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Summary of biomonitoring activities of the Wild Chimpanzee Foundation during the year 2010

Inventories and biomonitoring activities in National Parks and Protected Forests of Côte d'Ivoire and Liberia

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Summary

Since 2005, the Wild Chimpanzee Foundation has implemented biomonitoring programs in protected areas in Côte d'Ivoire, Liberia and Guinea. In addition to this, the WCF has now added to its general biomonitoring activities inventories to evaluate the levels of biodiversity in identified sites in targeted areas within these countries. The implementation of these programs and inventories responds to the needs of the park, forest and land managers concerned by the effective tools and up to date information on the status of these sites in order to maximize their sustainable use and management.

In Côte d'Ivoire, we have continued our biomonitoring programs in the Taï National Park and in the Classified Forests of Cavally and Goin-Débé throughout 2010. Additionally, an eco-guard program and sustainable management plan for these forests was initiated as well as a specific conservation project for the research area of Taï National Park through the implementation of a permanent surveillance presence combined with a research program. In addition, a scoping study was conducted in Comoé National Park. Inventories were conducted in the Taï area between Liberia and Côte d'Ivoire to study the feasibility of establishing landscape corridors for the Taï-Sapo Forest Complex.

In Liberia, most of our activities were focused on the biological evaluation of mining concessions of ArcelorMittal Limited in order to implement a biomonitoring program to help monitor the future impacts of mining activities that are programmed to take place.

At the beginning of 2010, the biomonitoring program of Taï National Park completed its fifth phase of data collection and the 6th phase started towards the end of the year. The results of phase 5 show a reduction in anthropogenic threats and a stable population of chimpanzees. Concerning the surveillance project in the research area of Taï National Park, in its first year, we have already noticed a positive impact of the surveillance on the abundance of animals in the zone and a decrease in poaching pressure. The activities in the Cavally and Goin Débé Classified Forests have allowed for the drafting of management plans for these forests. In addition, the Eco-guard program has shown to aid in collecting useful information for the biomonitoring and surveillance programs of these forests in general.

Regarding the Comoé National Park, the assessment has enabled us to make an inventory of the state of the flora and fauna. We have noted an invasion of cattle in the north-east and an increase of plantations in the south-west, and although an array of different wildlife is still present, the population numbers have dropped considerably. Concerning the implementation of the corridor, the first evaluations show that the potential corridor Taï-Grebo (around the Hana River) holds wildlife such as monkeys and buffalo in the remaining forested areas, despite the high agricultural and hunting pressure. The biological evaluation of ArcelorMittal's mining concessions in Nimba also revealed the presence of primates, notably chimpanzees and monkeys, once again despite the high levels of hunting and agricultural practices.

The implementation of all the biomonitoring and inventories helped significantly to optimize the management and conservation of natural resources in both countries. We hope to be able to continue our activities in the existing sites and acquire other opportunities elsewhere to continue to ensure the survival of the remaining wild chimpanzee populations and their forested habitats.

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Introduction

Since 2005, the Wild Chimpanzee Foundation has conducted biomonitoring and inventories on wildlife in Côte d'Ivoire, Guinea and Liberia, in various parks, reserves, classified forests and mining concessions in order to assess the wildlife potential of these heritages and to monitor their evolution over time while evaluating how the different anthropogenic factors that affect them.

In 2010, our activities in Côte d'Ivoire took place in Taï National Park, Comoé National Park and in the Protected Forests of Cavally and Goin-Débé. We also carried out inventories in the two potential landscape corridors linking the Taï NP with the Grebo National Forest in Liberia in order to assess the feasibility of establishing these targeted transboundary corridors for the conservation of the Taï-Sapo Forest Complex.

In Liberia, our work focused on a biological assessment in the mining concessions of ArcelorMittal Limited in Nimba County. Additionally, the implementation of the Pan African Program, initiated by the Max Planck Institute of Leipzig (Germany) in collaboration with the WCF was conducted, consisting of a nationwide survey of chimpanzees. The study will continue through 2011, results of which will be presented in a separate report. Other activities carried out by the WCF in Guinea will also be presented in a separate report prepared by the WCF Guinea office.

I. Taï National Park : Biomonitoring

The implementation of the biomonitoring program underway since 2005 in the TNP continued through 2010, integrating the data quality control aspect put in place since 2009. Data collection is conducted by 5 teams composed of local villagers and 2 officers of the Office Ivoirien des Parcs et Reserves (OIPR). Each team is supervised by a WCF officer or an OIPR officer who are trained specifically for this purpose. The teams work simultaneously to collect essential information on wildlife human aggressions, which are then used to program surveillance activities of the park authorities.

The activities of Phase 6 are currently in progress and thus we will focus on the results obtained from phase 5 in 2010. With the implementation of the system of data quality control, we noted a real improvement in quality of data collected, providing a reliable basis for comparison of data and especially the evaluation of management activities for the years to come.

A comparison of encounter rates obtained during Phase 5 with those of Phase 2 (taken as the reference phase) show a decrease of about 50% of observed monkeys and bovids; but there is an increase of about 60% for chimpanzees and more than 100% for the elephants (Table 1). Overall, results show a stable population of bush duikers and chimpanzees, while the number of monkeys is considerably decreased whereas elephant populations are on the increase.

Table 1 Summary of density and abundance estimates of animal species in the Taï National Park, for phases 2 and 5 of data collection

Species / species group	Density Phase 2 (N/km ²)	Abundance Phase 2 (N)	Density Phase 5 (N / km ²)	Abundance Phase 5 (N)
Cercopithecus diana	22,90	122 550	9,40	50 560

All monkeys	50,0	267 850	21,10	112 930
Maxwell's duikers	4,0	21 335	4,40	23 550
All duikers	7,70	41 480	8,50	45 430
Elephants	0,03	180	0,05	260
Weaned chimpanzees	0,09	480	0,10	550
All chimpanzees	0,10	560	0,12	650

In addition, there were no large variations in the range of species. The signs of bovids were found throughout the park, as well as for monkeys though they appeared rarer in the east of the park (Figure 1). Chimpanzees are more abundant in the western side of the park while the elephants are for the majority in the south and west of the park (Figure 2).

The human aggression signs cover the whole park and represent 90% of threats for the local wildlife (Figure 3). There is a general drop of aggression in relation with the previous phases, but an increase of attacks on the wildlife is noticed between the phases 4 and 5. Encounter rates which were obtained during this phase are of 1.79 signs/km for all human aggression signs and 0.47 signs/km for hunting specifically.

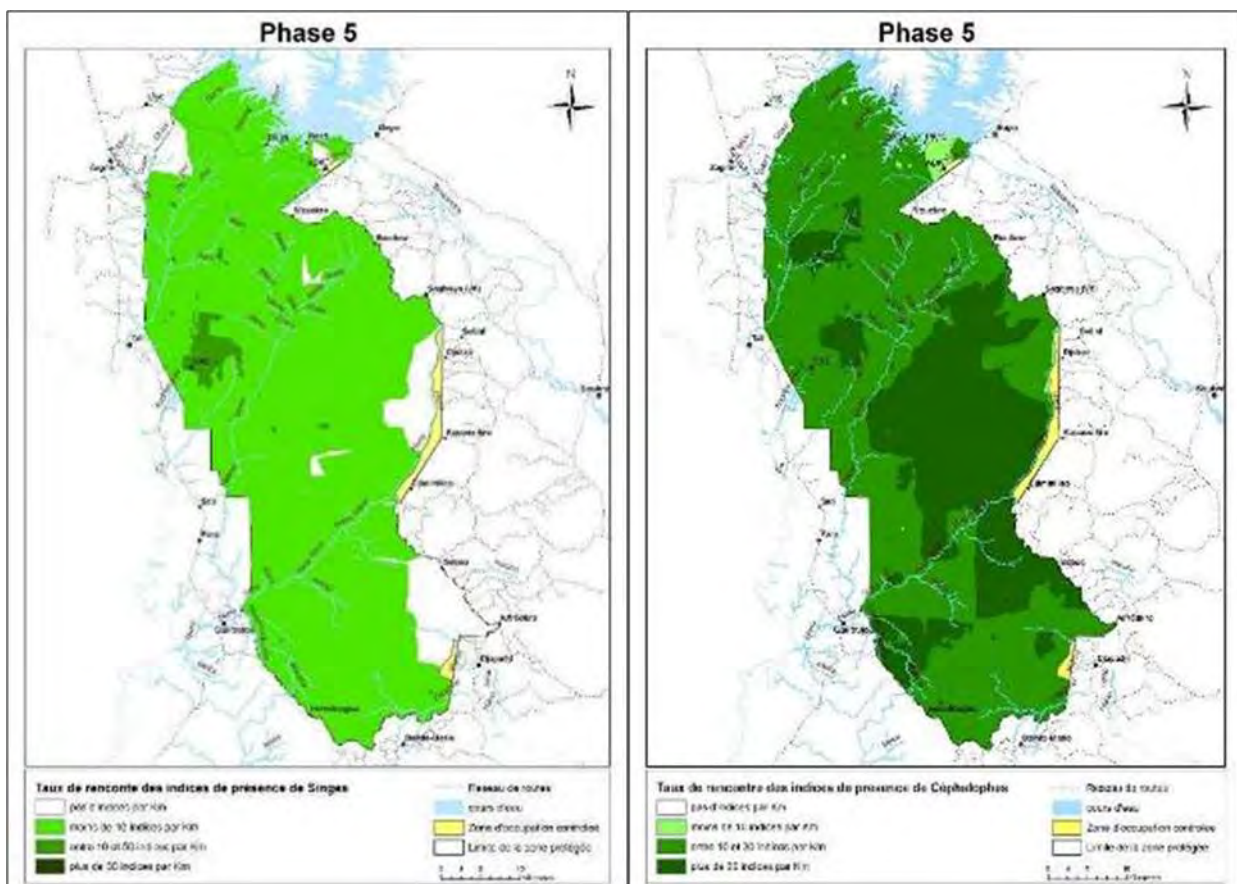


Figure 1 Spatial distribution of monkeys(left) and duikers (right)

