

# HOME RANGE OF KEYSTONE MAMMALS AND CONSERVATION STATUS OF THEIR ECOSYSTEM: AFI MOUNTAIN WILDLIFE SANCTUARY, BOKI, CROSS RIVER STATE, NIGERIA

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**ABSTRACT:** The line transect survey method was adopted to study the home range of mammals and conservation status of this ecosystem by following transect routes and trails of animals. The sampling technique adopted was stratified random sampling done by the survey of 30 transect routes in which accessibility was not made impossible by terrain. The total sample area was 6.2 km<sup>2</sup> (30 transects of 2000 m length x 100m width) which represented 6.2 % sampling intensity of the total forest area of about 100km<sup>2</sup>. This technique was adopted in order to cover the entire home range of the species. Ten surveys were carried out in all. Conservation status was carried out by patrolling and monitoring the frequency of sighting of illegal exploiters and discovery of indices such as carbide dumps, snares, traps, as well as bullet shells which are signs of illegal hunting. The home range of Chimpanzees, Pan troglodytes; Gorillas, Gorilla gorilla; and Drill monkey Mandrillus leucophaeus; based on the faecal droppings and food residues found were 60%, 66.7% and 70% respectively. The home range for Mona monkey, Cercopithecus mona; Putty nosed monkey, Cercopithecus nictitans; and Red eared monkey, Cercopithecus erythrotis; were 70%, 70% and 70% respectively. Senegal galago, Galago senegalensis; Blue duiker, Cephalophus monticola; Bay duiker, Cephalophus dorsalis and Yellow backed duiker, Cephalophus silvicultor, were 73.3%, 66.7%, 66.7% and 63.3% respectively. Red river hog, Potamochoerus porcus; Buffalo, Syncerus caffer; Rock hyrax, Procavia capensis, exploited a home range of 63.3%, 56.7% and 80% respectively. The indices of conservation status of this ecosystem indicated that the number of guns confiscated, bullet shells found and carbide dumps seen were 5, 19, and 17, respectively. The number of traps and snares found were 14 and 32 respectively. The number of poachers and illegal loggers seen were 8 and 15 respectively.

**Keywords:** Assessment, Home range, Keystone mammals, Conservation status, Afi Mountain, Wildlife sanctuary

## 1. INTRODUCTION

Mona monkeys has a dark brown back, cream white underside, extending to their inner limbs and a long tail. Nature endowed this animal with this colouration to blend with the environment (Kingdon, 1997)[1]. The light under part colouring makes the animal to blend with the sky when foraging in the trees when looked at from the ground or under, while the dark back makes the animal to blend with the ground surface or forest floor when viewed from top. Oates and Butynski (2008) [2]reported that mona monkey has brown agouti fur with a white rump, while tail and legs are black and the face is blue-grey with a dark stripe across the face. The Putty-nosed monkey has dark brown colouration with a conspicuous white nose and a long tail. Eckardt and Zuberbühler (2004)[3]

pointed out that the white nose is the reason for its name. It is primarily arboreal and often associates with monkeys of other species .

The Red eared monkey has a deep brown back, white underside, red nose, red long tail and a unique red ear (Kingdon, 1997)[1]. The colouration makes the animal to blend with the sky when viewed from under and blend with the ground when viewed from a higher elevation. Oates and Butynski (2008)[2] reported that it is a small monkey found in Cameroon, Equatorial Guinea, and Nigeria in subtropical or tropical moist lowland forests, which serve as its natural habitat, although threatened by habitat loss.. Groves (2005)[4] stated that this guenon lives in groups of up to 35 in arboreal regions and mainly feeds on fruits but sometimes eats insects and leaves. The forest buffalo had a

reddish pelage on its body, darker neck and head fur, short legs, large head and a backward bent or curved horns. Senegal galago is a small mammal with gray back, yellow and white underside, hairy tail and shiny brown eyes, long limbs, and a long hairy tail; a brown grey back and a yellowish under parts and a body weight of 112-300g with the gestation period of about 4 months (Kingdon, 1997)[1].

Buffalos are not very tall standing 130-150cm with a massive body weighing 425-870kg with relatively short legs (Encyclopaedia Britannica (2010)[5]. Bulls are about 100 kg (220 pounds) heavier than cows, and their horns are thicker and usually wider, up to 100 cm across, with a broad shield (only fully developed at seven years) covering the forehead; The coat of savannah buffalo is thin and black, except in young calves, whose coats may be either black or brown. It is one of the most successful wild ruminants resistant to nagana disease caused by tse-tse fly and rinderpest (Kingdon, 1997)[1].

