

Annual Report of Cross River Gorilla Ecological Monitoring at the Kagwene Gorilla Sanctuary, Cameroon

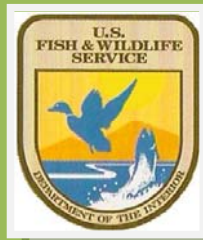
Progress Report for July 2012 – June 2013



RI/WCS/2013

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The Kagwene Research Camp and work conducted at the Kagwene Gorilla Sanctuary were supported with funds by the Wildlife Conservation Society, the U.S. Fish and Wildlife Services and World Wide Fund for Nature. July 2012 to June 2013.

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Produced: November 2013

Recommended citation: Ikfuingei, R. (2013). *Annual Report of Cross River Gorilla Ecological Monitoring at the Kagwene Gorilla Sanctuary, Cameroon Progress Report for July 2012 – June 2013*. An unpublished report submitted to the Wildlife Conservation Society, the U.S. Fish & Wildlife Service, the World Wide Fund for Nature, and the Cameroon Ministry of Forestry and Wildlife. Edits; Andrew Fowler

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Executive Summary

Data analyzed and presented in this report were collected from July 2012 to June 2013 using hand-held data collection devices running Cybertracker software. During this reporting period WCS staff concentrated on gorilla ecological monitoring while the MINFOF staff carried out anti-poaching patrols. A total distance of 1005.19 km was covered in 268 gorilla trail days and 756.03 observation hours. Data were recorded at 249 fresh night nest sites, comprising 1877 individual nests of Cross River gorilla. An infant gorilla foot print and an infant gorilla nest were recorded in the minor and major groups confirming the presence of infants in both groups. Gorillas were found to range mostly in the northwest and centre of the Sanctuary, their typical home range in recent previous years. Analysis of the evidence of fresh and recent Cross River gorilla feeding found on trails produced 5475 records of feeding events. The most commonly eaten plant parts were pith (78.94%), fruits (7.11%) leaves (6.59%) and bark (6.47%) (Figure 8). The data shows an interesting picture of the plant parts eaten by the gorillas with a peak in fruits in July. These plant parts eaten by the gorillas indicated a peak for fruits in January to February and leaves in May. MINFOF Eco-guards carried out 23 patrol days of anti-poaching patrols from July 2012 to June 2013 covering more than 74.43km and more than 38.22 hours of observation within the Kagwene Gorilla Sanctuary. The Conservator also made much effort to enforce the wildlife laws within the KGS during this reporting period.

The third annual wildlife survey in the KGS using the guided recce method with survey lines generated systematically on a topographical map of the Sanctuary was completed during the reporting period. The results indicated that most wildlife species within the sanctuary were gradually increasing as compared to the first survey.

The spatial distribution of the large mammals indicated an overall higher concentration in the northwest section of the sanctuary which had least human activities compared to the south, southwest and southeast sections. This coincided with the preferred gorillas range. Farming under the forest canopy and grazing of livestock in the grassland areas of the sanctuary are issues currently being addressed in the process of developing a management strategy for the sanctuary.

The camera trapping activities during this reporting period have proven extremely successful and encouraging, revealing some of the best images of Cross River gorillas to date. These images have not only indicated important information about the gorilla population, but have also led to increased international publicity and awareness about the rarity of the Cross River gorilla.

INTRODUCTION

Field research began in the Kagwene Mountains in 2003. At this time work was primarily focused on understanding the behavioural ecology of the gorillas and the recording of human activities. Between 2004 and 2005 an intensive gorilla monitoring period was organized and considerable data were collected related to home, seasonal, and daily ranges, in addition to nesting and feeding behavior. From early 2006 a greater emphasis was also placed on patrolling and removing snares. Beginning in 2009, the appointment of two MINFOF Eco-guards to the sanctuary permitted a greater focus on anti-poaching and enforcement actions to be implemented to complement WCS's continued daily gorilla monitoring.

This report presents the results of monitoring and protection activities within the Kagwene Gorilla Sanctuary (KGS) from July 2012 to June 2013. In order to evaluate the effectiveness of WCS intervention measures within the sanctuary three monitoring measures were carried out: 1) Tracking Cross River gorillas to their nest sites – to monitor the use of the sanctuary by the gorillas and assess social and ecological parameters of the gorillas; 2) Anti-poaching (MINFOF) patrols – to monitor human pressure and reduce its impact, and 3) Wildlife survey – to give an estimate of large mammal populations and human activities within the sanctuary. Data were also collected on “Other types of work” – to collect more information on wildlife species within the sanctuary after ending gorilla tracking at a fresh nest site. During each of these monitoring activities data were collected according to an adaptation of the recce walk technique (Kühl et al. 2008; White & Edwards 2000). The full methods are described in the “Proposed Kagwene Gorilla Sanctuary Monitoring Protocol Manual updated February 2010 version”.

The aim of the monitoring program is to assess whether WCS activities within the KGS are improving the conservation prospects for all wildlife species and the understanding related to the behavioural ecology of the Cross River gorilla (CRG) (though this is not an empirical focus). The objectives are:

- To monitor the presence, distribution, and ecology of the CRG;
- To monitor the presence, distribution and pressure of human activities within the KGS; and
- To monitor the presence and distribution of other wildlife within the KGS.

This document presents the analyses of these results along with detailed information of management related factors.

Sanctuary Background

The Kagwene Gorilla Sanctuary was created on 3rd April 2008. It covers a 19.4 km² area consisting mainly of montane forest and grassland (Figure 1). Altitude ranges from 1,000 - 2,037 m.a.s.l.

We recorded rainfall (mm) and temperature (°C) at 0730h everyday at the Kagwene research camp using two rain gauges (the average taken as total rainfall per day where there is rainfall) situated in open grassland to measure rainfall and a min-max thermometer positioned in a shady part of the camp to record the lowest and highest temperatures (Figure 2 & Figure 4).

The climate is characterized by a short dry season (November to March) and a long wet season (April to October) each year. There was more rainfall in Kagwene Gorilla Sanctuary during the reporting period compared to the past five years respectively (Figure 3). Due to a faulty thermometer data on temperature was not collected in November 2012.

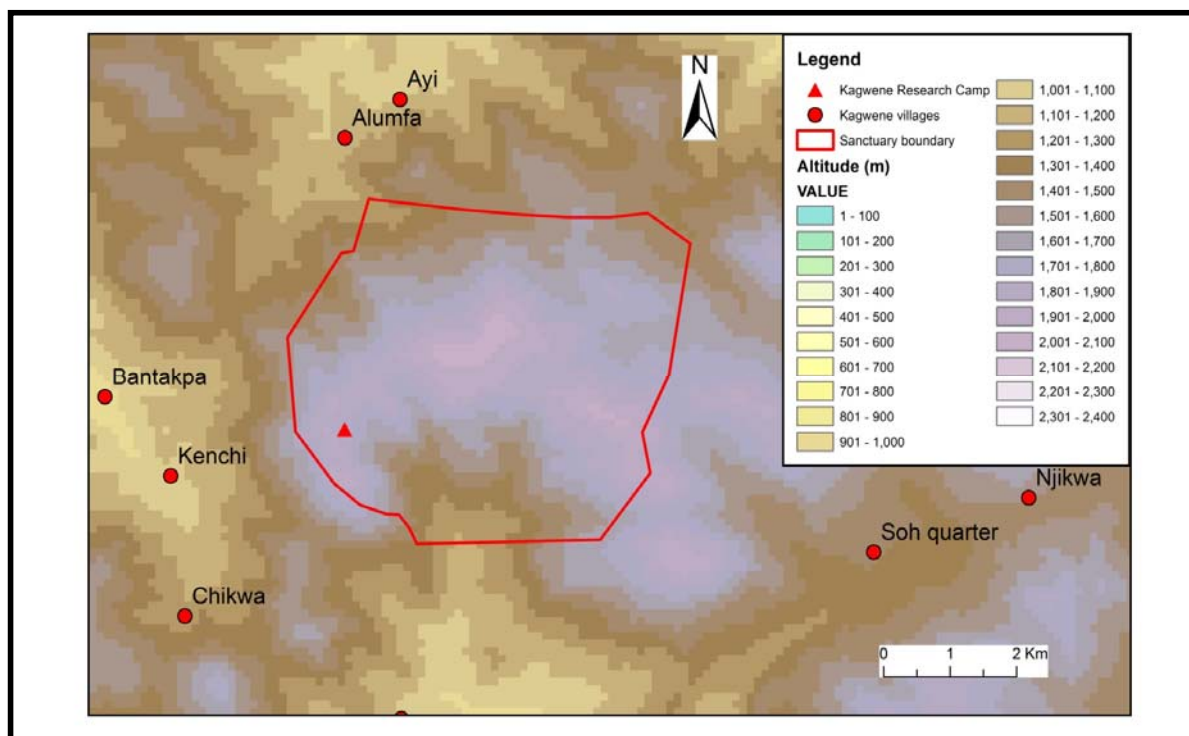


Figure 1: Topography of the Kagwene Gorilla Sanctuary

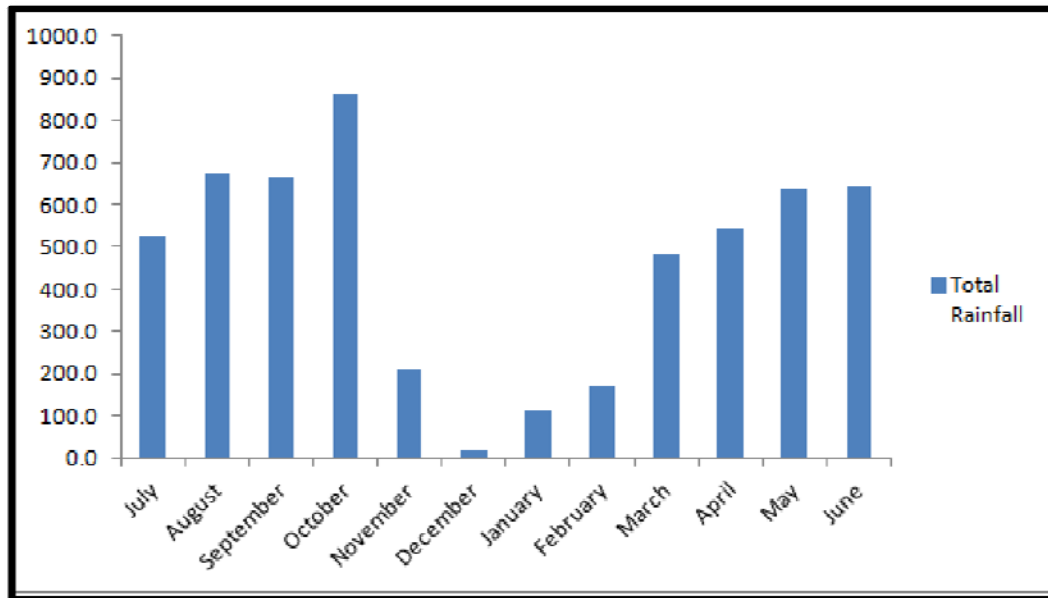


Figure 2: Rainfall in the Kagwene Gorilla Sanctuary, July 2012 to June 2013.

