



SPECIAL PROJECT REPORT



**TITLE: THE IMPACT OF THE 2013 ANT-POACHING OPERATION ON THE
POPULATION OF ELEPHANTS IN MIKUMI NATIONAL PARK IN TANZANIA**

By

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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN
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DECLARATION

I EZEKIEL FELICIAN do hereby declare that this special project is based on the research work carried out by myself under the supervision of Prof PEREKA A.E. This special project has not any in part or whole, been submitted for the degree of BSc Wildlife Management or any other degree at Sokoine University of Agriculture or any other institutions.

Signature.....

Date

The above declaration is confirmed by

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Prof PEREKA A.E

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Date

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DEDICATION

I dedicate this work to my supervisor Prof PEREKA A.E, and my loving family who are always supporting me with my studies up to this level.

ABBREVIATIONS

EIA: Environmental Investigation Agency

MINAPA: Mikumi National Park

NP: National Park

SUA: Sokoine University of Agriculture

TAWIRI; Tanzania Wildlife Research Institute

TANAPA: Tanzania National Park

WD: Wildlife Division

WWF: Worldwide Fund for Nature

WMA; Wildlife Management Area

ABSTRACT

One of the best ways in assessing the approach for wildlife conservation is through determination of population size of a particular animal species at a certain time interval. Ant-poaching operation conducted in 2013 for the aim of reducing poaching was assessed to see if it brought an impact to the current population size of the elephants in Mikumi National Park. The survey conducted for three days brought a total population of 1636 elephants. This data show an increase of the elephant population from 338 elephants in 2013 to 1636 in 2015. The results might have been affected by two factors which were conservation approach (2013 ant-poaching operation) The impact of the 2013 ant-poaching operation was verified by a decrease in poaching rate as there was a small elephant carcass ratio of 13% in 2015, compared to 30% elephant carcass ratio in 2013. This was attributed by a decrease in the number of poachers, most of whom were arrested with their firearms during 2013 ant-poaching operation. Elephant population was also affected by the elephant migration between Mikumi National Park (MINAPA) and the other protected areas bordering the park, these include; Udzungwa National Park, Wami Mbiki Wildlife Management area and Selous game Reserve. This has caused a rapid increase of elephant population in Mikumi because during rainy season elephants tend to return back to their original habitat which is Mikumi National Park. It is suggested that more research should be done in all protected areas bordering the park so as to obtain the actual population size.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Conservation of elephants and other wild animals in Tanzania is mostly based on fences, payment of fine approach and community based approach (Schmitt J, 2010, Ashley C, 2002). Since colonial era, fencing and payment of fine by those who were caught hunting illegally, were the approaches used to protect wildlife. (Schmitt J, *et al* 2010)

Although there are being different critics for this approach (Ashley C, 2002), It is still being given priority in the current wildlife policy as a major way of protection and conserving wildlife (Tanzania Wildlife Policy section 3.2.1, 2007). With rapid poaching rate of elephants during the 1980s this approach together with community based approach brought high contribution to the reduction of poaching cases (EIA, 2014 and Ashley C, 2002).

Poaching of elephants resumed in 2006 due to high pressure from the high demand of ivory by black markets found in Asian countries mostly China, Vietnam, Sri Lanka, Malaysia and Philippines (EIA, 2014) to the extent that it overcame the existing conservation approaches (Schmitt .J *et al*, 2010). For example, Selous Game reserve was having a population of 70,406 elephants in 2006 while in 2013 the population declined down to 13,084 elephants (EIA, 2014).

In October 2013 the government of Tanzania ordered security personnel from Tanzania's People's Defense Force, local police, special anti-poaching militias, and wildlife rangers to conduct an ant-poaching operation in all protected areas in the country (*Inter Press service*, Jan 6th 2014).

The operation was halted in November 2013 due to high criticisms prompted on violation of human rights which were perceived to have been excuted to local people surrounding the protected areas (*Inter Press service*, Jan 6th 2014).

Although the operation was halted, it brought some success toward reducing the poaching activities in which about 900 people were arrested as suspects and many tools such as firearms and snares were caught (EIA, 2014).

To date the government is still putting effort toward ant-poaching mechanisms which include establishing cases towards illegal traders of ivory and provision of transparent data concerning poaching collaborating with international community's toward ant-poaching activities and increasing security level at ports to prevent illegal shipping of ivory from Tanzania (EIA 2014).

