



**République Démocratique du Congo
Programme National**

Batiment CHANIC, Ave. Col Mondjiba 1275
Kinshasa, Gombe, RDC

Parc National de la Maiko

Identifying conservation priorities for the recovery of
the Maiko National Park

*Post-conflict surveys of wildlife populations and
human impact in the North Sector of the park.*

Progress Report and Data Presentation

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September 2005

IMU Technical Rapport N° 4

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N° 3. *Rapport sur le braconnage à l’Eléphant et sur la commerce de l’ivoire dans et à la périphérie de la Réserve de Faune à Okapis.* December 2004, Christian Amboya, 33 pp.

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1. SOMMAIRE

- Ce rapport présente les premières informations sur les conditions dans le Secteur Nord du parc national de la Maiko et sa zone périphérique depuis les années 1990. Les inventaires fournissent les données de base sur la faune et les activités humaines dans une région le plus éloignée du pays.
- Les équipes du terrain ont réalisé 378 km des lignes de reconnaissance sur une étendue de 1250 km² en juillet 2005.
- L'expédition a collecté les données sur l'accès, l'occupation humaine, l'infrastructure et les conditions sécuritaires dans le secteur et ses environs. Les données ont compris les observations de la grande faune à travers leurs crottes, nids, signes de broutages, etc. Les données sur les activités humaines ont compris les observations de passage, des habitations, évidence de la chasse et activités minières. Les observations sur les habitats d'intérêt particulier (clairières d'éléphant, villages abandonnés) ont été faites.
- Les populations importantes d'éléphants, d'okapi, de céphalophes, les primates, le léopard et les chimpanzés ont été documenté dans le secteur.
- La présence de gorille a été confirmée, mais l'espèce semble être rare dans le secteur. Il s'agit probablement des solitaires dispersés. L'évidence de gorille (crotte et traces) a été observée pour la première fois à l'Est de la rivière Lindi.
- L'évidence de chasse a été observée dans toutes les grilles d'échantillonnage. Néanmoins, la chasse est concentrée dans les environs immédiats des camps miniers et des villages. Les enquêtes ont montré que la chasse a été pratiquée aux besoins de la subsistance, et de fournir un ravitaillement aux sites miniers. Aucune évidence de l'exportation de la viande de chasse hors le secteur n'a été observée. L'évidence d'une faune abondante de petits ongulés et de leur prédateur principal, le léopard, indique que la chasse n'a pas encore réduit les populations animales dans le secteur.
- L'exploitation minière de l'or, y compris les sites de prospections, a été observée dans 22 de 50 grilles d'échantillonnage. Plus de trois quarts (27 sur 35) des camps miniers observés ont été actifs. Le médian de nombre d'occupants dans les camps a été entre 10 – 15. Le camp le plus large visité avait 120 personnes.
- Onze points de vérification des limites ont été documentés et une carte révisée de limite du parc a été produite. Les données ajoutées à la carte de base de site ont été faites (rivières, villages, mines, et voies d'accès).
- L'expédition a négocié l'accès au site avec les chefs de milices qui contrôlent toujours certaines zones. Leur coopération permet la remise des activités des gardes de l'ICCN. Suite à ces négociations, et pendant l'entrée des équipes dans le secteur, les exploitants miniers ont quitté une mine illégale dans le parc. Les patrouilles de l'ICCN ont été organisées dans le secteur après le retour des équipes du terrain.
- Quarante-cinq villageois locaux ont été engagés comme porteurs, guides et assistants du terrain. Tous ont reçu une formation de base. Cinq gardes ICCN ont été engagés pour les inventaires et ont bénéficié d'une formation dans la navigation en forêt et la récolte de données sur le terrain.
- Une premier base d'opérations a été établie avec l'ICCN à Yongesa.
- Les données du terrain, y compris les photos documentaires, tableaux de vérification, et shapefiles sont gardés dans une banque de données du projet.
- Les recommandations pour appuyer la remise de contrôle de l'ICCN et d'élargir les inventaires de base sont présentés en rapport des résultats acquis

1. SUMMARY

- The report presents the first information on conditions in the north sector of the Maiko National Park and surrounding landscape since the early 1990s. These surveys provide post conflict base line data on the status of wildlife and human impact in one of the most remote regions in DRC.
- Survey teams conducted 378 km of ground reconnaissance covering an area of 1250 km² in July 2005. The expedition collected data on access, infrastructure and security around the northern sector of the park.
- Data on wildlife and human activities included observations of large mammal and their sign (dung, nests, feeding), evidence of human passage, settlement, hunting and mining, and notes on habitats of special interest (elephant clearings, current and past settlement areas).
- Important populations of elephants, okapi, duikers, primates, leopards and chimpanzees occur in the sector.
- Gorilla presence is confirmed, but the species is uncommon in the survey zone, and may consist primarily of wide-ranging solitary animals. Occurrence of gorilla sign (dung and tracks) is reported for the first time east of the Lindi River.
- Evidence of hunting was recorded in nearly all survey grids, however most of the hunting is concentrated in the immediate vicinity of mining camps or settlements. Hunting is limited to meeting local subsistence needs and the demand of artisanal miners. There is no export of bushmeat from the region. Abundant evidence of small ungulates, and their primary predator, the leopard, indicates that hunting has not strongly reduced wildlife populations in the survey zone.
- Evidence of mining, including test pits (primarily alluvial gold) occurred in 22 of 50 survey grids. Over three fourths (27 of 35) of the mining camps visited were active. The median number of occupants in mining camps was 10 –15 people. The largest camp contained 120 miners.
- Eleven field verification points for the park limits were collected and a revised map of the park boundary produced. Additional inputs to the base map include locations of rivers and associated names, settlements, mines and access routes.
- The expedition negotiated security assurances with militia leaders, who still exert control, for ICCN guards to resume activities in north sector of the park. Artisanal miners abandoned at least one major illegal gold mine in the park as the expedition entered the area. Arrangements were made to ensure follow up patrols by the guards.
- Forty-five guides, porters and field assistants hired from local communities received basic training. Five park guards were engaged for the surveys and were trained in navigation and field methods.
- A preliminary operational base for ICCN was established at the designated patrol post of Yongesa.
- Survey data including photographic records, verification tables and shapefiles are contained in a project database.
- Recommendations to support ICCN recovery of the north sector are provided in relation to the new information obtained. Additional survey zones are identified to provide a comprehensive view of the park's wildlife and its threats.

2. INTRODUCTION

The establishment of base line surveys of biodiversity and human impact is a primary objective of WCS CARPE-supported program in the Maiko-Tayna-Kahuizi Biega (MTKB) Landscape.

The Maiko Park and its surrounding landscape (**FIGURE 1**) is one of the least known and most inaccessible of Congo's protected areas. Current status of the biodiversity and the impact of human activities in the area remain little known. Over the past decade, and continuing to present, many areas of the park and its adjoining landscape have been inaccessible due to continuing activities of Mai-mai and other militias. The entire park, and many areas of the MTKB landscape have been classed as among the most logistically difficult and insecure in the country by MONUC since the beginning of the conflict.

In April portions of the northern Sector of the park became accessible, and WCS survey teams, based in Loya, where continuing Mai-mai activity precluded access, moved operations to the Kanabiro area. This report provides the results of the initial phase of base line surveys for the North sector of the park and its surrounding communities. The inventories represent the first engagement of ICCN and its partners in this region since the early 1990s.

Rationale and products of base line inventories

Over the past fifteen years, WCS and its partners, including the CITES MIKE program, have conducted exploratory surveys, and wildlife inventories and human impact assessments over a number of large forest landscapes in DRC. These surveys often represented the first significant conservation engagement with these remote, little known natural landscapes and have identified a number of sites of high conservation importance and potential.

The inventories include faunal surveys, as well as an evaluation of the use of wildlife, other forest products and mining resources by local people. The primary product of these inventories is the identification of remaining important concentrations of biodiversity, with an assessment of the threats and opportunities for the effective conservation and management of these areas and their resources. This information has been used to develop conservation and management in zones where risks and costs are high, but where important remaining natural resources are at stake.

In addition to providing information, the surveys hire local people and train them to participate in the discovery and documentation of the landscape. These individuals raise awareness and create support for conservation in local communities. Some are recruited as park guards by ICCN, other work in long term monitoring. In the case of the Maiko Landscape, the surveys have been instrumental in recovery and re-establishment of ICCN in areas where they have been absent, or had only limited access for over a decade.

The report provides a summary of the results of the first phase of baseline surveys conducted by WCS and ICCN in the north sector of the Maiko National Park and its immediate vicinity, an updated base map for the sector, and an overview of the conservation potential and threats to the region. A final section provides a plan for extension of these inventories to additional areas of the park and its buffer zone.

Acknowledgements

We acknowledge and thank staff of the ICCN, Parc National de la Maiko, and in particular, ICCN Chef de Site, Didier Bolamba, and Conservateur, Dilere Kipiri for their support, assistance and participation in this survey.

3. OBJECTIVES OF THE REPORT

1. **Exploration and Base line status.** Document the distribution and relative abundance of important fauna; describe threats and human use of natural resources in the survey zone.
2. **Site base map.** Verify and map access routes, park boundaries, rivers, settlements, natural resource extraction and ICCN operations.
3. **Training.** Identify, recruit and train local staff to participate in the surveys.
4. **Security and Logistics.** Evaluate security and establish operational bases and access routes in relation to overall objectives for protection and natural resource management in the zone.
5. **Planning.** Identify future areas of interest and intervention throughout park.

The report is divided into four sections, which follow.

Site overview provides pre war information on the park and surrounding area based on the first surveys conducted from 1989 to 1992.

Field operations summarizes survey calendar and provides information on site security, training and survey costs.

Survey design and methods presents the survey layout for the inventories and describes the data collection protocols.

Results document survey coverage and provide summary tables of observations on fauna and human activities in the zone. An overview of base map inputs is provided.

Conclusions summarize the current results in comparison to pre-war status of the area. A proposal for extending inventories to provide a comprehensive overview of the park and buffer zone is provided.

Annexes. Survey protocols, survey design coordinates and documentation of the expeditions interventions to initiate recovery of the park from militia control are provided.

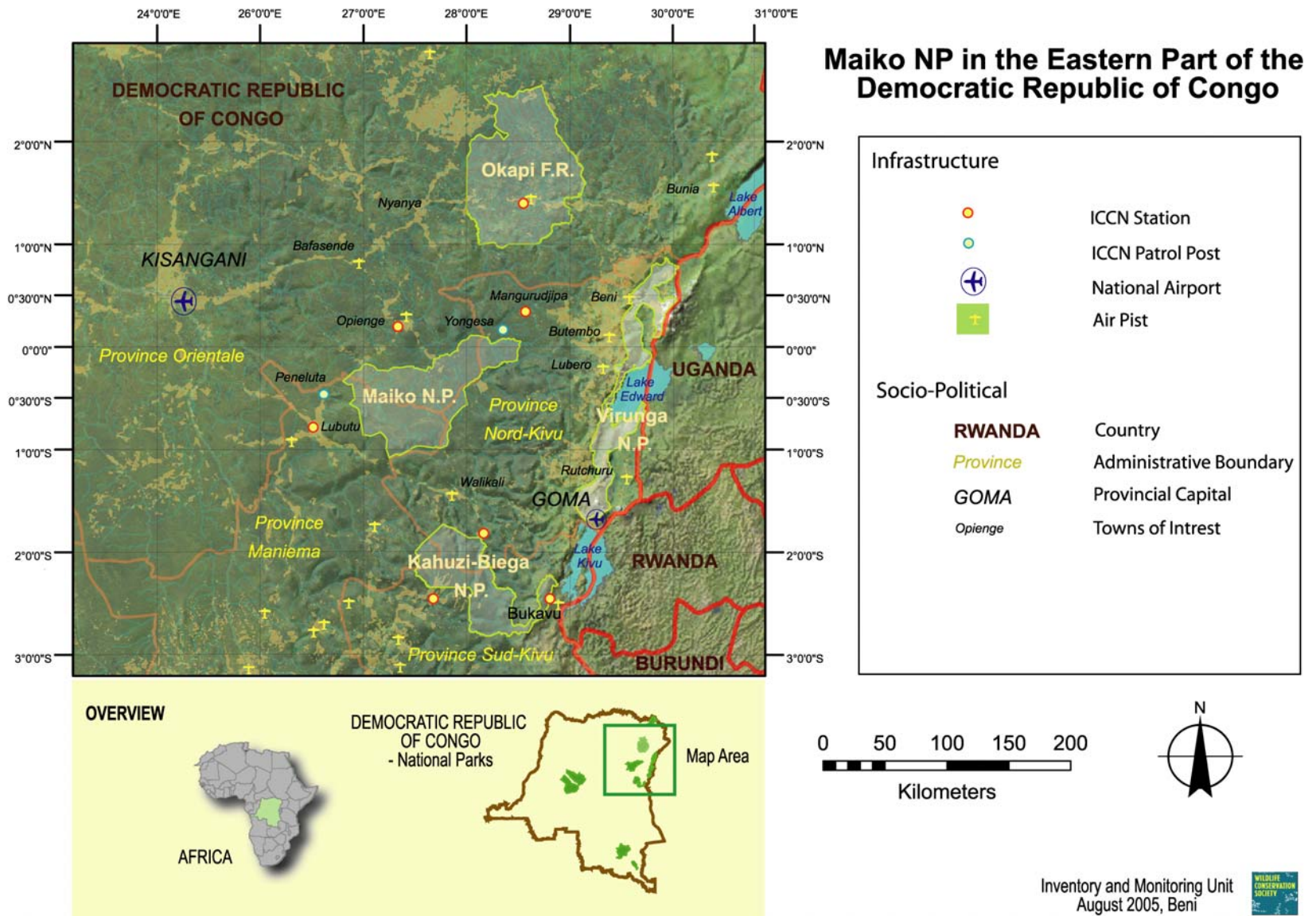
4. SITE OVERVIEW

Park History

The Maiko National Park was created in 1970 in the center of one of the most remote areas in the eastern Congo Basin. Estimates of the park area vary and no accurate map of the limits exists. Hart and Sikubwabo (1994)¹ give an estimate of 10 800 km² for the park, a figure also used by IUCN, ICCN and CARPE. Nevertheless the current surveys have shown major discrepancies between existing maps of the park, and legal park limits based on field verification of control points in the field.