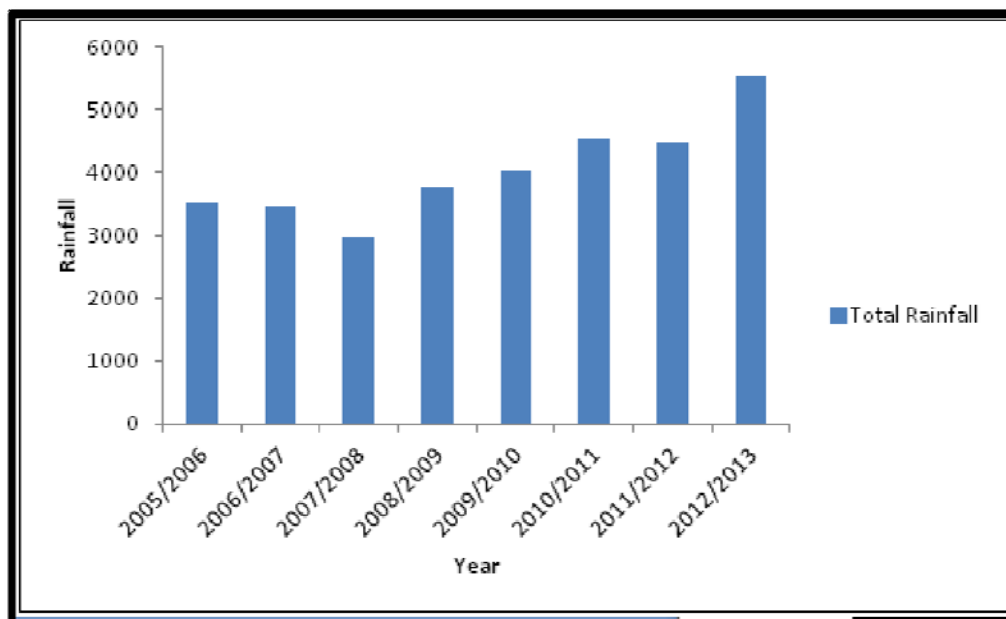


Figure 3: Annual rainfall in Kagwene Gorilla Sanctuary from July 2005 to June 2013.

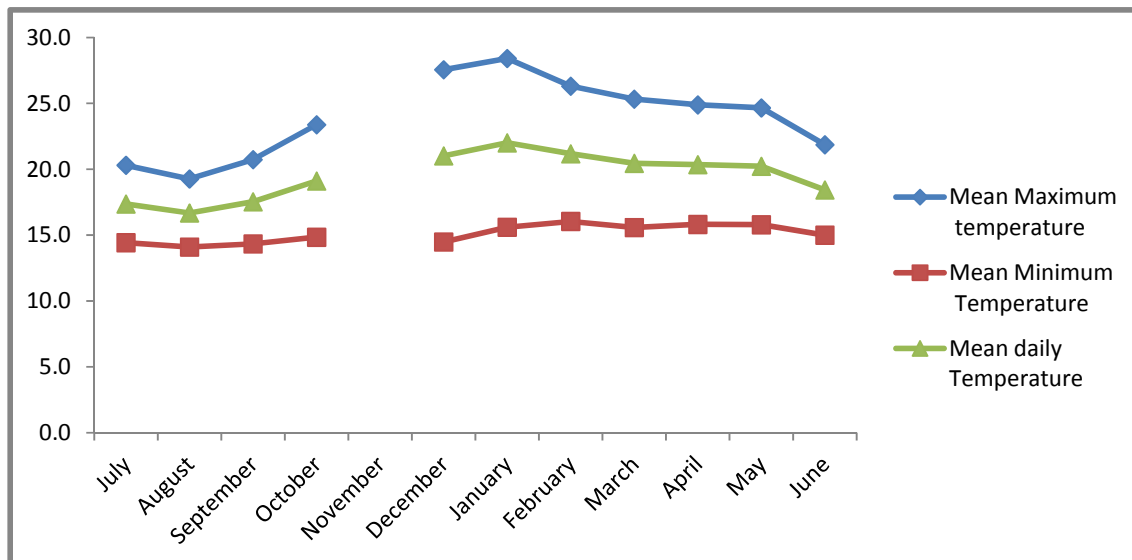


Figure 4: Temperature records taken at the Kagwene Research Camp from July 2012 to June 2013. (Data was not collected in November due to the malfunctioning of the thermometer.)

CROSS RIVER GORILLA MONITORING

METHODS

Study site

Gorilla trails were located each morning from observations of a fresh trail seen the previous day or by making use of the extensive local knowledge of WCS trackers in situations where the tracking team had a public holiday. Between July 2012 and June 2013, tracking to Cross River gorilla nest sites was alternated between the two known Cross River gorilla groups (Major group and Minor group) present in the Sanctuary.

Study groups

A brief history of the social organisation of the Cross River gorilla group in the KGS prior to the reporting period (July 2012 to June 2013) is presented here to facilitate the reader's understanding of the current situation. At the end of 2005, a mean group size of 12.4 gorillas was reported within the Kagwene Gorilla Sanctuary [Sunderland-Groves, 2009 #159]. In July 2006, trail observations indicated evidence that an aggressive incident (probably a dominance contest) occurred after which we began to observe two nesting groups; one group of six and another group of eight individuals suggesting a split in the previous single group. It was suspected that the older silverback from the one large group was ousted in July 2006 and two younger silverbacks each began to range separately with following females. In March 2007 a villager from Ayi reported the sighting of a lone silverback near his 'farm' (supposed within the boundary of the proposed Sanctuary). In subsequent years we continued to receive reports from villagers in Ayi about the sighting of a lone gorilla nest (occasionally two) in their forest area close to the Sanctuary. In May 2008 the first signs of further group fission were observed when following the Major group trails. In May 2010, we conducted a survey in the

reported area to investigate these observations and recorded several old different single nest sites, confirming the presence of the suspected ousted silver back. Currently there are two groups ranging within the Kagwene Gorilla Sanctuary (the Major and Minor groups). During this reporting period group fission and the lone gorilla that was ousted from the Major group in 2006 was captured by a camera trap with a female gorilla.

Data collection

Gorilla Monitoring

Data were collected only from trails less than three days old. Rugged, hand-held computers equipped with CyberTracker software were used for data collection following the KGS monitoring Protocol of 2007 updated in April 2009 (Warren et al 2009). Data were collected for large mammal signs, gorilla feeding, and nest sites less than three days old. In particular, a keen look-out for evidence of infant and/or juvenile gorillas (small gorilla footprints, small dung in nests, or small nests) was maintained.

Annual Wildlife Survey

An annual wildlife survey was conducted using the guided recce method. The guided recce lines were placed systematically over the topographical map of Kagwene Gorilla Sanctuary (Figure 15). Two wildlife surveys were carried out during this reporting period (one in the dry season and another in the wet season).

Anti-poaching Patrols

The entire sanctuary was patrolled by MINFOF Eco-guards with particular focus on specific areas in some months where certain human activities were known to be occurring. Patrols made use of the main forest paths in the sanctuary and branching to follow hunting trails when observed. The patrol team avoided opening up new trails.

Signs of Human Activity Data collection

Fresh and recent human sign, as well as all large mammal sign was noted during patrols. If snares were encountered they were recorded and then removed. Data were collected using a CyberTracker equipped hand held computer.

Climate

From July 2012 to June 2013 KGS had a long wet season (April to October) and a short dry season (November to March), with a total of 5539.78 mm of rainfall. Rainfall was recorded in all months. However, heavy rains were recorded in between July 2012 and October 2012 with a peak in October 2012. The months of December, January, and February had little rainfall. Mean monthly temperatures ranged between 17.4 °C and 22.0°C, with the greatest daily fluctuation in temperature recorded in November and December.

Results and discussion

1. Gorilla Monitoring

Two hundred and sixty eight days of gorilla trail monitoring took place. The analysis showed that a total of 1005.19 km of gorilla trails were walked, with an average of 83.76 km each month (range 64.52 – 131.98 km) and more than 756.03 hours of observation were made (Table 1). The majority of gorilla ranging was in the northwest and centre of the sanctuary, and there was no record of a nest site outside the sanctuary boundary. Detailed feeding data showed what they fed on during these occasions. However, in the previous reporting years

gorillas nested west outside the sanctuary boundary where they fed on pith of *Aframomum* sp, *Anchomanes difformis*, *Nephtytis poissoni*, *Palisota manii*, *Landolphia congolensis* and on black ants (Ikfuingei R, 2011, Ikfuingei R 2012).

Table 1: Parameters of tracking Cross River gorilla trails in Kagwene Gorilla Sanctuary, July 2012 to June 2013.

Month	# of days	# of hours	Distance (Km)
July	21	63.85	95.16
August	22	48.61	79.13
September	22	74.97	86.43
October	22	49.91	64.52
November	24	58.22	78.25
December	21	49.78	69.37
January	21	119.81	131.98
February	25	66.95	90.67
March	23	59.52	86.5
April	23	57.56	74.06
May	23	58.08	76.96
June	21	48.77	72.16
Totals	268	756.03	1005.19

We recorded data at 249 fresh night nest sites, comprising 1877 individual nests, of Cross River gorilla in the KGS (Table 3). The mean count of nests of weaned individuals was 7.54 per nest site with a range from 2-12. The majority of nest sites were recorded in the northwest and centre regions of the KGS (Figure 5). Comparing with last year (July 2011 until June 2012), there was a further extension of the gorillas' home range to the centre east and southwest of the sanctuary suggesting that the gorillas are now feeling secure within the sanctuary. The highest number of individual nests counted (12) was recorded in December 2012, January 2013 and February 2013. The least number of individual nest count (2) was recorded From February 2013 to June 2013. We did not record any solitary nest during this reporting period and we suggest that the solitary black back which was being recorded in the previous reports must have found a female-hence the two nest recorded during the reporting period. These two individuals have been recorded by the camera traps we introduced during the reporting period.

Of the 249 fresh night nest sites that were recorded, 7.2% (n=18) were reused night nest sites, and of those 44.4% (n=8) were recorded in the wet season, and 55.6% (n=10) in the dry season. An analysis of dietary data from the sanctuary revealed that night nests reuse was influenced by the availability of pith, bark, and leaves. Peak fruit availability in KGS normally falls between August and October and there were no records of nest reuse during that period. Nest site reuse in KGS may be influenced by a number of different factors and not just fruit availability as reported in the last reporting season. Gorillas in KGS are confined to a restricted range and so use the same area and seasonal food sources. The total monthly

night nest count ranged from 139 to 182 (Table 3). All night nest sites were assigned to a particular group indicating that the trackers were efficient in determining differences between the subgroups of Cross River gorillas in the sanctuary. Two groups (Major and Minor) range separately. The lone silver back formed a group with a single female from February 2013 to June 2013 (Table 3). Our results are from fresh night nest sites only (1 to 3 days old), to avoid problems with accurate nest counts associated with nest site degradation and zero nest.

Aggressive behavior by Cross River gorillas

There were 20 aggressive behaviors (15 from the Major group, and 5 from the Minor by gorillas directed at the monitoring team from July 2012 to June 2013 (). Aggression encounters ranged from one in November, December and April to 5 in January. Aggressive behaviour in most cases was chest-beating and barking by the silverback (Error! Reference source not found.) and occasionally charging at the monitoring team. Chest-beating in gorillas is part of aggressive behavior usually presented by a silverback to scare off other animals or against unrelated silverbacks. The monitoring team retreated in all encounters of aggressive signals to avoid confrontations with the gorillas. This aggressive behavior could be attributed to the presence of infants in the Major and Minor groups.

Table 2: Encounters with Cross River gorilla recorded during tracking from July 2012 to June 2013.

* J=Major group, N=Minor group, J1=group consisting of 5 gorillas splitting from the Major group and J2= smaller group consisting of 3 gorillas splitting from the Major group.

Month	Encounter with CRG		Group		
	# of times	Type	J	J1	N
July	-	Chest-beating & barking	-		-
August	-	Barking	-		-
September	3	Barking	3		-
October	2	Barking	1		1
November	1	Chest-beating	1		
December	1	Barking	-		1
January	5	Chest beating	4		1
February	3	Barking	2		1
March	2	Barking & chest beating	1		1
April	1	Barking	1		-
May	-	-	-	-	-
June	2	Chest-beating & barking	2		-
Totals	20		15		5

Nest Type Construction at Kagwene Gorilla Sanctuary

From July 2012 to June 2013, Cross River gorillas in Kagwene Gorilla Sanctuary constructed ground nests (36.3%, n = 682) and arboreal nests (63.7%, n = 1195). There are seasonal differences in night nest construction by Cross River gorillas in KGS. Of all 849 night nests recorded in the dry season (November to March) 69.1% (n = 587) were ground nests and 30.9 (n=262) were arboreal (Figure 6) while in the wet season 9.2% (n=95) were ground nest and

90.8% (n=933) were arboreal nests. Cross River gorilla nest building in KGS is likely to be influenced most by rainfall, the gorillas preferring to be off the ground during the wetter months. The high percentage of arboreal nests throughout the year as a whole could possibly be linked to disturbance from cattle and humans, including perhaps even our monitoring staff, although this is yet to be proven. The gorillas during this reporting period used a smaller area (Figure 5) of the sanctuary as compared to the previous years. This might be due to the fact that the forest under growth in Kagwene which is made up of mostly *Acanthaceae* dried off during the dry season leaving the forest completely open and the gorillas were using areas of the forest that had undergrowth.