Despite these efforts, poaching is still being carried out in a protracted manner, for example in September 2014 there was a report of 22 elephants being poached at northern Niassa near Selous game reserve (EIA, 2014).

1.2 Problem statement & justification

As poaching activities continue to increase, there was a need of assessing the approaches used to fight against poaching so that the best approach can be used to suppress even eliminate poaching in Tanzania. In wildlife management, one of the best ways of assessing the approach for wildlife conservation is by looking on population trend of particular animal species (Bouché P *et al*, 2011). Therefore it was necessary to determine the current population size of elephants at MINAPA so that it can be known and assess whether or not, 2013 ant-poaching operation brought conservation benefits. The results obtained would help decision makers to make the right decisions on selecting the appropriate approaches for protecting elephants from poaching.

1.3 Objectives of the study

1.3.1 General objective

To study the impact of the 2013 ant-poaching operation on the population of the elephants in Mikumi National Park.

1.3.2 Specific objectives

- i. To determine the population size of the elephants in Mikumi National Park.
- ii. To review on previous data of the population size of elephants at Mikumi National Park.
- iii. To make comparison between the current data and previous data on the population size of elephants at Mikumi National Park.

1.4 Hypothesis

1.4.1 Null hypothesis

There was no difference between the current elephant population size and previous population size at Mikumi National Park.

1.4.2 Alternative hypothesis

There was a difference between current population size and previous population size at MINAPA.

2.0 LITERATURE REVIEW

2.1 Elephant population in Tanzania

Elephant population in Tanzania has fallen by nearly 42% in just three years from 2009 to 2012 (Reuteurs, Jan 3 2012). A report from wildlife division which showed the estimation of total number of elephants found in all protected areas in the country decrease from 141000 in 2006 to 110000 elephants in 2009(WD, 2014). A study conducted in Selous game reserve and Mikumi national Park has shown a decrease from 74,900 in 2006 to 43,552 in 2009 (EIA,2014).

The main reason of decrease in elephant population was thought to have been caused by poaching. This was verified by number of carcasses observed between 2010 and 2013. This is shown in Table 1 as follows;

Table 1

Year	No. of Carcasses
2010	259
2011	276
2012	473
2013	219

(WD, 2013)

2.2 Elephant population size

Elephant population size can be determined by a variety of survey techniques. In recent surveys the technique mostly used is aerial count because it can be applied even to inaccessible areas while in the older surveys included aerial count, ground count and expert opinion (Bouché P *et al*, 2011). Ground count can be applied and give excellent results where the size is small to medium and where vegetation is intense. It's advantage is that it provide estimates for more species than aerial count (WWF, 2000). Though it has disadvantages such as requiring well established road system which is not biased toward a certain vegetation type, accurate measurement of each site of the road is required and expensive in terms of vehicle (WWF, 2000).The area must be divided into blocks whereby survey teams (one per block) travel in blocks simultaneously to detect and count precisely each herd (Ouédraogo *et al.*, 2009). Expert opinion is applied where functioning research and management are active in a given area. This can be drawn from non-census patrolling, biodiversity inventories and discussion with community (Bouché P *et al*, 2011). Data from previous survey and information used to gauge the overall status of the region's elephant population are assessed by literature review, discussion with local managers and researchers (Bouché P *et al*, 2011).

Elephant population trend can be assessed by using direct numerical comparisons (for identical survey areas), direct numerical comparisons from overlapping survey areas (comparing number

of historical survey with recent surveys) and density comparison (identical survey area but lack raw data) (Bouché P et al, 2011).

CHAPTER THREE

MATERIALS AND METHODS

Study site

Mikumi National Park (MINAPA) was gazetted as a national park in 1964. It is the fourth largest national park in Tanzania covering 3,230km² (1,250 square miles). The park is located in the eastern Tanzania, between 7°00' and 7°50'S longitude, and between 37°00' and 37°30'E latitude. It is found in Morogoro region and 283 km (175 miles) from Dar es Salaam. In the southern part it shares boundary with the Selous game reserve (TANAPA 2004).

