CHECK LIST AND POPULATION DENSITIES OF MAMMALS IN THE UNIVERSITY OF AGRICULTURE MAKURDI WILDLIFE PARK, BENUE STATE, NIGERIA

ABSTRACT

Appraisal of fauna species which form an integral part of ecology, in protected based areas is necessary before any meaningful conservation work can commence.This study was undertaken in the wildlife park of the University of Agriculture, Makurdi, to produce the species list and determine the population density of mammals in the park. Species list was obtained using both direct and indirect methods while density of mammals were determined using the kings census method. The park was stratified into two vegetations types, the riparian and woody vegetations. Result obtained showed that 19 species of mammals were identified while the density of some of them ranged from 1.0/km^2 to 10.0/km^2 in both the riparian and woody vegetations in the park.

Keywords: Check list; mammals; population density; wildlife park.

1. INTRODUCTION

Large mammals are big animals that can produce milk to feed their young ones, which include Elephant (*Loxodonta african)*, Lion (*Pathera leo)*, Buffalo (*Syncerus caffer)*, *Chimpanzee (Pan troglodytes*), Giraffe (*Giraffa camelopadalis)*, Leopard (*Panthera perlus*, Bush Buck (*Tragelaphus scriptus)*, Warthog (*Phacocoerus aethiopicus)*, and Gorilla (*Gorilla gorilla).* [1].

The establishment of many National Parks, Game Reserves, Zoological gardens, Wildlife Sanctuaries and Natural history museums backed up by promulgation of wildlife laws, decrees and edicts are clear indication to conserve and manage wildlife resources [2]. Following the drafting of the Organization of African Unity Convention on Wildlife Conservation in 1979, known as "International Treaty Year" Nigeria become a member signatory to the Treaty. The immediate result was the setting up of the Nigerian National Wildlife Development Committee (NNWDC) charged with the responsibility of providing

policy for implementation of the agreement of the Organization of African Unity (O.A.U) convention NARESCON, [3]. The action recommendations of the committee were: The effective protection of rare and endangered species of wild animals, effective hunting control to make it productive rather than destructive, the setting aside of reserve areas for preservation of natural ecosystems (vegetation, soil and wild animals) characteristics of each area on a cultural and economic bases for reservation, tourism, and meat production and the setting aside of unique natural features as national monuments and parks.

Sequel to NNWDC recommendations, the University of Agriculture Makurdi, in 1998 established a wildlife park. The establishment and development of wildlife programmes such as National parks and game reserve has brought about a new form of recreation for the people, National parks and game reserves have tremendous value of attracting both local and international tourist for the purpose of recreation and have been accepted as places of entertainment and mental relaxation. National Parks make a substantial contribution to rural development by enhancing the esthetic and recreational values of natural resources [4]. Wild animals especially large mammals add to the natural beauty of the forest and grasslands in which they are found. They feature in many of our folktales, customs and traditions [5]. People go to national park to watch or photograph animals in the wild for their sheer beauty and appeal to the human being.

Wild animals have great educational and aesthetic value, many biology, zoology, and ecology and evolution classes from primary schools to Universities use animals as example to illustrate biological principles and theories. According to Alo *et al* [6], wildlife and natural institutions are materials for education and scientific studies. The wildlife biologist does not lack interest in individual animals, for this form the basis for understanding the larger group. However the conservation, destruction or management of wildlife demands that we be interested in wildlife population and the ways in which these respond to changes in the environment.

The population is the basic unit of management, from it we take a harvest and by its response we judge our management effort [7]. However, many of the researches done in the UAM Park were on the ecological health of the park habitat. No work has been done in relation to the animal resources of the park. There is therefore dearth of information on large mammal

population density and in general wildlife resources have remained a major setback to the study area.