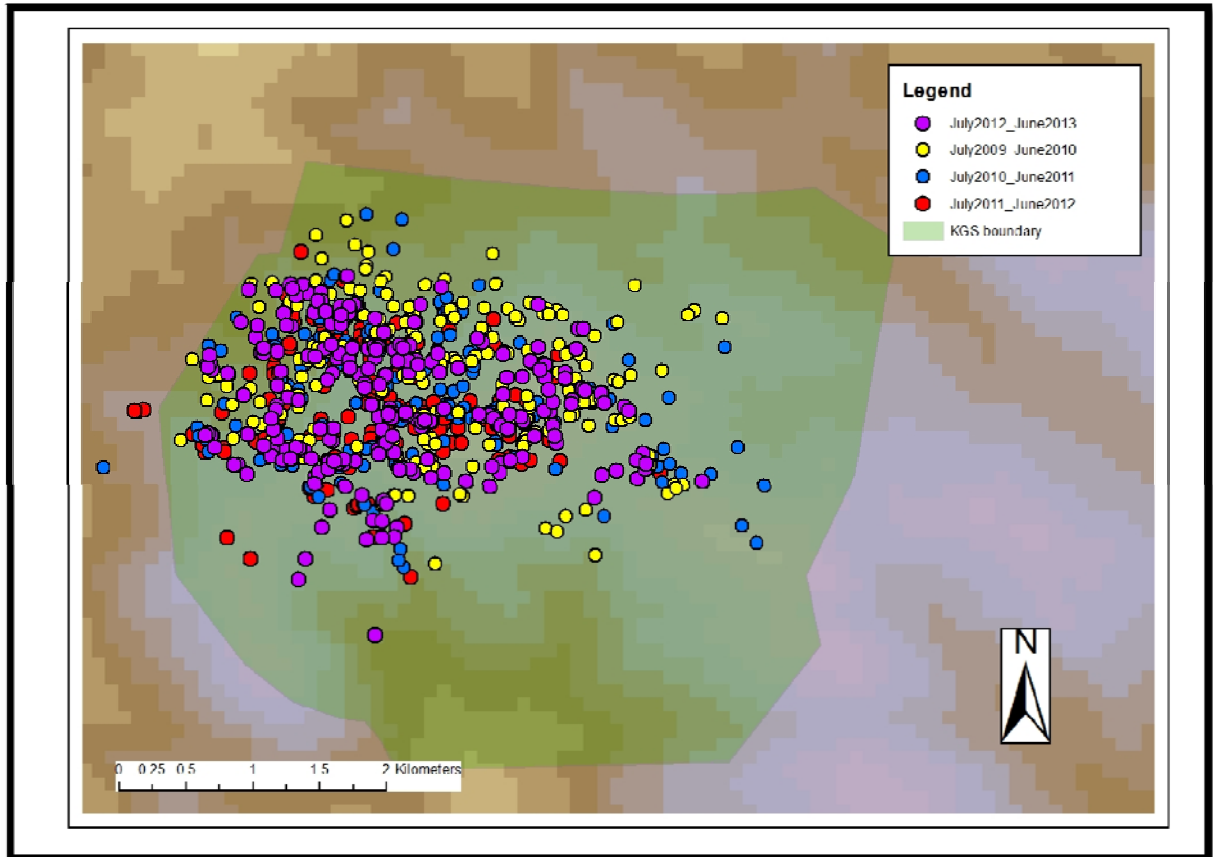


Figure 5: Night nest sites in KGS from July 2009 to June 2013.

The gorillas did not nest outside of the sanctuary boundary during the reporting season as compared to the previous reporting periods.

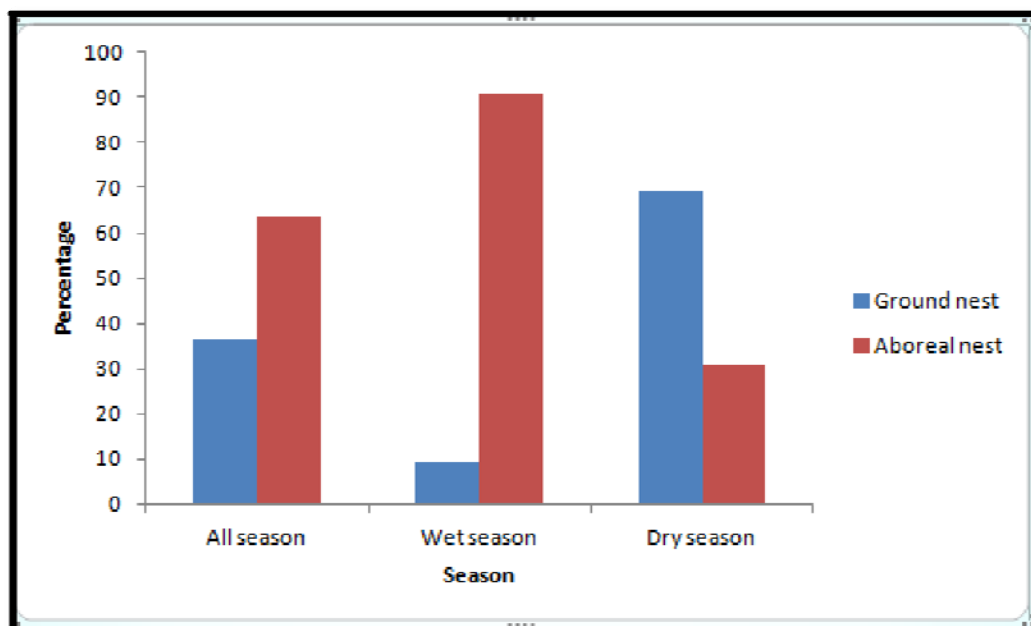


Figure 6: Seasonal Cross River gorilla nest construction in KGS July 2012 to June 2013.

Table 3: Parameters of nest sites and monthly sub-groupings data collected in KGS, July 2012 to June 2013.

Month	# of days sampled	Total # of nest sites	Total # of nest count	Total # of nest sites per group*					Max # of nest	Min # of nest
				J	J1	J2	J3	N		
July	21	22	162	11				11	10	6
August	22	20	139	11				9	8	5
September	22	19	128	10			2	7	10	2
October	22	15	112	12				3	11	2
November	24	22	162	10				12	10	5
December	21	21	170	10	1			10	12	3
January	21	21	182	12				9	12	5
February	25	23	175	11	1	1	1	8	12	2
March	23	21	160	10			2	9	10	2
April	23	21	158	8	1	1	1	10	11	2
May	23	23	174	10	2			11	10	2
June	21	21	155	8		2	1	10	10	2
Totals	268	249	1877	123	5	4	7	109		

* J=Major group, N=Minor group, J1=group consisting of 5 gorillas splitting from the Major group & J2=group consisting of 3 gorillas splitting from the Major group.

Table 4: Estimate of number of individuals in the gorilla groups within KGS at the end of the reporting season June 2013.

Age-sex	Major 1	Major 2	Minor Group
Infant/Juvenile	1	0	1
Adult female/ Sub-adult	4	2	5
Silverback	1	1	1
TOTALS	6	3	7

Four infant nests (two from the minor group and two from the major group) were recorded at night nest sites during this reporting season. With the fission of the major group we currently do not know the exact status of the infant/juvenile.

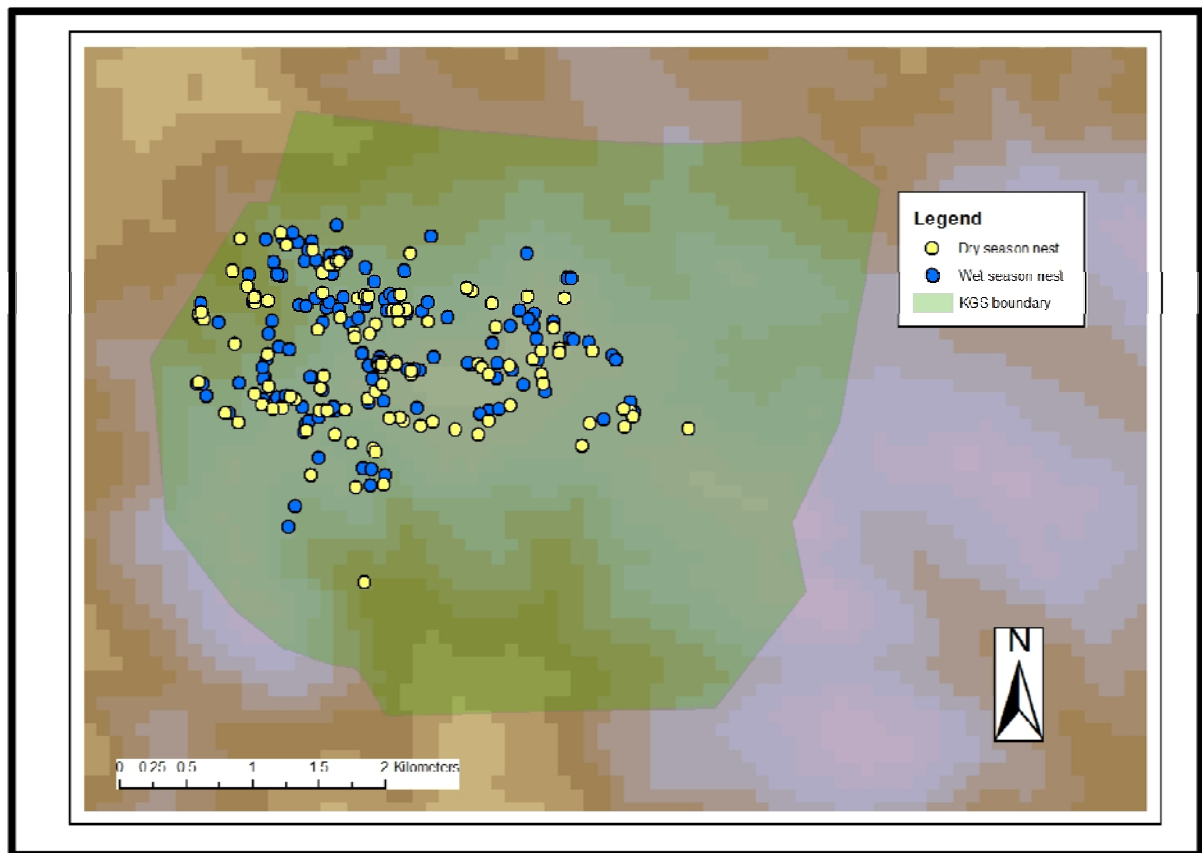


Figure 7: Wet and dry season Cross River gorilla night nests in KGS, July 2012 to June 2013.

The gorillas ranged more widely in the wet season (Figure 7) when the abundance of tree fruits was at its highest in different parts of the Sanctuary. In the dry season when fruits were scarce gorillas fed on low quality herbaceous foods that were more consistent and uniform in their availability, such as pith, bark and leaves and hence tended to have short day ranges

(Figure 7). However, gorillas spent most of their time in the centre and north western part of the sanctuary, perhaps indicating that foraging is most profitable to them in this area.

Gorilla Feeding Ecology

Analysis of the evidence of fresh and recent Cross River gorilla feeding found on trails produced 5475 records of feeding events. The most commonly eaten plant parts were pith (78.94%), fruits (7.11%) leaves (6.59%) and bark (6.47%) (Figure 8). The data shows an interesting picture of the plant parts eaten by the gorillas with a peak in fruits in July. The gorillas constantly fed on bark throughout the year. There is need to investigate the tree species and nutritional content of the tree bark eaten by gorillas in Kagwene gorilla sanctuary as studies in other lowland gorilla sites suggest that bark is or can be a source of protein for gorillas (Rogers et al 1990).