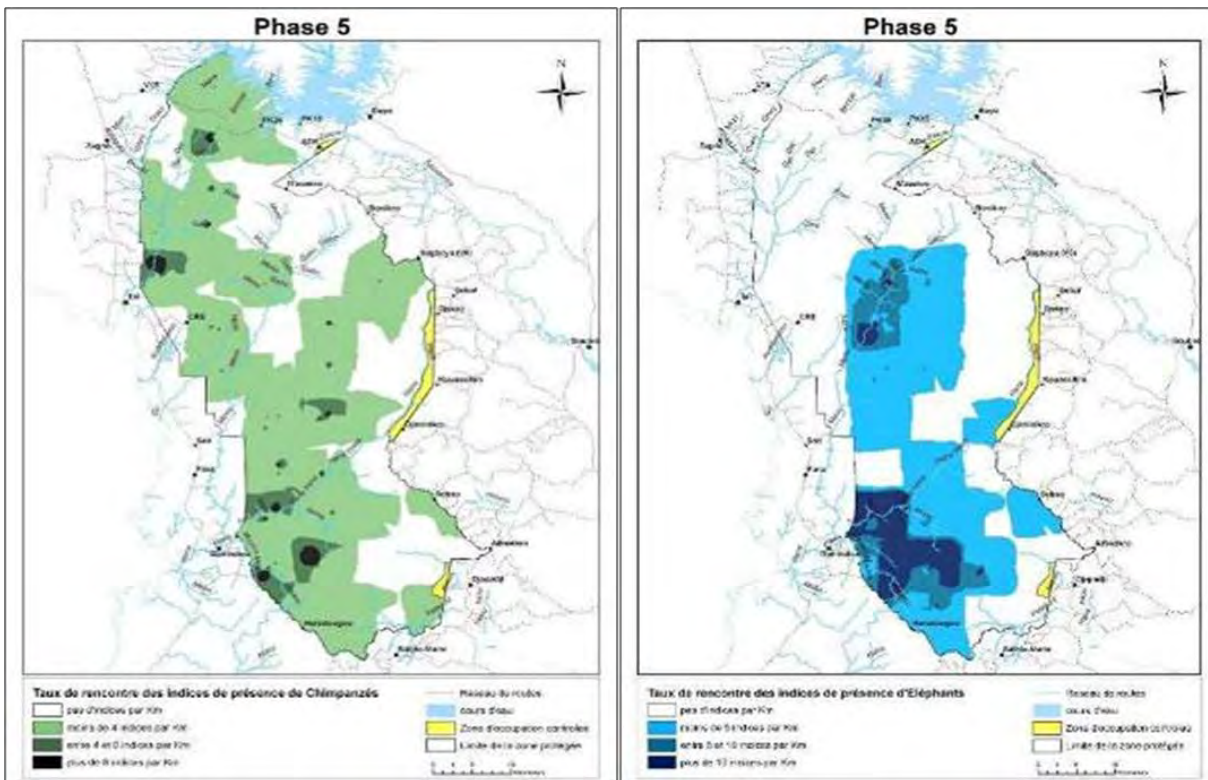


Figure 2 Spatial distribution of chimpanzees (left) and elephants(right)

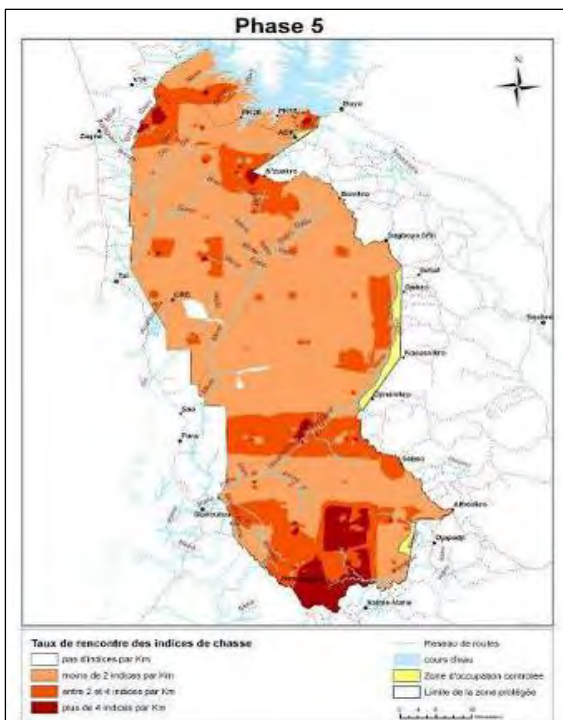


Figure 3 : Spatial distribution of hunting signs

The results obtained during Phase 5 primarily demonstrate the importance to continue the activities of data quality control. In addition, management measures (Surveillance, Awareness, Participatory management, etc.) must be reinforced in the areas with highest human pressures. The dramatic situation of monkeys' decrease indicates that special protection measures must be taken for the monkeys, which seem to be the most important target of poachers.

II. Comoé National Park (CNP)

The activities in the Comoé National Park during the year 2010 consisted of an aerial survey of the park and the GEPRENAF area (Project of participative management of natural resources and fauna) to collect data on wildlife and illegal human activities. The design is presented in figure 8.

Among the 8477 individuals of mammals observed during the data collection (percentage shown in Figure 4, Figure 5), domestic cattle were much more observed in the heart of the park, mostly near major rivers (Figure 9). Most of the primates were observed near the river Comoé apart from patas monkey and baboon (Figure 7). The most observed wild cattle were the hartebeest (*Alcelaphus buselaphus major*) with 756 individuals (Figure 5). Concerning the primates, two chimpanzees (*Pan Troglodytes verus*) and 30 monkeys including the baboon (*Papio anubis anubis*), the patas monkey (patas patas *Erythrocebus*) and the vervet monkey (*Cercopithecus aethiops sabaues*) were observed (Figure 7). Moreover, two elephant tracks (*Loxodonta africana*) and 36 individuals from other mammal species (hippos, mongooses and warthogs) were detected.

