Evaluation of habitat values for conservation of Olive Baboon (*Papio anubis* f.) at Kopre Game Reserve, Hong, Adamawa State, Nigeria.

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ABSTRACT

The quality of habitat is important for the conservation of any given species. The idea of the relative wildlife value of a site is important for conservation strategies. This study was conducted to evaluate the habitat value of Kopre Game Reserve for the conservation of Olive baboon (*Papio anubis*). The method outlined by Bramble and Byrnes was adopted for the study. Seven (7) one-acre plots were established randomly within the home range of the baboons. Habitat needs viz; food, water and cover were evaluated in each plot. Food plant species were assessed in terms of abundance and diversity. The percentage ground cover were obtained and scored, while interspersions of cover type and succession stages were physically observed. The habitat quality was determined statistically, where mean of the seven (7) plots were obtained as the numerical habitat value. The results obtained indicated an overall numerical value of 5.17 which is interpreted as a medium value habitat with 6-7 habitat needs met. Generally, Kopre Game Reserve has high prospects for conservation of Olive baboons (*Papio anubis*) if human activities such as farming, livestock grazing, indiscriminate bush burning and hunting currently going on in the reserve are effectively checked.

KEYWORDS: Habitat, Value, Olive baboon, quality, assessment.

Introduction

Wild animals need food, water and cover to survive. Wild animals generally occupy areas that are rich in food sources, water and shelter (Decalesta and Stout, 1997). Habitats that provide these in abundance are good habitats that can support wildlife species (Anderson, 1999). Habitats that have high values need to be protected for the perpetuation of wildlife species (Simon, 2010). If a species is to persist, its members must find sufficient food to grow and to survive as adults and reproduce in sufficient numbers so as to conserve their genes. The environment within which they live must therefore contain a vast array of plants that differ in size, physical structure and chemical content. Survival and reproduction depends on the animal's ability to locate and harvest these foods in a combination that meet its nutritional needs (Richard, 1998). The driving force in the use of habitat by animals may be food availability and safety (Perry and Garland, 2002). Differences between habitats can modify overall population size (Morris, 1995).

Primates must acquire adequate nutrition under a suite of environmental and social constraints to reproduce successfully (Chapman *et al*., 2004; Felton *et al*., 2010). Knowledge of a species' or a population's specific nutritional goals can be important in the construction of informed conservation or restoration plans for endangered species (Felton *et al*., 2010). The idea of the relative wildlife value of a site is important for conservation strategies (Ratcliffe, 1996). The rapid growth of human populations has resulted in the loss and disturbance of wild primate habitats (Oates, 1999; Cowlishaw and Dunbar, 2000; Chapman and Peres, 2001). The survival of non-human primates is increasingly threatened due to habitat destruction, disease and a relentless trade in bush meat (Ammann *et al*., 2003; Hughes, 2003; Kormos *et al*., 2003; Caldecott and Miles, 2005). Hunting for bush meat, fire damage to forests and cattle grazing have negatively impacted primate populations (Fowler, 2006). Human activities in reserve areas such as firewood collection, cattle grazing, bush fires and hunting tend to make animals feel unsafe to use such habitats (Kiffner *et al*., 2013). The deteriorating rate of biological resources is becoming a major challenge to conservationists (Anthony *et al*., 2007).

Baboons (genus *Papio*) are Old World monkeys of the family Cercopithecidae (cheek pouched monkeys) widely distributed across Africa and into the Arabian Peninsula. Various morphotypes are typically distinguished including the Hamadryas, Guinea, Yellow, Chacma, Kinda and Olive baboons (Zinner *et al*., 2009). Except the Hamadryas, baboon taxa have a social structure based on female philopatry and male emigration (Encarta, 2000). They vary in weight depending on the species. All baboons have long dog-like muzzles; close-set eyes; thick fur except on muzzle and rough spots on their protruding buttocks, called ischial callosities (Encarta, 2000). These callosities are nerveless, hairless pads of skin that provide for sitting comfort of the baboon (Wikipedia, 2010). Baboons are adaptable to a considerable range of habitats (Richard, 1998). They are generally adaptable to life on the ground. They range in large herds called troops, over rocky, open lands and wooden areas of Africa (Swann, 1998).