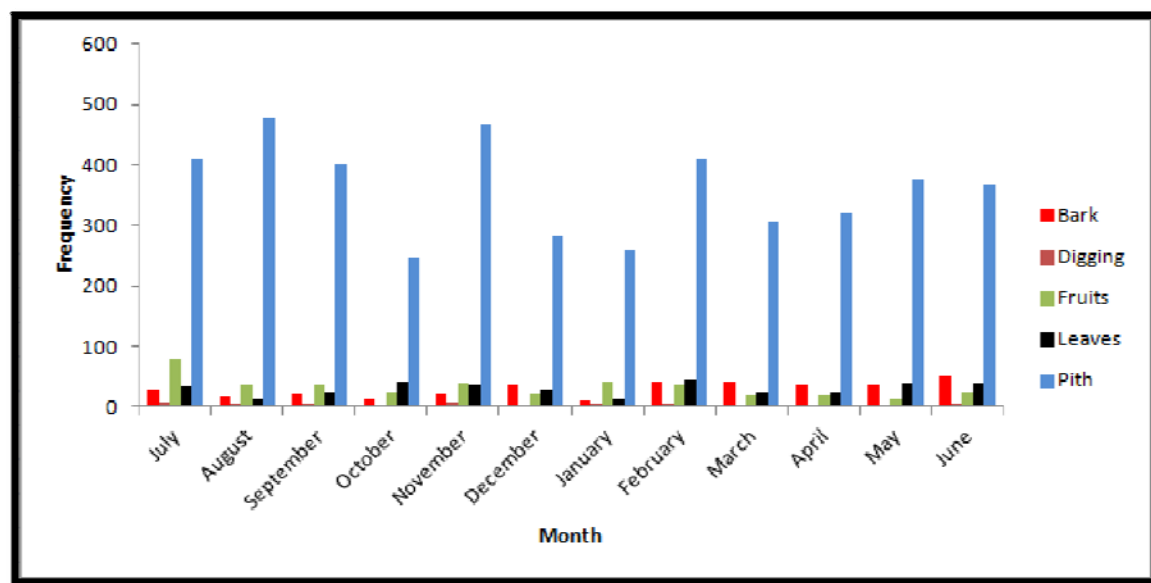


Figure 8: Patterns of Cross River gorilla feeding signs in KGS, July 2012 to June 2013.

The ranging pattern of the gorillas could be influenced by the presence of herbaceous plant material (pith) and ripe fruits. In July the gorillas ate more fruits and pith consumption was slightly decreased (Figure 8) indicating the importance of fruits in the diet of Cross River gorilla in KGS. It would be interesting to investigate the fruiting plant patterns eaten by gorillas in KGS as the fruiting during July 2009 to June 2010 was in September 2009, July 2010 to June 2011 peak was in January 2011, July 2011 to June 2012, the was in February 2012, but during this reporting period the fruiting peak was in July 2013 when most fig trees fruited. This will assist in understanding whether there is any influence of ripe fruits on the ranging pattern of the gorillas. The data collected does show an interesting picture of the distribution of these feeding signs within the area that the three groups are currently ranging (Figure 10). Apart from plant parts we also recorded feeding signs on black ants (*Dorylus sp.*) by gorillas in the Sanctuary during this reporting period. However no tools were seen at the feeding sites.

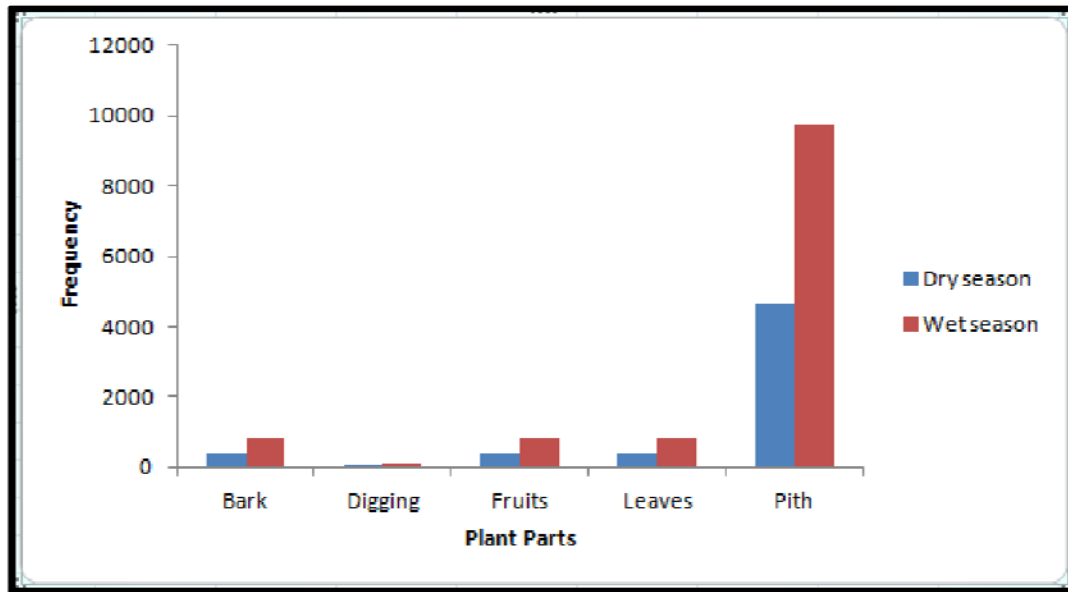


Figure 9: Seasonal feeding pattern by gorillas in KGS, July 2012 to June 2013.

In KGS leaf flush occurred in March, April, and May at the beginning of the wet season and gorillas took advantage by feeding on high quality young leaves at a time when fruits are traditionally scarcer (Figure 8). This year fruits were eaten during the months of July 2012 which coincided with the peak of wet season at KGS (Figure 2 & Figure 8).

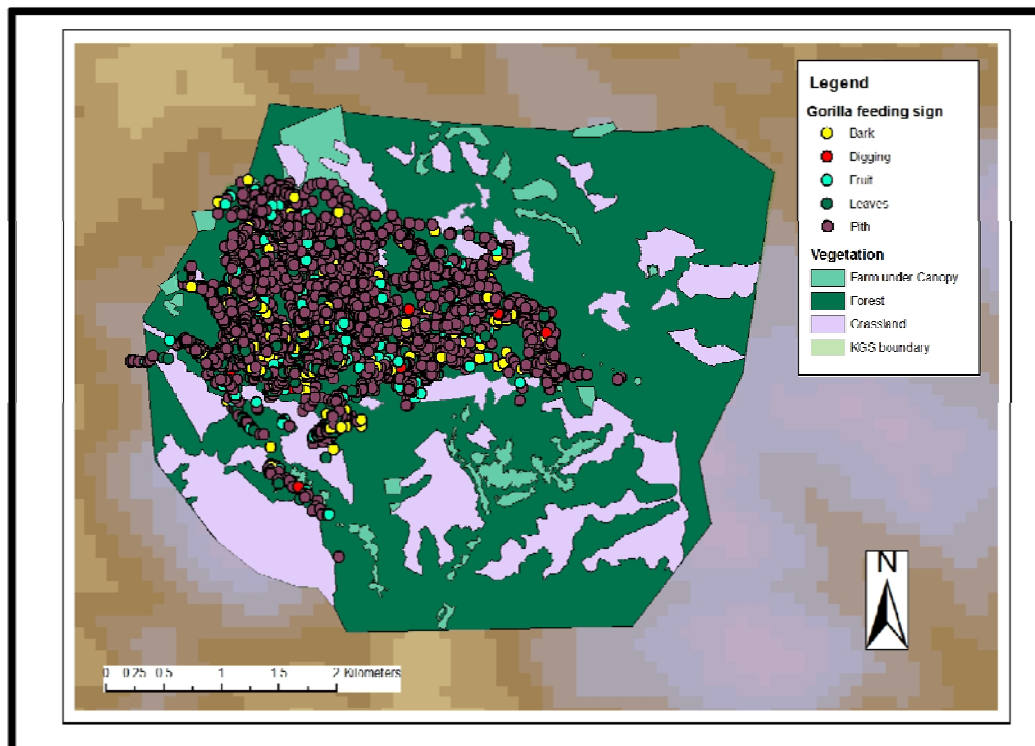


Figure 10: Location of top five most commonly recorded gorilla foods on gorilla trails in KGS, July 2012 to June 2013.

However, more fruits were consumed by gorillas in the wet season than in the dry season (Figure 9).

In July-August 2013 when fruits from *Syzygium sp*, *Landolphia sp* and *Aframomum sp* . were abundant; the monthly gorilla tracking trails was longer than any other month indicating that Cross River gorillas travelled long daily distances (Figure 10) as compared to the other months when they fed on leaves, herbaceous pith or stems and bark from trees. Cross River gorillas fed on the bark of *Garcinia sp*, *Landolphia sp.*, *Ficus sp.*, *Rubiaceae sp.* (Coffee) and roots of *Ficus sp*.

Wildlife species and Habitat

Signs of fourteen large mammal species were recorded along gorilla trails (Table 6 & Table 7). Medium duikers had the highest encounter rate while the Mona monkey and flat headed Cusimanse had the least. The genet and African civet were not recorded in the sanctuary during this reporting period (Figure 12 & Table 7).. Most wildlife species are distributed evenly across the sanctuary in areas where the gorillas range (Figure 11) though rock hyrax is restricted to rocky areas. Preuss's monkeys for some reason, seem to restrict their ranging to particular parts of the sanctuary presumably those areas where hunting pressure is least as these would be sought after prey by humans. However above 90% of mammals were recorded in montane forest.

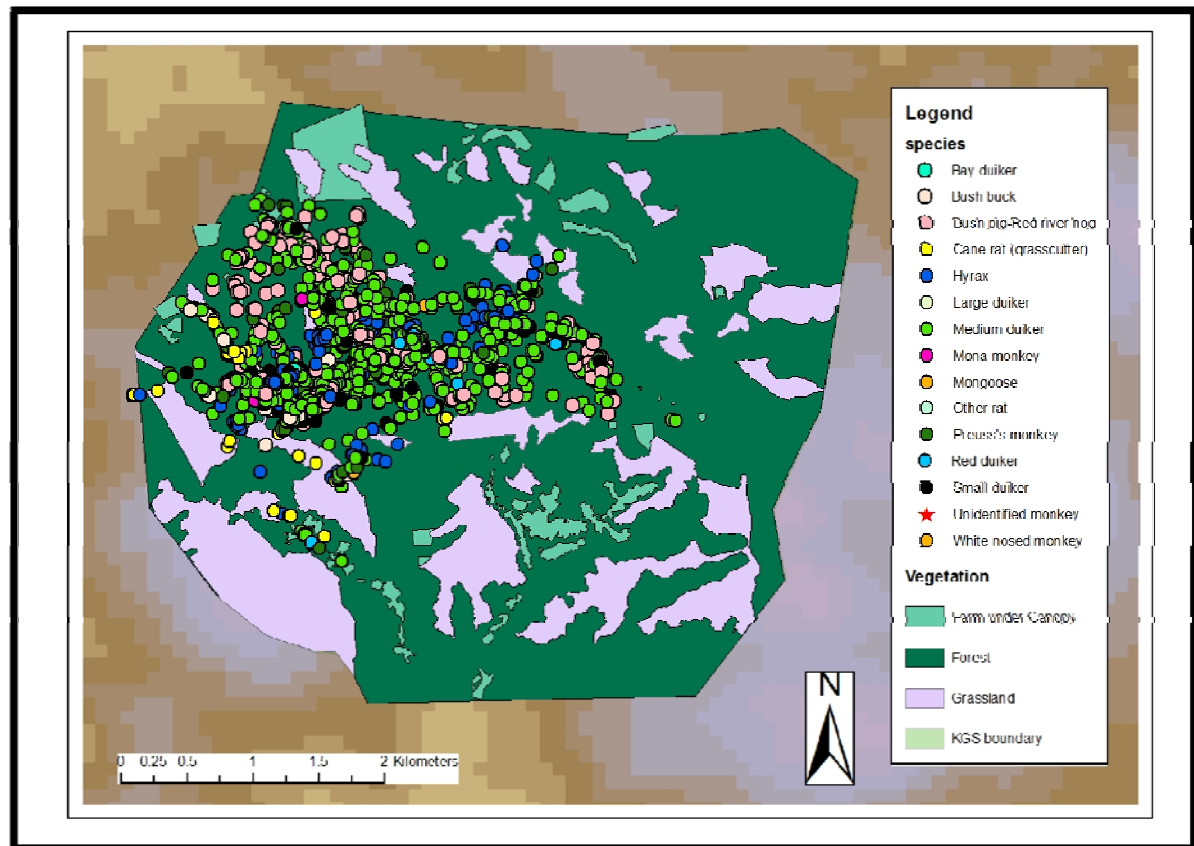


Figure 11: Geographic location of large mammal species sign encountered during tracking gorilla trails in KGS, July 2012 to June 2013.