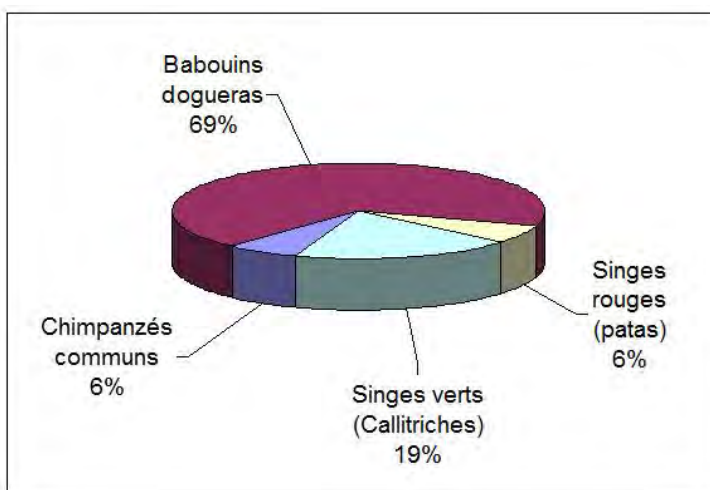


Figure 4 Proportion of primate species observed

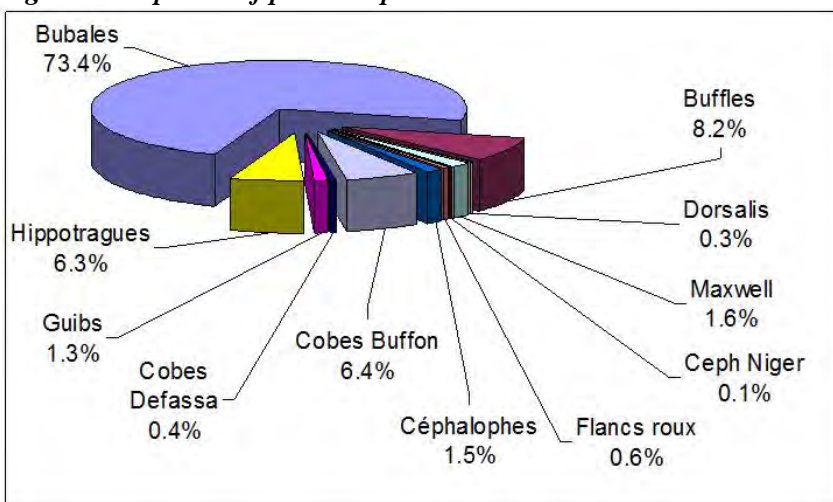


Figure 5: proportion of mammal species observed

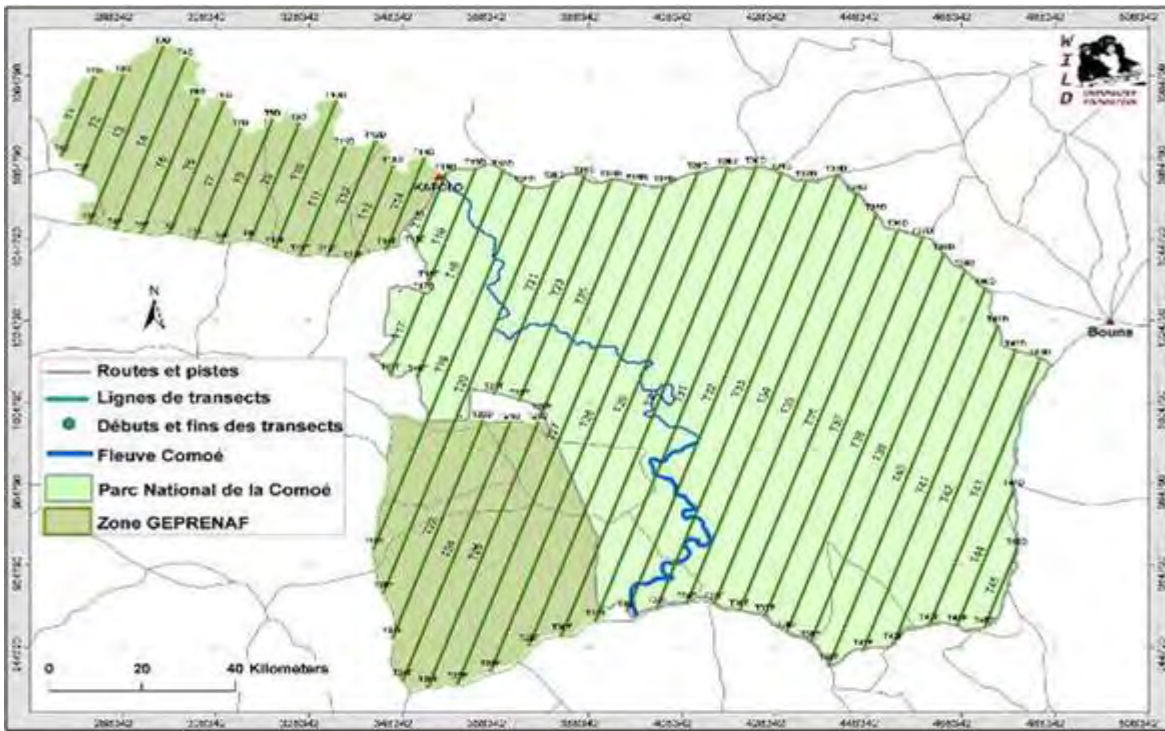


Figure 6 Study area and design in the Comoé National Park



Figure 7 location of primates observed

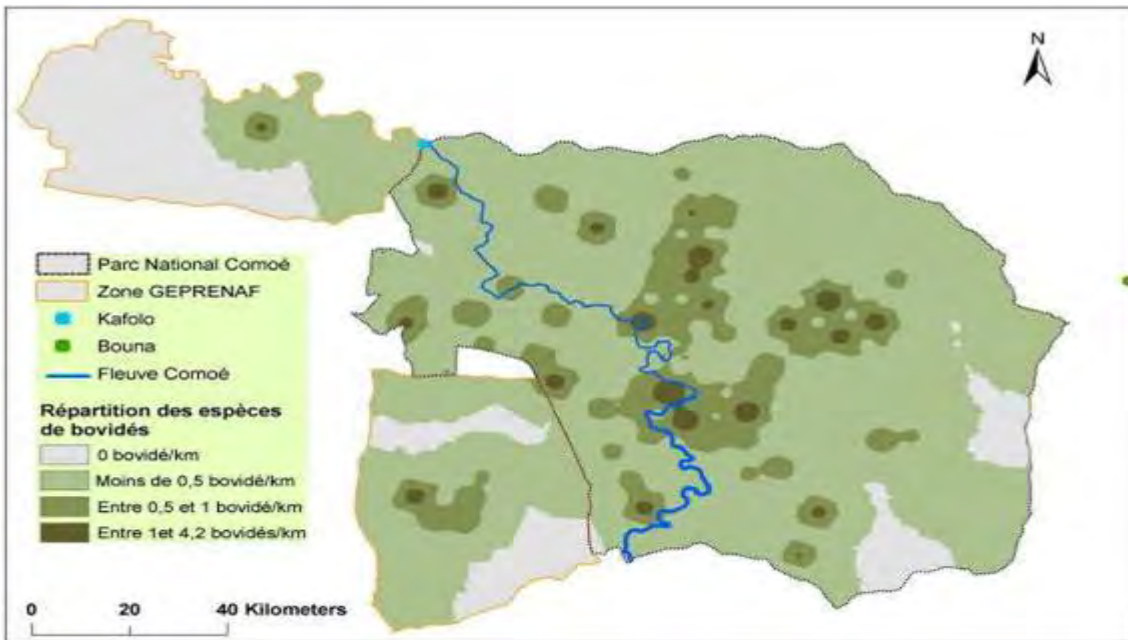


Figure 8: Spatial distribution of bovids

All kinds of human activities were more observed in the GEPRENAF area, than in the park (Figure 10) (with 62% of the total observations. The encounter rate calculated was over 17 signs/km in the GEPRENAF area, a rate three times higher than that calculated for the Comoé National Park.

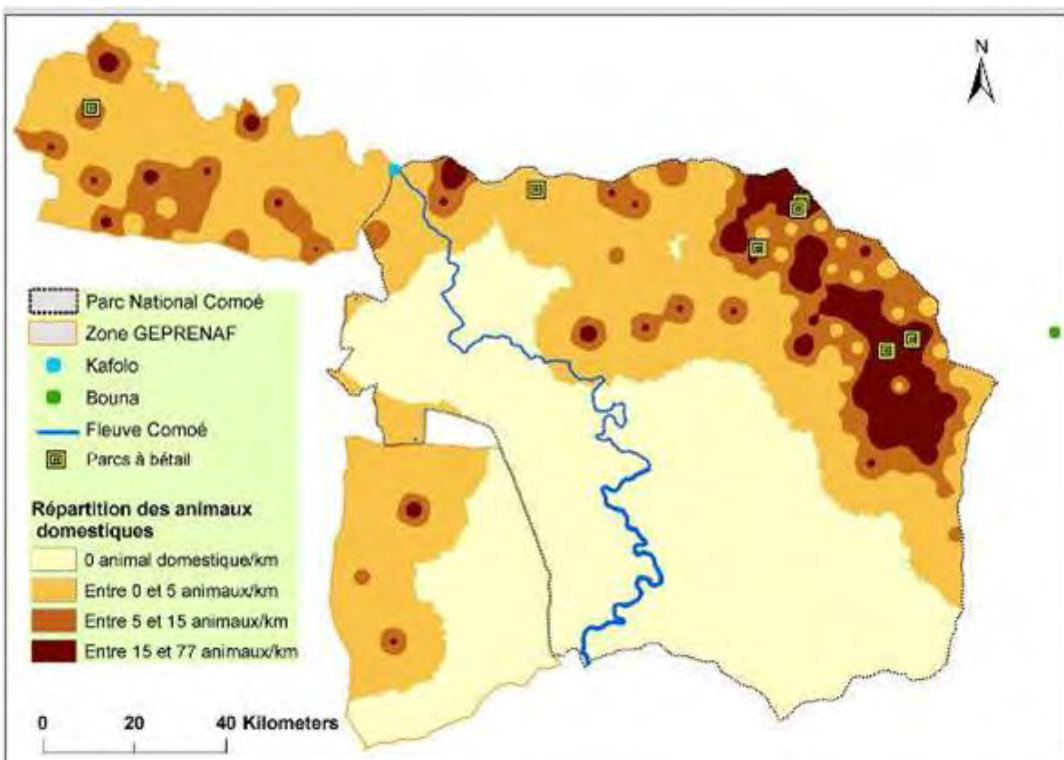


Figure 9: Spatial distribution of cattle

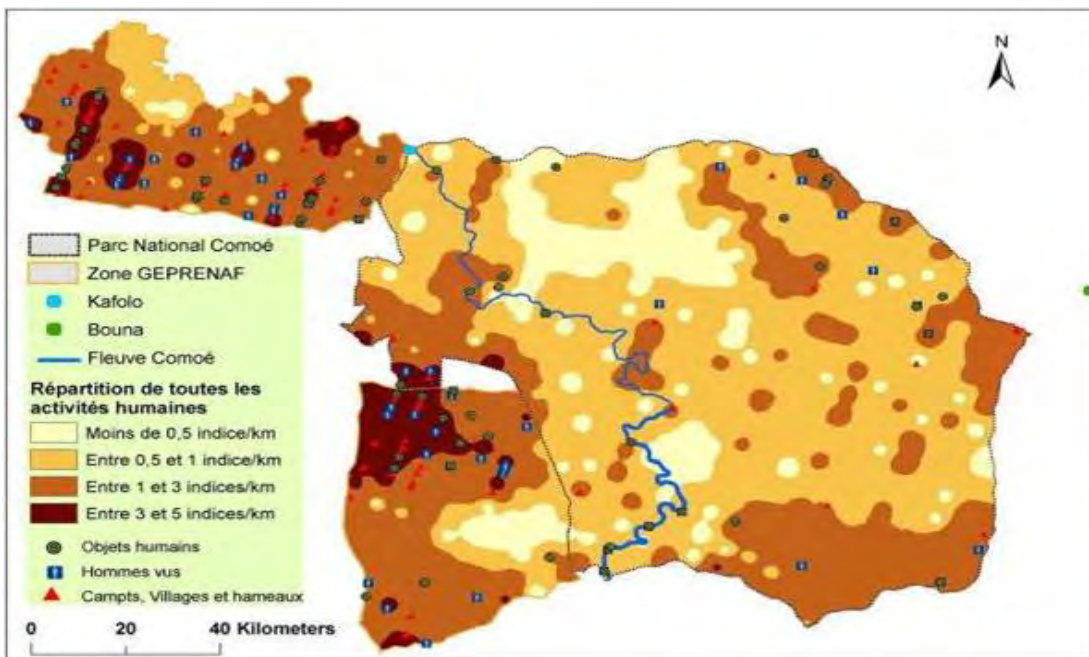


Figure 10: spatial distribution of encountered human activities

The assessment of Comoé National Park showed that there is still a variety of wildlife present, but that their abundance is much lower than in previous years, due to the ever-remaining threats from anthropogenic activities. To better protect the biodiversity of this park, urgent actions must take place. Such actions should be (1) restore urgently the Comoé National Park in its entirety by removing all the plantations and the activities of grazing domestic animals, (2) encourage the establishment of a biomonitoring program covering all seasons of the year, (3) encourage local communities, especially in the northeast of the park, with the support of other structures such as ANADER (National agency for rural development assistance), to find other management alternatives for cattle in the dry season, (4) develop an environmental education program in the villages, and (5) promote and encourage research and conservation activities for Comoé NP.