Blue duikers had a bluish gray body colour with light red flanks and small legs. Bay duiker had a reddish body and black ruff running along the top of the back from the neck to the buttocks. Yellow backed duiker had a dark body with a yellow rump. Red river hog is a forest pig found on the Afi Mountain Sanctuary as reported by Kingdon (1997)[1] that it lives in rainforests and wet dense savannas, in forested valleys, and near rivers, lakes and marshes. Species distribution ranges from the Congo area and Gambia to the Eastern Congo, southwards to the Congo River and to the Kasai. The animal was observed to have a reddish body colouration with long ears and snout as Kingdom (1997)[1] noted that the Red river hog has striking red fur, with black legs and a tufted white stripe along the spine; they have white face markings around the eyes and on the cheeks and jaws; the rest of the muzzle and face are black with adults weighing 45 to 115 kilograms. Rock hyrax was observed to have a blunt face, dark brown colouration, the body is heavily built with short stocky limbs. Their fur is thick and grey-brown in colour, although this varies strongly between different environments; from dark brown in wetter habitats, to light gray in desert living individuals, its

reaches a length of 50 cm and weigh about 4 kg, with a slight sexual dimorphism; males are approximately 10% heavier than females. Kingdon (1997)[1] reported that forest buffaloes lives in small groups of 1 to 12 animals with related females and their offspring as the core and 1 or 2 attendant males and has a gestation period of 11 months. The objectives of this study included determination of the population size as well as the home range of these species due to their endangered status within their range.

## 2. SURVEY AND SAMPLING TECHNIQUES

The line transect survey method was adopted for this study considering the nature of mammalian species and rugged topographic terrain of the study area. This was done by following transect routes which were equally trails of animals which had already been created by both animals and humans activities with distances labeled with flagging by the protection staff with reference to cardinal points. This method was adopted by Dandelot, (1974)[6]; Burnham, (1980)[7]; Seber, (1982)[8]; Oates, (1985)[9]; Davies (1987)[10]; Dunn, (1992)[11]; Fox, (2007)[12]; Mercader *et al.*, (2007)[13]; Oates, and Butynski, (2008)[2] in their survey of primates and other mammals in Africa. The sampling technique adopted was stratified random sampling done by the survey of transect routes in which accessibility was not made impossible by terrain. This technique was adopted in order to cover the entire home range of the species to make discovery of animals or their nests sites where possible, or hearing vocalizations and even direct observation of the animals foraging, where possible. The total sample area was 6.2 km<sup>2</sup> (30 transects of 2000m length x 100m width) which represented 6.2 % sampling intensity of the total forest area of about 100km<sup>2</sup>. Ten surveys were carried out in all. Home range was determined by dividing species presence (x) by total 30 transects x 100%. Conservation status was assessed by evaluating the level of achievement and implementation of objectives of establishment or management of the park such as preservation of species and ecosystem, tourism and recreation, education and research, stabilization of hydrological system, preservation of cultural heritage, among others. Patrolling and monitoring

effectiveness were assessed through the frequency of sighting of illegal exploiters and discovery of indices such as carbide dumps, snares, traps, as well as bullets shells which are signs of illegal hunting.

### 3. RESULTS

#### 3.1 HOME RANGE OF MAMMALS

The home range of Chimpanzees, *Pan troglodytes* ; Gorillas, *Gorilla gorilla*; and Drill monkey *Mandrillus leucophaeus*; based on the faecal droppings and food residues found were 60%, 66.7% and 70% respectively. The home range for Mona monkey, *Cercopithecus mona*; Putty nosed monkey, *Cercopithecus nictitans*; and Red eared monkey, *Cercopithecus erythrotis*; were 70%, 70% and 70% respectively. Senegal galago, *Galago senegalensis*; Blue duiker, *Cephalophus monticola* ; Bay duiker, *Cephalophus dorsalis* and Yellow backed duiker, *Cephalophus silvicultor*, were 73.3%, 66.7%, 66.7% and 63.3% respectively . Red river hog, *Potamochoerus porcus*; Buffalo, *Syncerus caffer*; Rock hyrax, *Procavia capensis*, exploited a home range of 63.3%, 56.7% and 80% respectively, as shown in table 1 below.