Table 5: Large mammal habitat records (percentage of waypoints for each habitat type) in KGS, July 2012 to June 2013.

Species	Montane forest	Secondary forest	Grassland	Herb patch	Old farm	Grand Total
Bay duiker	100.00					100
Bush buck	92.00		8.00			100
Bush pig-Red river hog	99.58		0.42			100
Cane rat	88.89		11.11			100
Gorilla	99.03	0.05	0.24	0.67	0.02	100
Hyrax	100.0					100
Large duiker	100.0					100
Medium duiker	100.0					100
Mona monkey	100.0					100
Mongoose	100.0					100
Other rat	100.0					100
Preuss's monkey	100.0					100
Red duiker	100.0					100
Small duiker	100.0					100
Unidentified duiker	100.0					100
Unidentified monkey	100.0					100
White nosed monkey	100.0					100

Table 6: Frequency of observations of fresh and recent large mammals sign whilst tracking to gorilla nest sites in KGS, July 2012 to June 2013.

		Preuss's	Putty-nosed	Medium	Larger	Small	Bush	Bay	Red river	Red	Flat headed	Unidentified	Rock	Cane
Month	Mona monkey	monkey	monkey	duikers	duikers	duikers	buck	duiker	hog	duiker	cusimanse		hyrax	Rat
July		24		91		5	7		35	2		1	6	9
August		14		114	2	7	3		44		1		4	3
September		8	3	87		14	2		34	3			12	2
October		3		26		3			15				1	
November		18		81	2	8	1	3	13	3			11	6
December		5		43	1	5		1	7				8	4
January		7		49	1	7	1		1			3		2
February		13	1	79	1	16	5		19		2	5	20	6
March	2	6		44	1	3	1		16	2		5	14	1
April		4		56		3			16	1		2	11	
May	1	8	1	78	1	2	3		18	1			7	11
June	1	10		64		9	2	1	20	3		1	19	1
Total	4	120	5	812	9	82	25	5	238	15	3	17	113	45

Table 7: Encounter rate (per km) of fresh and recent large mammal sign whilst tracking to gorilla nest sites in KGS, July 2012 to June 2013.

Month	Mona monkey	Preuss's monkey	Putty- nosed monkey	Medium duikers	Larger duikers	Small duikers	Bush buck	Bay duiker	Red river hog	Red duiker	Flat headed cusimanse	Unidentified duiker	Rock hyrax	Cane Rat
July		0.27		1.03		0.08	0.08		0.40	0.02		0.01	0.07	0.10
August		0.19		1.55	0.03	0.10	0.04		0.60		0.01		0.05	0.04
September		0.10	0.04	1.06		0.17	0.02		0.41	0.04			0.15	0.02
October		0.05		0.44		0.05			0.26				0.02	
November		0.25		1.13	0.03	0.11	0.01		0.18	0.04			0.15	0.08
December		0.07		0.63	0.01	0.07		0.01	0.10				0.12	0.06
January		0.05		0.36	0.01	0.05	0.01		0.01			0.02	0.16	0.01
February		0.15	0.01	0.94	0.01	0.19	0.06		0.23		0.02	0.06	0.24	0.07
March	0.02		0.07	0.54	0.01	0.04	0.01		0.19	0.02		0.06	0.17	0.01
April		0.06		0.81		0.04			0.23	0.01		0.03	0.16	
May	0.01	0.11	0.01	1.09		0.03	0.04		0.25	0.01			0.10	0.15
June		0.14	0.01	0.91		0.13	0.03	0.01	0.28	0.04		0.01	0.27	0.01
Total	0.004	0.119	0.005	0.808	0.009	0.082	0.025	0.005	0.237	0.015	0.003	0.017	0.112	0.045

Mona monkeys which were first recorded within the sanctuary during the last reporting year were recorded twice within this reporting period. Red river hogs which were first recorded in the sanctuary in 2010 during dry season wildlife surveys in the northwestern part of the sanctuary were also present throughout the reporting period within the sanctuary. During this reporting period its range had expanded to cover the same area as the Cross River gorilla (Figure 12).

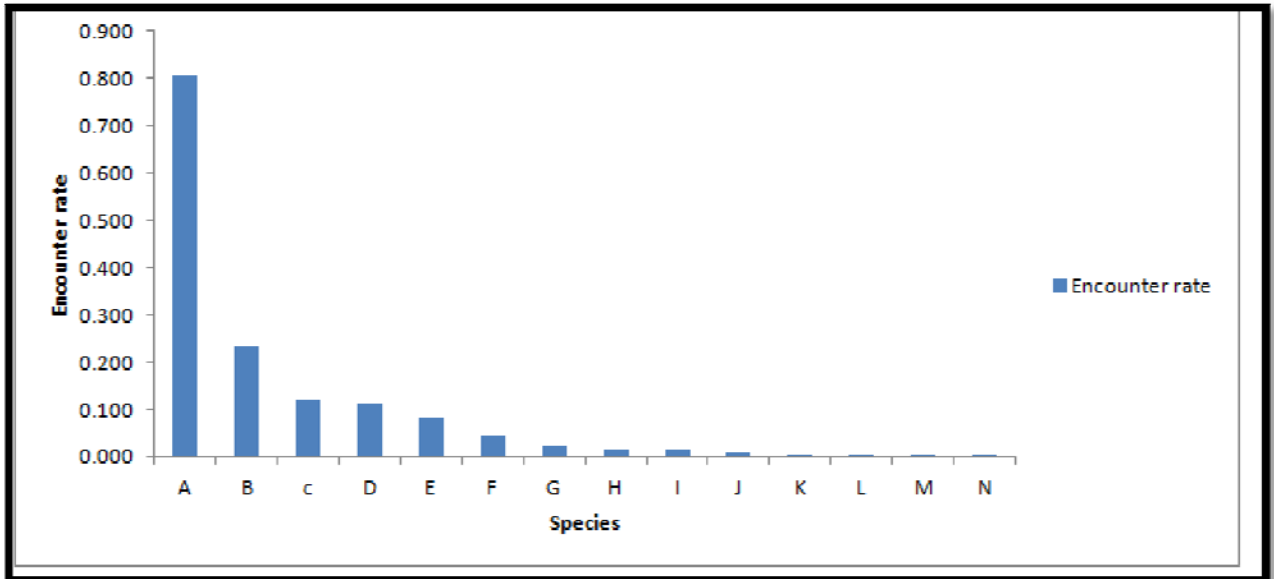


Figure 12: Encounter rates (per km) for large mammal recorded while tracking Cross River gorilla in KGS, July 2012 to June 2013.

A=Medium duiker, B=Red river hog, C=Preuss's monkey, D=Rock hyrax, E=Small duiker, F= Cane rat, G=Bush buck, H=Unidentified duiker , I=Red duiker, J=Larger duiker, K=Putty-nose monkey, L=Bay duiker, M=Mona monkey, N=Flat headed cusimanse

Human activity

Domestic stock, farming and hunting are the main human pressures within KGS. Most of the active farms with annual crops were recorded on the Kenchi, section of the sanctuary. However domestic stock (cattle, goats, sheep and horses) were common on the grassland patches within the sanctuary (Figure 13 & Figure 20). Wire snares were recorded mostly around Kenchi-Alumfa section of the sanctuary coinciding with the core area for gorillas and other wildlife species found within the sanctuary.

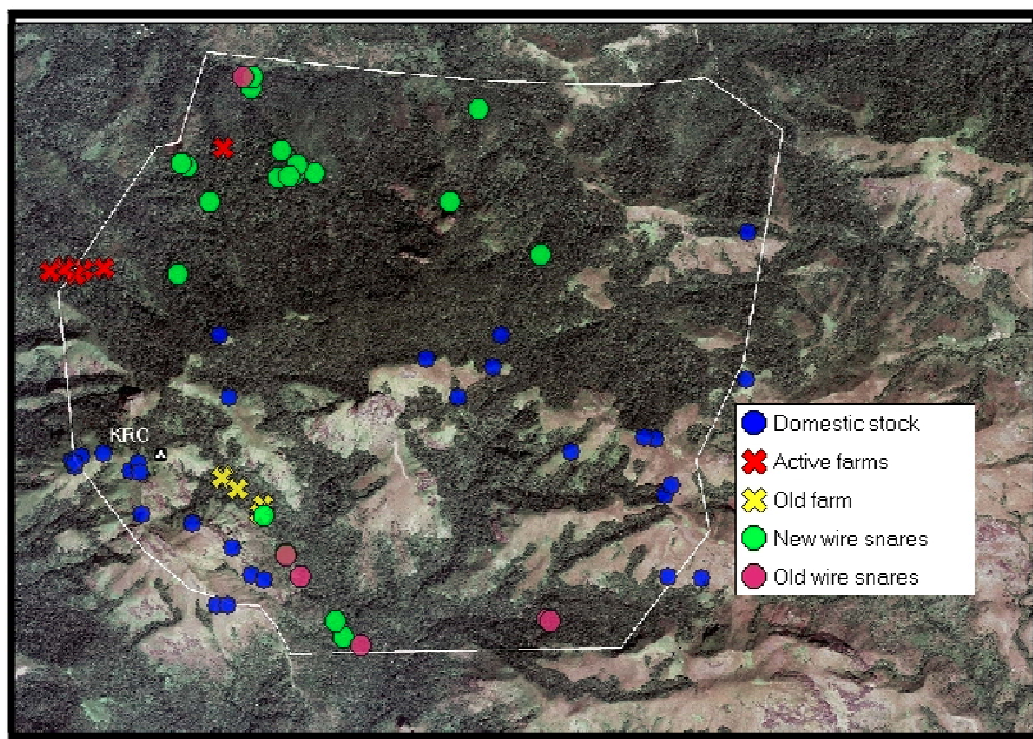


Figure 13: Human activities recorded within KGS, July 2012 to June 2013.

Camera traps

The initial camera trapping activities established in March 2012 have proven extremely successful and encouraging, revealing some of the best images of Cross River gorillas to date. These images have not only indicated important information about the gorilla population, but have also led to increased international publicity and awareness about the rarity of the Cross River gorilla.