III. Cavally and Goin-Débé classified forests (CF)

Elaboration of the management plans

In collaboration with the Société de Développement des Forêts (SODEFOR-Government authority responsible for classified Forests in Côte d'Ivoire), the WCF initiated the preparation of a sustainable management plan for both forests. Several activities were conducted in order to draft the management plans for each of the classified forests (Table 2).

Table 2 Overview of sustainable activities in Cavally and Goin Debe classified forests

Activities	Details /Sub-activities	Location	Period
Management plan survey	Update of the methodology to reduce impact on environment	Abidjan	January 2010
	Data collection using new methodology with GPS	Classified forests	February 2010- june 2010
/Socio-economic survey	Implementation in the Goin Débé classified forest	Forêt Classée	
Workshop for management plan preparation	Seminar organized by SODEFOR	Bonoua	18-23rd october 2010

The update of the methodology of the management survey increased the performances of the data collectors through the reduction of working hours and the quality of the data with least possible impact on the flora. The main characteristics of the Cavally classified forest show that it is degraded with a deficit in medium sized wood and regeneration with regard to the commercial trees (table 3).

Table 3 Dendrometric characteristics of Cavally CF

Catégories d'espèces	Effectifs par ha et par classe de diamètre				Surface terrière totale (m ² /ha)	V (m ³ /ha) >= 60
	5-20 cm (1)	20-50 cm (2)	>= 50 cm (3)	>= 60 cm (4)		
	Principales 1 (P1)	13,944	6,979	4,592	3,291	2,450
Principales 2 et 3 (P2 +P3)	14,661	8,141	6,215	4,617	3,395	22,689
Total P1 + P2 + P3	28,605	15,119	10,807	7,908	5,845	37,814
Autres essences	83,590	61,955	14,000	6,826	9,799	18,828
Toutes espèces	112,195	77,074	24,807	14,734	15,644	56,642

Regeneration density

- (1) Density of regeneration trees
- (2) Density of the workable trees
- (3) Density of large reproductive trees
- P principal commercial trees P1, P2 et P3

Socio-economic surveys released will guide the development of written agreements between SODEFOR and farmers occupying land in the forests, in order to rehabilitate the area for the long-term (Figure 11).

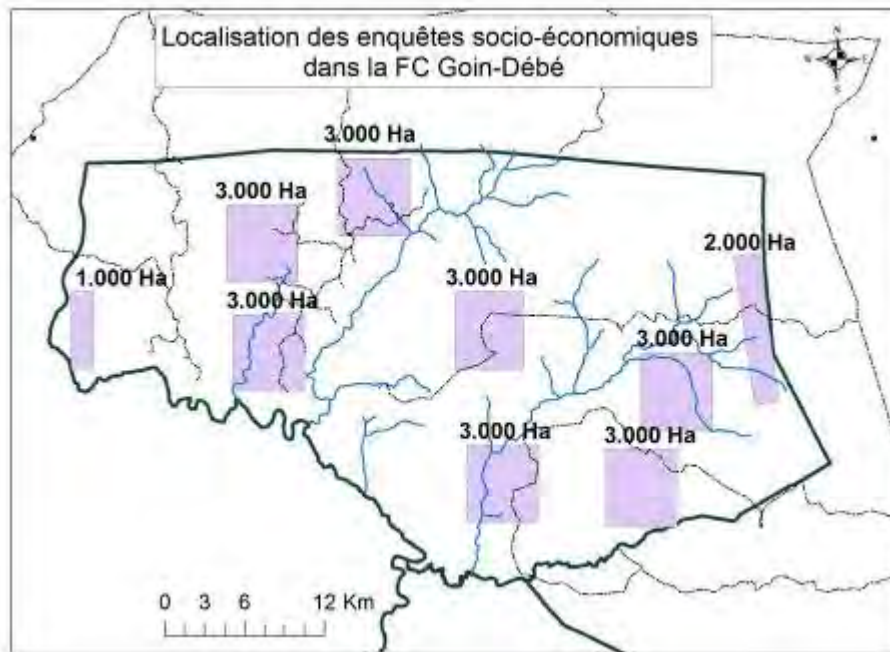


Figure 11 Location of survey carried out

The seminar organized by the SODEFOR allowed to group all the necessary information, as well as to decide together on the orientation of the management plan. A temporary version of the management plan for the Cavally classified forest is available since middle of November 2010.

Surveillance program for Cavally and Goin Débé classified forest:

Since July 2010, patrolling activities have been discussed by all partners on a monthly basis. The results of the biomonitoring program guide the location of the SODEFOR patrols as well as the new eco-guard program. The greatest difficulty for the management of the classified forests is the lack of a permanent presence of the authorities in the field due to a lack of human resources. To assist the SODEFOR, the WCF put in place an eco-guard program, made up of teams of local community members to collect information in the field on the threats encountered in the forests. The eco-guards also collect information on the presence of chimpanzees and other indicator species, following the results of the previous biomonitoring missions. In 2010, 5 missions were carried out in the Cavally CF, and results showed that despite a high encounter rate of species signs, the forest has been newly infiltrated, with new cocoa and rice fields, as well as newly made poacher's trails. A SODEFOR agent accompanies the team for each mission and the information collected is sent back to the SOEDFOR office to help orientate future conservation measures for the forest.

Biomonitoring program in the classified forests

In February 2010, as well as carrying out training of the biomonitoring teams on collecting data related to fauna in the forests, the teams were also trained in the new methodology for the fauna and flora survey, in order to carry out a simultaneous activity, thereby reducing man hours spent in the field for data collection activities. This method was only used for the Cavally Forest, as fauna survey had already been carried in 2009 in Goin-Débé CF.

Results of second phase of biomonitoring in the two classified forest are described below.

Presence of chimpanzees

We calculated the abundance and the density of chimpanzees in both forests during both phases. The decrease of the number of chimpanzees in Goin-Débé classified forest is very high, passing from more than 200 individuals to less than 40 in 2009 (table 4). For Cavally classified forest, we consider that the number of chimpanzees remained constant between 2009 and 2010, approximately 60 individuals. At present, in both classified forests, the density of chimpanzees is low.

Table 4 Density and abundance of chimpanzees

	Dégradation (j)	AIC	Coef variation	Densité	Densité min	Densité max	N	N min	N max
FC Cavally 2010	91.22*	239.0	32%	0.081	0.044	0.149	52	28	96
FC Cavally 2010	73.3**	239.0	34%	0.100	0.022	0.193	64	34	124
FC Cavally 2009	91.22*	239.7	32%	0.068	0.037	0.127	44	24	81
FC Cavally 2009	73.3**	239.7	34%	0.085	0.044	0.164	55	28	105
FC Goin-Débé 2009	91.22*	239.7	38%	0.026	0.013	0.055	27	13	57
FC Goin-Débé 2009	73.3**	239.7	40%	0.033	0.007	0.154	34	16	73
FC Goin-Débé 2007	91.22*	234.0	48%	0.235	0.095	0.580	213	86	525
FC Goin-Débé 2007	73.3**	259.5	49%	0.293	0.116	0.739	265	105	668

* Nest decay rate following Kouakou et al. 2009

** Marchesi et al., 1995

Principal threats for the classified forests

The ongoing crisis in Côte d'Ivoire as well as the high rate of deforestation observed in the region have had a huge impact on the degradation of the Goin-Débé CF and threaten greatly the conservation of conservation of the Cavally CF (Figure 13: Spatial distribution of newly cut land land for agriculture

Figure 13: Spatial distribution of newly cut land land for agriculture

). The current surveillance program will allow straightening the situation if the general situation in the country improves