2. MATERIALS AND METHODS

2.1 T study Area

The research was carried out at the Wildlife Park of the University of Agriculture Makurdi, located in Makurdi. It lies within the Southern Guinea Savannah Zone between latitude 07^0 49' N and 07^0 52' N and longitude 08^0 40' E and 08^0 38' E [8]. The study area is located at the North Eastern part of the University. It is about 1.5km on the way to Gbajimba Local Government and shares a common boundary with five villages namely: Tse Dei, Anyam, Vambe, Tse Yauu and Tyodugh. The park covers an area of about $24.2km^2$ [8]. The terrain of the area is basically an undulating plain. Its relief ranges from 83m to 167m above mean sea level. The drainage system in the park comprises of several streams having water only during raining seasons. These major streams, which are tributaries of River Benue, include Baa and Najime streams. The climate of the study area is tropical climate with a clear distinct dry and wet season. Rainfall in the wet season (April to October) is about 1.240mm – 1.440mm. The monthly temperature is about (28.5^oC – 36^oC) and may rise to 38^oC in March to April. Three types of soils are found in the study area namely; alluvial, clay, loam, and sandy soil. The vegetation has been described as open woodland with trees having broad leaves. The riparian vegetation occurs in areas that are frequently flooded during rains. Areas previously cultivated referred to as grassland vegetation have the emergent of trees. The wildlife park contains most of the animals' species of typical western Guinea Savannah Zone. The area has subjected to intense hunting pressure for a long time and animals are less frequently seen during the day time, but their foot prints and droppings can be seen. Some of the animals and avifauna that roamed the study area and to some extent be seen include; Grimm's duiker *Sylvicapra grimma* Red-flanked duiker *Cephalophus patas* Warthog *Phaccorus aethipicus* Grass cuter *Thryonomys swinderianus* Giant ponchal rat *Cricetonuys gambionus* Monitor lizard *Varanus nitolticus* Guinea fowl *Numida meleagris* Bush fowl *Francolinus albogulanis* [9].

2.2 Data Collection

The line transect method as outlined by Sutherland [10], was used for the census of Large mammals. Four transects were laid according to the vegetation types in the park which comprises of Riparian and woodland vegetations.

Two transects of 1km in length and 3 meters in width were laid in each vegetation type. Each of the transects was walked twice a day for 15 days within an interval of 30 days. The census took place in the morning from 6.00am to 9.00am and in the evening between 3.00p.m and 6.00a.m. The census commenced at the same time each day. The surveys took place for 180 times within the period of six months. In each case, four observers (the researcher and 3 game guard) were involved in the census.

The census took place in the dry season from 1st February to 30th, April 2015, and during the raining season, the census was conducted from 1st July to 30th September 2015. Observers moved at the rate of 500m/h, stopping occasionally to observe for animals (direct observation). When an animal or group was sighted the sighting distance from the observed was noted. Other information obtained include the name of the animal species, number sighted, group spread, activity when sighted, habitat type and weather condition.

The researchers through interviews were also able to obtain information from Hunters (IFH), local people (IFLP), bush meat processing and selling centre (IFBPSC) and from Literature (IFL), on the presence and abundance of mammals in the study area.

2.3 Data Analysis

(i) The species list of the mammals was analyzed using descriptive statistics.

(ii) The absolute densities of the mammals was determined using the model outlined by Caughley (1997) as stated below;

$$D = \frac{n}{2L\hat{w}}$$

Where;

D = Absolute density of the population species.

n = Total number sighted

L = Total length of transect walked

$\hat{W}$ = Average sighting distance

The statistical test of significance between the absolute densities of mammals in the two vegetation type of the wildlife park was tested using the student's test.

3. RESULTS

A total of nineteen mammalian species were identified, and majority was through information from the local people and about 11 out of the number were through direct observation (Table 1**).** The result of population densities of mammals in Park are presented in Tables 2 and 3 revealed that, six species with 17 observations were made at riparian part of the park and

Cephalophus rufilatus had the highest density estimate of 600/Km^2 *Crocuta crocuta* and *Thryonomys swinderianus* at 100/Km^2. At the woodland part, five species were encountered with 12 observations; however, *Erythrocebus patas* had the highest density estimate of 500/Km^2 *Hystrix africanus* and *Genetta poensis* had the least at 100/Km^2.

Table 1. Species list of mammals in wildlife park University of Agriculture Makurdi.