Initially five camera traps were set up in the sanctuary at three different trails commonly used by gorillas in the forest but we later on deployed three more cameras to give a total of eight (Figure 14). In order to photograph both directions of passing animals especially the Cross River gorilla, a pair of cameras was set up with one camera on either side of the trail facing each other and the cameras were angled slightly away from each other to prevent the flashes interfering with each other. During this reporting period we acquired and deployed eight new camera traps capable of producing both still photographs and video images. They have both captured gorillas, Preuss's monkeys, duikers, genets, duikers and porcupines. The cameras have even captured dogs with ropes on their necks at the centre of the sanctuary

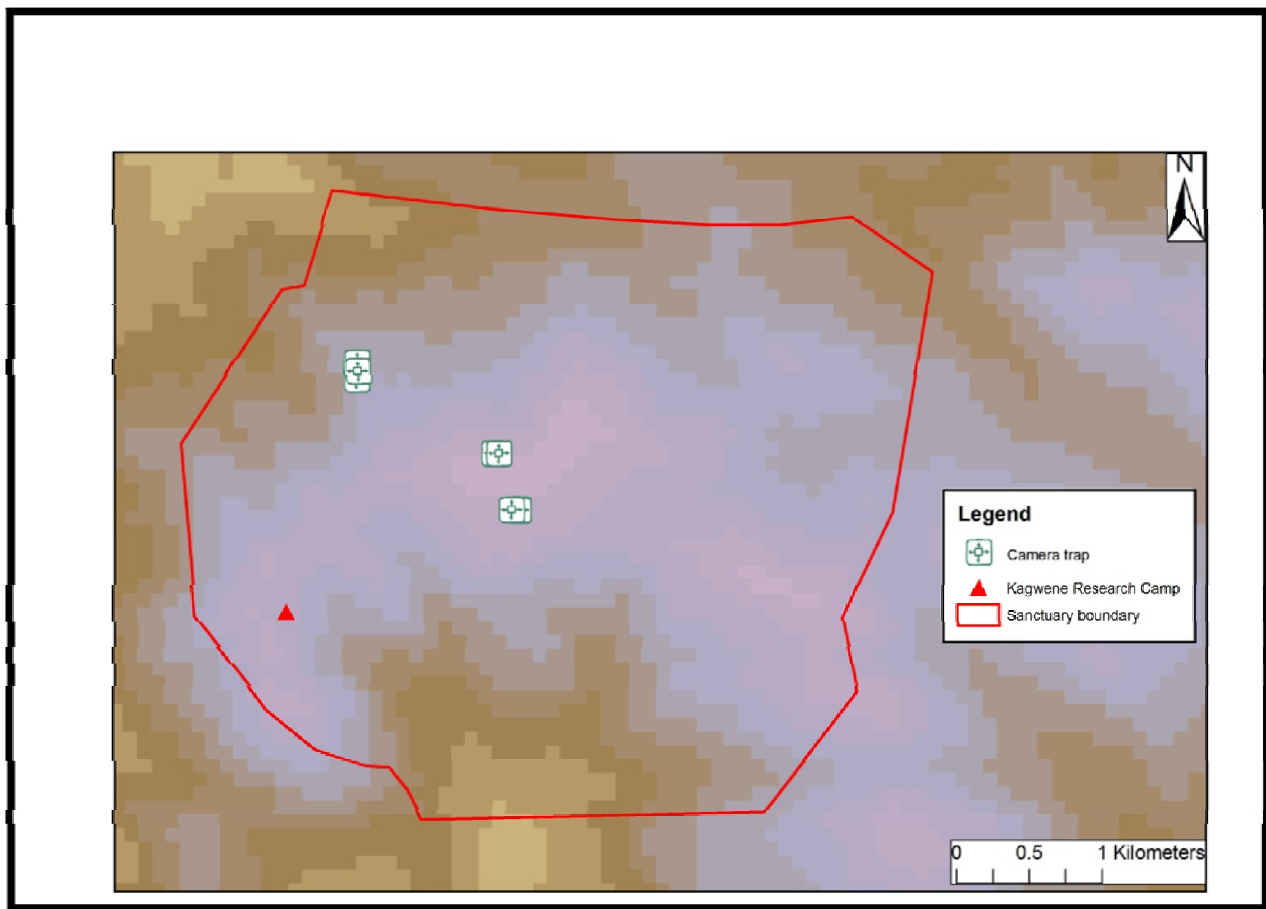


Figure 14: Camera traps in KGS from March 2012 to June 2013.

2. ANNUAL WILDLIFE SURVEY

Two wildlife surveys both in the wet and dry season were carried out in the sanctuary during this reporting period covering a total distance of 38.19km and total time spent was 48.94hrs (Table 8).

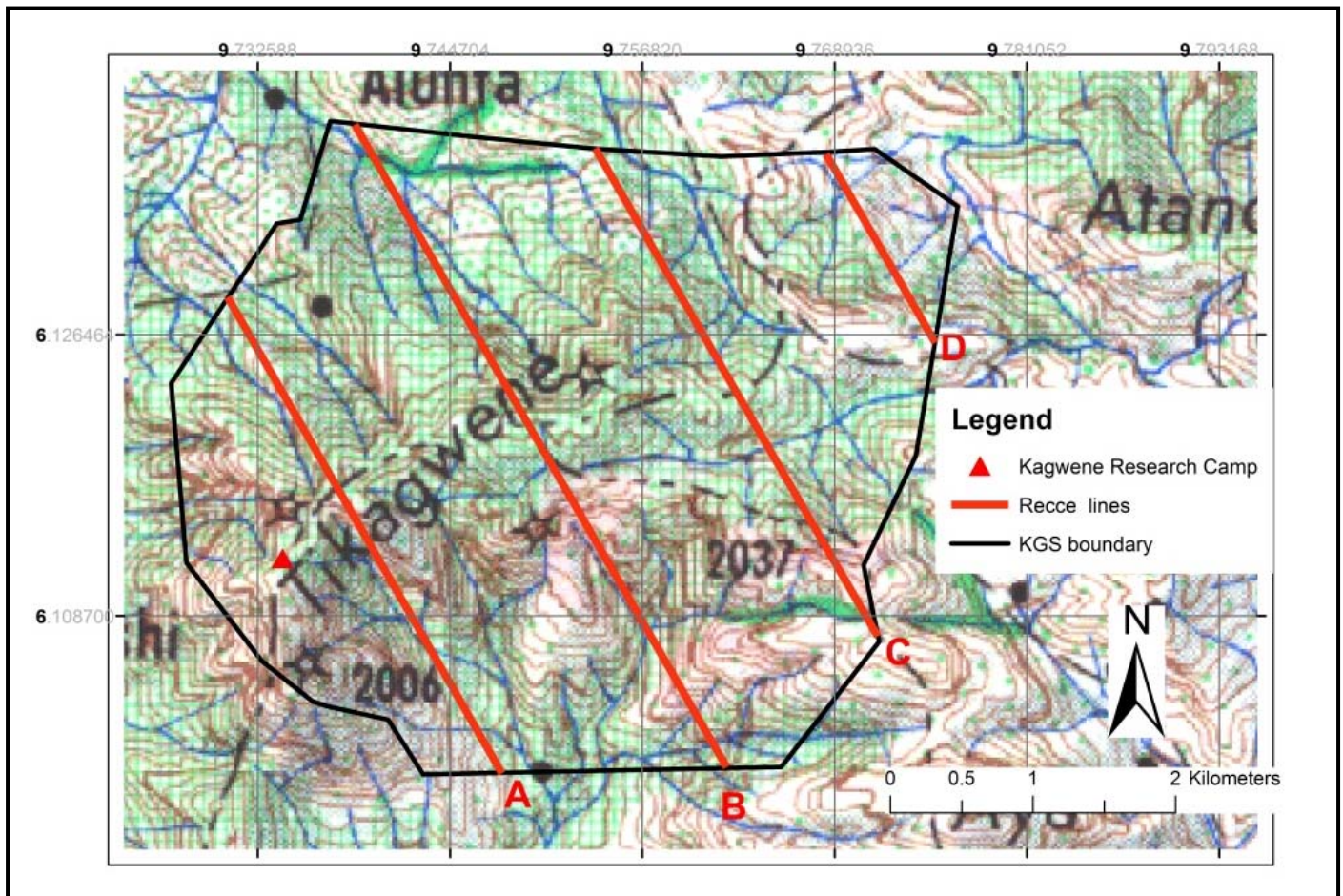


Figure 15: Layout of recce lines within the KGS for wildlife surveys.

Wildlife Species

There are slight increases in the abundances of most wildlife species recorded this year as compared to last year (Table 9). The flat-headed cusimanse, which was not recorded in the first wildlife survey, was recorded this year. However some wildlife species found in the sanctuary were not also observed during this survey.

Table 8: Wildlife survey patrol effort in KGS, September 2012 and February 2013

Date	Patrols	Distance covered (kilometers)	Time taken (hours)
9/8/2012	1	5.43	4.70
9/9/2012	1	8.11	5.46
9/10/2012	1	2.77	2.47
9/11/2012	1	1.18	0.96
9/12/2012	1	11.70	9.85
9/13/2012	1	9.97	8.25
9/14/2012	1	5.34	4.25
2/3/2013	1	4.04	2.54
2/4/2013	1	3.79	2.67
2/5/2013	1	2.42	2.16
2/6/2013	1	8.38	4.37
2/7/2013	1	6.25	5.10
2/8/2013	1	6.01	3.30
2/9/2013	1	4.02	2.53
Totals	14	79.43	58.60

Eighteen large mammal species were recorded during the wildlife survey (Table 9 & Figure 16). The most frequently encountered were the medium duikers, cane rat and brush tailed porcupines Red river hog, Preuss's monkey, and Cross River gorilla. The least frequently encountered were the Bay duikers. The otter which was observed in the sanctuary for the first time during the 2010/2011 wildlife survey was not recorded this year.

Table 9: Frequency and encounter rates of large mammal signs recorded in KGS during two sampling seasons, September 2012 and February 2013.

Species	Wet season	Dry season	Total	Abundance/KM 2012/2013	Abundance/KM 2011/2012	Abundance/KM 2010/2011
Brush-tailed porcupine	132	116	248	3.12	0.29	0.13
Cane rat	131	39	170	2.14	0.37	0.24
Bush pig	57	22	79	0.99	0.63	0.16
Medium duiker	49	43	92	1.16	0.24	0.05
Preuss's Monkey	42	10	52	0.65	0.5	0.24
Hyrax	31	25	56	0.71	0.24	0.1
Bush buck	27	15	42	0.53	0.45	0.16
White nose monkey	27	0	27	0.34	0.1	0.21
Flat headed Cusimanse	24	9	33	0.42	0.03	-
Gorilla	23	19	42	0.53	0.45	0.16
Small duiker	8	9	17	0.21	0.08	0.03
Larger duiker	1	0	1	0.01	0.79	0.52
Pangolin	1	0	1	0.01	-	-
Red duiker	0	4	4	0.05	-	-
African civet	0	3	3	0.04	-	-
Unidentified duiker	0	3	3	0.04	-	-
Bay duiker	0	1	1	0.01	-	-
Flying squirrel	0	1	1	0.01	-	-

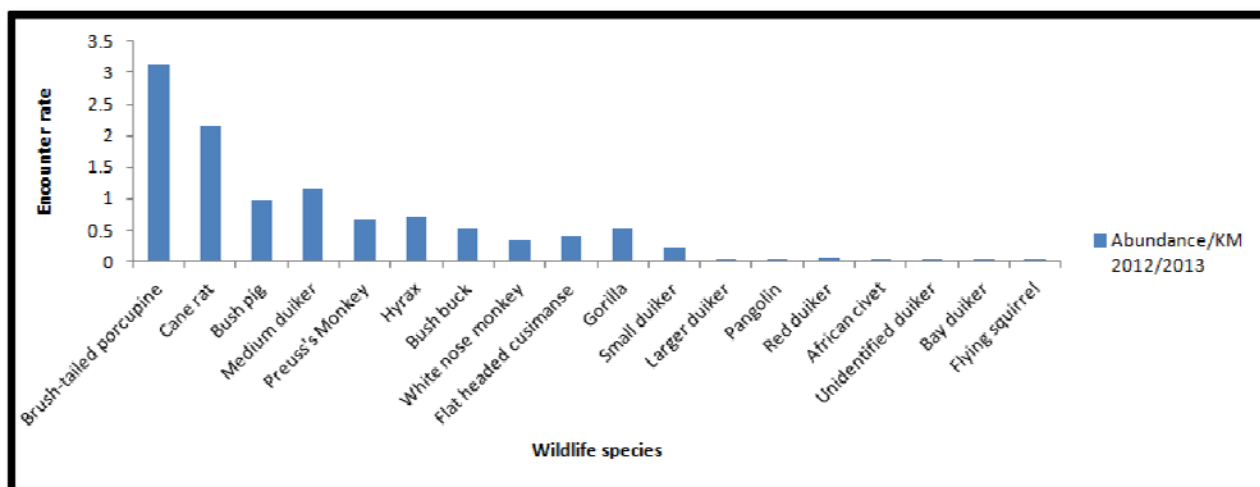


Figure 16: Encounter rate of wildlife species recorded during seasonal wildlife surveys in KGS July 2012 to June 2013.

This is the third complete seasonal wildlife survey in KGS. The otter and genet which were recorded for the first time in the sanctuary during 2010/2011 surveys were missed out this year. The African civet which was missed out during gorilla tracking was not documented while conducting the large mammal survey (Table 9 & Figure 17).