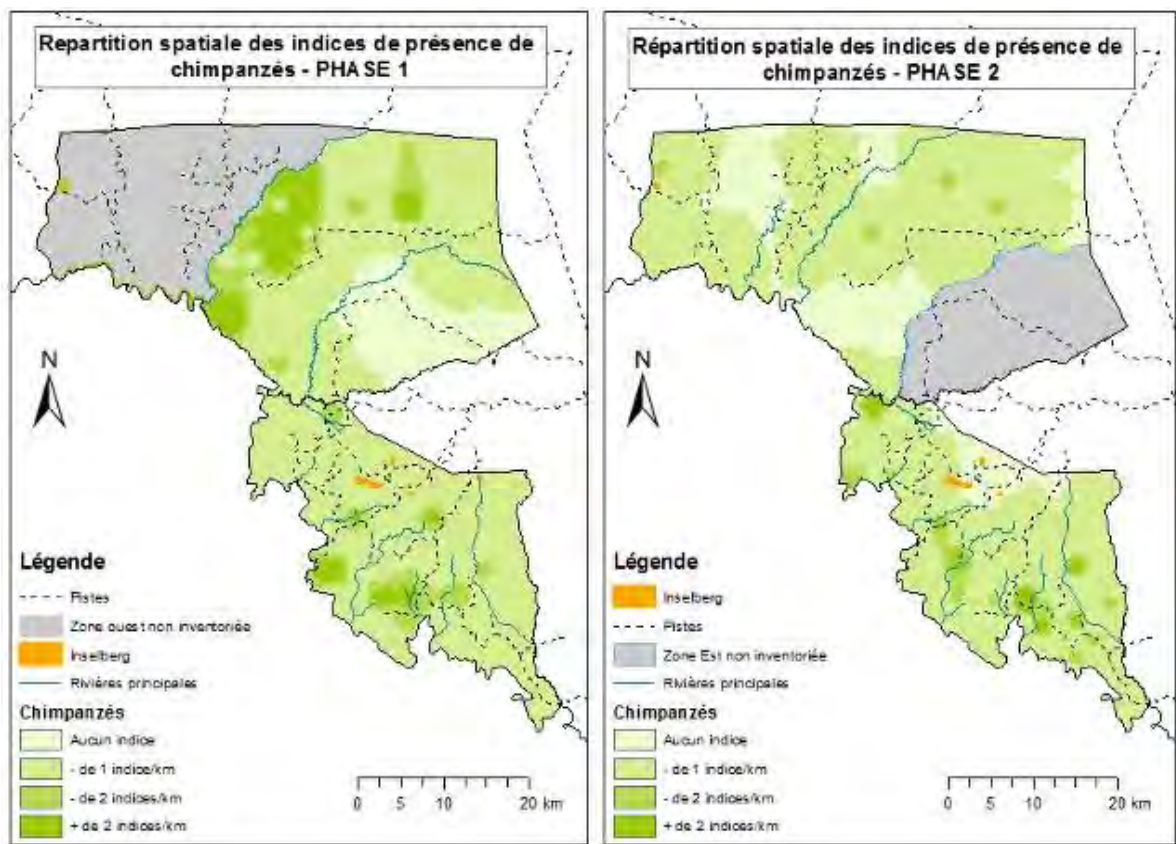


Figure 12 : Spatial distribution of chimpanzees

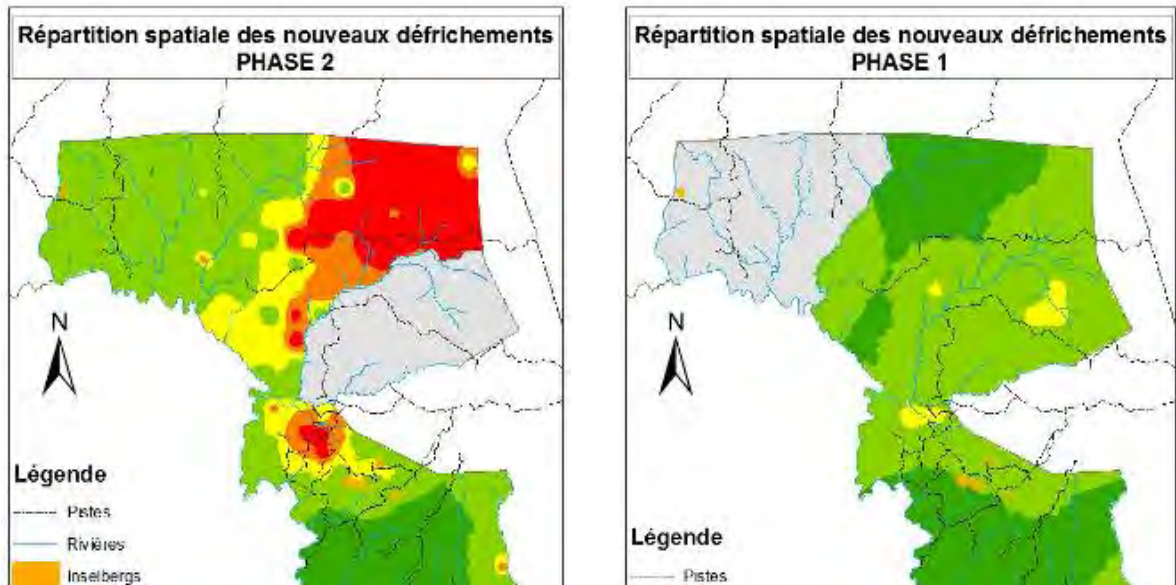


Figure 13: Spatial distribution of newly cut land land for agriculture

IV. Tai-Sapo corridor area

In 2010, the WCF carried out the first surveys in the transboundary corridors of the Tai-Sapo Complex: 1) along the Hana River (Djouroutou) and 2) in the Tai- Grebo Region. These studies allowed the WCF and partners to assess the feasibility of creating landscape corridors for the preservation of the largest forest bloc in West Africa. Data collection is ongoing in 2011 and the results will be presented once available. Some primary results for the Djouroutou corridor are presented below.

Bovid represent the group of species whose presence indicators (dung, tracks, etc) were the most frequently encountered (table 5). Regarding the bush-duikers, they were largely observed in the remaining forests near the Liberian Border (Figure 14)

Table 5 Encounter rates of bovinds

Observation	Number	Encounter rate (n/km)
Buffalo Dung	3	0.016
Buffalo tracks	17	0.091
TOTAL buffalo	20	0.108
Maxwell's duiker (seen)	1	0.005
Black duiker (seen)	1	0.005
Duiker dung	35	0.188
Duiker tracks	260	1.398
TOTAL Duikers	297	1.597
Harnessed Bushbuck imprints	49	0.263
Total Harnessed Bushbuck	49	0.263
TOTAL	366	3.934

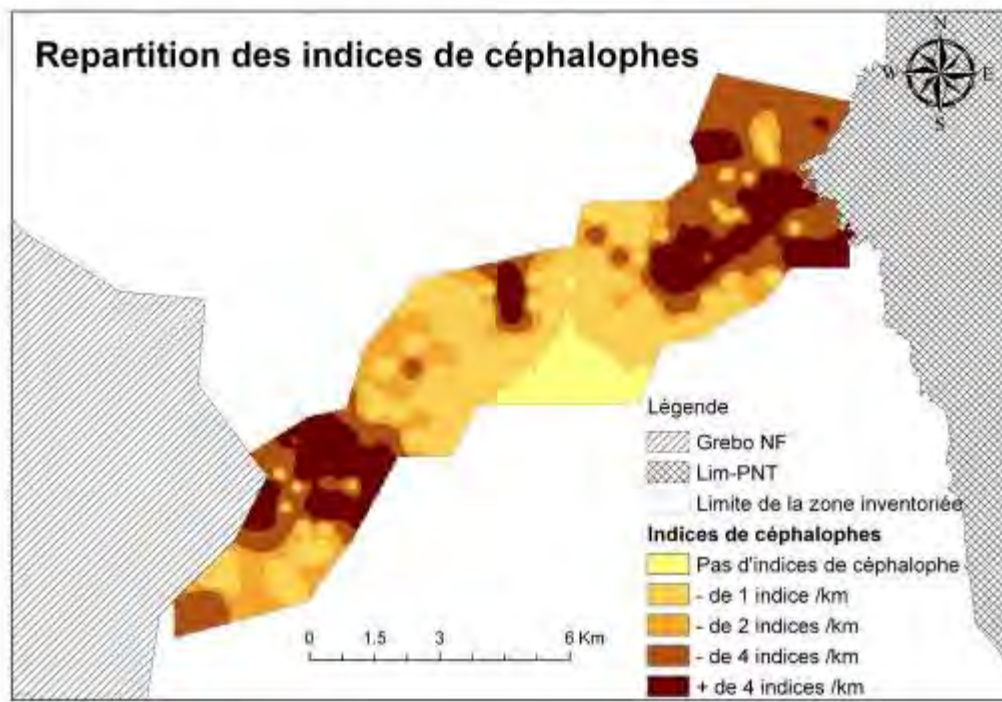


Figure 14 : Spatial distribution of bush duikers

Only 5 species of primates were observed in the corridor and no chimpanzee signs were found (table 6).

Table 6 Encounter rates of primates

Type of observation	Observation	Number	Encounter rate (n/km)
Primates seen	Diana	07	0.047
	Dwarf Galago	05	0.034
	Mona	12	0.080
	Spot-nosed Monkey	16	0.108
	Total seen	40	0.269
Primates heard	Sooty Mangabey	02	0.013
	Diana	01	0.007
	Mona	02	0.013
	TOTAL heard	05	0.034
TOTAL		45	0.303

Hunting activity is wide-spread in the zone; and consists mainly of traps set (around 2 per km) in areas of high encounter rates of duikers, and thus also forest areas. (Figure 15)

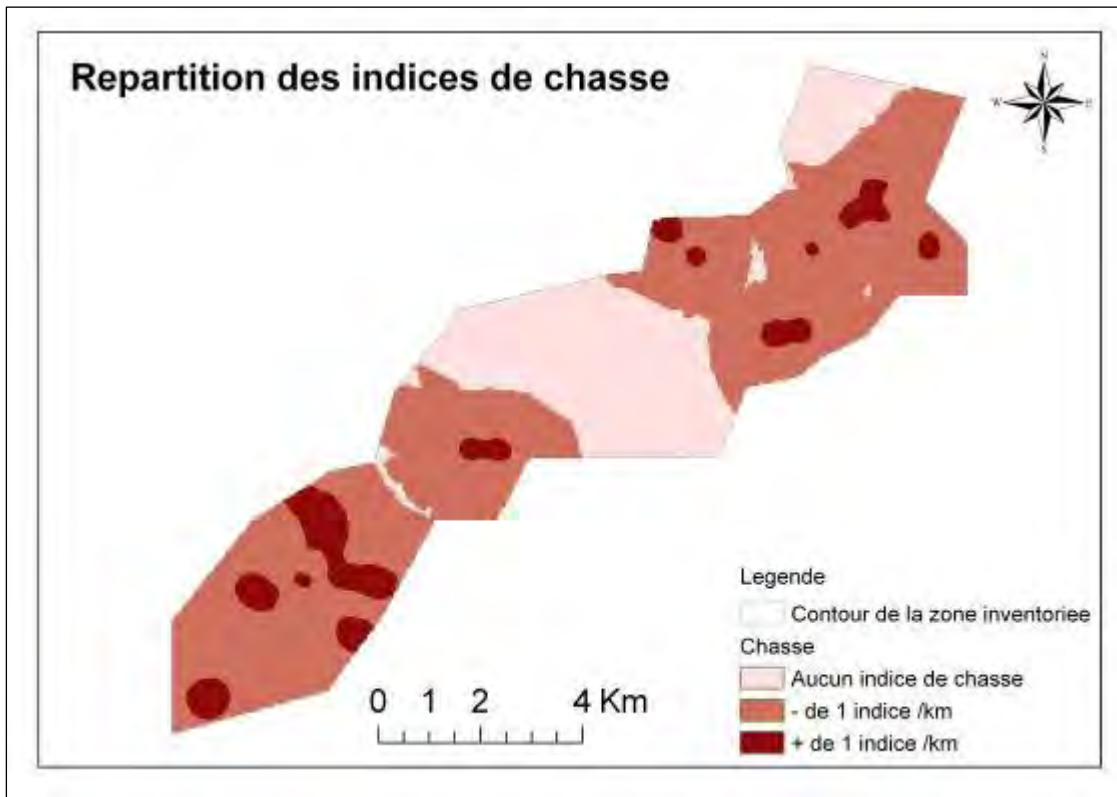


Figure 15: Spatial distribution of hunting activities

V. Nimba (ArcelorMittal Liberia)

Within the framework of collaboration between Conservation International and Wild Chimpanzee Foundation, a project to set up a program of biomonitoring in the mining concessions of Arcelor Mittal Liberia (AML) and in the remaining forest of West Nimba was implemented. The main objective of this project was to collect additional data to fill a gap mentioned during the previous studies (Biological Preliminary Assessments) in the concerned region.