¹ Hart J.A. and C. Sikubwabo. 1994. Exploration of the Maiko National Park of Zaire: 1989-1992. WCS Working Paper No 2. WCS, Bronx, NY.

FIGURE 1.



The park has three headquarters: Opienge, Mangrudjipa and Lubutu. All of these stations are remote from the park, requiring from one to five days travel to reach the site. Two patrol posts, Peneluta (Central Sector) and Yongesa (North Sector), have been established near the park limits. Operations from these posts are severely constrained by lack of communication and logistical support.

Fauna

Maiko Park contains at least 31 species of large mammals (> 2.5 kg), including a number of species of conservation concern: Eastern chimpanzees, eastern gorilla, okapi, elephant and the owl-faced monkey. The avifauna is poorly known, but likely to be rich. The endemic and vulnerable Congo peacock occurs in the park. Reptiles and amphibians remain totally undocumented.

Vegetation

Most of the park is covered by mature evergreen forest (Hart & Sikubwabo, 1994). Mixed forests dominate the landscape, however large patches of mono dominant *Gilbertiodendron dewevrei* cover about one third of the park, especially in the north. Regenerating forest and scrubland were recorded on 60% of survey girds in the 1990 exploration. Most of these areas are small. However, large areas of the north and central sectors of the park in particular in the area of the Angumu Massif were occupied by intensive mining operations from about 1938 – 1950. Secondary forests, intermixed with derived grasslands and thickets, today cover these areas.

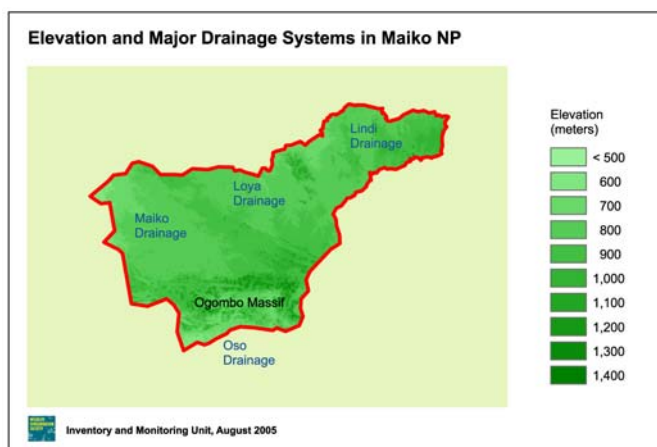
The northern sector of the park covered by this inventory is one of the least disturbed areas with unbroken primary forest covering all but a few small areas.

There have been only a few pioneers botanical explorations of the park, however these suggest that a number of sites in the park, in particular the isolated mid-elevation massifs, contain a highly diverse flora with high likelihood of localized endemic species. Botanical surveys yield important new discoveries.

Topography and hydrology

The average elevation of the park is about 850 m. Four major rivers drain the park: the Loya and Lindi basins (North Sector), Maiko basin (Central Sector) and the Oso basin (South Sector) (FIGURE 2). . Major massifs, including Angumu and Ogombo reach an elevation of 1200 m. Swamp forests and riverine vegetation are highly localized and represent a very low percentage of the area.

FIGURE 2.
Elevation and drainage



Status of wildlife and human activity before the conflict

The only previous survey of the park was conducted from 1989 to 1992 (Hart & Sikubwabo, 1994). This survey included observations from line transect and compass oriented reconnaissance (recces) lines, as well as village interviews. Over 557 km of path and 289 km of transects were surveyed, covering approximately half the park area, with survey effort placed in all the park sectors and surrounding buffer zone. A total of 30 species of mammal were recorded during the survey. Pigs, buffalo and okapi were recorded frequently, with 80% of all transects having signs. Animal populations were low around settlements, mining sites and camps. This was reflected in the patchy nature of high and low-density areas within a restricted range. Pockets of high elephant and okapi density were observed in the northern sector (10 out of 24 10 x 10 km survey grids surveyed). Overall chimpanzee and gorilla densities were low throughout the park (observations made on 13% and 5% of all transects). The northern and central sectors of the park contained the majority of ape observations. Even here, however only two survey grids were identified as having high numbers (around Loya, in old secondary vegetation).

Hunting was recorded on only 5% of all sampled segments in the 1990 surveys. Almost all of the signs consisted of old snare sets. There was little evidence of commercial bushmeat export during the survey, as most of the park then, as now, was remote from active markets and lacked navigable river systems. Twenty-five hunting camps were found on the surveys, of which only two were active. Elephant hunting occurred at low levels. Gold mining and prospecting were the most frequently recorded signs of human activity within the park. Artisanal mining occurred widely. Most operations were small scale. Only a few sites had more than 15 miners, and many sites were only intermittently occupied.

Overall, animal densities were highest in areas of high habitat diversity, including the massifs, and areas of regenerating vegetation in the Angumu mining zone abandoned thirty to forty years earlier. Remoteness to human settlement was not a dominant factor affecting faunal abundance, as most of park buffer zone contained unsettled forest, and human occupation of the park was limited to small and localized mining camps. The park was described as one of the most diverse and biologically intact lowland forests in DR Congo.

Park boundary and site base map

The park was created by Presidential Ordinance No 70-312 in November, 1970. The Maiko National Park is situated along the equator between 1° south latitude and 1° north latitude, and between 27° and 28° 30' longitude. Previous to this mission, there has been no verification of park boundary on the ground, and the limits are inaccurately represented on all existing maps. Park limits given in the legal text are often difficult to locate on the ground. The published limits are sometimes contradictory, and do not always correspond with existing local nomenclature in the region.

A revised base map of the park incorporating new verification points and river names gathered on this survey is used in the report. This revised map of the park limits is still incompletely verified. Creation of a corrected, and field-controlled map of the entire park limits is a priority, and should be accomplished before major extractive industries move into the area.

5. SURVEY OPERATIONS, SECURITY AND TRAINING

Access to the region

Access to the Maiko National Park remains logistically difficult and is further compromised by insecurity. No part of the park is accessible by vehicle, or air. The north and central sectors of the park are the most remote and difficult to reach. The field teams crossed numerous militia and

police checkpoints to reach the Kanabiro / Yongesa field base in the North Sector. **TABLE 1** summarizes conditions to reach the ICCN patrol posts of Yongesa (*Secteur Nord*) via the ICCN Station at Mangrudjipa, and Loya (*Secteur Centre*) via the ICCN station at Opienge, from the nearest major population and logistical centers of Butembo and Bafwasende respectively.

TABLE 1. Access to the North and Central Sectors of the Maiko National Park.

	PN Maiko Secteur Centre	PN Maiko Secteur Nord
Route	Bafwasende – PP Loya	Butembo – PP Yongesa
Via ICCN Park Station	Opienge	Mangrudjipa
Total distance (km)	About 180	About 210
Days march	5 - 7	8 – 10
Number of road blocks (militias, police, etc)	12 - 15	18 - 25
Number of bridges	58	Unknown
Villages	60	About 100
Estimated human Population along route	About 20,000	70,000 – 100,000
Supply line conditions	Limited local food available only at Opienge	Staples available east of Mangrudjipa. No availability to west and no cash economy

Project calendar and execution.

Survey period covered two phases, a preparatory phase including survey design, logistical arrangements, security clearance from militia and other local authorities and ICCN guard recruitment to accompany the survey.

The second phase of the surveys included the data collection along the route from Mandrudjipa to the project base camp near Yongesa, clarification of remaining security issues with local militia chiefs controlling the northern sector of the park, recruitment and training of local field teams and the execution of the field surveys.

Field data collection covered 36 days. **TABLE 2** provides a summary of team deployment on the ground.

Surveys were coordinate by Fidele Amsini. Fidele, Chryso Vyahavwa, Boniface Nyembo and Crispin Kibambe led field teams. All field leaders are trained and have at least two years experience in survey methods, field team management and logistics. They have had extensive previous experience in developing the contacts and information collection from the range of local people and itinerants that are found in remote sites where the surveys occur. All three of the field leaders had previously led surveys in other sites where security problems occurred, and were well prepared for conditions in the Maiko region. This latter was extremely important for the success of the mission.

TABLE 2: Survey strategy, team composition and planning.

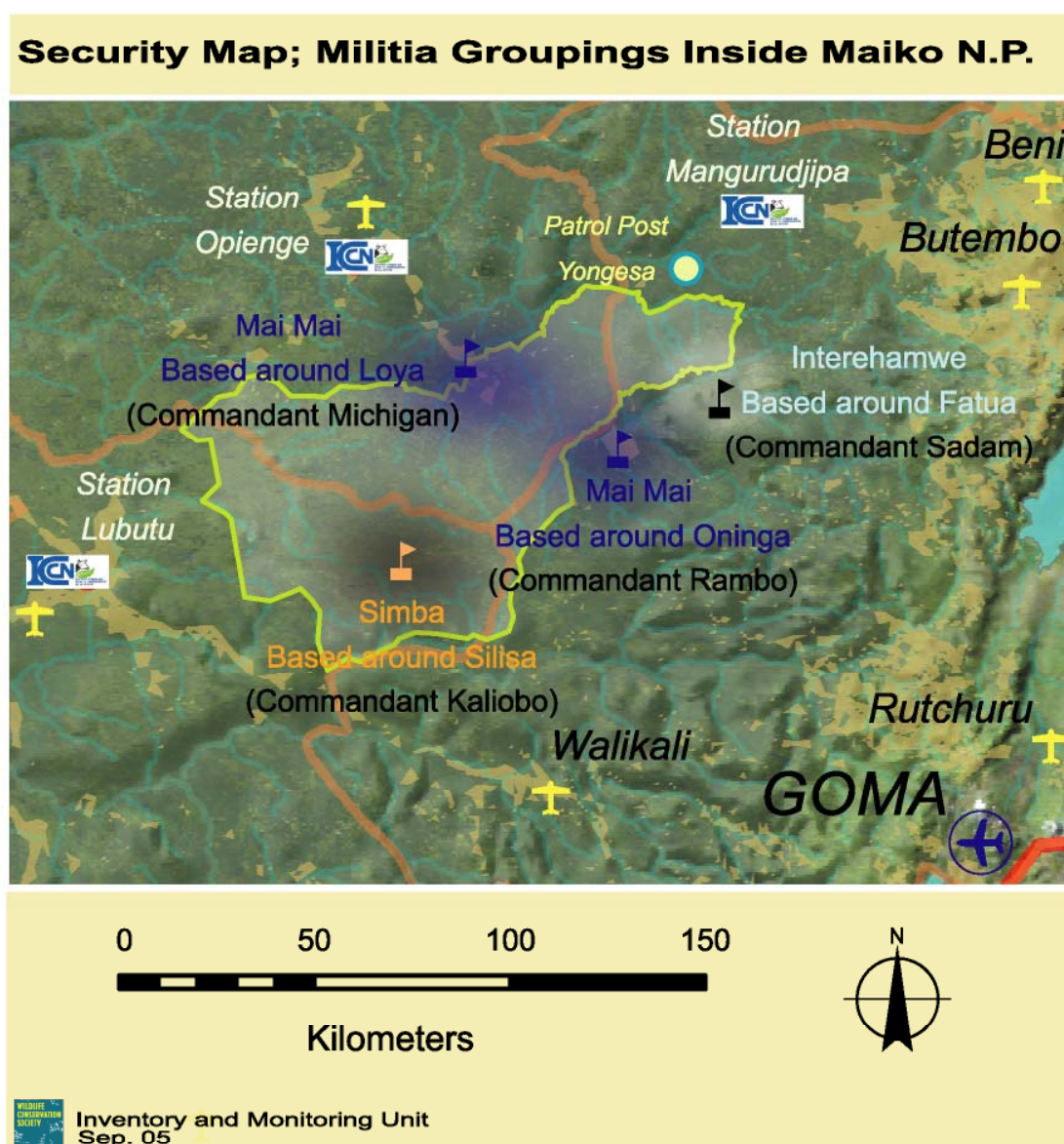
Circuit ID	Sub circuits	Team Leader	Start Date 2005	End Dates 2005	No of Days	Data base reference
PNM_circuit test	Practice1	Nyembo, Amsini,	9 July	11 July	3	AF1Ex1, AF1Ex2
	Practice. 2	Amsini, Nyembo,	12 July	13 July	2	AF1B
<i>PNM_Eq1_17-18/07/05</i>		Nyembo,	17 July	18 July	2	AF2, AE2
<i>PNM_Eq1_14/07/05</i>		Nyembo, Kibambe, Vyahavwa	14 July		1	AG2
<i>PNM_Eq2_16-18/07/05</i>		Kibambe, Vyahavwa	16 July	18 July	3	AH3, AG3, AH3B
<i>RV Circuit 1</i>	Equipe 1	Nyembo	22 July	26 July	4	AD3, AC3, AB3, AD4, AC4, AB4
	Equipe 2	Vyahavwa	21July	26 July	5	AF3, AE1, AD1, AC1, AE1B
	Equipe 2	Kibambe, Vyahavwa	30 July	31 July	2	AF4, AE4
	Equipe 3	Kibambe	21 July	25 July	4	AE2, AD2, AC2, AB2, AB2B
<i>RV Circuit 2</i>	Equipe 1	Nyembo	08 Aug	14 Aug	6	AI2, AJ2, AK2, AL2, AM2, AN2, AN2B,
	Equipe 2	Vyahavwa	07 Aug	14 Aug	7	AI3, AJ3, AK3, AL3, AM3, AN3, AO3, AO2, AO2B
	Equipe 3	Kibambe	06 Aug	12 Aug	6	AG4, AH4, AI4, AJ4, AK4, AM4, AN4, AO4, AO2
<i>Public Awareness and Public Relations</i>		Amsini	17 July	14 Aug		Mangrudjipa, Opienge
TOTALS			9 July	14 Aug	36	