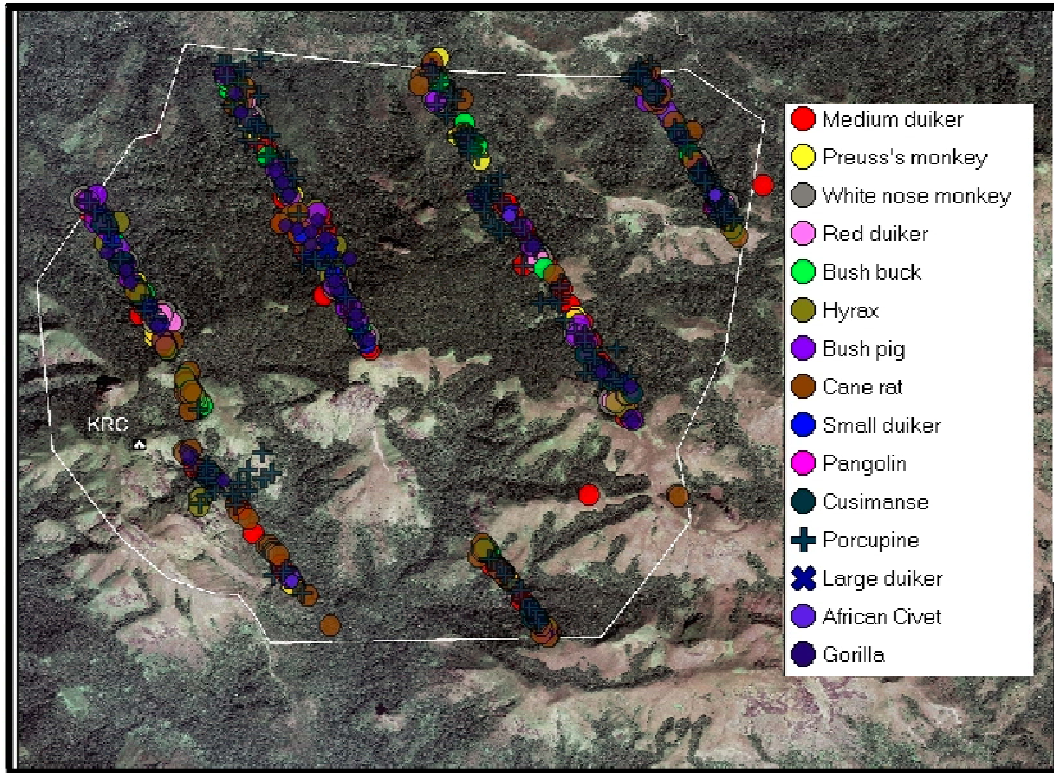


Figure 17: Location of wildlife species recorded in KGS during wildlife surveys, July 2012 to June 2013.

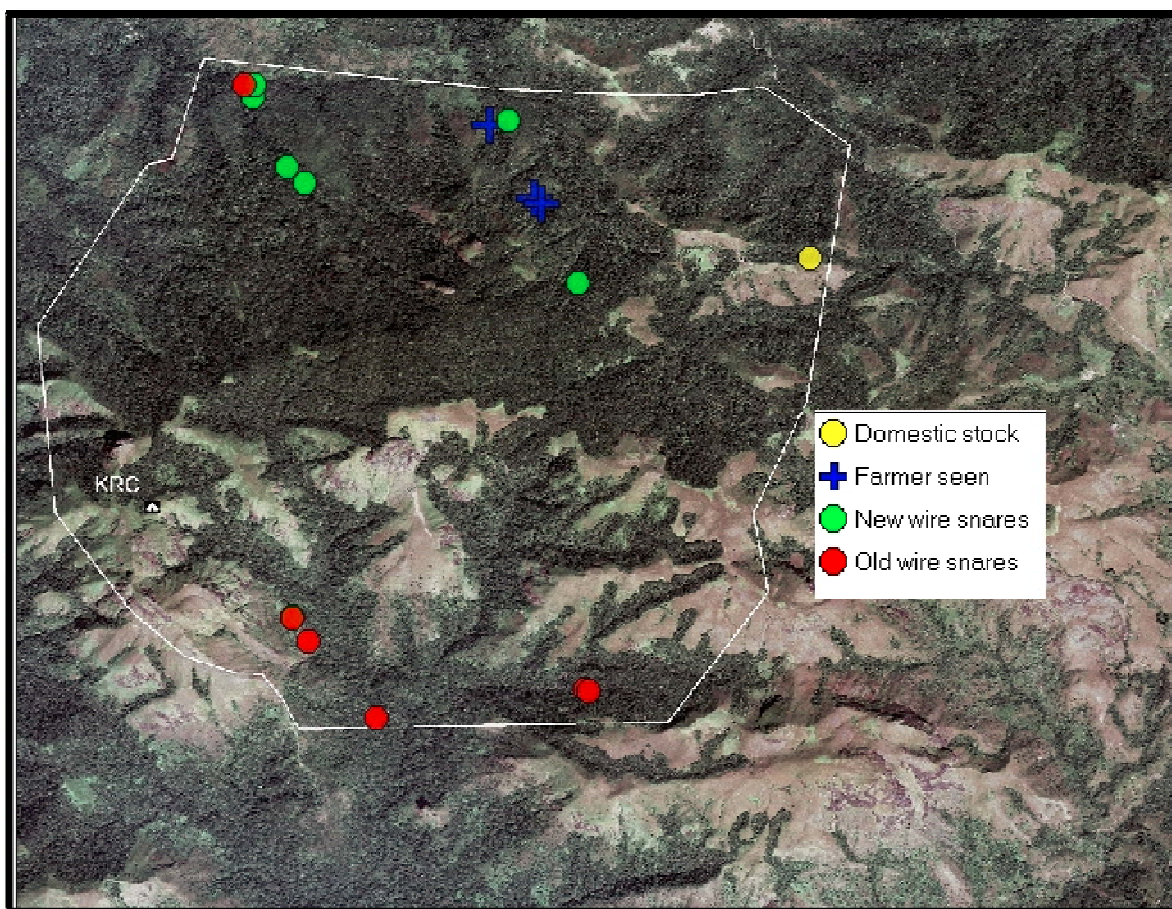


Figure 18: Location of human activity signs in KGS during wildlife surveys, July 2012 to June 2013.

Human Pressure

New wire snares were recorded on Ayi and Amassi sections of the sanctuary. Active farms were recorded on Ayi section of the sanctuary (Figure 17). Bush pigs during this reporting period help to destroy cocoyam farms inside the sanctuary and farmers have abandoned the farms.

There is need for more sensitization talks with the chiefs of the concerned communities to handle this encroachment issues. The old farms were abandoned and we are hoping that with time these farms will change to secondary forest and finally primary forest.

3. ANTI-POACHING PATROLS (MINFOF PATROLS)

Data analysis

In the analyses, only results of observations from all fresh and recent sign are presented. The encounter rate of all sign was calculated, expressed as the number of signs recorded

per kilometer of patrol. Records of the presence of brush-tailed porcupine paths were very numerous and for that reason were not recorded as this would have slowed down progress of patrolling excessively.

Twenty nine days of anti-poaching patrols were carried out in the KGS by MINFOF Eco-guards from July 2012 to June 2013. More than 66.2km were walked at an average of 22.07km each month (range 0.20km to 35.78km. More than 38.22 hours of observation were made (Table 10).

Table 10: Parameters of MINFOF anti-poaching, activities in KGS July 2012 to June 2013

Month	Number of patrol days	Distance covered (Km)	Time taken (hr)
July	9	22.01	18.51-
August	-	-	-
September	1	0.20-	2.1-
October	-	-	-
November	-	-	-
December	-	-	-
January	8	35.78	31.09
February	2	8.23	5.77-
March	3	8.41	7.13
April	-	-	-
May	-	-	-
June	-	-	-
Totals	23	74.43	38.22

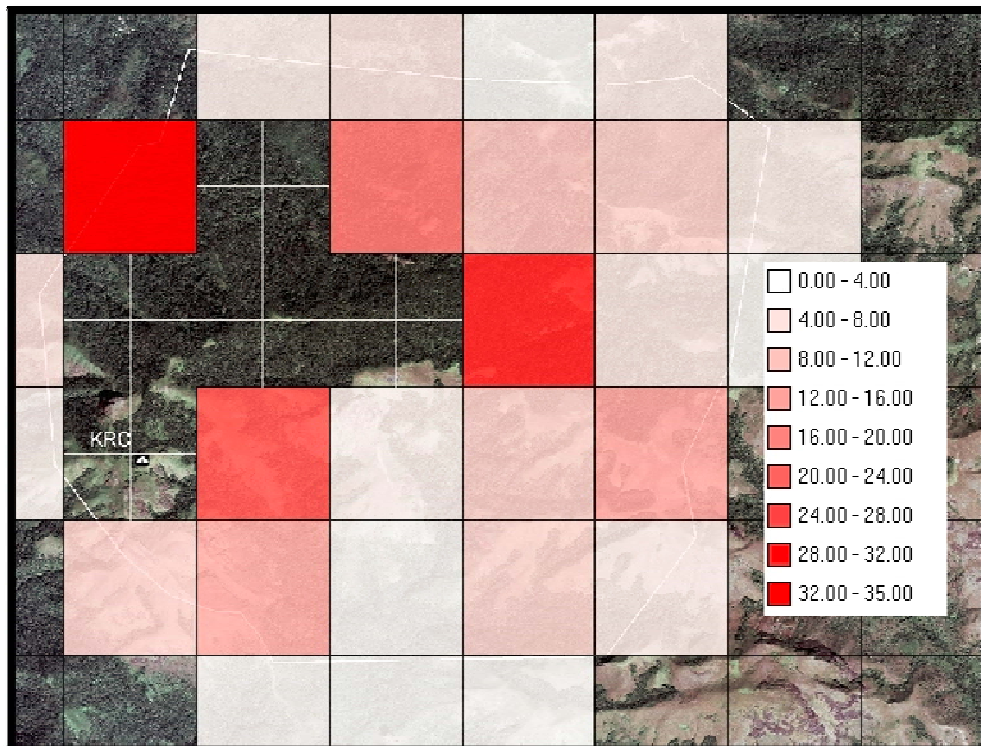


Figure 19: MINFOF grid map of patrol effort for anti-poaching, July 2012 to June 2013.

The grid map of patrol effort was created using the patrol effort map in Cybertracker. Each of the 31 grid cells measures 1000m x 1000m and the distance traveled in each grid cell was measured. During the reporting period, 83.87% (n=26) grids were patrolled as against 92.55% of all grids patrolled last year (Figure 19). During this year patrols were concentrated in areas that were identified (Ikfuingei R. 2011) to have more wire snares especially in gorilla-preferred habitat within the sanctuary. There is a need in the next reporting period to further intensify patrols in these areas and other adjacent areas as hunters have been noted to change their tactics when old ones are discovered.

Table 11: Frequency of human activity recorded during MINFOF patrols in KGS, July 2012 to June 2013

Month	Farming	Domestic stock	Hunting	Shed or Camp	Clearing or burning	Illegal path use	NTFP
July	2	9	6	2			
August							
September							
October		5					
November							
December							
January							
February		9					
March		3	2				
April							
May							
June							
Totals	2	26	8	2			

Table 12: Encounter rate of human activity during MINFOF patrols in KGS, July 2012 to June 2013.