**Table 1: Home Range of Mammals in the Sanctuary**

S/N	Name of Species	Common Name	Home Range (%)
1	Chimpanzees	<i>Pan troglodytes</i>	60 (18/30)
2	Gorillas	<i>Gorilla gorilla</i>	66.7(20/30)
3	Drill monkey	<i>Mandrillus leucophaeus</i>	70 (21/30)
4	Mona monkey	<i>Cercopithecus mona</i>	70 (21/30)
5	Putty nosed monkey	<i>Cercopithecus nictitans</i>	70 (21/30)
6	Red eared monkey	<i>Cercopithecus erythrotis</i>	70 (21/30)
7	Senegal galago	<i>Galago senegalensis</i>	73.3 (21/30)
8	Blue duiker	<i>Cephalophus monticola</i>	66.7 (20/30)
9	Bay duiker	<i>Cephalophus dorsalis</i>	63.3 (19/30)
10	Yellow backed duiker	<i>Cephalophus silvicultor</i>	63.3 (19/30)
11	Red river hog	<i>Potamochoerus porcus</i>	56.7 (17/30)
12	Buffalo	<i>Syncerus caffer</i>	80 (24/30)
13	Rock hyrax	<i>Procavia capensis</i>	

#### 3.2 CONSERVATION STATUS OF THE SANCTUARY

The indices of conservation status of this ecosystem indicated that the number of guns confiscated, bullet shells found and carbide dumps seen were 5, 19, and 17 respectively. The number of traps and snares found were 14 and 32 respectively, as shown in table 2 below. The number of poachers and illegal loggers encountered were 8 and 15 respectively.

**Table 2: Indices of Conservation Status of the Sanctuary**

S/N	Items	Frequency
1	Guns confiscated	5
2	Bullet shells	19
3	Carbide dumps	17
4	Traps	14
5	Snares	32
6	Poachers	8
7	Illegal loggers	15

#### 4. DISCUSSION

Gorillas ranged widely in this habitat covering most areas and more thorough in foraging compared to chimpanzees probably due to their larger sizes implying higher consumption capacity. But Fox, (2007)[12]; Mercader, (2007)[13]; Pruetz and Bertolani, (2007)[14]; Fischer *et al*, (2004)[15] and Won and Hey, (2005)[16] observed that the chimpanzees were more agile in movement and the use of tools. As a keystone species on which other species as well as most natural processes depend on to effectively carry out their roles in the natural ecosystem, nature provided that gorillas range over two thirds of the entire ecosystem in order to perform the natural cardinal linking role as they interact with other species so as to contribute to maintenance of equilibrium in the natural ecosystem. Gorillas were actually one of the giants of the Afi Mountain jungle. The drills lived and moved in groups carrying out all their activities together. Groves (2005)[4] and Oates and Butynski, (2008)[2] reported that a single male leads a group of around 20 females and is father to all the young. This group of 20 may join others forming super groups of over 200 individuals. They often rub their chests onto trees to mark their territory. Drills utilized tree tops as well as the forest floor for foraging, resting and sleeping unlike the heavier

gorillas. They foraged widely during the day and slept at nights. They were fond of making calls as they foraged probably showing appreciation to nature and communicating with group members.

There were three species of guenon found in the sanctuary, namely: Mona monkey, *Cercopithecus mona*; Putty nosed monkey, *Cercopithecus nictitans* and red eared monkey, *Cercopithecus erythrotis*. These are small cheek pouched monkeys. These monkeys made several types of sounds or calls. Arnold and Zuberbuhler (2006)[17] pointed out that the acoustical structure of these monkeys alarm calls vary according to the kind of predator that has been spotted. They also suggested that the monkey combines different sounds into a sequence, which has an entirely different meaning from the sounds when they were made separately. These three species were similar in foraging behaviour. They are arboreal in nature and were found utilizing the top crown of trees for food, resting and sleeping, and sometimes come down to the forest floor to complete their activities. These species did not build and sleep in nests as chimpanzees and gorillas. They are gifted naturally to sleep in the trees crowns without falling. Senegal galagoes foraged in trees for fruits and seeds at night since they are nocturnal while they slept and rested during day hours. They were relatively abundant in the area compared with the monkeys and apes. The signs of African buffalo were found more frequently towards the lowland areas of the sanctuary where the vegetation was partially disturbed leaving some grasses and herbaceous openings as well as low growing shrubs and trees which serve for food for the animals. This was an indication that this species is not endangered in this forest. They grazed on the grasses and browsed on the lower leaves of shrubs and trees as well. They were found at ranges close to streams courses which they drink or wallow to cool down their body temperatures. Encyclopaedia Britannica (2010)[5] reported that they are normally found within 20km from water course; Three species of duikers were seen in the area, namely: Blue duiker, *Cephalophus monticola*; Bay duiker, *Cephalophus dorsalis*; and Yellow backed duiker, *Cephalophus silvicultor*. These antelopes were abundant in the area as indicated by abundance of their faeces. The abundance of this animal species