Security constraints

Security was a significant constraint in gaining access to the survey zone, but once in the field, the teams were able to operate without major problems. The team received an offer of armed escorts from the local FARDC commander, though they did not require this. One group of Mai-mai who occupied a gold mine in the park, represented a potential impediment to the team, but the militia members fled when news of the potential FARDC escort for the field teams reached them, and the team moved freely through the area.

FIGURE 3 summarizes the militia occupation of the Maiko Park as of mid-2005. **ANNEX 1** provides background of the militia groups and their commanders operating in the north sector of the park and vicinity. **ANNEX 2** reports the proceedings of the security meeting with the FARDC commander in support of the inventories and the re-establishment of ICCN operations in the park .

FIGURE 3. Rebel militias operating in the Maiko National Park and surrounding landscape as of mid-2005.



Training

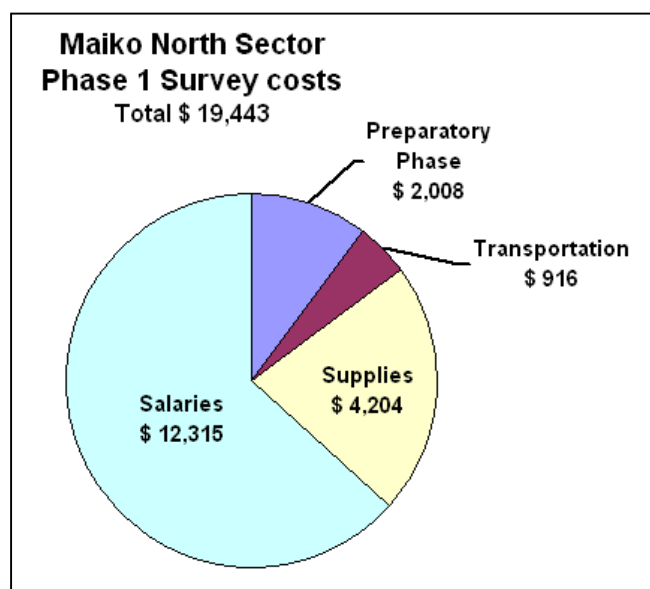
A total of 45 local villagers were hired to join the survey at different points as guides, porters and field assistants. These individuals received basic training in GPS and compass use, data collection protocols and field team discipline and security. Five individuals expressed strong interest in the surveys and showed promise for further training and involvement.

Survey costing

The first phase of the survey ran from June 12 to June 30 (18 days). The second phase ran from July 1 through August 19 (60 days). Preparations and execution of the survey covered 78 days.

The costs for the inventory totaled \$19,443 (**FIGURE 4**). This amounts to \$15.55 / km² for the total coverage of 1250 km², or \$51 / km of recce for total coverage of 378 km. (see details below).

FIGURE 4.



6. SURVEY DESIGN AND METHODS

Survey design and data collection protocols were developed to provide geo-referenced observations with a systematic coverage of the survey zone. A survey grid of 5 km by 5 km (25 km²) was placed over the survey zone (Maiko National Park). Central points, (centroids) were created for each of the “graticules” or grid squares and provided as sample point locations.

FIGURE 5 provides centroid locations for the North Maiko survey zone. Centroid coordinates are provided in **Annex 3**.

Data collection was made on two types of ground reconnaissance walks, termed *recces*:

Path and village recces. GPS Track logs and waypoints of observations made while following along established footpath system linking villages and mining camps in the sector. Data collected included landmarks (village, river names), basic demographic and economic activities in the settlements and camps visited, road conditions, bridges and any other auxiliary information collected on interviews during the overnight stay, or passage through the villages and camps.

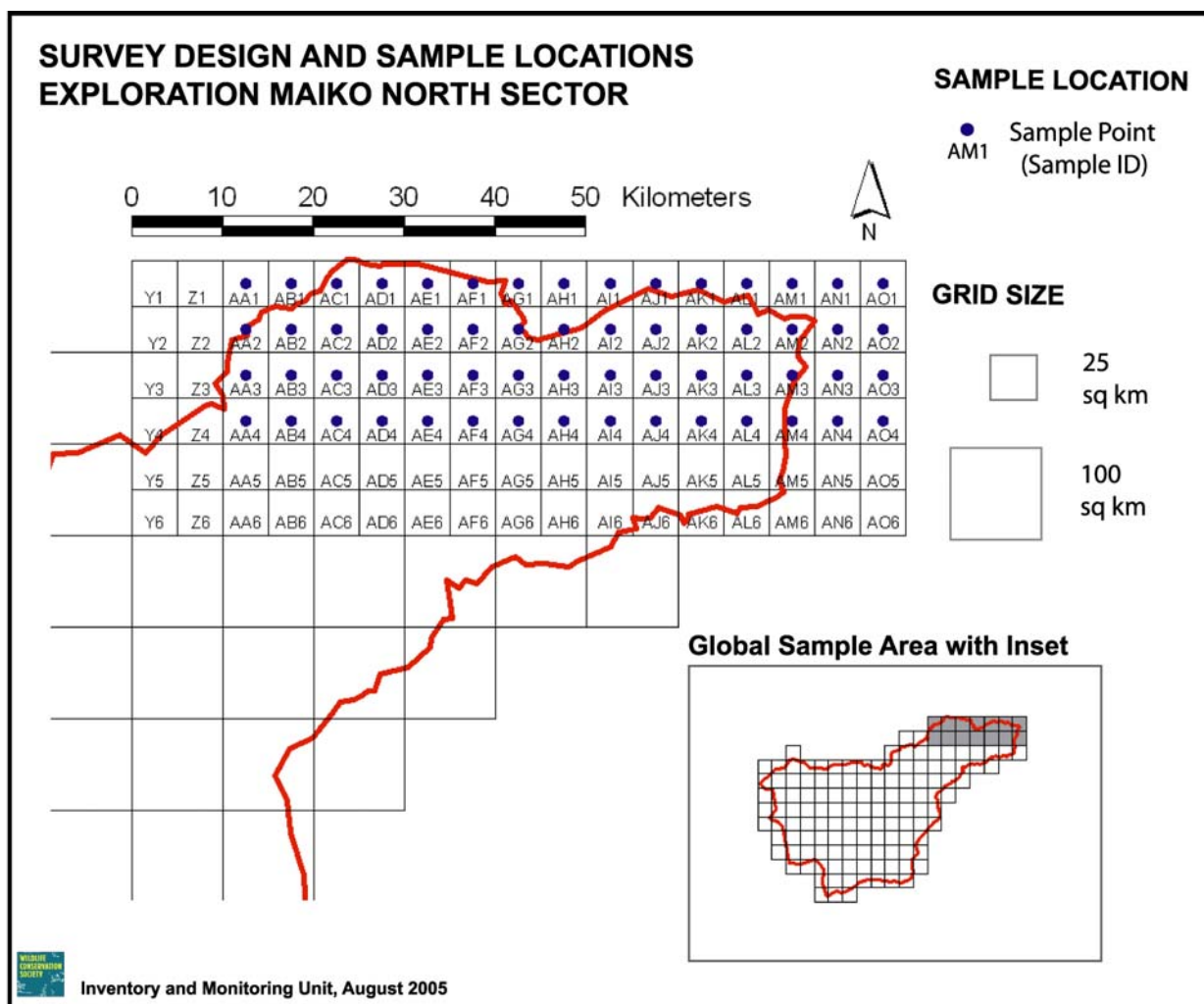
Compass line recces. Recces followed established compass directions to reach pre-established route points (often graticule centroids). Observations on fauna, flora and human activity encountered along the recce were recorded. The data protocol is attached in **Annex 4**.

All data were entered into a database and mapped using GIS software. Distances covered were determined for each of the surveyed graticules, yielding a map of survey coverage and effort. A summary of observations recorded in each of the grids was developed from the dataset. This report summarizes observations and provides maps of observations on a grid basis.

Verification points for the site limits were extracted from the satellite images and geo-referenced by field teams. A verification needs table with location names was developed. In addition the compass line recce circuits were divided into 500m segments to facilitate comparison to earlier survey data (Hart & Sikubwabo 1994). These segments are also used to perform selected special relationship analysis looking any human activity and mammal abundance (in preparation).

Pre-war data summaries were taken from Hart & Sikubwabo (1994). Locations of the centroid of the early survey grid were estimated and placed as best as possible using rivers and location names as reference marks.

FIGURE 5: Sample locations



7. SURVEY COVERAGE

The survey zone included both areas inside and outside the park. A total of 378 km of recces were surveyed in the inventory zone that included 50, 5 km by 5 km survey grids (1250 km²). Forty-one of the 50 grids (82 %) had at least 4 km of recce coverage (**FIGURE 6**). A summary of survey effort and observational base of faunal and human activities on the compass line recces is provided in **TABLE 3**.

FIGURE 6: Survey Coverage

BIOLOGICAL SURVEY COVERAGE AND TRACKLOG OF THE NORTHERN SECTOR OF MAIKO NP.