Month	Farming	Domestic stock	Hunting	Shed or Camp	Clearing or burning	Illegal path use	NTPF
July	0.12	0.53	0.35	0.12			
August							
September							
October		1.48					
November							
December							
January							
February		1.09					
March		0.51	0.33				
April							
May							
June							
Encounter rate/km	0.027	0.349	0.107	0.027			

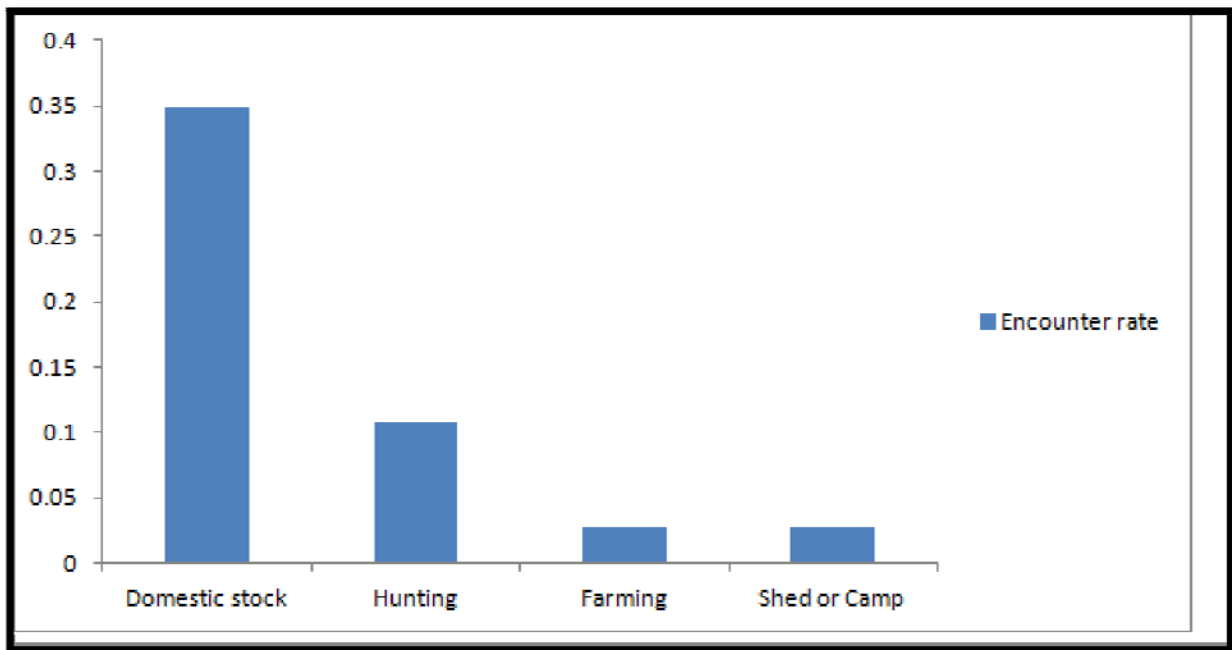


Figure 20: Average encounter rate of human activity during MINFOF patrol from July 2012 to June 2013.

Human pressure

The encounter rate of fresh and recent human sign recorded by the MINFOF Eco-guards during this reporting period was thankfully low (Table 11 & Table 12). Overall the most common human activities were the presence of domestic stock with an encounter rate of 0.35/km and farming with 0.027/km (Table 12). Domestic animals were mainly found in grassland during this reporting period. As Cross River gorillas are already fragmented in Kagwene, generalist parasites present in overlapping populations especially domesticated animals may pose a more significant threat to the critically endangered Cross River gorillas. During MINFOF anti-poaching patrols it is the mission of the team to seek out human sign and therefore we would expect the encounter rate to be larger on these days.

Within the sanctuary there were 10 shelters associated with pastoralist activity; these consisted of mud brick buildings with zinc roof shelters for livestock. MINFOF Eco-guards started enforcing wildlife laws by noting the names of all grazers within the sanctuary and issuing verbal warnings to grazers, poachers and farmers. The KGS Conservator organized a sensitization meeting involving some traditional authorities adjacent the sanctuary and grazers to inform defaulters on the existing prefectorial order banning all grazing, farming, and hunting within the sanctuary. In this meeting it was agreed that by the end of the next dry season, there should be no grazing or farming within the sanctuary.

It is clear that anti-poaching will remain an ongoing focus as hunters change snaring areas in the forest. The MINFOF Eco-guards need to step up their patrolling activities in order to completely control trapping using wire snares in the sanctuary. MINFOF Eco-guards need to continue to sensitize local communities and to apprehend those hunters who do not adhere to the wildlife laws of Cameroon.

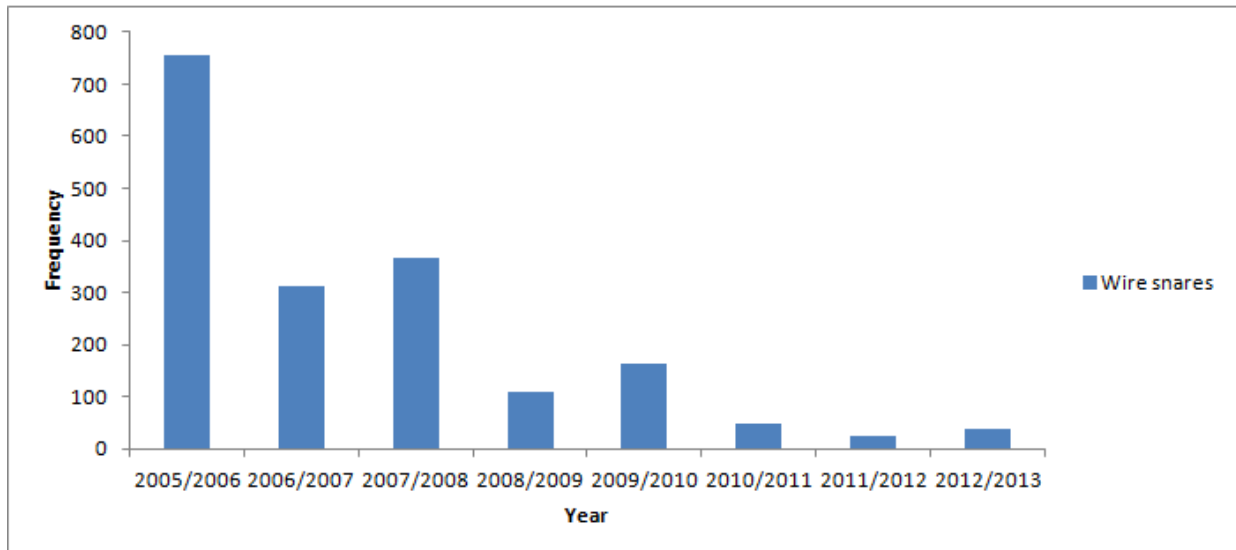


Figure 21: Wire snares recorded in KGS from 2005 to June 2013 by anti-poaching patrol team.

Even though MINFOF was not present for most of the reporting period, there was still a reduction in the number of traps and active farmland within the sanctuary. Most of the communities are beginning to understand that KGS needs to be protected by them and not by the Eco-guards. However more gun shots were recorded on the Ekaw, Chikwa region of the sanctuary while more wire snares were recorded on the Alumfa and Ayi portion of the sanctuary. Domestic stock was kept out of the grassland portion of the sanctuary except for the grassland area above Ekaw community. The majority of farms recorded during this reporting period were old abandoned farms as bush pigs were feeding on cocoyams and farmers abandoned their farms.

Farming is degrading the habitat for all wildlife in the sanctuary, reducing the area in which wildlife can range and possibly resulting in contact between wildlife and human waste in either drinking spots or feeding points and could result in disease transmission.

The disturbance caused by farming in the southeast of the sanctuary appears to have driven the gorillas away from this area. This can be clearly seen from the change in nest site localities over the years. The method of farm clearance does not totally devastate the area, there is still canopy and in some places fruiting trees still remain. This bodes well for the reclamation of this area by gorillas once human disturbance is reduced.

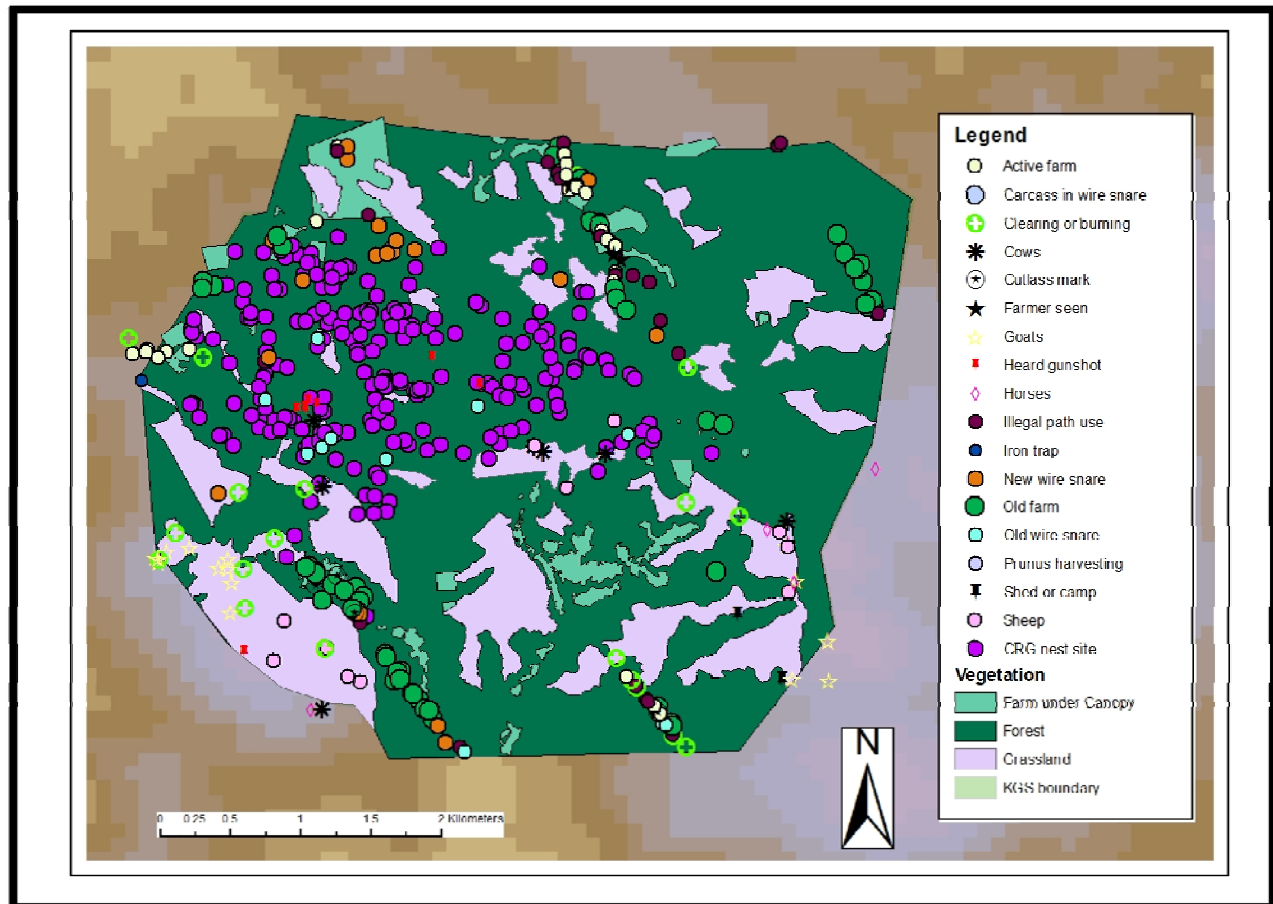


Figure 22: Location of human activity and Cross River gorilla nesting, July 2012 to June 2013.

Very few clearings or burnings were recorded during the reporting period (Figure 22). Urgently required management measures include the recovery of farmer-encroached forest and grazing areas within the sanctuary. With the delimitation of the sanctuary there is a need for agricultural re-training for the farmers of the area as it is now illegal to farm within the sanctuary.

Grassland is found in the south western and eastern sections of the sanctuary but domestic stock was not recorded grazing during this reporting period. Domestic stock was recorded at the south eastern portion of the sanctuary as against last reporting season where domestic stock was recorded all over the sanctuary (Figure 22). MINFOF Ecoguard patrol activities should pay more attention in evicting grazers from within the sanctuary. During this reporting period Cross River gorillas avoided constructing nests in areas where domestic stock and farmland were found but nested in some portions of the sanctuary very closed to wire snares (Figure 25). More illegal paths, traps (wire snares) and farmland were recorded on the Alumfa and Ayi sections of the Sanctuary indicating the human pressure especially hunting from those two communities. Most of the new wire snares recorded were closer to the illegal paths in the sanctuary.

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