implementation gap and guarantee coordination among conservation actors and donors, to ensure that efforts are targeted in the most important zones, i.e., those with the largest populations of chimpanzees and where elephants are still present, both of which are flagship species for conservation across West Africa.

The purpose of this study was to compile data on chimpanzee and elephant status (and human threat) in the four MRU countries in West Africa. We identified seven areas as conservation hotspots for chimpanzees and elephants, including the two STEWARD priority zones. This study showed that elephant status in this region was less well-known than that of chimpanzees, which was likely due to the generally low densities of elephants across the region. Only the Taï-Grebo-Sapo Forest Complex holds the only known viable population of elephants (except possibly the Ziama Forest and the area west of the Sapo National Park in Liberia), and is therefore key to the survival of this threatened species. Several areas still hold large chimpanzee populations, despite increasing human impact in and around most of these areas. They include the FDBR region in Guinea, the OKNP in Sierra Leone and the Tai-Grebo-Sapo Forest Complex. The MRU region has suffered a loss of elephants and chimpanzees and efforts to change this are needed now more than ever.

In light of the results of the study, we recommend the following:

1. Adapt priority areas for conservation funding in regard to the data existing on the ground, and so include the FDBR and the TGSFC as future STEWARD priority zones.

2. Increase support (financial and technical) to protected area managers to ensure the effective conservation of viable populations in these areas (see Table 9 for hotspots in need of support)

3. Build local capacity in MRU countries with regard to biomonitoring, data analysis, GIS, etc .

4. Coordinate conservation efforts by different stakeholders through increased communication between donors, researchers, NGOs and governments

5. Regularly update public databases such as the Elephant Database and the IUCN SSC A.P.E.S Database with new data and studies.

6. Lead systematic surveys using comparable designs as previous surveys in STEWARD priority zones to measure the impact of their activities.

7. Expand on the results presented in this study and update the West African Chimpanzee Survey status and Conservation Action plan.

8. Lead sociological impact and bushmeat consumption/ trade surveys to monitor and evaluate the impact of STEWARD-led programs in local communities to quantify the impacts on the bushmeat trade and use of natural resources.

9. Repeat nationwide surveys to estimate trends and assess conservation effectiveness.

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## 14. Appendix 1 – List of data and survey reports used

| Nb | Surveyed area | Year | Survey Effort (km) | Park Size ($km^2$) | Author | Publication |
|---|---|---|---|---|---|---|
| **Côte d'Ivoire** | | | | | | |
| 1 | Azagny National Park | 2009; 2013* | 56 | 129 | WCF | Unpublished Report |
| 2 | Banco National Park | 2008 | 227 | 34.74 | WCF | Unpublished Report |
| 3 | Bossématié Classified Forest | 2010* | 96 | 389 | Lapuente, J. | Pers. Comm |
| 4 | Cavally Classified Forest | 2010 | 300 | 677,93 | WCF | Unpublished Report |
| 5 | Comoé National Park | 2009 | 143.5 | 11495.5 | WCF | Unpublished Report |
| 6 | Goin Débé Classified Forest | 2010 | 284 | 1324.62 | WCF | Unpublished Report |
| 7 | Marahoué National Park | 2013* | 36.9 | 1010 | WCF | Unpublished Report |
| 8 | Mount Nimba Integral Reserve | 2010 | 13 | 45 | WCF | Unpublished Report |
| 9 | Mount Péko National Park | 2013* | 9.5 | 340 | WCF | Unpublished Report |
| 10 | Mount Sangbé National Park | 2013* | 36.1 | 950 | WCF | Unpublished Report |
| 11 | Taï National Park | 2013 | 362.64 | 4560 | WCF/OIPR | Unpublished Report |
| **Guinea** | | | | | | |
| 12 | Badiar National Park | 2012 | 72 | 382 | WCF | Unpublished Report |
| 13 | Diecke Classified Forest | 2012 | 115 | 640 | WCF | Unpublished Report |
| 14 | Foutah-Djallon | 2012 | N/A | N/A | WCF | Unpublished Report |
| 15 | Gadha-Woundou Classified Forest | 2012 | 83.5 | 280 | WCF | Unpublished Report |
| 16 | Haut-Niger National Park | 2012 | 196 | 1229 | WCF | Unpublished Report |
| 17 | Kankan Fauna Reserve | 2012 | 73 | 5350 | WCF | Unpublished Report |
| 18 | Koumbia | 2012 | 110 | 992 | WCF | Unpublished Report |
| 19 | Mount Nimba Integral Reserve | 2012 | 59.5 | 125 | WCF | Unpublished Report |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20 | Oure-Kaba | 2012 | 47.5 | 120.5 | WCF | Unpublished Report |
| 21 | Region of Foutah-Djallon-Bafing | 2014 | | | WCF | Unpublished Report |
| 22 | Tristao Island | 2014 | | | Leblan, V. | Pers. Comm |
| 23 | Ziama Classified Forest | 2012 | 156.5 | 1167 | WCF | Internal Report |
| **Liberia** | | | | | | |
| 24 | Gola National Forest | 2013 | 121.25 | 849.63 | Hillers, A, | RSPB Report |
| 25 | Grebo national forest | 2012 | 242.728 | 1269 | WCF | Unpublished Report |
| 26 | Sapo National Park | 2009 | 44 | 1500 | Boafo & Sani | Pachyderm 2013 |
| 27 | West Nimba Forest | 2010 | 70 | 121.11 | WCF | Unpublished Report |
| **Sierra Leone** | | | | | | |
| 28 | Gola Forest Reserve | 2010 | 208 | 1085 | Brncic, et al., | Tacugama Report (2012) |
| 29 | Kambui Hills Forest Reserve | 2010 | 20 | 152 | Brncic, et al., | Tacugama Report (2012) |
| 30 | Kangari Hill Non-Hunting Forest Reserve | 2010 | 15 | 141 | Brncic, et al., | Tacugama Report (2012) |
| 31 | Loma Forest Reserve | 2010 | 60 | 396 | Brncic, et al., | Tacugama Report (2012) |
| 32 | Nimini Hills North Forest Reserve | 2010 | 20 | 129 | Brncic, et al., | Tacugama Report (2012) |
| 33 | Outamba-Kilimi National Park | 2010 | 86 | 1,057 | Brncic, et al., | Tacugama Report (2012) |
| 34 | Tingi-Hills Non-Hunting Forest Reserve | 2010 | 24 | 116 | Brncic, et al., | Tacugama Report (2012) |
| 35 | Western Area Peninsular Forest Reserve | 2010 | 27 | 158 | Brncic, et al., | Tacugama Report (2012) |
| **Nationwide/Overall Coutntry Results** | | | | | | |
| | Guinea | 2012 | | | WCF | Unpublished report |
| | Liberia | 2010-12 | 3 | 112,220 | Tweh et al. | Oryx 2014 |
| | Sierra Leone | 2010 | 386 | | Brncic, et al., | Tacugama Report (2012) |