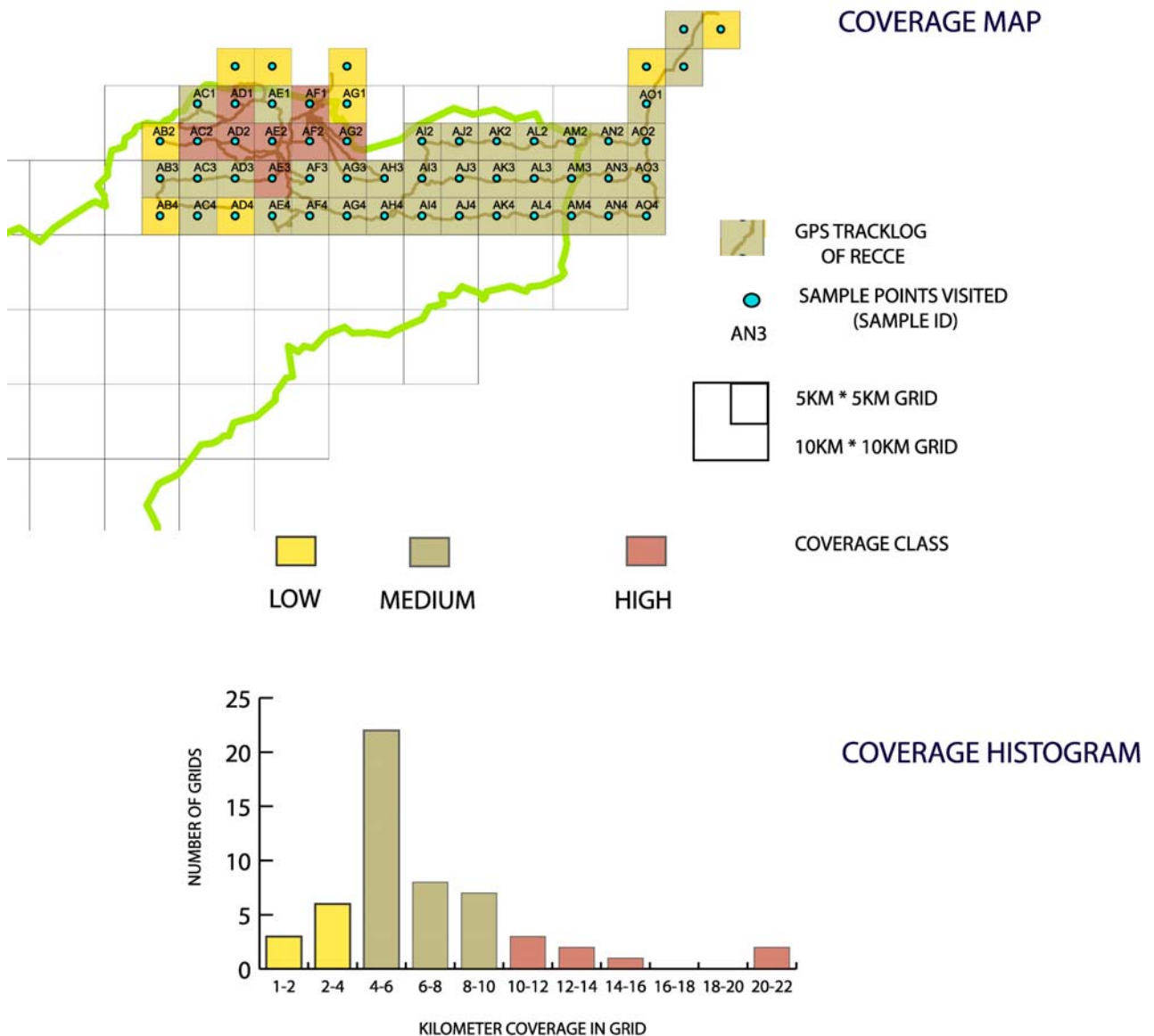


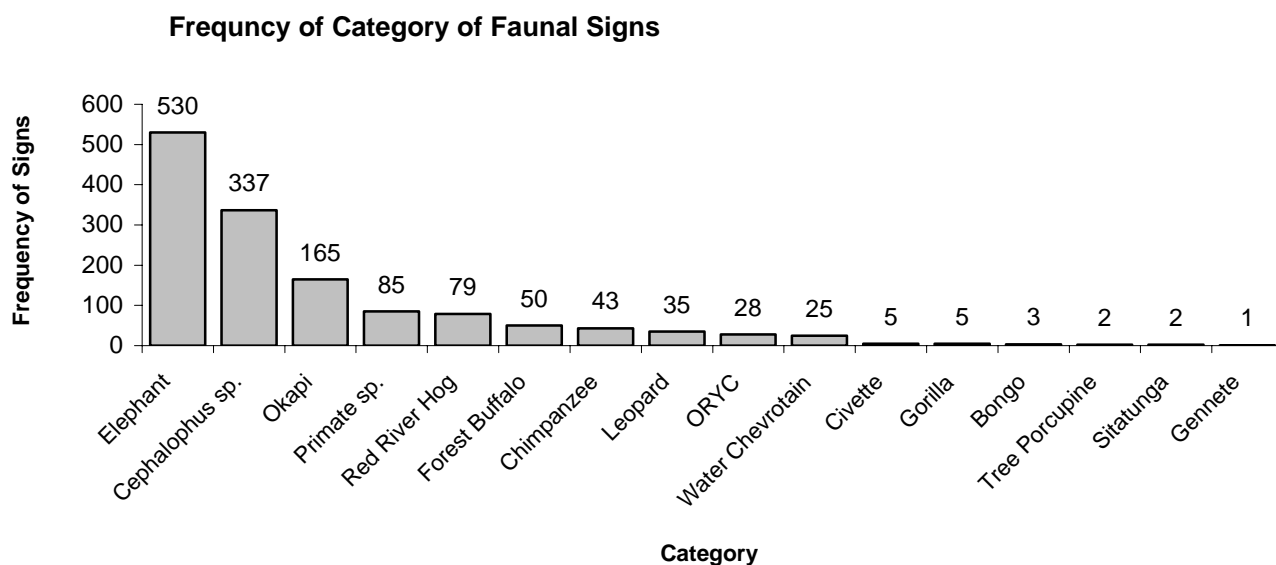
TABLE 3. Survey effort and summary observations of the biodiversity survey.

	EFFORT					OBSERVATIONS					
	5 km x 5 km grids surveys	Grid centroids visited	Total recce (km)	Teams	Waypoints	Observations faunae	Observations human activities	Elephant clearings (edo)	Landmark (rivers, summits)	Other observations (fruit trees, large birds)	TOTAL observations
Inside Park	39	35	300.7	3	1838	1353	541	5	162	336	2397
Outside Park	11	8	77.4		320	51	183	1	37	67	339
TOTAL	50	43	378.1	3	2158	1404	724	6	199	403	2736

8. FAUNAL OBSERVATIONS

Sixteen species and taxonomic groups were recorded on the inventories. Elephant, duikers and okapi were the most frequently recorded species (**FIGURE 7**).

FIGURE 7 Faunal observations. Direct observations and counts of animal sign combined.



Gorilla and Chimpanzee

Evidence of both ape species was recorded on the surveys. Chimpanzees were widespread, and chimpanzee sign, including seven direct encounters (calls heard), and twenty nest groups far outnumbered that of gorillas (**FIGURE 8**). The evidence for gorillas consisted of 2 fresh dung, two tracks and a feeding remains, all widely scattered (**FIGURE 9**).

Chimpanzees

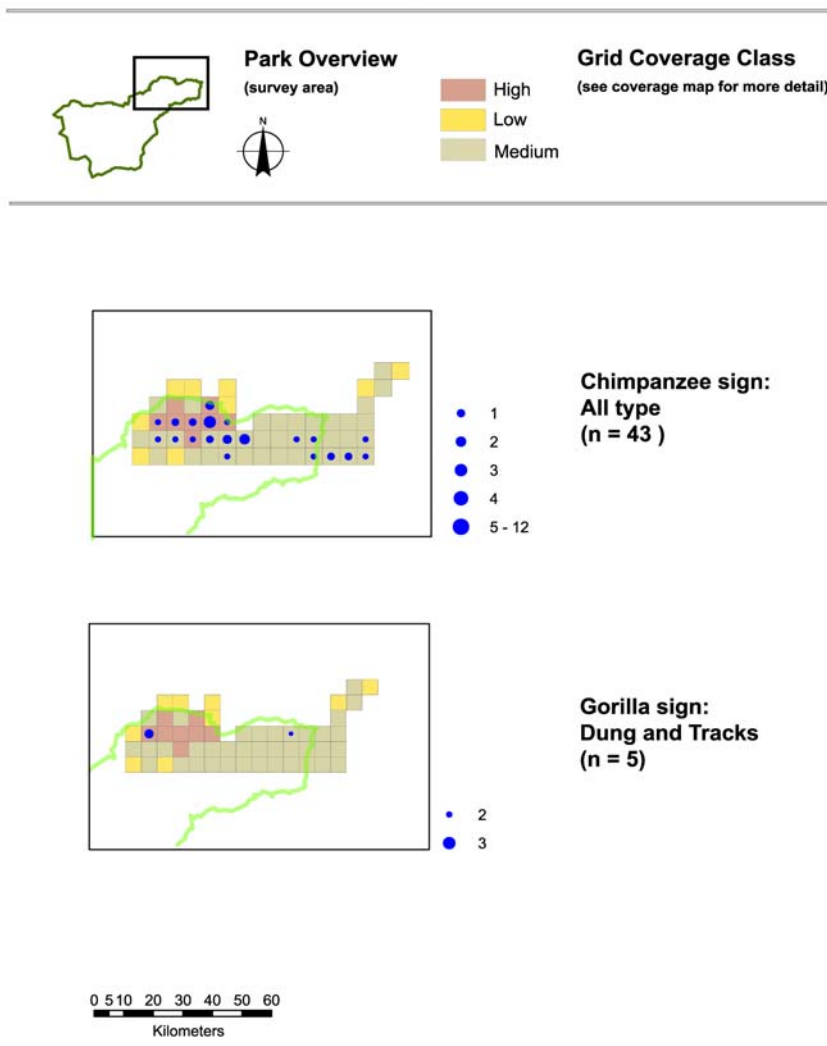
Type of Sign	AGE OF SIGN			TOTAL
	Recent	Old	Very Old	
Seen				0
Calls				7
Nest groups	6	11	3	20
Dung	2	1		3
Feeding Remains	9	1		10
Tracks	3			3
Total	20	13	3	43

Gorillas

Type of Sign	AGE OF SIGN			TOTAL
	Recent	Old	Very Old	
Seen				0
Cry				0
Nest				0
Dung	2			2
Feeding Remains	1			1
Tracks	2			2
Total	5			5

FIGURE 8. Ape distribution.

Ape Sign Abundance in the Maiko North Sector



Inventory and Monitoring Unit, Sep.05

Data Source
WCS-Maiko Survey 2005



FIGURE 9 A) Gorilla dung.
Eq3_21-250705, Data RowID 471



FIGURE 9 B) Gorilla print. Eq3_21-250705, Data RowID 2278

Elephant

Elephant occurrence was determined primarily by the presence of dung and by activity levels of established elephant trail networks. Elephant feeding sign and wallowing sites were also noted. Elephants were widespread throughout the survey region (**FIGURE 10**) with nearly one elephant dung recorded per km of recce. One third of the dung (33%) was fresh or recent. Forty three percent of 126 elephant trails elephant were active (**FIGURE 11**). A single recent elephant carcass was located. Poachers had killed the animal.

Elephant

Type of Observation	AGE				ACTIVITY		Total
	Recent	Old	Very Old	Fossilized	Active	Non Active	
Elephant boulevards					54	72	126
Feeding Remains	10						10
Carcass	1						1
Dung	125	234	13	1			373
Other Signs	14	1	2				17
Total	150	233	15	1	54	72	527

