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## FREQUENCY OF OCCURRENCE OF GORILLA (*Gorilla gorilla diehli*) IN THE OKWANGWO DIVISION OF CROSS RIVER NATIONAL PARK

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### ABSTRACT

A thorough understanding of gorilla distribution within its habitat is required for efforts geared towards its conservation for little is known about its distribution and abundance with previous reports suggesting that their numbers were higher in the past. Frequency of occurrence of cross river gorilla in okwangwo division of the cross river national park (CRNP), were investigated to determine the frequency of occurrence of cross river gorilla in group (direct and indirect observation/sighting) and determine their frequency based on area of sighting. Eight (8) transects were randomly selected and set in the following locations within the park; anape / gorilla rock axis, air craft axis, belegete I (oshinepa) axis, boggo axis, Ernest cave axis, okwa axis, belegete II axis and Pea tree axis. Already existing transects were randomly selected from the transects laid across the okwangwo division of the park. Transects at the starting point were more than 200m apart from each other, in ensuring that gorillas will not be counted upon sighting more than once during the frequency of occurrence. Direct sighting (physical and counting of individuals per group) of the gorillas and indirect sightings (activities such as calls – vocalization, droppings – fresh, recent/old, fur, nest sites – fresh, recent/old, footprints, trail/tracks) were means of observing the frequency of occurrence of the gorillas during the study. Transects count was done two times in a day; the observation lasted for eighty days. The data collected during the study were subjected to descriptive statistics. The cross river gorillas were sighted in group ranging from six (6) to sixteen (16) in numbers. Majority (21.7%) of the cross river gorilla presence was indirectly observed through their foot print. The result also showed that the cross river gorillas are found in all the sites /axis where the transects were set. In the long run, the habitat of the cross river gorilla will be of great ecotourism potential and ecological importance if the few remaining gorillas in the area are properly protected.

**Keywords:** Gorilla, nest, frequency, population, occurrence, national park

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### Introduction

Gorillas are the largest extant members of the primate order. Grubb *et al.* (2003) highlighted that they are divided into two species *Gorilla gorilla* and *Gorilla beringei* and four

subspecies *Gorilla gorilla gorilla* (the western lowland gorilla), *Gorilla gorilla diehli* (the cross river gorilla), *Gorilla beringei graueri* (the eastern lowland) and *Gorilla beringei beringei* (the mountain gorilla). The frequency of occurrence of the Cross River Gorilla in



their habitats has been of major concern to conservationists as a result of decline in their population as a result of loss and modification of forest habitats resulting from factors like intense logging, shifting cultivation, bush burning, over harvesting of fuel wood for commercial and household use, creation of grazing land and clearance for plantation farming (Chander *et al.*, 2009). Dunn *et al.* (2014) reported that surveys in recent years have shown that the gorillas occupy significantly larger areas of habitat than had been assumed, but data from a number of sites, particularly in lowland areas, remain limited. One vital need to better understand the gorillas in their immediate habitat is to observe them in their core habitat areas with regular research presence at the gorilla sites which would also contribute to their protection. This will ensure that the current status of the cross river gorilla population in cross river national park is understood. Onojeghuo *et al.* (2015) submitted that having a good understanding of wildlife species distribution would greatly assist wildlife conservation and management of endangered species such as the cross river gorillas which are critical to conservation management and planning. Flourishing primates' population serves as a good indicator of the general health of a rainforest ecosystem (Mcfarland, 1999, Oates 2001 and Edet *et al.*, 2005).