The area is composed of several numbers of flora and fauna. It is composed of large mammals such as elephants, giraffes, lions, zebras, buffaloes and more than 300 bird species (Mercer 1983; Hawkins and Norton 1998).

The park is composed of four vegetation zones which include miombo woodland in the south, arid bush land in the north, coastal forest in the east and mountain climate in the east and west (Hawkins and Norton 1998).

Rainfall patterns of MINAPA consist of both unimodal and bimodal rainfall patterns (Turner and Paavola 2003). In the northern part consist of bimodal whereby there is short rainfall which start from mid-September up to December and long rains which start from March up to May. Unimodal rainfall pattern occur to the southern part of the park whereby there is long rains which start from December to May (Turner and Paavola 2003).

The park is shared within three districts i.e. Kilosa, Mvomero and Morogoro. It is surrounded by 18 villages containing indigenous people of Luguru, Sagara and Vidunda. In all villages there is a high proportion of immigrants which include people from Iringa, Mbeya, Kilimanjaro, Lindi and Shinyanga (Wapalila G.J 2008).

Main livelihood activity in these villages is small scale farming which is monoculture farming system. Majority of the villagers farm for subsistence by selling excess yield.

In most villages livestock is not an economic activity and some villagers engage in non-farm activities such as making bricks, mats, tailoring, making local beer, tea rooms and shop which acts as an alternative source of income (Wapalila G.J 2008).