FIGURE 10

Elephant Sign Abundance in the Maiko North Sector

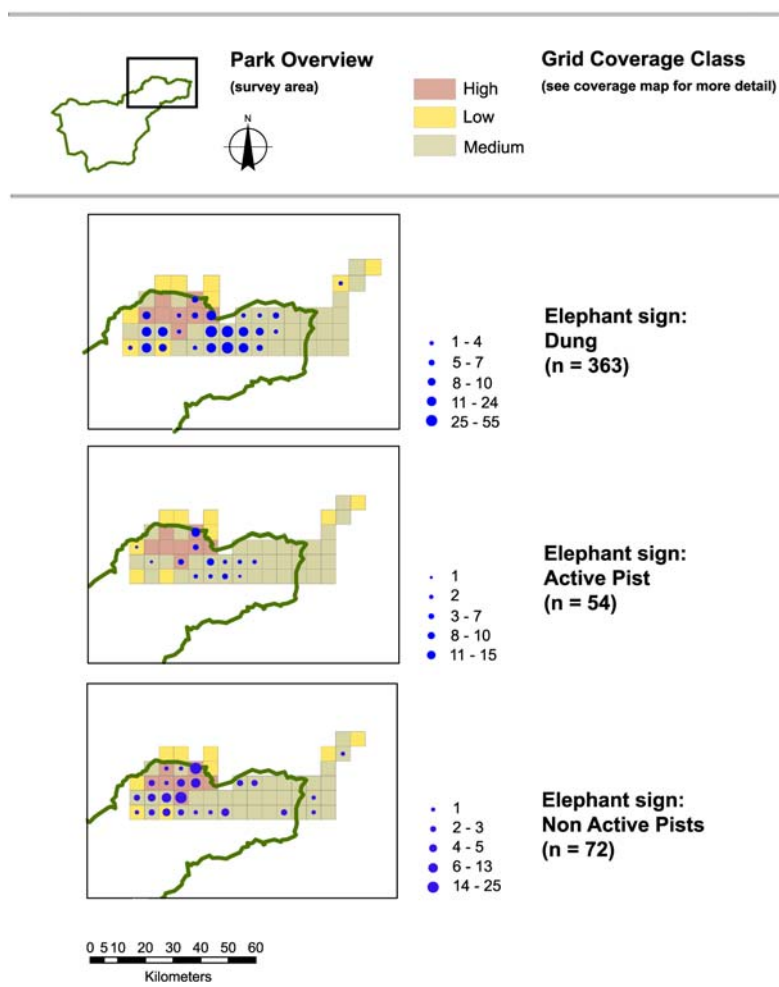
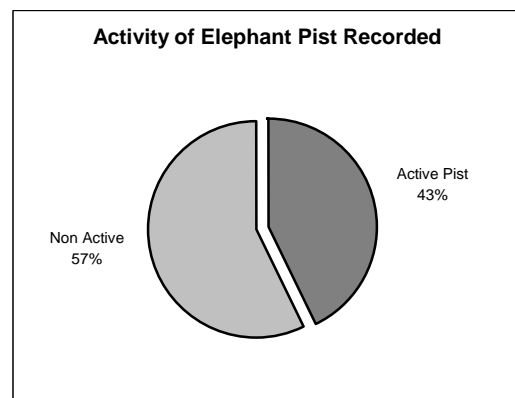
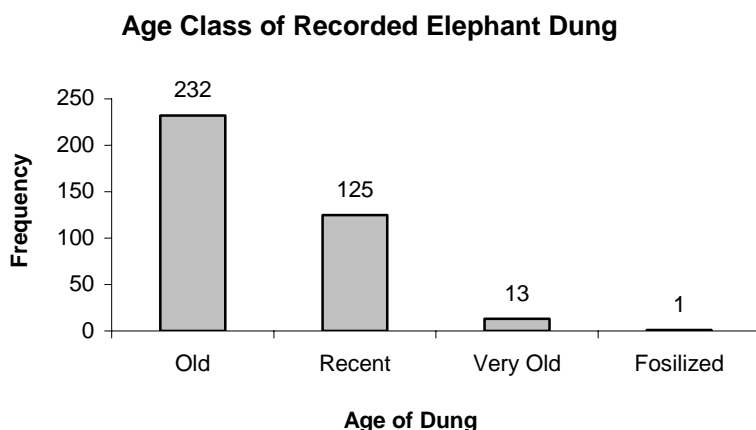


FIGURE 11. A) Age of elephant dung and B) activity levels of major elephant trails recorded



Okapi and Buffalo

Both Okapi and buffalo were widespread in the survey zone (FIGURE 12). Thirty-five (0.09 / km) okapi dung were recorded, of which 28 % were fresh or recent (FIGURE 13). Buffalo evidence was mainly concentrated on trails as the animals moved between the scattered small clearings where the buffalo feed and wallow.

Okapi.

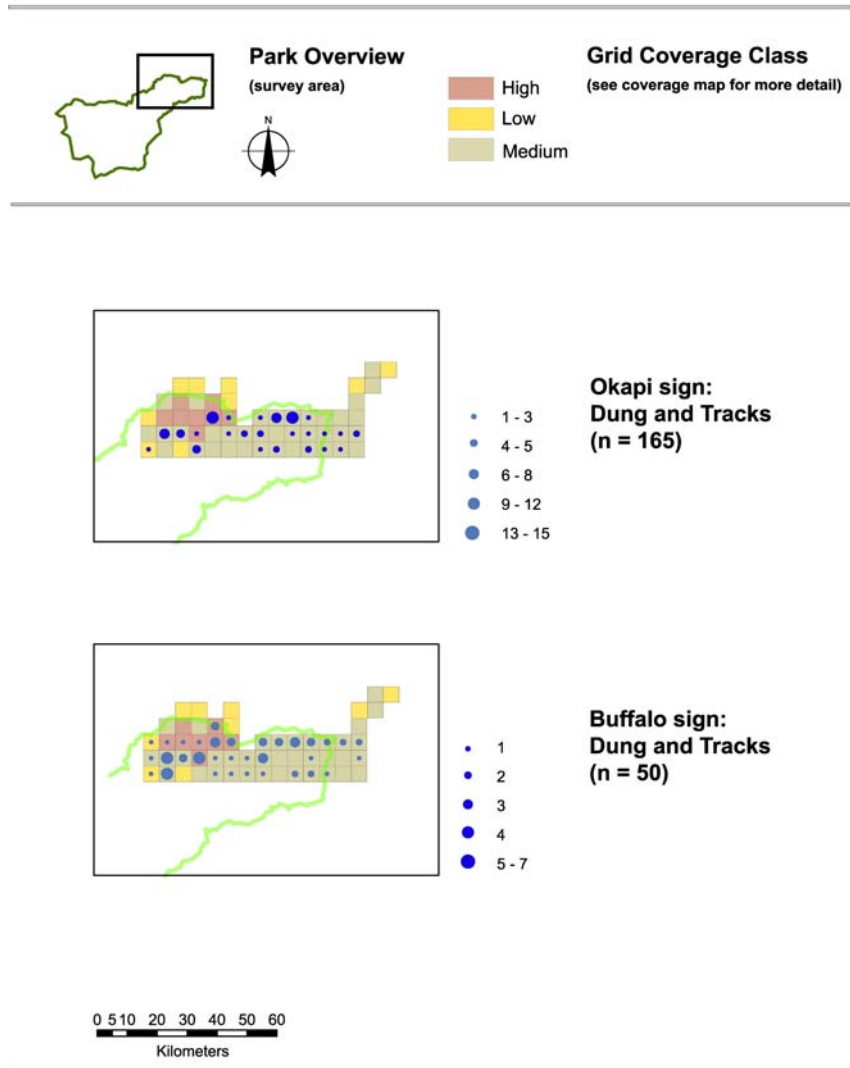
Type of Sign	AGE		Total
	Recent	Old	
Feeding Remains	1	0	0
Dung	10	25	35
Tracks	119	10	130
Total	130	35	165

Buffalo.

Type of Sign	AGE OF SIGN				TOTAL
	Recent	Old	Very Old	Seen	
Seen				2	2
Dung	17	1	1		19
Feeding Remains	5				5
Tracks	21	3			24
Total	42	4	1	2	50

FIGURE 12

Large Ungulate Sign Abundance in the Maiko North Sector



Inventory and Monitoring Unit, Sep.05

Data Source
WCS-Maiko Survey 2005



Fig 13 A) Buffalo
PNM_Eqscient2_16-180705



Fig 13 B) Okapi
PNM_Eqscient2_16-180705

Small ungulates and pigs

Six duikers (*Cephalophus spp.*), the chevrotain (*Hyemoschus aquaticus*) and the pygmy antelope (*Neotragus batesi*) occur in the Maiko Park. These are together classed as small ungulates. Small ungulate sign can be divided between small species: blue duiker (*C. monticola*), and *Neotragus batesi*, medium-sized species: red duikers (5 species, below) with the chevrotain, and large species, yellow-backed duiker (*C. sylvicultor*).

Two pig species occur in the Maiko, the giant forest hog (*Hylochoerus meinertzhageni*) and the bush pig (*Potamochoerus porcus*). Most of the field sign was attributed to the bush pig, however, it is not always possible to distinguish between the sign of the two species.

The evidence from the inventories indicates a robust and relatively undisturbed population of pigs and small ungulates in the survey zone. Both pigs and duikers are wide spread (**FIGURE 14**). The encounter rate of all small ungulate dung combined was 0.51 / km. Red duikers and yellow-backed duiker dung represented 40 percent of all duiker dung counts. These species are invariably seriously reduced relative to blue duikers when duikers are hunted. As hunting pressure increases, red duikers numbers become very low. The dung count ratios of medium and large species to small species (0.68 / 1) suggests that hunting pressure is not high and has not led to a major reduction of small ungulates.

Small Ungulate sign and sightings recorded on surveys.

Species	Local name	Type of Sign					TOTAL OBSERVATIONS
		Seen	Carcass	Call	Dung	Tracks	
Blue duiker	Mboloko	1			119	32	151
Red duikers ¹	Mbengele, Mungele, Seke, Nkoto	3	1	1	76	76	157
<i>C. sylvicator</i>	Mohimbo				5	22	27
Unidentified duiker	inconnu				1		1
TOTAL SIGNS		4	1	1	201	130	337

¹ Red duikers: *Cephalophus leucogaster*, *C. nigrifrons*, *C. weynsi*, *C. dorsalis*.

Leopard

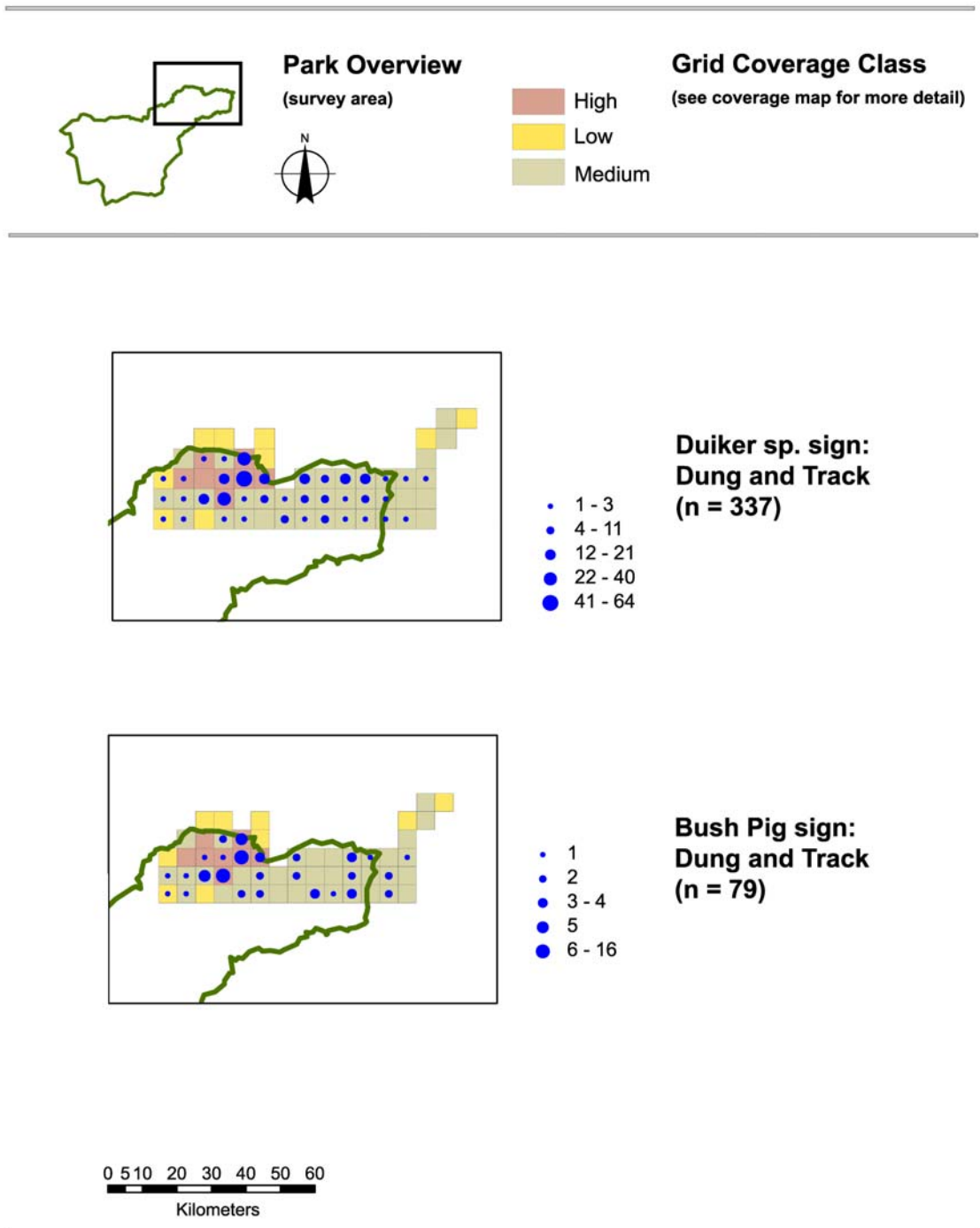
Leopard sign was widespread proof that the survey zone contains an important reservoir of these cats. (**FIGURE 15**). Identified prey included remains of three l'hoesti monkeys (*Cercopithecus l'hoesti*) all found at the same location. Based on tracks and other sign, at least three leopards participated in these kills (probably mother with two cubs) (**FIGURE 16**). The apparently robust leopard population is further evidence that hunting has not reduced the small undulate populations in the survey zone.

Leopard sign recorded on surveys.