The Cross river gorilla; one of the great ape taxa inhabits the forests of the southern Nigeria-Cameroon border and is critically endangered as categorized on the IUCN Red List and is the most threatened taxon of ape in Africa (IUCN, 2005; Oates *et al.*, 2008; Walsh *et al.*, 2008; De Vere *et al.*, 2010; Nkemnyi *et al.*, 2011; Bergl *et al.*, 2012). Its population stands at an estimated number of <300 individuals (Oates *et al.*, 2007; Sunderland-Groves *et al.*, 2009; Nicholas *et al.*, 2010;

Etiendem, 2013b). The survival of the Cross river gorilla will therefore be dependent on knowledge of its population status through frequent monitoring of their occurrence in their habitats. While recent research has offered a number of insights into the biology of the Cross River gorilla (Bergl and Vigilant 2007; Bergl *et al.*, 2012; Etiendem *et al.*, 2013a; Imong *et al.*, 2014; Sawyer 2012), several questions critical to their effective conservation remain unanswered, including a precise estimate of the gorillas' current population size (Dunn *et al.*, 2014). Without this knowledge it is impossible to effectively assess subpopulation viability, prioritize interventions or measure success of conservation activities over time.

## Materials and Method

### Study Area

Cross River National Park (CRNP) is one of 25 UN biodiversity hotspots of the world (Sotolu *et al.*, 2017). The Okwangwo division of CRNP is the largest and most important site for cross river gorilla (*G. g. diehli*) in Nigeria established in 1991. CRNP lies within longitudes 5° 05' – 6° 29' N and latitudes 8° 15' – 9° 30' E occupying a total land area of about 4000 km<sup>2</sup>. Managed by the Nigerian national park service, the okwangwo division is one of two widely-separated divisions of the national park (the other being the Oban division to the south), although gorillas are only found in the okwangwo division. Okwangwo was created by amalgamating three former forest reserves and covers an area of 640 km<sup>2</sup>. Elevation ranges from 150m in river valleys in the south to around 1,700m on the edge of the obudu plateau in the north. Within the park, there is a rare continuum, ranging from lowland to sub montane and montane forest. Gorillas are known from two areas of okwangwo: the former boshi



extension forest reserve (established in 1958 to protect gorillas) that occupies ridges and valleys extending northwest from the obudu plateau and the okwa hills in the central region of okwangwo, immediately west of Cameroons takamanda national park (Dunn *et al.*, 2014).

### Method of Data Collection

A total of eight (8) transects were randomly selected across the okwangwo range (division of the park) where data were collected through direct and indirect sightings. The direct sightings involved the physical sighting of the cross river gorilla and counting of individuals per group while the indirect sighting included the activities carried out by

the gorillas found only in this section of the park. The indices used in the indirect data collection included activities such as calls (vocalization), droppings (fresh, recent/old), fur, nest sites (fresh, recent/old), footprints, trail/ tracks. Distinction was made between adult males, adult females and the young ones through their body features and physical sightings. The following were the sites where the transects were set; anape / gorilla rock axis, air craft axis , Belegete I (oshinepa) axis, boggo axis, Enest cave axis, okwa axis,, belegete II axis and pea tree axis of the park. The population monitoring took a total of eighty days for data collection.

### Results and Discussion

**Table 1: Frequency of Occurrence of Cross River Gorilla in Group through Direct sightings**

Number of Gorilla Sighted	Frequency	%	Mean of Group
Sighted in a group of six (6)	1	7.1	7
Sighted in a group of seven (7)	2	14.3	
Sighted in a group of eight (8)	2	14.3	
Sighted in a group of nine (9)	2	14.3	
Sighted in a group of ten (10)	1	7.1	
Sighted in a group of thirteen (13)	2	14.3	
Sighted in a group of fourteen (14)	2	14.3	
Sighted in a group of fifteen (15)	1	7.1	
Sighted in a group of sixteen (16)	1	7.1	
<b>TOTAL = 98</b>	<b>14</b>	<b>100</b>	

Table 1 show the result of the frequency of occurrence of the cross river gorilla during the study. The cross river gorillas were sighted in group ranging from six (6) to sixteen (16) in

numbers. The highest number of the gorillas sighted in any group during the study was sixteen (16) which was observed once during the study. This finding is similar to that of



Head *et al.* (2011) whose count in his study in the Mawambi Hills indicated the sighting of sixteen (16) gorillas. The result also shows that the least number of cross river gorilla sighted in any of the group during the study was six (6) which was sighted once all through the study. Occurrences in number in

groups sighted ranges from six (6) to sixteen (16). The cross river gorillas were observed through direct sighting. This finding showed reduction in the number reported by Oates *et al.* (2007) that in the last two decades fewer than 300 cross river gorilla may remain, spread across an area of about 12, 000Km.