Baboons are regarded as dietary generalists, consuming a wide range of food items in varying proportions. Baboon diets are dominated by fruits, leaves and subterranean items, with flowers and animal matter constituting a smaller proportion of the diet (Hill and Dunbar, 2002). Savanna baboons consume a broad array of dietary items (Henzi and Barrett, 2003).

Materials and Methods
The Study Area

The Kopre Game Reserve is located in Hong Local Government Area of Adamawa State. Hong lies between latitude 12°30' N and 13°15'N and longitude 10°35'E and 13°15'E. The State is located in the North Eastern part of Nigeria. It shares boundary with Taraba State in the south and west; Gombe State in the north west and Borno State to the west (Adebayo and Tukur, 1999). The Kopre site was initially proposed to be a forest Reserve in the early 1990s by the Adamawa State Ministry of Environment. An area of 50km^2 was demarcated which was later reviewed to a game reserve and the total land area was extended to more than 70km^2 in February, 2006. Many species of primates and other mammals exist in

Adamawa State, though the distribution of the species is not uniform in various parts of the State (Adebayo and Tukur, 1999). The area experiences rainfall from the month of April to October. The mean annual rainfall is between 900 and 1,000 mm. The dry season is from November to April. March is the driest month. Temperature remains high for most part of the year with April being the hottest month. It is cold from the month of December and January with temperature ranging between 27℃ and 32℃. Although, relative humidity is low, it is however high during the wet season.

    The most prevalent and widespread soil groups consist of sand, while laterite and alluvial soils make up the remaining group. The sand which is derived from the hills has a poorly developed profile and it is structurally unstable (Joseph, 2014). The geology of the area is made up of the basement complex rocks of the precambian age. The rock structure consists of the sedimentary, igneous and basement complex rocks. The vegetation falls under the Sudan savanna type. It is marked by short grasses interspersed with scattered and some stunted trees. The common tree species are tamarind, baobab, shea, locust bean and acacia species among others (Joseph, 2014).

Survey Design
    The evaluation of the habitat conditions includes the following steps:
Step 1: This involved determination of all the needs of the Olive baboons. Knowledge of the habitat needs were obtained from local hunters, direct observation (personal experience) and publications. Habitat needs were classified into three categories: food, cover and water (Bramble and Byrnes, 1979). Parameters considered under food included important food plants abundance and important food plants diversity. Parameters under cover included: low vegetation cover, tree cover, interspersion of cover types and successional stages of cover types.
Step 2: The field assessment of the characteristics of various habitat needs of Olive baboons involved the establishment of seven (7) one-acre plots at random in the study area. Important food plants abundance was obtained by determination of the number of food plants density in established plots. Food plants diversity was determined by counting the different food plant species in the established plots in the habitat. The percentage ground surface covered by low vegetation, shrubs and tree cover were determined by actual measurement in the established plots. The stage in plant succession was determined by inspection and recording of the dominant stage present in the habitat.

Data Analysis
    Analysis of data on the habitat values followed Bramble and Byrnes (1979) method. Scores on field characteristic data was rated on a scale of 2 to 10 and the sum determined. The mean was calculated by dividing the sum by the characteristic and then multiplied by 2/3 to obtain the habitat value. High value habitats range from 7 to 10, with 6-7 habitat needs met; low value habitats range from 1 to 5, with only 1-3 habitat needs met; while medium value habitats lie in the range 5.1 to 6.9, with 4-5 habitat needs met.

Results

The results obtained from the seven (7) established plots for the evaluation of habitat value for conservation of Olive baboons in Kopre Game Reserve is presented in Table 1. The results indicated a habitat value range of 4.22 to 6.90 with a mean value of 5.69, which was interpreted as a medium value habitat with 4 – 5 habitat needs met. A total of ten (10) important baboon food plants were identified in the seven (7) one-acre plots in the home range of Olive baboons in the Kopre Game Reserve as presented in Table 2.