Activities ran from May 2010 till December, 2010. After a training of the teams, an experimental phase was conducted to prospect and collect preliminary information to better plan the second phase, i.e. the main phase of data collection

Sites given up to the mining exploitation are the mountains of Gangra, Yuelliton and Tokadeh which part of the classified forest of West Nimba. Our activities took place not only in these sites but also in the remaining parts of West Nimba forest to serve as an offset site for the preservation of the biodiversity of the region. The work carried out will help AML plan a sustainable management of the mining activities to minimize the negative impacts on the local wildlife.

Signs of bovids were the most encountered with a rate of 13.47 signs per km whereas the signs of primates were only 0.55 per km. We note a strong presence of human activities, with 10 signs per km, which could explain the low level of primate presence (table 7).

Table 7 Encounter rates per site

Parameters	Site	Bovid signs	Chimpanzee signs	Human activities	Primates heard	Other mammals
Number observed	Gangra-Yuelliton	231	12	173	3	13
	Tokadeh	124	0	147	1	2
	West Nimba	599	21	389	2	18
	TOTAL	954	33	709	6	33
Encounter rate	Gangra-Yuelliton	14.44	0.75	10.82	0.19	0.81
	Tokadeh	9.81	0.00	11.63	0.08	0.16
	West Nimba	14.20	0.50	9.23	0.05	0.43
	TOTAL	13.47	0.47	10.01	0.08	0.47

No primate signs were recorded in Tokadeh, and a lower rate of bovid signs were encountered. Direct observations for all species were rare.

All different types of human activities were encountered, with West Nimba having the lowest encounter rate.

The spatial distribution of bovids shows that they are encountered in the whole study site, but that they are more abundant in West Nimba. For the chimpanzee populations, we estimate a total of 2 to 3 groups present in the area (Figure 16). The signs of human threats are more abundant in the periphery of the zones of study and particularly near the tracks which open access to the places of poaching, agricultural and forest exploitations (*Figure 17*).

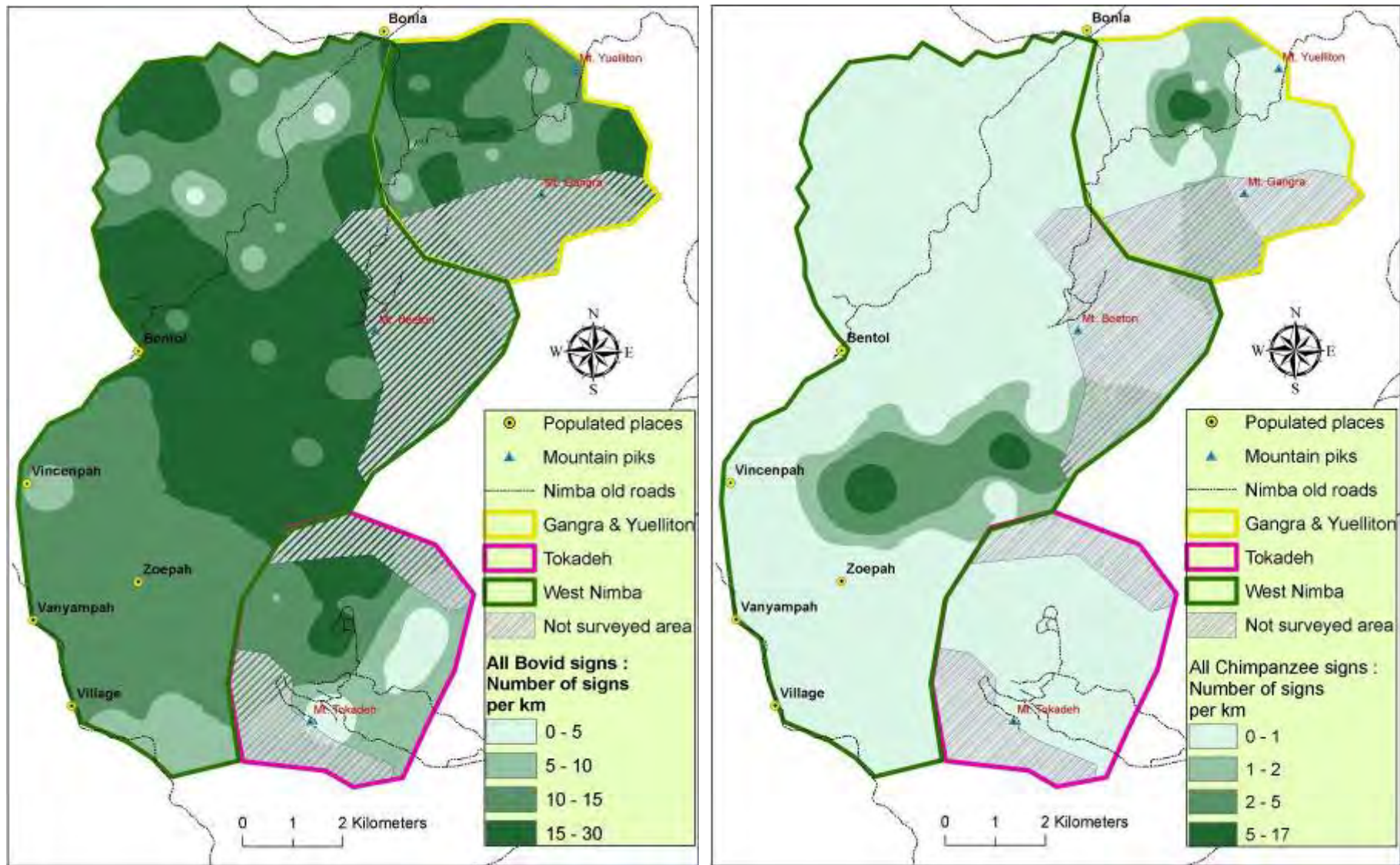


Figure 16 Spatial distribution of bovids (left) and chimpanzees (right)