Type of observation	AGE OF SIGN		TOTAL
	Recent	Old	
Seen			0
Call			1
Dung	10	1	
Feeding Remains	1		
Tracks	22		
Total	33	1	35

FIGURE 14.

Small Ungulate Sign Abundance in the Maiko North Sector



Inventory and Monitoring Unit, Sep.05

Data Source
WCS-Maiko Survey 2005

FIGURE 15

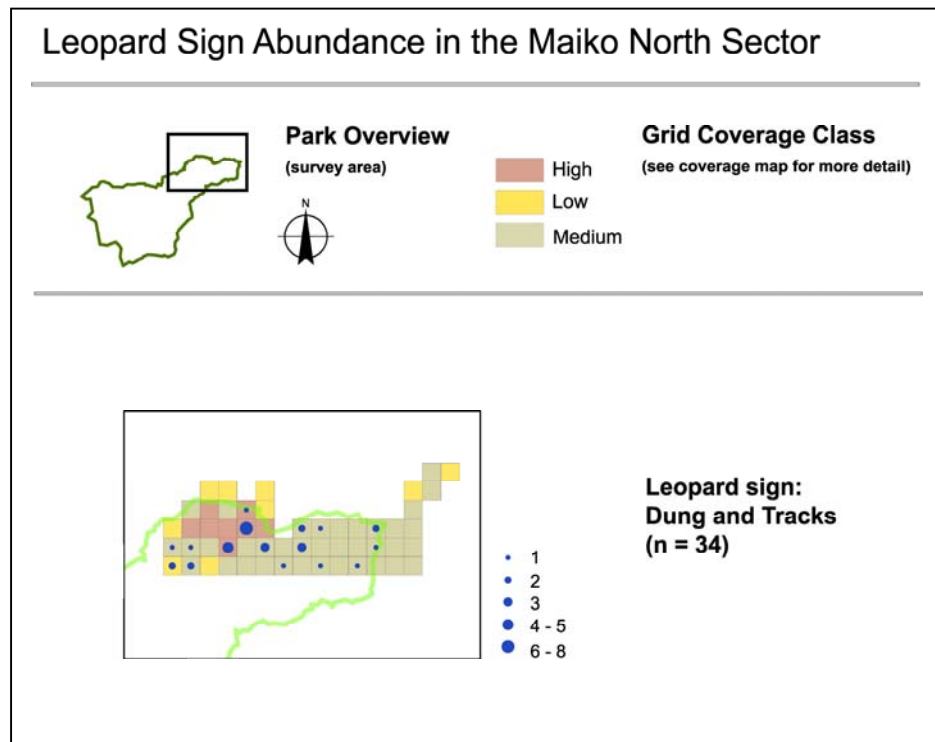
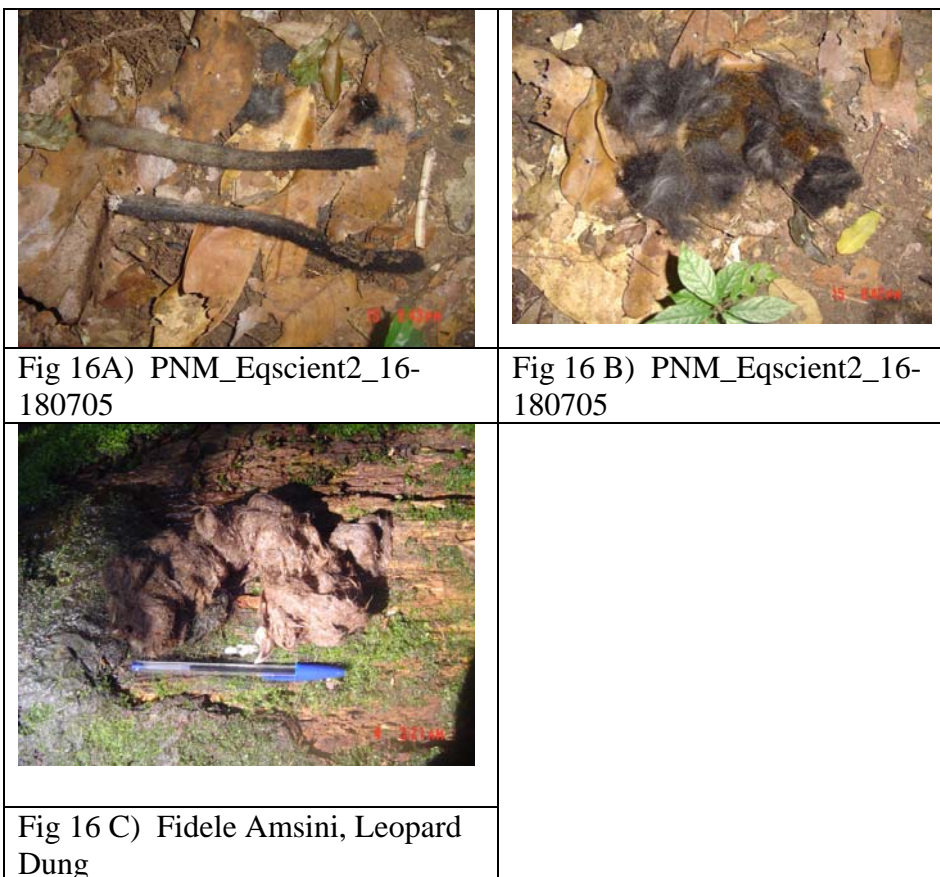


FIGURE 16. A and B) remains of leopard-killed l'hoesti monkeys. C) leopard dung.



Primates (excluding apes)

Eight species of diurnal primates were recorded on the inventories, with 57 direct observations (seen or heard) of primate groups (0.15 groups / km). Five carcasses were found, all natural kills. Owl-faced monkeys (*Cercopithecus hamlyni*), an important species for the site was not recorded, however, this may be a problem with identification of this cryptic species. Specific identification could not be had for 32 records including seven direct observations. Further work on the primates of the region is warranted as these populations appear to be subjected to only minimal hunting over most of the area (only one shotgun cartridge recorded).

Local Name	Scientific Name	Feeding Remains	Carcass	Call	Tracks	Seen	Total
Abula	<i>Papio anubis</i>				1		1
Agase,	<i>Lophocebus albigena</i>			16		5	21
Kidekide	<i>C. ascanius</i>		1	1		2	25
Badius	<i>P. badius</i>			1		3	4
Mbela	<i>C. angolensis</i>					1	1
Mbengi	<i>C. wolfi-denti</i>			1			1
Saba	<i>C. mitis</i>		1	13		5	19
Sabila	<i>C. hoesti</i>		3	1		1	5
Inconnu	<i>Unidentified</i>	23		4	2	3	32
Total		23	5	37	3	20	86

9. HUMAN OBSERVATIONS

Evidence of seven categories of human activity was recorded on both path and compass line recces (**FIGURE 17**).

The majority of evidence of human activity consisted of machete cuts or other signs of passage. These were found essentially across the whole survey zone (**FIGURE 18**).

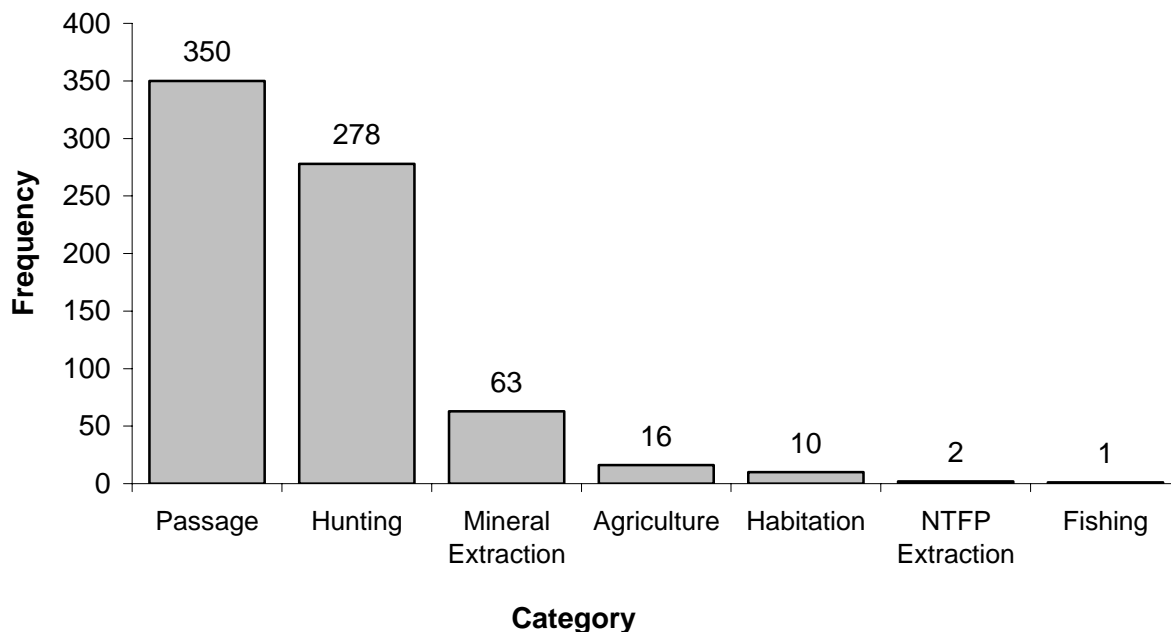
Evidence of hunting (mainly snares) was widespread, Overall encounter rates of snares averaged 0.74 / km. Nevertheless snare locations were often highly localized. Seven of 14 hunting camps located on the survey were classed as active. (**FIGURE 19**).

Mining activities (including abandoned and active sites, as well as test pits (or “meta”) were concentrated in the west of the survey zone (**FIGURE 20**). Twenty-seven of 35 mining camps located of surveys were active. These camps also included associated hunters in some cases.

Evidence of permanent settlement (agriculture, villages) was limited to a few areas located both inside and outside the park.

FIGURE 17. Evidence of human activity.

Frequency of Categories of Human Signs Recorded



Hunting evidence

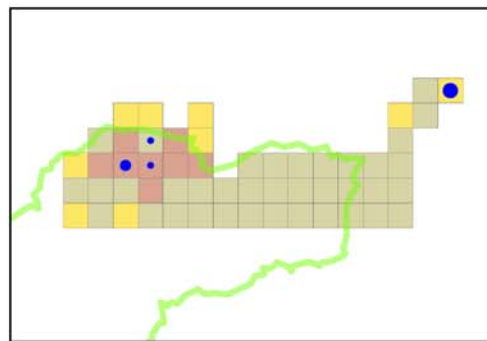
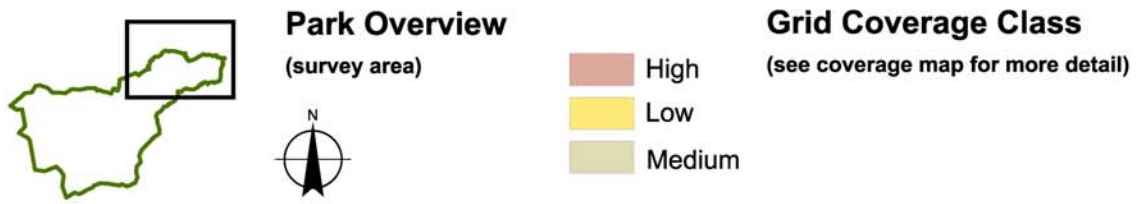
Type of Observation	AGE			ACTIVITY		Total
	Recent	Old	Very Old	Active	Non Active	
Cartridge	1					1
Large Hunting Camp				3	6	9
Small Hunting Camp				4	1	5
Snare event	70	191		2		263
Total	71	191	2	9	4	279

Artisanal mining evidence

Type of Observation	AGE (abandoned)			ACTIVITY (operational sites)		
	Recent	Old	Very Old	Active	Temporarily not occupied	Total exploited sites
Open Mine	1			3		3
Test Pit	3	14	3			
River Bed Mine				2	2	4
Mining Camp				27	8	35
Total	4	14	3	32	10	42

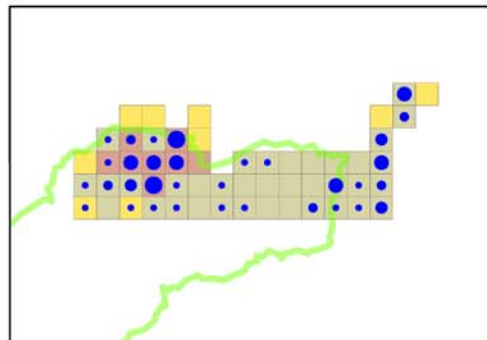
FIGURE 18

Human Access Sign Abundance in the Maiko North Sector



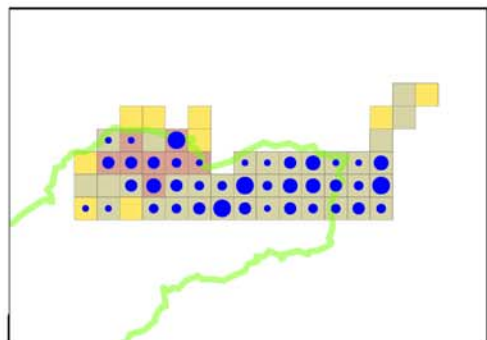
Village sign:
(n = 10)