in this forest was attributable to the rugged terrain which hampers poaching; abundance of food resources particularly fruits from trees made available by the activities of monkeys and birds as well as low population of predators. They utilized variety of fruits and leaves available in the forest. They browsed on leaves of low growing trees, shrubs and herbs as well as fallen fruits and seeds. They rested under covers provided by tree trunks, buttresses, large rocks and thickets especially in the night indicated by abundance of their faeces in such areas. They were seen close to water courses which they drink after foraging. Their faeces were severally found under covers of rock boulders and outcrops as well as caves indicating that they sleep there in the night and equally rest for hours during day time. Their faeces were black and tiny resembling the seed of pawpaw fruits. Kingdon (1997)[1] reported that this species is well distributed in the forest region between River Niger and East Africa; in lowland and montane forests, riverine and littoral forests as well as moist thicket having preference for fruits and seeds for food where available compared to foliage.

Their activities were mostly observed in wet areas close to water bodies. They carried out a great deal of soil digging in search of root tubers and invertebrate organisms particularly worms and insects. They also consumed fruits and seeds as was noted by Kingdon (1997)[1] that the Red river hog is omnivorous, eating mainly roots and turnips and supplements its diet with fruit, grasses, herbs, eggs, dead animal and plant remains, insects, and lizards. It uses its large muzzle to root about in the soil in search of food. In this way Red River Hogs can cause much damage to agricultural plants. They made use of forest cover, rocks and tree trunks for resting and sleeping. Kingdon (1997)[1] observed that the red river hog is mostly nocturnal; they hide in dense bush by day but after sunset roam in troops searching for food. Querouil and Leus (2008)[20] reported that the Red river hog live in small troops of four up to twenty animals, occasionally forming groups of up to sixty animals: comprising a male (boar), some adult sows and their piglets.

Rock hyrax were very abundant as indicated by their grazing signs on the grasses and herbs, and were most active in the morning and evening. Margolis (2008)[21] pointed out that hyraxes feed on a wide variety of plants, including both grasses and broad leaved plants, insects and grubs, and that they forage for food up to about 50 m from their refuge, usually feeding as a group with one or more animals acting as sentries to give an alarm call from a prominent lookout position on the approach of danger for the animals to quickly retreat to their refuge. They had certain spots where they defecated and urinated daily for weeks or even months. Rock hyraxes were found to be very noisy and sociable as observed by Olsen, (2008)[18]. The most familiar signal is a high trill given in response to perceived danger. The rock hyrax spent most of its afternoon time resting and basking in the sun to warm themselves.

The control of illegal exploitation such as poaching, illegal logging and farming in the park was given the priority it deserves as recommended by Ukpog, (2008)[19]. Routine anti poaching patrols of the park was carried out by the rangers. Patrols were done mostly on foot through trails in the park. Vehicular patrols were not possible because the terrain does not permit such operations. Rangers were equally stationed in each of the villages surrounding the park to aid easy detection of poachers. Patrols had facilitated confiscation of thousands of snares, traps, firearms and ammunitions from poachers in the sanctuary in the past few years. Patrolling is one of the basic and most important functions of the guard force of protected areas. The management authority should employ adequate guard force for improved monitoring to ensure that reserve regulations are kept.

## CONCLUSION AND RECOMMENDATION

Many valuable mammal species were actually present in this sanctuary which ranged widely in this unique ecosystem. Some were threatened while some endangered within this ecosystem. The conservation of this sanctuary was a rational action



by the Cross River State Government in compliance with global conservation strategy. The

need to improve on the conservation effort of this ecosystem cannot be overemphasized.

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