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ASSESSMENT OF WILDLIFE DISTRIBUTION IN RELATION TO WATERHOLES IN MARGUBA RANGE OF OLD OYO NATIONAL PARK, NIGERIA

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ABSTRACT

This study assessed wildlife distribution in relation to waterholes in Marguba range of Old Oyo National Park, Nigeria. It involved Observations, Identification and Counting of different wildlife species utilizing each of the waterholes in the Park. Data obtained was analyzed using descriptive statistics. Four (4) waterholes are recorded in the Park (Oopo River, Ogun River, Ayinta River and Ibuya River). The frequency distribution of herbivores species observed around the waterholes revealed that Ogun River recorded no herbivores. Also Kob recorded the highest number of observation with 7 individuals, follows by Roan antelope with 4 individuals while Red flanked Duiker, Waterbuck and Western hartebeest recorded 1 individual each. The frequency distribution of non-human primates species observed around the waterholes, Oopo and Ayinta River recorded no observation. Ibuya recorded the highest number with 4 individuals while Ogun recorded 2 individuals. The frequency distribution of amphibians/reptiles' species observed around the waterholes, Ibuya recorded the highest number with 11 individuals, followed by Oopo River with 3 observations while Ogun and Ayinta recorded 1 individual each. Also Frog (*Rana* sp) recorded the highest with 7 individuals. The animal indices around the waterholes showed that herbivores recorded the highest with 48.35, followed by Amphibian/Reptile with 31.0% while Non-human primates is the least with 20.7%. The study recommends that provision of functional artificial waterholes in the park should be established.

Keywords: Distribution, Wildlife, Waterholes, National Park

INTRODUCTION

Water is an essential limiting determinant in wildlife distribution and abundance, especially in the savannah regions. Water availability largely determines the distribution and abundance of animals in savannah and semi arid environment; as a result, distribution and quality of water are factors that determine carrying capacities of protected areas in such environments (Kamando *et al.*, 2008). Rainfall primarily determines water availability which varies greatly among and within seasons in a year with most of the annual precipitation falling within a few months each year (Aremu *et al*, 2000). A change in the amount of rainfall not only determines water availabilities on a landscape scale but also has strong influence food resources for wildlife species (Finch, 2012). One of the strategies used in the management of Protected Areas (PA) is an understanding of the relationship between the habitat conditions and the animal populations (Ayeni, 2007). Owen-Smith, (2018) ascertain that wildlife species tends to prefers habitat types where nutrient and water intake could be maximized as this as an impact on the distribution pattern of large wildlife species.

Water is available to animals from three different sources including free water (*i.e.* streams, Rivers, puddles, lakes etc), preformed water (*i.e.* water contained in food), and oxidative or metabolic water (*i.e.* water produced as a product of the oxidation of organic compounds containing hydrogen). Highly seasonal patterns of rainfall directly determines the levels of waterholes and Rivers (*i.e.* free water), and cause seasonal changes in the availability of food (Gimberzeysky, 2013). Halidu *et al.* (2015) reported that animals may stick with environment with limited water by concentrating in areas with relatively constant supplies of water and producing resistant life forms to overcome periods of water limitation through behavioral and physiological adaptations. Although physiological adaptations to extreme water deprivation have been documented in a variety of taxa restricted to dry environments, many species, exclusively rely on behavioral strategies to avoid dehydration (Oliver *et.al*, 2005). For example, seasonal movements from and to areas with high abundance of free water are commonly observed behavioural strategy of medium to large sized vertebrates for overcoming water limitation during the dry season (Halidu *et al.*, 2014).

Though many studies have been carried out in Old Oyo National Park to assess the abundance and distribution of wildlife species, little or no studies have been conducted on the assessment of wildlife distribution in relation to waterholes in the Park. Given the decrease in natural habitat along with population number of the species, a critical need to evaluate the current population status of the animal in relation to waterholes in the Parks is essential.

METHODOLOGY

Study Area

Old Oyo National Park is one of the Oldest conservation area in Nigeria and indeed the West African sub region having been designated upper Ogun Forest Reserve in 1936, converted to Oyo-Ile Forest Reserve in 1941 and designated Game Reserve in 1952. The sources potentials and the rich cultural and biological diversities informed the Federal Government, decision to elevate the reserve to the status of a National Park by decree No 36 of 1991. It is based on the ruins of the Old capital of Oyo Empire located in the Northern part of present day Oyo State. The park is situated in the heart land of commerce industry and culture and is in close proximity to Ibadan, Lagos, Akure and other cities. It has a total land area of about 2,512km^2 and average rainfall of 1,100mm/year. The park lies between latitude 8°15' and 9°00'N and longitude 3° 35' and 4° 42' E. The vast Guinea Savannah ecotype with luxuriant grass, browse plants species and water supports grazing of ungulates. Unfortunately, this very attributes in vegetation also attracts cattle rearers who encroaches on the park annually; illegal grazing of livestock has therefore become the greatest problem confronting the management of

Old Oyo National Park, an act that was prohibited by section 30 of Decree 36 of 1991.