- 1
- 3
- 5



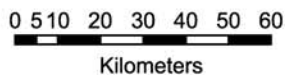
Access sign:
Pist
(n = 135)

- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 20



Access sign:
Machete Cut
(n = 206)

- 1 - 2
- 3 - 4
- 5 - 7
- 8 - 10
- 11 - 13

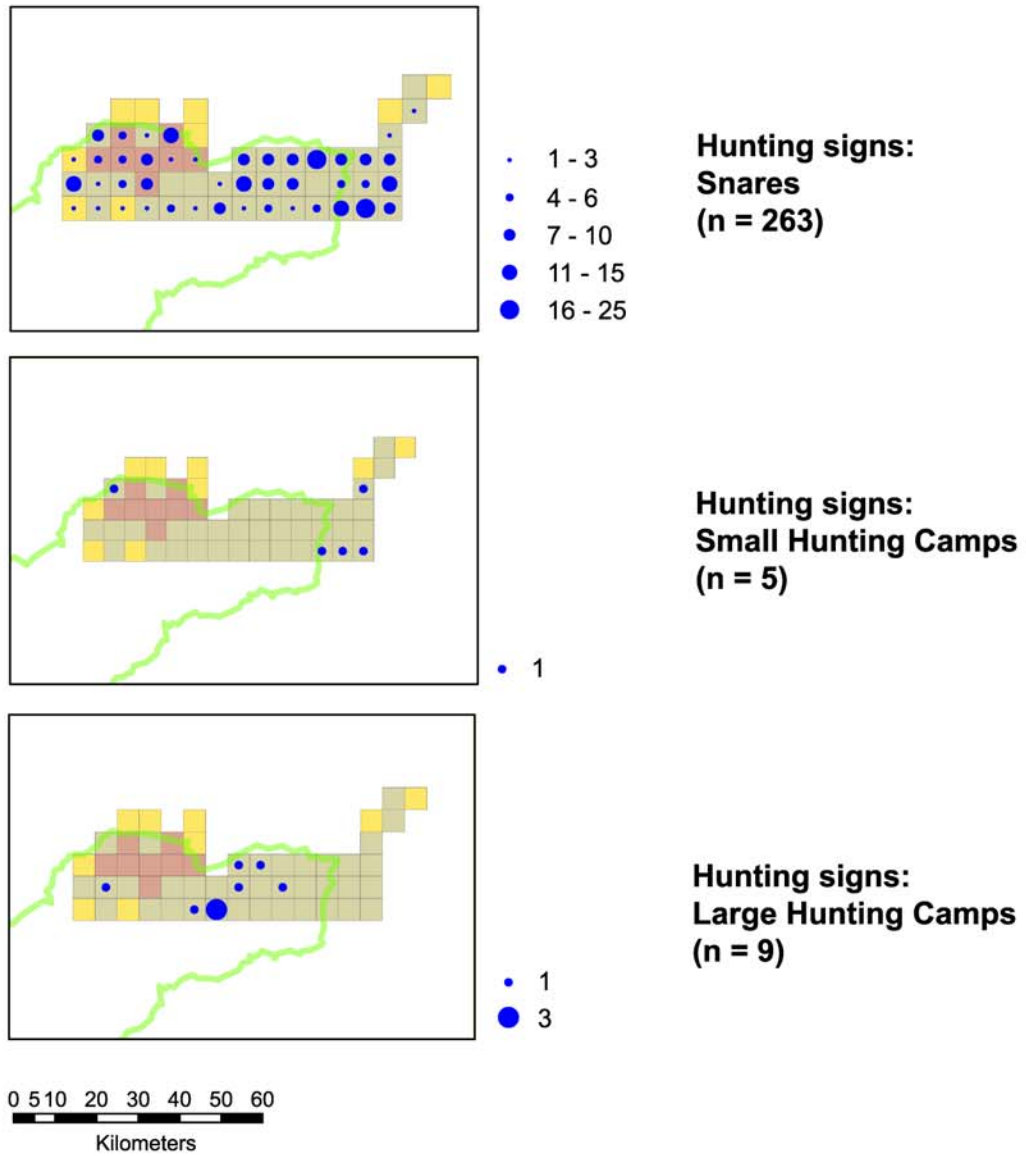
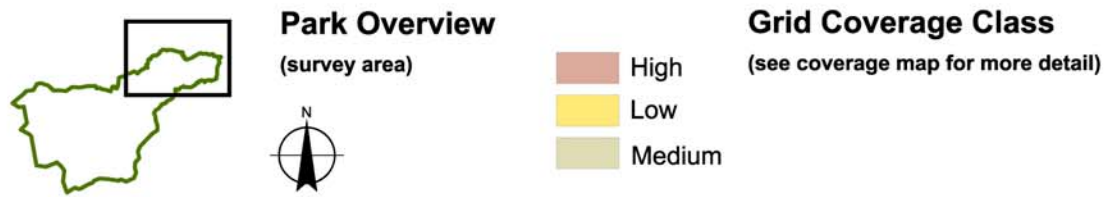


Inventory and Monitoring Unit, Sep.05

Data Source
WCS-Maiko Survey 2005

FIGURE 19

Hunting Sign Abundance in the Maiko North Sector

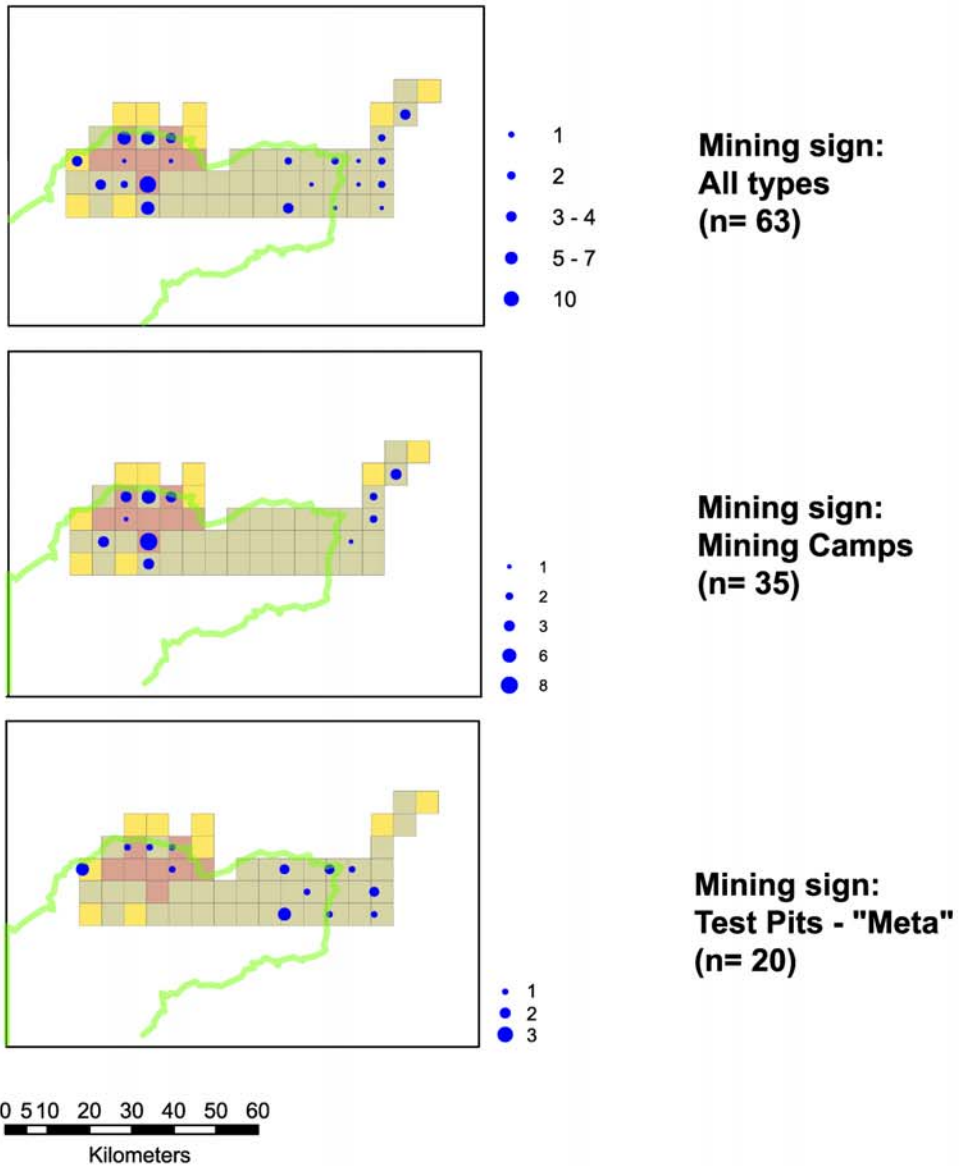
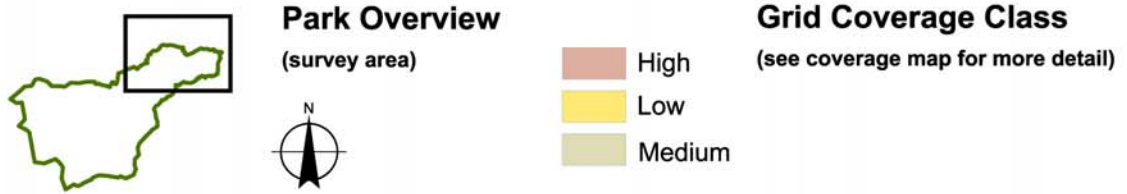


Inventory and Monitoring Unit, Sep.05

Data Source
WCS-Maiko Survey 2005

FIGURE 20

Mining Sign Abundance in the Maiko North Sector



Inventory and Monitoring Unit, Sep.05

Data Source
WCS-Maiko Survey 2005

10. BASE MAP DEVELOPMENT

Improved and additional base map layers were developed from data collected by the field teams. A list of layers produced is summarized in **TABLE 4**. **TABLE 5** provides details on data collected on specific features map features. In addition, 592 geo-referenced photos were taken during the surveys to support field observations.

TABLE 4. Base map layers developed for Maiko North Sector.

Theme	Shapefile Description	Shapefile Origin/Date	Data Type	Data Additions
Survey design and coverage	Survey Design, survey grid coverage (km)	WCS-2005	Point	Geo-referenced field points (centroids), survey track logs and waypoints
Park Limits	PNM Park Boundary	CBFP2000_modified	Point, Line	Waypoint verifications (11). Revised park limits
Recce observations	Biomonitoring	WCS-2005	Point, Line, photos	Track logs, waypoints, geo-referenced photos.
Villages	Villages	WCS/Unknown	Point, photos	Location, ethnic group, population, geo-referenced photos
Rivers version 1	River	WCS-2005	Line	DEM and LandSat image 4 classes
Mines and Mining Camps	Mining	WCS-2005	Point, photos	Activity, Number of people, geo-referenced photos
Access routes north-east sector	Infrastructure	WCS-2005	Line	Foot paths
Security	Security	WCS-2005	Point, Polygon	Checkpoints, Militia occupation
DB exploration 2005		WCS-2005	Point	Survey points and track logs

TABLE 5. Base map data points.

	Mining villages	Boundary	River Crossings			Village		Points	Other	TOTAL
			Confluence	Source	Point	Active	Old			
Inside Park	26	10	1	5	55	2	6	39	8	152
Outside Park	8	1	0	0	59	15	96	0	2	181
TOTAL	34	11	1	5	114	17	102	39	10	333

11. CONCLUSIONS AND RECOMMENDATIONS

Despite difficult access and initial insecurity, the field teams were able to reach the north sector and conduct almost 400 km of reconnaissance over an area of 1250 km². The relatively high levels of large mammal sign, including species such as elephant, okapi, and leopard, all of which are very vulnerable to direct poaching, or other human disturbance, are evidence that wildlife populations in this sector of the park are relatively intact.

A preliminary comparison of the frequency of elephant sign between the 1990s surveys and the current survey, suggests that elephant numbers and distribution were comparable in the region during the two periods. This is perhaps the single best indicator that impact of DRC's decade of conflict—the presence of heavily armed ivory hunters—has spared this corner of the forest....So far.

Yet the prognosis for conservation here remains uncertain. Evidence of mining and hunting are widespread in this sector of the park, which was one of the least occupied during the 1990's. The continued presence of uncontrolled militias in the region represents a threat. The ICCN has scarcely established a foothold in the zone, and their operations remain seriously constrained by logistical constraints.