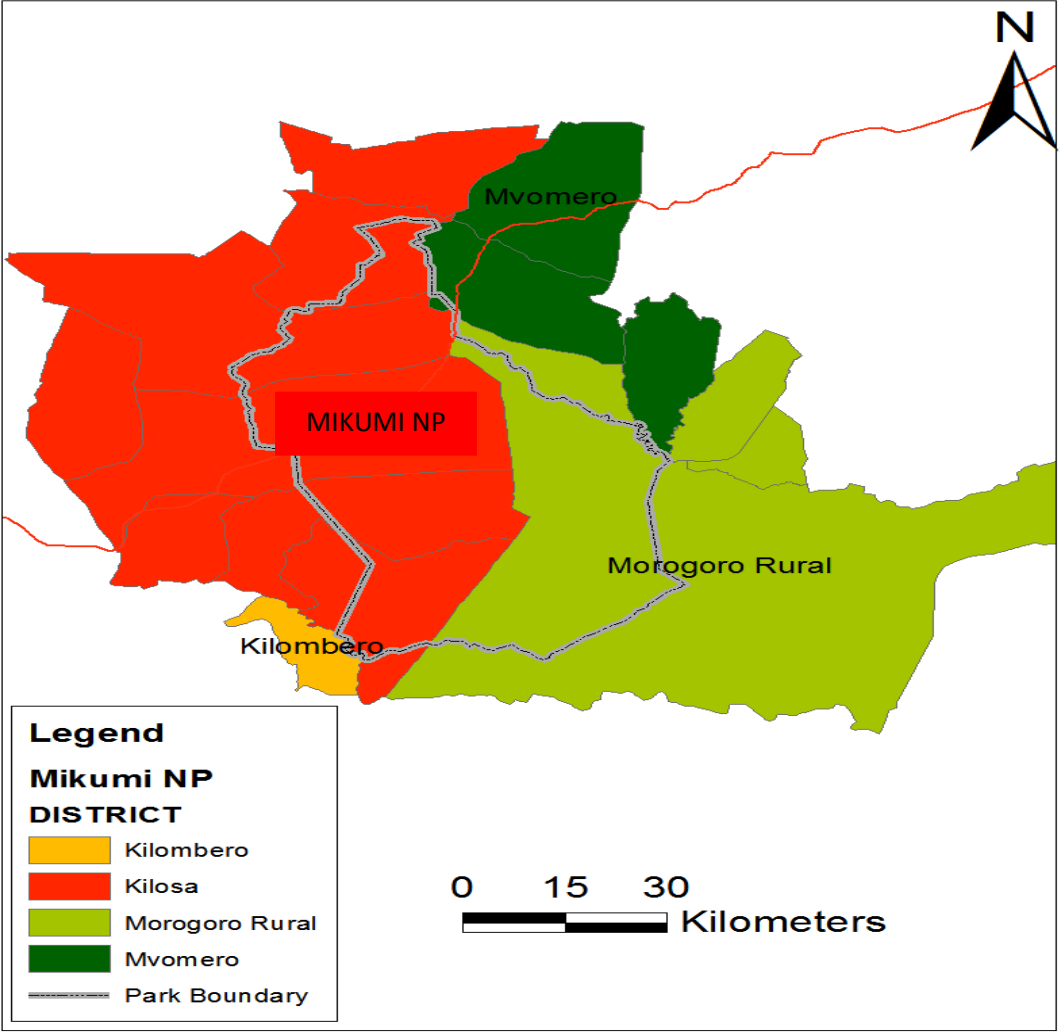


Fig 1: The map showing Mikumi national park (Source: MINAPA, 2015)

3.0 METHODS AND EQUIPMENTS

3.1 Equipments

The tools that were used during the study include vehicle, notebook, pen, pencil, compass, and binocular (WWF 2000). I didn't manage to obtain a range finder; therefore perpendicular distance was obtained through estimation (WWF 2000).

3.2 Methods

Research methods that were used include both sample count of three transects of 150km in length and interview methods.

3.2.1 Data collection/ Sample collection

3.2.2 Line transect

- Road line transect was used, with three transects covering a total distance of 150 km long (transect length) at areas with high population concentrations and accessible. This activity was done for three days.

Limitations- Non random sampling of the study area, individuals must be located before they move or detection function will be biased, improper estimation of perpendicular distance.

3.2.3 Interview

Interview was conducted to two (2) park warden ant-poaching department and one researcher at elephant research center in Mikumi national park.

Respondents reported twenty two (22) cases of elephant poaching since termination of ant-poaching operation on November 2013. In 2012 there were 35 cases of elephant poaching. Two hundred and nine (209) elephant carcasses were reported in a survey conducted by game rangers.

Secondary data was collected from reports, published and unpublished papers from, Mikumi National Park.

3.5 DATA ANALYSIS

3.5.1 Population size

Data analysis was done by using simple arithmetic (WWF, 2000).

Population trend was assessed by direct numerical comparison from overlapping survey areas.

This is done as follows;

The total wildlife area = 3230 km²

Distance traveled by observers = 150 km

Average distance of animals seen from the road = 0.5 km

Total area surveyed = 150 km x 0.5 km = 75 km²

Total number of elephant seen = 38

Therefore in 1 km there were 38/75 elephant
Therefore in 3230 km it was estimated that there were:
 $38/75 \times 3230 = 1636$ elephants at the time of data collection (year 2015)

3.5.2 Accuracy

The accuracy of this calculation is verified by comparing these data with data obtained from previous surveys (WWF 2000) whereby there is greater variation from previous data of 2013 (338 elephants).

Elephant carcasses ratio

As an index of mortality, elephant carcasses ratio was calculated by using the number of carcasses seen divide by the number of live elephants seen.

This is calculated as follows;

$$\frac{\text{carcasses}}{\text{live elephants}} \times 100\%$$
$$\frac{209}{1636} = 0.13 \text{ or } 13\%$$

Therefore elephant carcass ratio is 13%.

CHAPTER 4

4.0 RESULTS

4.1 Elephant population trend

The estimated total elephant population observed in the current study was 1636 elephants

Table 2: Elephant population trend from 1986 to 2015 in MINAPA

YEAR	Population	Source
1986	1920	TAWIRI 2011
1989	744	TAWIRI 2011
1994	700	TAWIRI 2011
1998	2623	TAWIRI 2011
2002	1144	TAWIRI 2011
2006	2812	TAWIRI 2006
2009	1566	TAWIRI 2009
2011	2179	TAWIRI 2011
2013	339	TAWIRI 2013
2014/2015	1636	Ezekiel 2015 (Unpublished)



Fig 2: A group of elephants grazing within the park (Taken from Mikumi NP on 4/3/2015, Ezekiel 2015 (Unpublished))

4.2 Elephant carcasses ratio

Elephant carcass ratio was calculated to be 13% whereby, according to (Douglas-Hamilton and Burrill 1991), natural mortality occurs at the ratio between 4-16%. Therefore 13% show that, this is within a normal range of natural mortality.

4.3 Number of firearm, raw ivory, and number of cases filed and number of poachers arrested during 2013 ant-poaching operation.