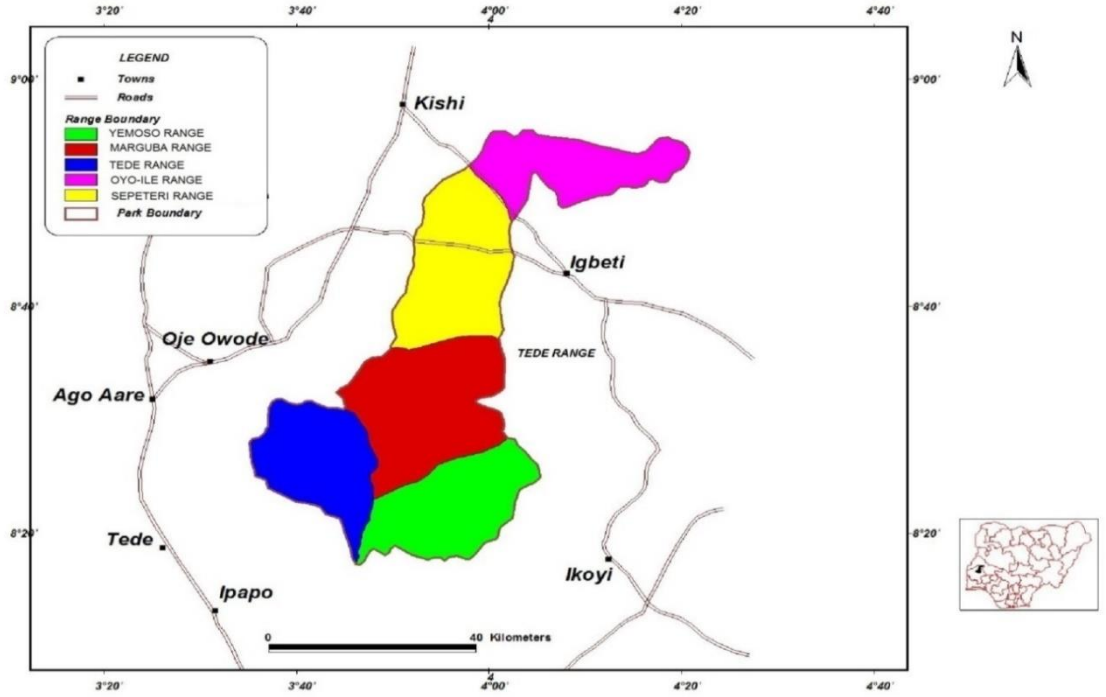

Figure 1: Map showing Old Oyo National Park Source: Ogunjimi *et al.,* (2016)

Data Collection

Direct sighting, using population studies method described by Buckland *et al.*, (1993) and line transect method using the existing jeep tracks along waterholes (Rivers) as described by Suthelad (1997) was used. The location was transverse in the morning between (07:00 and 11:00 a.m) and in the evening (16:00 to 18:00 hours). Data obtained were analysed using descriptive statistics i.e frequency tables and percentages.

RESULT AND DISCUSSION

Results

Table 1: Waterholes Available At Marguba Range of Old Oyo National Park

S/N	Waterholes
1	Oopo River
2	Ogun River
3	Ayinta River
4	Ibuya River

(Source: field survey, 2022)

The frequency distribution of herbivores species observed around the waterholes are indicated in Table 2, Ogun River recorded no herbivores. Also, Kob recorded the highest number of observation with 7 individuals, follows by Roan antelope with 4 individuals while Red flanked Duiker, Waterbuck and Western hartebeest recorded 1 individual each.

Table 2: Frequency distribution of Herbivores Species Observed Around the Study Waterholes

Herbivores		Waterholes				Total(%)
		Oopo	**Ogun**	**Ayinta**	**Ibuya**	
Roan Antelope	*Hippotragus equinus*	-	-	1	3	4(28.6)
Red Flanked Duiker	*Cephalophus rufilatus*	-	-	1	-	1(7.1)
Waterbuck	*Kobus defeassa*	-	-	-	1	1(7.1))
Kob	*Kobus Kob*	2	-	-	5	7(50.0)
Western hartebeest	*Alcelaphus buselaphus*	-	-	-	1	1(7.1)
Total		**1**	**-**	**3**	**10**	**14**

(Source: field survey, 2022)

Table 3 showed the population structure of herbivores species observed in the study area, it was observed that adult individuals recorded the highest number of observations with 9 individuals, followed by young with 4 individuals while juvenile recorded the least with 1 individual.