Recommendations

The North Sector of PN Maiko is now known to contain a significant but vulnerable reservoir of wildlife. We recommend the following to ensure the protection of this important resource:

Re-establish ICCN operations in the North Sector

- Open the Yongesa Patrol Post
- Evaluate options for mixed ICCN-FARDC security sweeps to clear the sector of militias.
- Provide support for park guards to initiate patrols.
- Initiate a reporting and evaluation process for anti-poaching patrols.
- Initiate a wildlife and human-impact monitoring program in the sector.

Develop a base of support in local communities

- Recruit and train local guides and porters to accompany patrols
- Develop selected villagers as sources of information on illegal activities in the park.
- Establish communication with traditional authorities

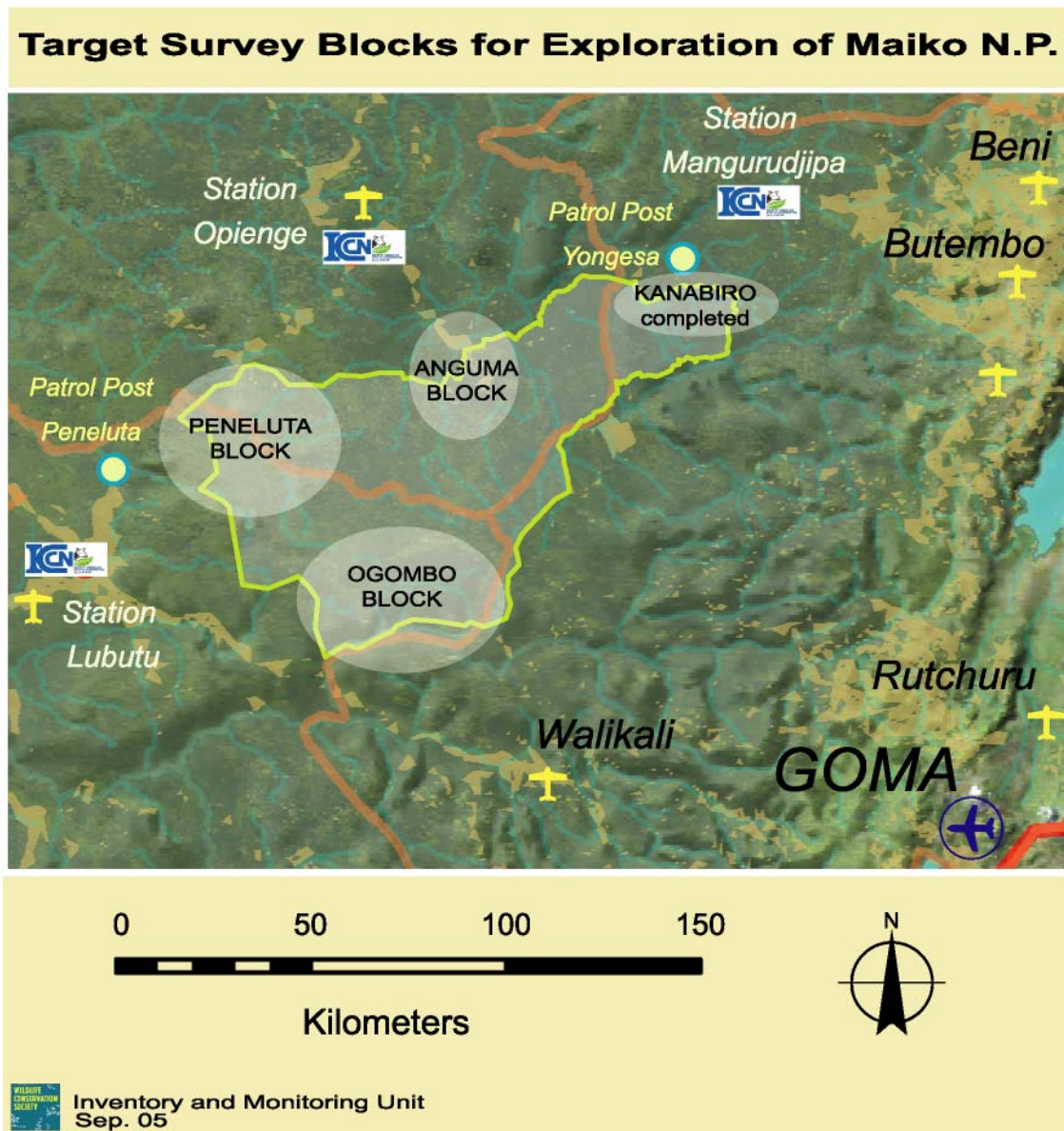
Further exploration and inventory

The unexpected and favorable results of this survey highlight the importance—and urgency of undertaking surveys comparable to this one in other sectors of the park. Three sectors have priority (**FIGURE 21**):

1. Peneluta area in the northwest,
2. Central Sector, in particular Angumu and surrounding areas, and
3. Ogomobo Massif in the south of the park

It is advantageous to develop and undertake these surveys as soon as possible. This will ensure that any other important populations of wildlife are identified and prioritized for protection. In addition, gains in security from this survey will ensure that access will be enhanced, costs reduced and many constraints eliminated.

FIGURE 21. Priority zones for post-conflict surveys in the Maiko National Park



ANNEXES

ANNEX 1. Bandes armées opérant dans le Secteur Nord du PN Maiko et ses environs.

Les bandes armées, suivant opèrent actuellement dans le Secteur nord du PN Maiko :

- **Les Mai Mai** : Ceux ci sont en plusieurs factions dans le Parc. Ceux dirigés par Commandant Rambo occupent la partie Sud - Ouest du Secteur Nord du parc (base à Oninga dans le territoire de Walikale), les autres dirigés par General Michigan Mutoya occupent le Nord – Est du Secteur Centre du parc (base à Balobe, en territoire de Bafwasende). Toutes ces bandes ont un objectif commun à savoir: s’abattre sur la faune sauvage et soutenir l’exploitation artisanale des matières précieuses dans le parc et ses environs immédiats, et malmener la population par des pillages répétées.
- **Les Interhamwe** : Venus du Rwanda lors la guerre de 1994, ceux ci se sont installés au Sud du Secteur Nord du Parc sous le Commandant Sadam. Leurs bases se trouvent à Fatua et Vumilia, territoire de Lubero. Ils se livrent au braconnage dans le parc et semment la terreur auprès de la population locale.
- **Les Simba** : Rebelles depuis 1964, ils occupent la partie centrale du Secteur Sud du Parc avec un base à Silisa, en territoire de Lubutu. Les simbas ont été contacté par la première mission d’exploration du parc (Hart & Sikubwabo, 1994).. Comme toutes les autres bandes, se livrent au braconnage et exploitation des matières précieuses..

A part des bandes armées, la population locale exploitent et même occupent illégalement le parc.

ANNEX 2. Operational Agreement between WCS / ICCN Inventory team and FARDC

COMPTE RENDU DE LA REUNION D'ISANGI

Date : le 03 juillet 2005

Lieu : Bureau, FARDC Isangi

Durée : De 20h20' – 22H05'

Participants :

- Cap.Makoma Cmdt Second de Bataillon FARDC Butembo,
- Lt. Movede, Cmdt Infanterie, Section FARDC Isangi,
- Lt. Chargé des Renseignements Militaires, Bataillon FARDC de Butembo,
- Lt. S1 de Bataillon FARDC Butembo,
- Ir. Fidèle AMSINI, Site Manager WCS MAIKO
- Boniface NYEMBO, Assistant de Recherche, WCS MAIKO
- Mr Mboyo MULONGOY, Sous Officier de garde, ICCN Maiko / Etaito

Ordre du jour :

1. Appercu général sur la situation sécuritaire du Secteur nord du PN Maiko
2. Collaboration ICCN Maiko/Etaito et les FARDC

Déroulement de la Réunion

Sur le plan sécuritaire

A tour de rôle, le Capitaine et Commandant Second de Bataillon et le Lt Commandant Section FARDC Isangi ont prit la parole en se complétant, confirment que jusqu'ici la situation sécuritaire du Secteur était bon. Sauf hier seulement qu'un des leurs informateurs est venu d'Elonga (localité située dans le territoire de Bafwasende, base arrière des Mai Mai de Loya). Ce dernier a confirmé le retrait des Mai mai Loya/ Opienge des villages pour la forêt. Ils seraient mécontents de l'arrestation de leur chef, le "Général " Michigan qui serait arête et transféré à Kinshasa selon certaines sources. La source continue en précisant que ces Mai mai venaient de déléguer une équipe à Oninga (Localité située dans le territoire de Walikale mais très proche de l'ancien Poste de Patrouille de Mandaye) pour demander à ceux d'Oninga de constituer ensemble un front commun, avec but de tuer ou prendre certains agents de l'Etat en otage pour revendiquer la libération de leur général arrêté et transféré à Kinshasa. Vue cette situation, ces autorités militaires nous déconseillent de traverser à la rive gauche de la rivière Lindi, étant bastion de ces inciviques. Les inciviques ont installé deux camps dans le Parc, le premier à la confluence de la rivière Angumu dans la rivière Loya et le deuxième camp à la confluence de la rivière Mandaye dans la rivière Lindi. En fin, nos officiers nous confirment le contrôle des rivières Longomane et Lubero par les Interhamwe.

A notre tour (WCS et ICCN Maiko) nous avons fait voir à nos amis militaires que notre souhait est de assurer les inventaires sur le terrain sur la plus grande partie possible du Secteur. Ainsi, les militaires nous promettent une escorte de 12 militaires pour nous accompagner afin de prévenir et contrecarrer ce qui pourrait nous arriver.

Réciproquant, à notre tour, nous (WCS et ICCN) avons fait savoir à nos interlocuteurs que nous avons des gardes qui sont bien armés et qui constituent aussi une force. Ainsi, le nombre des militaires nous proposé est exorbitant et voudrions revoir ce nombre à la baisse, surtout que ceci

engage des frais (ration, per diem...). Nos amis militaires décident de revoir le nombre sur base des informations en rapport avec la situation sécuritaire au moment de notre descente sur terrain.

Collaboration Entre ICCN-Maiko/Etaïto Et Les fardc

A ce chapitre toutes les autorités (militaires et ICCN Maiko) ont salué les résultats encourageants de patrouilles mixtes organisées par les gardes du parc (ICCN) et les militaires des FARDC. Bilan: un incontrôlé interhamwe abattu dans le Secteur Lubero – Longomane. L'arme de la victime est gardée à ce jour au bureau de la Coordination du Site ICCN Maiko à Butembo. Toutes les deux parties (ICCN et FARDC) réitèrent les souhaits de continuer avec ces genres de patrouilles en vue de sécuriser le secteur.

Ainsi, fait à Isangi, le 03 Juillet 2005

Ir. Fidèle AMSINI
Site Manager
WCS MAIKO

NB: Il n'y avait pas un rapporteur désigné pour la réunion. Les notes ci haut sont mes notes personnelles.

ANNEX 3. Survey grid centroid coordinates

LABEL	Y_COORD	X_COORD	LABEL	Y_COORD	X_COORD	LABEL	Y_COORD	X_COORD
AB4	-0.0072	27.9766	AC3	0.0381	28.0215	AD2	0.0833	28.0664
AC4	-0.0072	28.0215	AD3	0.0381	28.0664	AE2	0.0833	28.1113
AD4	-0.0072	28.0664	AE3	0.0381	28.1113	AF2	0.0833	28.1563
AE4	-0.0072	28.1113	AF3	0.0381	28.1563	AG2	0.0833	28.2012
AF4	-0.0072	28.1563	AG3	0.0381	28.2012	AI2	0.0833	28.2910
AG4	-0.0072	28.2012	AH3	0.0381	28.2461	AJ2	0.0833	28.3360
AH4	-0.0072	28.2461	AI3	0.0381	28.2910	AK2	0.0833	28.3809
AI4	-0.0072	28.2910	AJ3	0.0381	28.3360	AL2	0.0833	28.4258
AJ4	-0.0072	28.3360	AK3	0.0381	28.3809	AM2	0.0833	28.4707
AK4	-0.0072	28.3809	AL3	0.0381	28.4258	AN2	0.0833	28.5156
AL4	-0.0072	28.4258	AM3	0.0381	28.4707	AO2	0.0833	28.5606
AM4	-0.0072	28.4707	AN3	0.0381	28.5156	AC1	0.1285	28.0215
AN4	-0.0072	28.5156	AO3	0.0381	28.5606	AD1	0.1285	28.0664
AB3	0.0381	27.9766	AC2	0.0833	28.0215	AF1	0.1285	28.1563
						AO1	0.1285	28.5606