	Common Name	**Scientific Name**	**Methods of Identification**				
			DO	**IFH**	**IFLP**	**IFBPSC**	**IFL**
1	Bush buck	*Trageluphus scriptus*	X	-	X	X	X
2	Grimm's duiker	*Sylvicopra grimmin*	X	-	-	-	-
3	Red flanked duiker	*Cephalophus refilatus*	X	-	X	-	-
4	Spotted hyena	*Crocuta crocuta*	X	-	-	-	-
5	Grass cutter	*Thryienomys swimderianus*	X	X	X	X	-
6	Fox	*Vulpes spp*	X	-	-	X	-
7	Hare	*Lepus corpensis*	-	X	X	-	-
8	Red patas monkey	*Erythrocebus patas*	X	X	X	-	-
9	Tantalus monkey	*Cercopithecus aethiops*	X	X	X	X	-
10	Bush baby	*Galango spp*	-	-	-	-	X
11	Crested porcupine	*Hyshiy spp*	X	X	X	X	X
12	Bush pig	*Phacocoems aethiopicus*	X	X	X	X	X
13	African civet cat	*Vivera civetta*	-	X	X	-	-
14	Hunting dog	*Lycaon pictus*	-	X	X	-	-
15	Lion	*Panthera leo*	-	-	X	-	-
16	Maxwell duiker	*Cephalophus maxwelli*	-	X	X	-	X
17	Ground squirrel	*Xyrus retilus*	-	X	X	-	-
18	Forest Genat	*Genetta poensis*	X	-	X	-	-
19	African hedgehog	*Atelerix. algirus*	-	X	X	-	-

LEGEND

X Applicable
- - Not Applicable
DO - Direct Observation
IFH - Information from hunters
IFLP - Information from Local People
IFBPSC - Information from Bush meat Processing and selling centers
IFL - Information from literature

Table 2. Population densities of mammals in riparian vegetation of the wildlife park.

S/N	**Common Name**	**Scientific Name**	**Frequency of observations**	**Estimated mean density per km^2**
1	Red flanked duiker	*Cephalophus rufilatus*	6	600
2	Grimm's duiker	*Sylvicapra grimminii*	3	300
3	Bush Buck	*Tragelaphus scriptus*	2	200

4	Spotted Hyena	*Crocuta crocuta*	1	100
5	Fox	*Vulpes spp.*	4	400
6	Grass cutter	*Thryonomys swinderianus*	1	100
	Total		17	1700

Table 3. Population densities of mammals in woodland vegetation of the wildlife park.

S/N	Common Name	Scientific Name	Frequency of observations	Estimated mean density per km^2
1	Tantalus monkey	*Cercopithecus aethiops*	3	300
2	Red patas monkey	*Erythrocebus patas*	5	500
3	Bush pig	*Phacocaerus aethiopicus*	2	200
4	Crested Porcupine	*Hystrix africanus*	1	100
5	Forest Genet	*Genetta poensis*	1	100
	Total		12	1,200

4. DISCUSSION

Species List of mammals in UAM wildlife Park:

Nineteen (19) different species of mammals were documented ranging from the smallest, the African Hedgehog (*Atelerix. algirus*) and the biggest, the Lion (*Panthera leo*). The species reported in this study have been reported by several authors as savanna species [11, 12]. More so, the red flanked duikers (*Cephaluphus rufilatus*) had the highest frequency observation and the Grass cutter (*Thryonomys swinderianus*) had the least. The implication of this finding could be because the Grass cutters species are nocturnal in behaviors hence the sighting was accidental or opportunistic and the hyena too this could have accounted for the low frequency of sight of these two species. However, these populations' densities for all species are smaller than that observed by Tawo *et al* [13] in a fragmented forest in Cross River State. The woodland vegetation of the wildlife park recorded patas monkey (*Erythrocebus patas*) as the highest species encountered and the crested porcupine (*Hystrix africanus)* and the forest genet (*Genetta poensis*) the least. These densities though low, are however higher than those observed by Yager *et al* [14] in Pandam Wildlife park, a location in the same ecological region as the study site.