**Table 2: Frequency of Occurrence of Cross River Gorilla through indirect sighting**

Indices	Frequency	%
Call/vocalization	18	19.5
Dropping	8	8.7
Feeding signs	19	20.6
Foot print	20	21.7
Duns	6	6.5
Trail	6	6.5
Nest sites (one on the ground, seven up)	2	2.2
Nest sites (one on the ground nine up)	1	1.1
Nest sites (one on the ground, ten up)	2	2.2
Nest sites (one on the ground fifteen up)	1	1.1
Nest sites (two on the ground and eight up)	2	2.2
7 nest sites	1	1.1
10 nest sites	1	1.1
11 nest sites	2	2.2
12 nest sites	1	1.1
13 nest sites	1	1.1
14 nest sites	1	1.1
<b>Total</b>	<b>92</b>	<b>100</b>

Table 2 shows the result of the frequency of occurrence of cross river gorilla through indirect sighting from the study. Indirect sighting was through the following: call / vocalization, droppings, feeding signs, foot print, duns, trail, nest sites and many more. Majority (21.7%) of the cross river gorillas presence was observed through their foot print while sightings through the observation of feeding signs from areas where the gorillas fed from and that through call/ vocalization accounted for 20.6% and 19.5%, respectively.

One major means of sighting the cross river gorilla was the observation of the nest sites constructed by the gorillas either on the ground or tree whereas in some cases it was both on the ground and tree. The gorilla nest sites were defined as an assemblage of freshly constructed nests at one site and can be clearly recognized as a sleeping site due to presence of fresh dung (Head *et al.*, 2011). Findings from the study reveal that nest constructed by the cross river gorilla ranges from 1-14 nests from the sites observed



within the transects set. This finding is close to that reported by Nicholas *et al.*(2010) with 1-18 nests in his study of the cross river gorilla between sites in the cross river national park and also agrees vividly with the

findings that group size in cross river gorillas varies widely between sites, with groups of 1-18 nests reported (Ekinde and Warren 2007; Nicholas *et al* 2010).

**Table 3: Frequency of Occurrence of Cross River Gorilla Based on Area of Sighting**

Area of Sighting	Frequency	%
Air craft axis of the park	10	12.5
Anape/gorilla rock axis of the park	10	12.5
Belegete I (oshinepa) and II axis of the park	20	25.0
Bogga axis of the park	10	12.5
Ernest cave axis of the park, Anape	10	12.5
Okwa axis of the park	10	12.5
Pea tree axis of the park Busi extension	10	12.5
<b>Total</b>	<b>80</b>	<b>100</b>

Table 3 shows the areas within the Okwangwo division of the cross river national park where cross river gorillas were sighted. Majority (25.0%) of the cross river gorillas utilize the Belegete I (oshinepa) and II axis of the park while other areas in the park were utilized likewise accordingly. Findings from the study reveal that the anape/gorilla axis which have not been frequented by the gorillas for over a long period as a result of deforestation (Head *et al.*, 2011) now witness the presence the cross river gorilla which once inhabited the area.

### Conclusion

From the study, it was observed that frequency of occurrence in group through direct sightings shows that the gorillas occur in the park with close to sixteen (16)

individuals sighted at a time in group living. Findings from the study showed that belegete I (oshinepa) and belegete II areas of the park were the most preferred habitat for the cross river gorilla in the park. This show that despite the threats posed to the habitats of the gorillas at present time, it still prefer the habitat. The presence of nest both on ground and tree remains one key means of observing the frequency of occurrence of the cross river gorilla in the Okwangwo division of the park. In the long run, the habitat of the cross river gorilla will be of great ecotourism potential and ecological importance if the few remaining gorillas in the area are properly protected.

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