Table 3: Population Structure of Herbivores Species Observed Around the Study Waterholes

Herbivores	Adult	Juvenile	Young	Total
Roan Antelope	3	-	1	4
Red Flanked Duiker	1	-	-	1
Waterbuck	-	-	1	1
Kob	4	1	2	7
Western hartebeest	1	-	-	1
Total	**9**	**1**	**4**	**14**

(Source: field survey, 2022)

Table 4 showed the frequency distribution of non-human primates species observed around the waterholes, Oopo and Ayinta River recorded no observation. Ibuya recorded the highest number with 4 individuals while Ogun recorded 2 individuals. The population structure of non-human primate's species observed in the study area indicated that adult individuals recorded the highest number of observations with 4 individuals while young and juvenile recorded 1 individual each (Table 5).

Table 4: Frequency Distribution of Non-human Primates Species Observed Around the Study Waterholes

Non-human Primates		Waterholes				Total (%)
		Oopo	Ogun	Ayinta	Ibuya	
Patas monkey	*Erythrocebus patas*	-	2	-	3	5(83.3)
Baboon	*Papio anubis*	-	-	-	1	1(16.7)
Total		**-**	**2**	**-**	**4**	**6**

(Source: field survey, 2022)

Table 5: Population Structure of Non-human Primates Species Observed Around the Study Waterholes

Non-human Primates	Adult	Juvenile	Young	Total
Patas monkey	4	-	1	5
Baboon	-	1	-	1
Total	**4**	**1**	**1**	**6**

(Source: field survey, 2022)

Table 6 showed the frequency distribution of amphibians/reptiles' species observed around the waterholes, Ibuya recorded the highest number with 11 individuals, follows by Oopo River with 3 observations while Ogun and Ayinta recorded 1 individuals each. Also, Frog (*Rana* sp) recorded the highest with 7 individuals The population structure of amphibians/reptiles' species are revealed in table 7 in which adult recorded the highest with 9 individuals.

Table 6: Frequency Distribution of Amphibian and Reptiles Species Observed Around the Study Waterholes

Amphibians/Reptiles		Waterholes				Total
		Oopo	Ogun	Ayinta	Ibuya	
Nile crocodile	*Crocodilus niloticus*	-	-	-	4	4(25.0)
Frog	*Rana* sp	2	1	1	7	11(68.8%)
Monitor Lizard	*Varanus niloticus*	1	-	-	-	1(6.3)
Total		**3**	**1**	**1**	**11**	**16**

(Source: field survey, 2022)

Table 7: Population Structure of Amphibian and Reptiles Species Observed Around the Study Waterholes

Amphibians/Reptiles	Adult	Juvenile	Young	Total
Nile crocodile	-	3	1	4
Frog	8	2	1	11
Monitor Lizard	1	-	-	1
Total	**9**	**5**	**2**	**16**

(Source: field survey, 2022)

Table 8 revealed the animal indices around the waterholes, in which herbivores recorded the highest with 48.35, followed by Amphibian/Reptile with 31.0% while Non-human primates is the least with 20.7%.

Table 8: Summary of Animal Indices around the Waterholes studied

Species	Waterholes				Total (%)
	Oopo	**Ogun**	**Ayinta**	**Ibuya**	
Herbivores	1	-	3	10	14(48.3)
Non-Human Primates	-	2	-	4	6(20.7)
Amphibian/Reptile	-	-	-	9	9(31.0)
Total	**1**	**2**	**3**	**23**	**29(100.0)**

(Source: field survey, 2022)