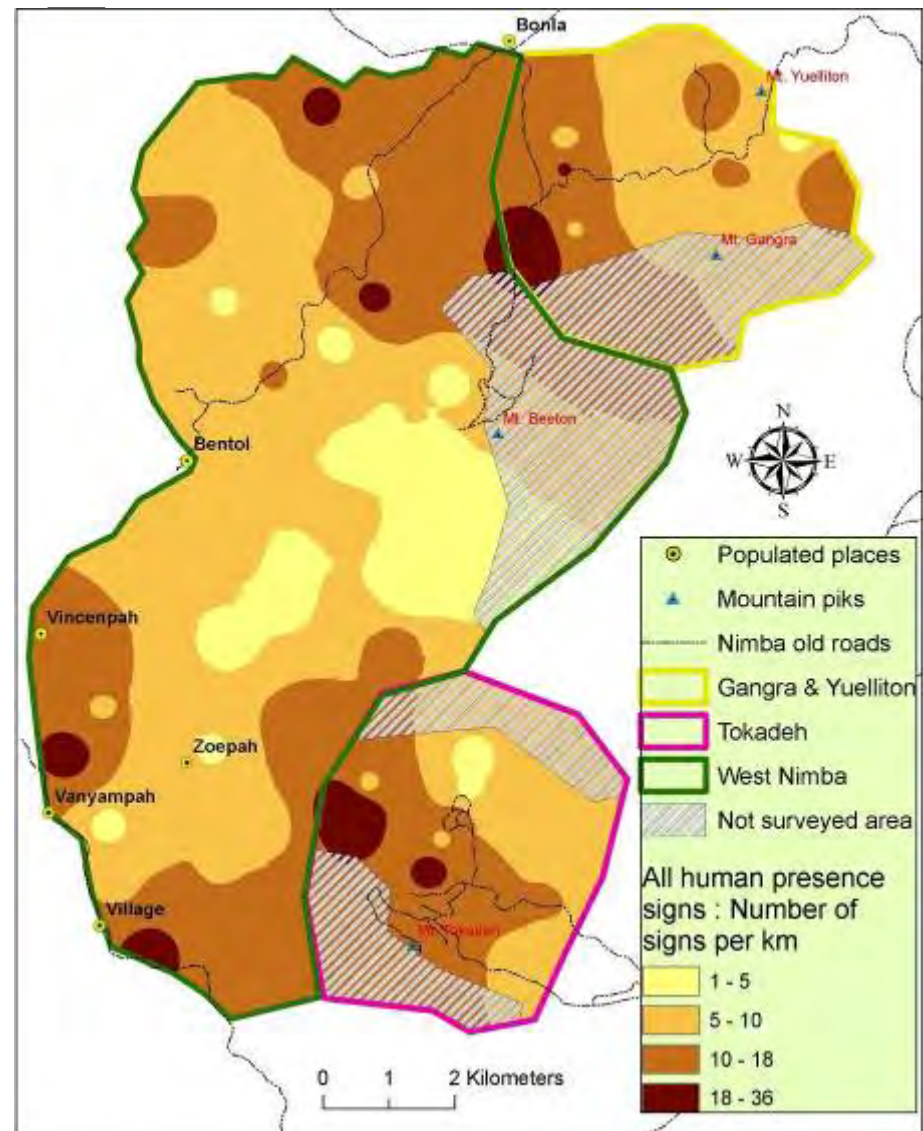
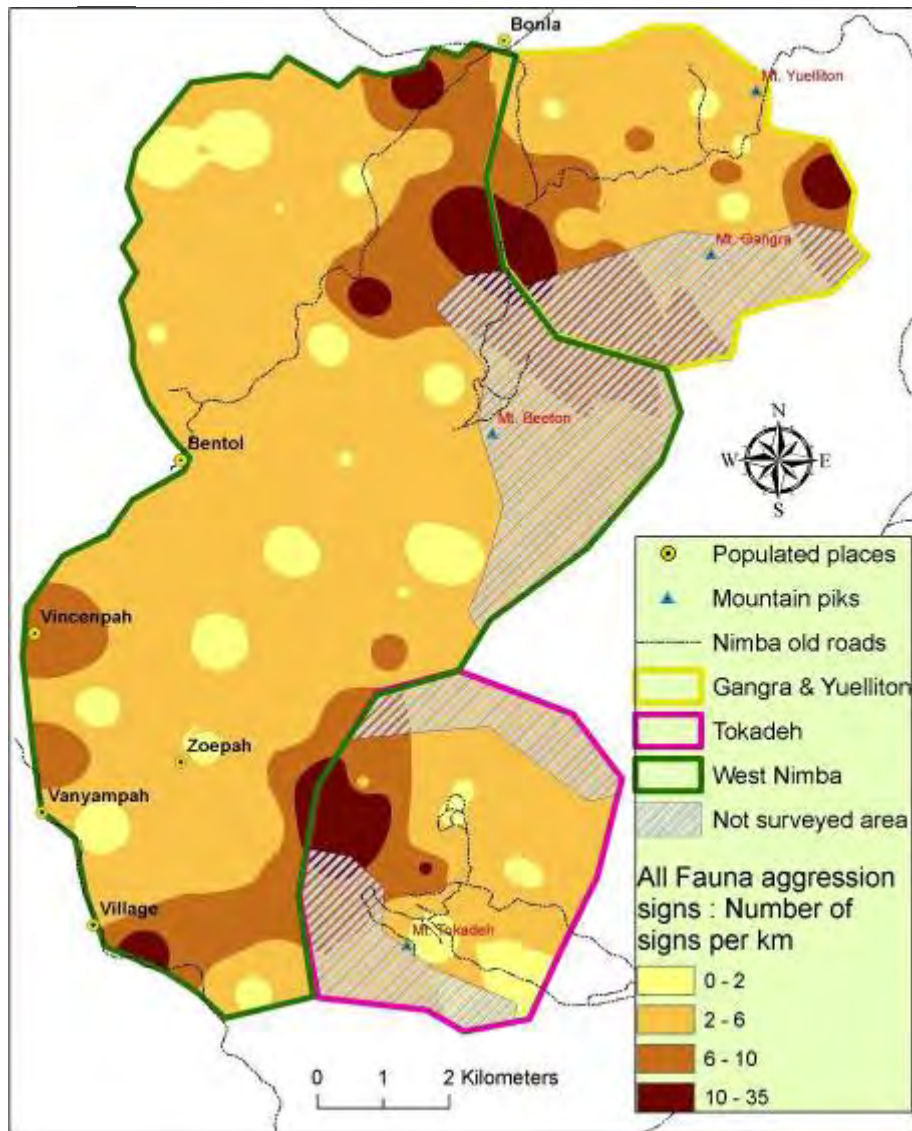


Figure 17 : Spatial distribution of human threats

We did not observe fields at Tokadeh but the proportions of secondary forests and bush are more prominent than the proportion of primary forests. This situation is similar to Gangra-Yuelliton, but we noticed the opposite in West Nimba where the proportion of non-degraded forest is the most abundant.

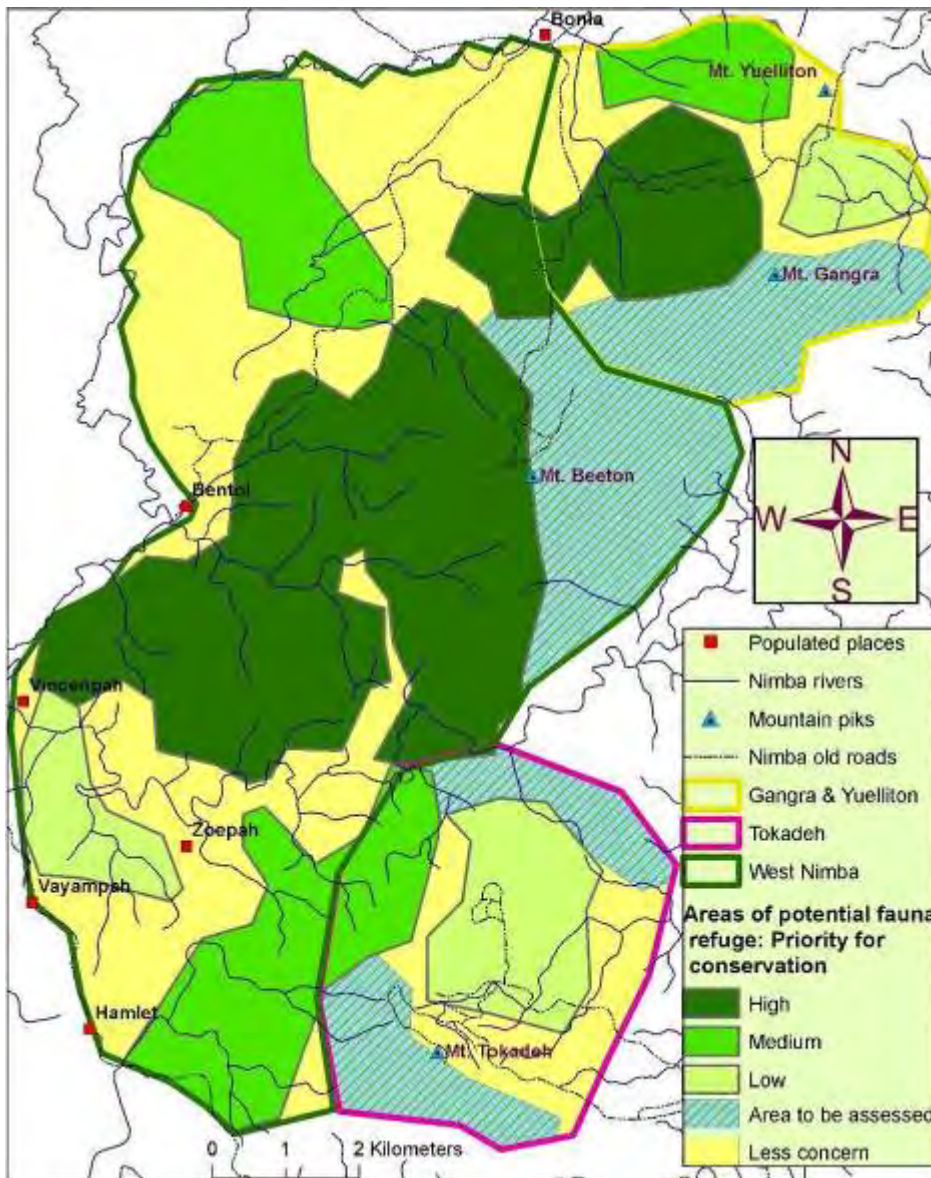


Figure 18 Priority zones for biodiversity conservation

By taking into account zones of presence of bovids and primates in the zones prospected, we defined zones of high priority for the conservation of the biodiversity (in dark green in the Figure 18). The zones of average priority (in light green) show the zones of strong presence of the other animals (bovids and other mammals, not chimpanzees) in secondary forests and rivers-zone. The zones of low priority of preservation include the spaces where the vegetation is generally degraded with a strong abundance of species adapted to these types of vegetation, or zones of forests but with a low abundance of animals.

VI. Taï National Park: Support to Surveillance Program

Since December 2009, WCF, OIPR, with support from the UNDP under a Swiss fund, started a project in the TNP in Côte d'Ivoire to improve the research of the park by evaluating the impact of law enforcement in the park on the poaching activities carried out by local communities. The study site is set in and around the research zone of the park, which holds 4 habituated groups of chimpanzees (Taï Chimpanzee Project) in an area of 150 km².

Two priority tasks are set to be answered by this study: (1) Assuring the strengthened surveillance and the collection of data by the agents of the OIPR in the zone of scientific research in the PNT; (2) following the evolution of the abundance and the density of various bio-indicator animal species in a zone of 150 km² and (3) determining the factors which influence the distribution of the fauna in the zone of research. This project is conducted by two Ivorian Phd students.

Activities implemented are presented below according to products initially defined in the statement of the project. During both training courses in March / April / May, 2010, a total of 46 persons among which 38 agents of the OIPR, 4 assistants of Taï Chimpanzee project (TCP), two PhD students and two main trainers of the WCF (experts in biomonitoring) participated to learn the methodology of data collections. Since December, 2009, activities of surveillance of the zone of research of PNT are in progress within the framework of this project. The agents of the mobile brigade ensured the surveillance zone and the periphery with monthly patrols. In October, 2010, the agents of surveillance of the PNT accumulated a presence in forest of 1127 person-day of which 76 were devoted to data collection. Between January and October, 2010, a phase of collection of data was carried out on 60km of transects. Data collected previously by PhD Student, G. Campbell serves as a reference data. For the second phase of collection, the sampling area will be extended to a total of 162 linear transects. The data are collected along transects (1 km long) and at listening points during 30 minute intervals.