Table 1: Habitat Values obtained from seven (7) one-acre Plots in Kopre Game Reserve

Plot	Category of habitat needs	Mean score ($\bar{x}$)	Mean total score ($\bar{x}_a+\bar{x}_b$)	Numerical habitat value and their interpretation ($\bar{x}_a+\bar{x}_b$)2/3
A	a.Top important habitat need	4.5		
	b.Lesser important habitat needs	4.0	8.5	5.70 (medium)
B	a.Top important habitat needs	6.0		
	b.Lesser important habitat needs	4.3	10.3	6.90 (medium)
C	a.Top important habitat needs	4.0		
	b.Lesser important habitat needs	4.0	8.0	5.36 (medium)
D	a.Top important habitat needs	3.5		
	b.Lesser important habitat needs	6.0	9.5	6.37 (medium)
E	a.Top important habitat needs	4.5		
	b.Lesser important habitat needs	4.0	8.5	5.70 (medium)
F	a.Top important habitat needs	4.0		
	b.Lesser important habitat needs Table 1 continued	4.3	8.3	5.56 (medium)
G	a.Top important habitat needs	2.7		
	b.Lesser important habitat needs	3.6	6.3	4.22 (low)

Table 2: Important Baboon Food Plants Diversity in Kopre Game Reserve.

S/No.	Family name	Species name	English name	Hausa name
1.	Sapotaceae	*Vitellaria paradoxa*	Shea	Kadanya
2.	Anacardiacea	*Haemostaphis barteri*	Bloodplum	Jinin kafiri
3.	Mimosoideae	*Parkia biglobosa*	African locust bean	Dorawa
4.	Bombacaceae	*Adansonia digitata*	Baobab; sour gourd	Kuka
5.	Leguminosae	*Afromoxia laxiflora*	Satin wood	Kanya
6.	Apocynaceae	*Carissa adolia*		Makarfo
7.	Ebenaceae	*Diospyrus mespiliformis*	English ebony	Gizagi
8.	Balanitaceae	*Balanite aegyptica*	Desert date	Aduwa
9.	Leguminosae	*Tamarindus indica*	Tamarind	Tsamiya
10.	Moraceae	*Ficus spp.*	Fig	Gamji

Discussion

The results obtained from the evaluation of the habitat value of Kopre Game Reserve for the conservation of Olive baboons (*Papio anubis*) indicated that out of the seven (7) one-acre plots evaluated, six (6) plots were of medium habitat value, with 4 to 5 habitat needs met, while one (1) plot was found to be of low habitat value with 1 to 3 habitat needs met.

The mean of numerical habitat value of the plots was 5.69 which implied a medium value habitat having 4 to 5 habitat needs met. The habitat has the potential to be improved to high value status for the conservation of Olive baboons (*Papio anubis*) if conservation measures such as the adoption of a well regulated burning regime particularly in the woodlands and grasslands; enrichment planting of indigenous tree species that provide fruits are adequately implemented. Human activities have been observed to be the primary factors that militate against habitat value of the Kopre Game Reserve. Human activities such as felling/cutting of trees for firewood, fire damage to forest as a result of indiscriminate burning and cattle grazing have contributed to the decline of cover and forage resources required by the baboons. This observation is in consonance with Pirta *et al.* (1997) who reported that destruction or loss of habitat due to human activities decreases the available area for primate habitation and leads to a reduction of available natural forage. Perhaps, anthropogenic factors that have altered the habitat might explain why no large mammals were sighted by the researchers during the survey period, though, indices such as faecal droppings, grazing sign and foot prints of large mammals were sighted. However, birds and reptiles were relatively abundant and commonly sighted. This is in accord with the report by Kiffner *et al.* (2013) who hypothesized that areas of high anthropogenic disturbances are likely to have lower number of animals utilizing such habitats or complete absence of animals. Similarly, Fowler (2006) reported that hunting for bush meat, fire damage to forests and cattle grazing

have negative impacts primate populations. Efforts should be made to check indiscriminate human activities for timely restoration of the habitat.

Conclusion

This study has revealed a habitat value range of 4.22 to 6.90 with a mean value of 5.69 which was interpreted as a medium value habitat with 4 – 5 habitat needs met. A total of ten (10) important baboon food plants were identified in the baboon habitat. The habitat holds prospects for the perpetuation of baboon populations. However, concerted efforts should be made to enhance the habitat value through regulated burning regime. In addition, anthropogenic activities such as felling of trees, illegal grazing and indiscriminate bush burning need to be checked.

In view of the findings from this study, the following recommendations are made:

i. Adamawa State Ministry of Environment should ensure that the Kopre Game Reserve is gazetted.

ii. Adamawa State Government should intensify efforts to employ forest/game guards for adequate protection of the game reserve.

iii. Enlightenment campaign should be embarked upon to create awareness of the importance of protected areas among the local people and the need for them to cooperate in ensuring the conservation of habitats and biodiversity.

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