Data on number of firearm, number of cases filed and number of poachers arrested specifically in Mikumi national park were not obtained due to the reason that such information was combined with others from different areas and published by wildlife division for the whole counts. The Table below summarizes number of firearm, raw ivory, number of cases filed and number of poachers arrested during 2013 ant-poaching operation.

Table 3: Number of poachers, raw ivory and firearms arrested in 2013 ant-poaching operation (Source: Wildlife Division 2014)

Person days and Cases filed	Man-days	71,130
	Cases filed	839
	Poachers arrested	2,085
Raw Ivory	Whole	39
	Pieces	172
	Kgs	522.5
Firearm & Ammo	Auto-Rifles	21
	Rifles	194
	S/Gun	363
	Muzzle Loader	1140
	Ammo	5,033

Table 2. Shows 2,085 arrested poachers with a total of 1718 firearms and 5,033 ammunitions, ivory weighing 522.5 kgs with approximation of 78 elephants killed.

4.3 Elephant Migration

Elephant migration occur between Mikumi National Park and other nearby protected areas, these include; Udzungwa National Park, Wami Mbiki WMA and Selous Game reserve. Currently there were two identified wildlife corridors which used by elephants during the dry season to look for water, cover and food. These include the Udzungwa-Mikumi corridor and Wami Mbiki-Mikumi corridor (TAWIRI 2009).

During the rainy season elephants tend to return back from their migrating zones as the Park has enough water, food and cover (TAWIRI 2009).

The study was conducted during rainy season; there was plenty of food, cover and water availability.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Elephant population

The results obtained from the current study showed the improvement of elephant population size as it was compared to the year 2013 which was having the population of 338 elephants while we currently have 1636 elephants. This might be due to decrease in mortality rate especially human influenced mortality (poaching and habitat destruction). This is verified by the results observed in carcass ratio of 13%.

5.2 Elephant carcass ratio

Results showed 13% elephant carcass ratio. This ratio does not exceed 16% which is the maximum ratio for natural mortality (Douglas-Hamilton and Burrill 1991). This showed that death of elephants was mostly caused by natural factors such as diseases and ageing. In census results of 2013 there was a carcass ratio of 30% which showed that death was mostly caused by unnatural factors such as poaching and habitat destruction.

5.3 Factors affecting elephant population

These results were probably affected by two factors; Conservation efforts (Example 2013 ant-poaching operation) and the migration between Mikumi national park and Udzungwa NP and Wami Mbiki WMA (TAWIRI 2009). The study was conducted during rainy season where elephants tend to return back from their migrating zones.

With plenty of food, cover and water availability more elephants have returned to the park and this has contributed much to the increase in population.

Previous studies conducted by TAWIRI was done in the whole ecosystem surrounding Mikumi national park. By doing this, results which obtained were able to determine the actual population of elephants.

The current study showed the decrease in number of poachers as large number of them was arrested with their firearms and ammunitions during the 2013 ant-poaching operation. The reduction in number of poachers has contributed much on the increase in the elephant population.

Large number of firearms and ammunitions which was caught during the operation also contributed to the reduction of poaching rate which was very high in 2013 (WD 2013).

Results also shows number of raw ivory caught which reach to approximate 78 elephants. This is 4.2% of elephants died between 2011 and 2013; this showed how large number of raw ivory was not found.

5.4 Factors affecting the accuracy of the Data

The accuracy of the data was probably affected affected by the following factors;

Visibility: For large and black animals like elephants were able to be seen easily and therefore easy to be counted.

Vegetation: Since it was during rainy season some animals were not seen easily.

Animal behavior: elephants found in large herds were not easily counted

Distribution of habitat: The survey did not cover all parts of the park. I was conducted on mostly on the northern part of the park where there was plenty of food availability, water and cover.

Migration: During rainy season elephants increased in MINAPA because of water, food and cover availability. Most of elephants tend to migrate from Udzungwa NP, Wami Mbiki WMA and Selous game reserve (TAWIRI 2009) to MINAPA.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

The result indicated that there was an increase in elephant population size from 338 in 2013 to 1636 in 2014/2015. This showed that the 2013 ant-poaching operation was effective in controlling the poaching activities. This effectiveness was also verified by decrease in carcass ratio from 30% in 2013 to 13% in 2014/2015.