5. CONCLUSION

For long time survival of wildlife resources, it can only be achieved by adequately involving the residents of the neighboring communities in the management of park resources. This is true because they are the cardinal factors towards its success or failure. Result of the study has shown the presence of mammals in the park, although large mammals like elephant and lion, were not sighted directly in the park, however small and medium size mammals were found during the census and although even though their mean population densities were low, these were still higher than that of some protected areas in the same ecological region.

Recommendations

Based on the finding of this study the following recommendation are made

1. Efforts should be made by the park management to undertake a comprehensive survey of both diurnal and nocturnal mammals in the park.
2. Efforts should also be made by the park management to enforce the laws protecting the park from all kinds of anthropogenic activities to avoid loss of biodiversity in the park.

REFERENCES

1. **Gawaisa SG.** The status of large mammals and the impact of human activities on Gashaka Gumti National Park. Unpublished B. Tech Thesis. Federal University of Technology, Yola. 1997. Pp 1 – 62.
2. Kuuder CW, Bagson E, Aalangdong IO. Assessment of Visitor Satisfaction in Mole National Park, Ghana. *African Journal of Hospitality, Tourism and Leisure* 2013. 2. 3.
3. Natural Resources Conservation Council – NARESCON**.** Natural Resources Conservation Plan. Final report, 1992. 1:(1)- 14.
4. Akosim C. Evaluation of Biodiversity Conservation and Management in Pandam Wildlife Park Plateau State, Nigeria. A dissertation submitted for the PhD in Department of Wildlife and Fisheries, University of Ibadan, Ibadan.2000. 280Pp.
5. NEST, Resident altitudes towards conservation and black howler monkey in Belize: the community Baboon sanctuary. pp 341-350
6. Alo EB, Akosim C and Arifalo EI. An Appraisal of the Environmental and Socio-Economic value of ex-situ and in-situ wildlife conservation programme in Nigeria. In proceeding of Annual Conference of Forestry Association of Nigeria, 1996. Pp56.
7. Dasmann RF. Wildlife biology 1st edition. John Willy and sons. New York. 1964. 1 – 231.
8. Tyowua BT, Agbelusi EA, Dera BA. Evaluation of Vegetation Types and Utilization in Wildlife Park of the University of Agriculture Makurdi, Nigeria, *Research Article - (DOI: http://dx.doi.org/10.15580/GJAS.2013.1.110512225)*

9. Joel SM. An Assessment and Inventory of Avifauna Resources in the University of Agriculture Makurdi Wildlife Park. Unpublished B.Forestry Project Submitted to the Department of Forestry, Wildlife and Range Management, University of Agriculture, Makurdi. 2001.

10. Sutherland WJ. Ecological census Techniques. A handbook, Cambridge university press U.K 1999. pp 73-81

11. Bukie JO. Some Aspects of the Population Ecology of Guenons in Afi Mountain Wildlife Sanctuary (AMWS), Cross River State, Nigeria. Unpublished M.Sc thesis, Department of Forestry and Wildlife Resources Management, University of Calabar, Calabar.2015. 260Pp.

12. Tyowua BT, Yager GO, Samuel DE. Feeding Ecology of Primates in Southern Sector of Gashaka-Gumti National Park (Filinga Range),Taraba State, Nigeria *Asian Journal of Environment & Ecology2(3): 1-9, 2017; Article no.AJEE.32899.*

13. Tawo AN, Bukie JO, Ogogo AU, Bisong FE**.** Assessment of the population of Wild Ruminants in a Fragmented Forest Habitat: Case Study of Abayum Forest, Ikom Cross River State, Nigeria. *Journal of Agriculture and Ecology Research International 6(1): 1-7, 2016; Article no.JAERI.1451 ISSN: 2394-1073.*

14. Yager GO, Bukie JO, Kaa EA. Assessment of population density and structure of primates in pandam wildlife park, plateau state, Nigeria. *Sustainability, Agri, Food and Environmental Research,* (ISSN: 0719-3726) , 6(2), 2018: 18-35 http://dx.doi.org/10.7770/safer-V6N2-art1503