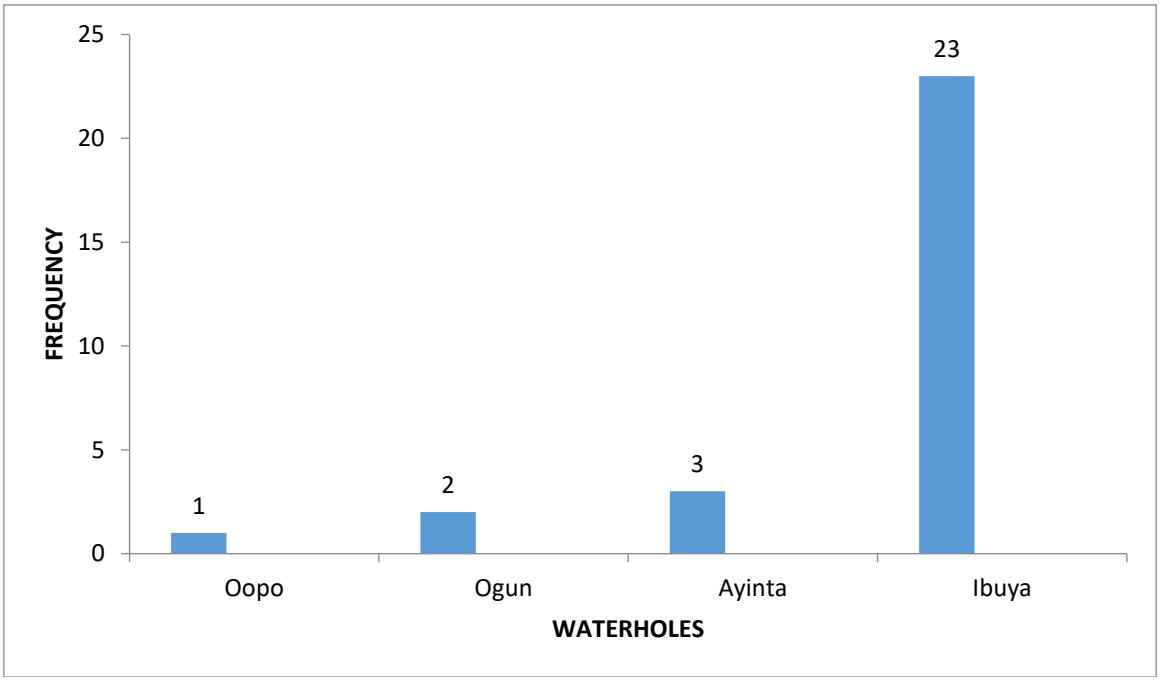

Figure 1: Rate of utilization of the waterholes by Wildlife Species

Figure 1 show that Ibuya River is the most utilized by the wildlife species with 23 observations, follows by Ayinta River with 3 observations while Oopo River recorded 1 observation.

Discussion

The finding of this study revealed that wildlife species were observed around the water holes more regularly in Ibuya Pool than other waterholes found in the Park. This indicates that wildlife species are not evenly distributed across the waterholes. This is in agreement with Epaphras *et al.* (2007), in their work of wildlife water utilization and importance of artificial water holes that, wild animals drink more regularly during the dry season in order to meet their body requirement of water. Proper management of a game ranch consists of maintaining a healthy and balanced (sex & age structure) herd at a population density that is consistent with long term habitat capability and sustainable levels of utilisation (Halidu *et al.*, 2014). Wildlife is difficult to manage, which thus necessitates the early recognition and rectification of problem to avoid serious damage. A reliable census of animal numbers is one of the important cornerstones of effective wildlife management on any game ranch. It is a yardstick to determine trends in animal population size. Population density of game must be matched to food and water availability and, in case of stock farmers, competition for food (Halidu *et al.*, 2015). Their daily and seasonal migrations and distribution are to a large extend determined by spatial and temporal surface water distribution. Findings from the study on distribution pattern indicates that the wildlife species visits the water holes virtually every day during the dry season and irregular visits during the wet seasons. This may be as a result of presence of water virtually all over the park and also the conditions of the feeding materials of the animals in the wet season. Free water sources can determine wildlife species presence/absence, movement and carrying capacity in seasonally dry and semi-arid environments. Unlike in the seasonally wet ones where water is found virtually everywhere and even performed water- water intake as animal tissue, succulent leaves and fruits which may meet part or all of daily water needs of some species of wild animals. This was also ascertained by Pelinck (1974) that food and water abound in different parts of the park and animals do not have to converge at the River banks for vegetation, water, protective cover, solar radiation and predators.

Difference in water requirement may cause animals of different species to distribute differently around the water points, some species of larger antelopes, example Roan antelope *(Hippotragus equines)* walk long distances from the water points to feed, whereas small species like the Grimm's duiker (*Silvicapra grammia*) preferably feed closer to the water points (Smit *et al.*, 2009). Adeyemo *et al.* (2006) also claimed that small bodies animals like the Impala (*Aepyceros melampus*) and Grimm's duiker (*Sylvicapra grimmaia*) were mostly confined to the immediate vicinity of the water, whereas the medium sized animals (*Kobus kob)* were distributed further away from the water holes. Spatial and temporal variation in distribution of different species of wild animals may be linked to the availability of water. This was supported by Aneni and Osaguona, (2005) that wild animal's daily and seasonal migrations are to a large degree determined by spatial temporal surface water distribution.

CONCLUSION

It can be concluded from this study that four waterholes were available in the study area (Oopo, Ayinta, Ogun and Ibuya). The mostly utilized waterholes are Ibuya and Ayinta River while herbivores and Amphibian/Reptiles are the most species that utilized these waterholes. The study recommends that provision of functional artificial waterholes in the park should be established, special attention and monitoring should be given to all perennial water holes, especially during the dry season when most animals resides very close or visit the water holes often. Also there should be close monitoring of the water body at all seasons to prevent water pollution by poachers or other River users upstream.

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