The results of TAWIRI in 2013 which show the population of 303 elephants did not show the actual population size of elephants in Mikumi National Park because it was during dry season where elephants tend to migrate to Udzungwa NP Wami Mbiki WMA and Selous game reserve.

Decline in number of poachers with their firearms and ammunitions also verify how this operation was effective in increasing population size of elephants.

Small number of ivory was caught, this showed that large number has either been sold to the market or it was en-route to the market.

6.2 RECOMMENDATIONS

These results can be a starting point to call for a census in Udzungwa NP, Wami Mbiki WMA and Selous game reserve and other areas bordering the park so that the results can be complemented together to obtain the actual population and remove the bias caused by migration.

These results may encourage the government to plan for conducting another ant-poaching operation, to eliminate poaching. However in planning this, different factors such as violation of human rights must not be ignored, as by ignoring this, the hostility of the local people toward wildlife might be high and this may have greater impact on the wildlife conservation.

Although a large number of poachers had been caught, these people may return to hunt after coming back from prison. Therefore different strategies for poverty reduction such as alternative income generating activities must be given to local people. Such activities can be bee-keeping and honey harvesting, mushroom farming, fish pond farming and selling other forest products which do not destroy the wilderness.

Engaging local people in protecting wildlife must not be ignored as this might be cost effective than spending more costs in fuels and running cases in the court against poachers.

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APPENDIX I

RESEARCH QUESTIONS TO PARK WARDEN AND PARK OFFICERS;

1. What do you know about 2013 ant poaching operation?
2. How many cases of elephant poaching have been reported since the termination of 2013 ant poaching operation?
3. How many carcasses have been reported?
4. How many poachers were arrested since termination of 2013 ant poaching operation?
5. How many cases of elephant poaching have been reported before 2013?
6. How many carcasses of elephants have been reported in the years before 2013?
7. How many poachers were arrested before 2013?

Table 4a: Elephant Census form for Transect 1

Place: Mikumi NP

Time: Start-08:00AM **End-**12:00 PM

Date: 04/3/2015

Transect: No 1 Length 50 km

Observer's name: EZEKIEL FELICIAN

Weather: Sunshine

S/ No	Perpendicular Distance, m	Number seen	Sex composition		Age composition			Habitat	Activity	Remarks
			Male	Female	Adult	Juvenile	Calf			
1	450	4	1	3	2	2	0	Grassland	Grazing	Crossing road
2	500	5	2	3	2	1	2	Woodland	Grazing	Adult raising the trunk
3	450	4	3	1	2	1	1	Grassland	Grazing	Adult female defecating

Table 4b: Elephant Census form for Transect 2

Place: Mikumi NP

Time: Start-08:00AM **End-**12:00 PM

Date: 05/3/2015

Transect: No 2 Length 50 km

Observer's name: EZEKIEL FELICIAN

Weather: Sunshine

S/ No	Perpendicular Distance, m	Number Seen	Sex composition		Age composition			Habitat	Activity	Remarks
			Male	Female	Adult	Juvenile	Calf			
1	550	3	1	2	1	2	0	Grass land	Grazing	Crossing road
2	450	4	3	1	1	3	0	Grass land	Grazing	Adult female defecatin g
3	450	6	3	3	3	2	1	Grass land	Grazing	Scare of a vehicle
4	500	3	2	1	2	1	0	Grass land	Grazing	Adult raising the trunk

Table 4c: Elephant Census form for Transect 3

Place: Mikumi NP
PM

Time: Start-08:00AM End-12:00

Date: 06/3/2015

Transect: No 3 Length 50 km

Observer's name: EZEKIEL FELICIAN

Weather: Humidity

S/ No	Perpendicular Distance, m	Number Seen	Sex composition		Age composition			Habitat	Activity	Remarks
			Male	Femal e	Adult	Juvenile	Calf			
1	500	3	2	1	1	2	0	grassland	Grazing	Crossing road
2	100	5	3	3	2	1	1	grassland	Grazing	Scare of a vehicle
3	200	1	1	0	1	0	0	grassland	Grazing	Crossing road

NB: 1. Calf: less than one year(<1 year)

2. Juveniles: 1 to 15 years

3. Adult: 15 years and above