Results show that the primary species seen directly during data collection is primates and ungulates. The Red Colobus and Diana monkey are the species most frequently met among primates. Regarding the ungulates, Maxwell's duiker dominate the observations, and overall small duikers 90 % of the direct observations.

Indirect observations of animals

At the listening points, vocalizations of monkeys are also noted, and results show that the Diana monkey were most common, followed by the red Colobus, Mona monkeys and then mangabeys

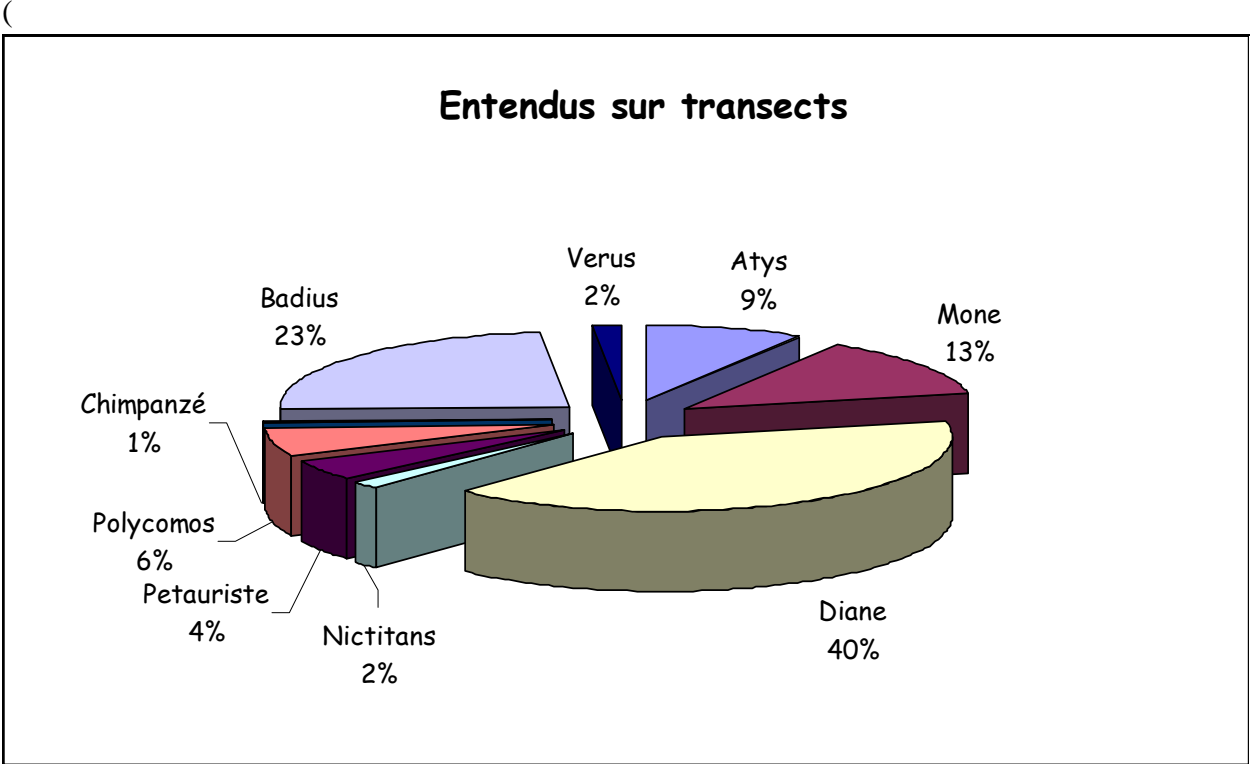


Figure 19).

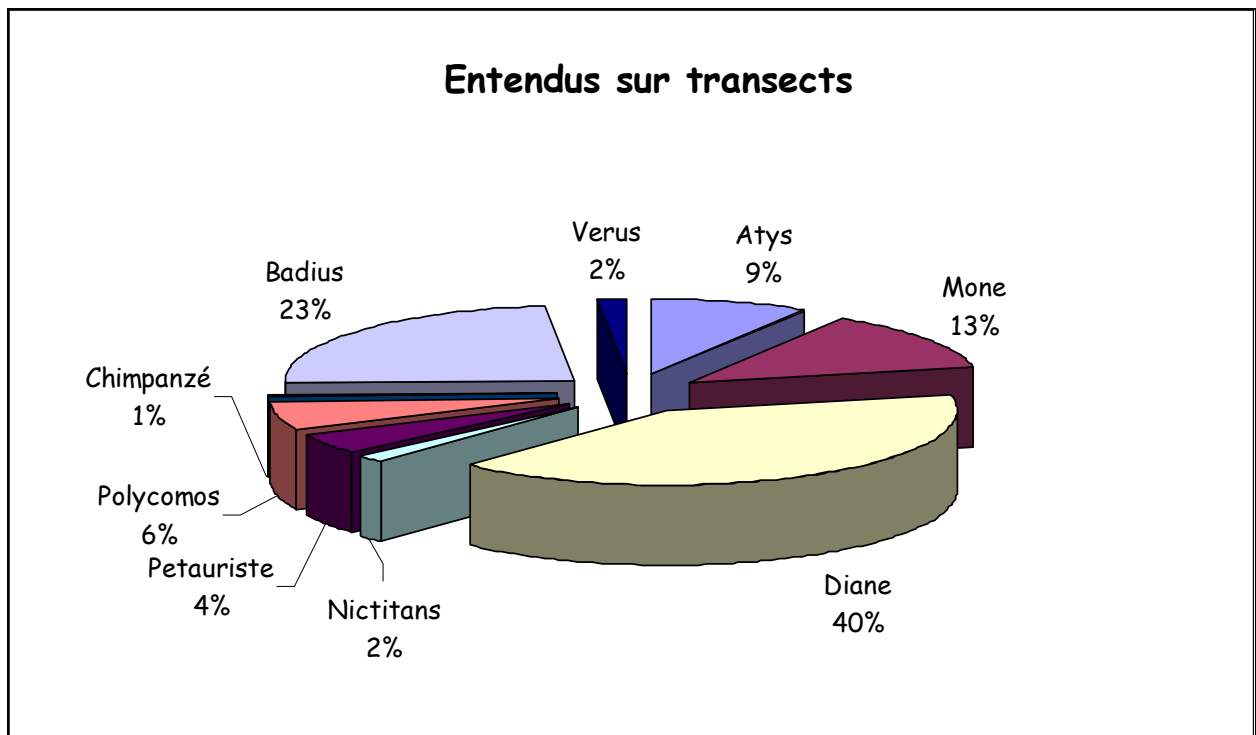


Figure 19 Primates heard at listening points

Indirect observations such as duiker droppings are also collected. Small duiker droppings represent 86.6% of total observations (Figure 20), which were most observed in the research zone which is an area of permanent non-aggressive human presence.

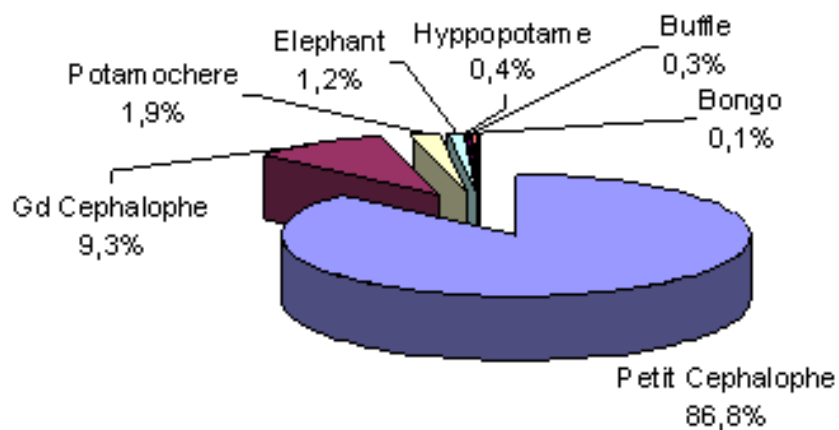


Figure 20: Observations of droppings

The insufficient number of identified nests of chimpanzee did not allow us to make a statistical analysis with the Distance software.

The signs of threats are many and varied. Among these signs, the tracks of poaching are the most numerous and were found to be more concentrated in the periphery of the park close to zones of the villages of Tai and Paulé-Oula with more than 3 tracks per kilometer

We noted based on our work, that encounter rate of illegal human activities in the Park has decreased from 2.2 to 1.8 signs per km during year 1 of the project compared to the previous study. It represents a decrease of 18 %. The encounter rate of primates increased from 3.44 to 3.55 primates / km and for ungulates the signs of presence (dropping) increased from 6.43 to 10.93 signs / km (that is 70 %). Thus far, the increased surveillance in the park clearly shows a positive impact on the wildlife populations in the research zone and its periphery.

Conclusion and perspectives for 2011

The report of our work in Ivory Coast and in Liberia in 2010 shows that the WCF is expanding its areas of work across the forests of West Africa, despite the difficulties encountered in the region. Many of the projects attained the objectives set out and have helped improve the management of the various protected areas and targeted species. Nonetheless, it must be stated that though these projects may prove successful and indispensable for the preservation of West African biodiversity and the chimpanzees populations, the duration of these projects are on average for one year, thereby not guaranteeing them on the long-term. Moreover, the socio-political situation in Côte d'Ivoire for example can cause disturbances in the foreseen action plans, with many international donors systematically interrupting funds during such crises, thereby hindering the continuation of such activities and thus it is important to state that funds made available for conservation should be continued during such periods to minimize the impacts of such crises on the forest and chimpanzees of west Africa. We therefore hope that peace and tranquility return to the sub-region so that such projects can be ensured for the long-term to obtain better results for West African biodiversity.

In 2011, the WCF plans to continue working in the aforementioned Protected Areas, with possible opportunities for other areas, such as Banco NP in Abidjan and Grebo NF and Sapo NF in Liberia.

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