GROUND COUNTS FOR MEDIUM - LARGE MAMMALS IN KATONGA WILDLIFE RESERVE, UGANDA

Report prepared by

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Abstract

(i) Katonga Wildlife Reserve (KTWR) is still under threat of invasive *Lantana camara* species now that the two main land title holders of Byabasita and Kisororo were compensated and all the people including pastoralist were yet to be completely evicted from the reserve.

(ii) The objectives of this survey were; to generate information on populations for the medium to large mammals, assess mammal distribution patterns and to generate information for monitoring and assessing the effectiveness of current conservation strategies in KTWR.

(iii) The transect survey method was used as used; it involved walking along transects during data collection. We undertook counts along a few tracks towards the reserve headquarter also. Tracks towards headquarter are largely in open sites where habitat manipulation through regulated burning and thickets removal was done. Within the 60 minutes of walking along the tracks we encountered more diversity in wild animals than any other area in the reserve. For example, we recorded waterbucks, impalas, bushbucks, warthogs, vervets, duikers, zebra and reedbucks respectively. However, only one zebra was recorded out of the five recorded during 2015 survey. It is possible that the zebra could have died because carcasses of zebra, bushbuck and waterbuck were recorded.

(iv) The wild animal population in KTWR is slowly growing. Black and White colobus (1,290) were the most abundant species recorded. This is no surprise because most of KTWR land cover is now wooded; this was followed by bushbuck (952), waterbuck (871), reedbucks (597) and duikers (393) in order of reducing population. The Giant forest hog, impala, Red colobus and hippopotamus numbers recorded were so small to be analysed in DISTANCE.

(v) Cattle grazing as one of the human activities recorded in addition to tree cutting and poaching are some of the threats to this wildlife habitat. However, now that the title holders were evicted; invasive plant species such as *Lantana camara* remain the biggest challenge in KTWR.

(vi) The slow increase in species numbers could be due to the poaching activities recorded as well as the presence of the invasive plant species. Therefore, there is need to aggressively control the spread of invasive species such as *Lantana camara*; now that the encroachers were evicted.

(vii) There is need to intensify surveillance activities to prevent remnant cattle grazers that sneak into the reserve. However, there is also need to re-package the sensitization protocols for the communities about the benefits of conservation and the need to avoid grazing in the reserve.

1.0. Introduction

Katonga Wildlife Reserve (KTWR) is one of the many reserves where cattle grazing had remained a big challenge over the years. However, with the eviction of the community and the land title holders from the reserve, sanity has been realized in the reserve. What remains as a major challenge to conservation is the presence of the invasive plant species that have occupied large expanses of the reserve.

The presence of the invasive plant species has been closely linked to the negative effects of altering the distribution pattern of wild animal species as they compete for food resources and space. This has further exposed the wild animals to poaching as they wonder to look for better areas with pasture. The big question remains; will the reserve regain its status to ensure species survival despite the evictions?

Because of the questions and, as outlined in the Annual Operation Plan, and the strategic plan (2013-2018), Uganda Wildlife Authority through its Ecological Monitoring and Research Unit (EMRU) conducted a ground count/survey in KTWR. The objective of the survey was to; generate information on populations for the medium to large mammals, assess mammal distribution patterns as well as generating information for monitoring and assessing the effectiveness of current conservation strategies in KTWR.

The ground mammal count was successfully carried out from 23rd May to 11th June 2017. The wild animal population in KTWR was slowly growing. However, we still record a slow increase in species numbers could be due to the poaching activities recorded as well as the presence of the invasive plant species. The presence of these challenges especially the invasive plants could be leading to the changes in the distribution of some habitat sensitive species such as the zebra and impala in this reserve.

Since 2008, much has changed in terms of species diversity, vegetation change and the impact of human activities around and within the reserve. The overall aim of the survey was to determine the status of mammal species in Katonga Wildlife Reserve after eviction of the communities.

1.1. The specific objectives of the survey were;

(i) To generate information on populations for the medium to large mammals,

(ii) To assess mammal distribution patterns in KTWR

(iii) To as well as generating information for monitoring and assessing the effectiveness of current conservation strategies in KTWR.

2.0. Description of the survey area

Katonga Wildlife Reserve which derives its name from the Katonga River is located in Kyenjojo and Kamwenge districts in western Uganda and covers an area of about 210 km^2. It was gazetted as a Game Reserve in 1964 and later became a wildlife reserve in 1996. Figure 1 shows the location of the study area.

In the late 1960's the wildlife reserve served as a pathway for game migration between western Uganda, Sudan and Tanzania, however poaching and Un controlled cattle grazing and encroachment took a heavy toll on wild species in the seventies and eighties. As a result Topi, eland, oribi, zebras and roan antelope went extinct in Katonga WR.

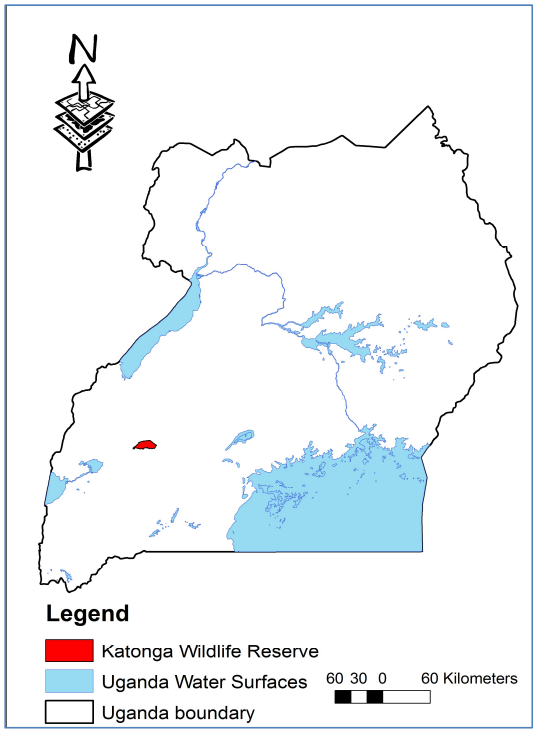


Figure 1: Location of Katonga Wildlife Reserve

3.0. Method and Materials

The same survey method as used in 2008, 2013 and 2015 was used. The survey team comprised of 4 members for each of the 4 groups headed by experienced team leaders with knowledge in using distance sampling technique as described by (Buckland *et al* 1993); and had received prior training during the 2015 census and could effectively handle most of the survey equipment. The ground count started at as early as 6:30 a.m. and lasted till 6:30 pm given that most transects were located very far away and had to be reached on foot by 9.00 am. This was necessary for early spotting of animals and to be able to come back and prepare for next day as the census activity became tiresome. A total of 32 transects each approximating to 2.5 km were walked twice to get a larger sample of populations for data analysis. Transects were walked quietly in the North-South direction with the help of a hand

held GPS for marking waypoints of animals sighted and a topographic map. Each individual or group of animals sighted on either side of the transect was counted and the perpendicular distance from the line transect recorded using range finders as data was being recorded on the data sheets. Most transects were located in bush land and thickets of *lantana camara* making it cumbersome to access and sight animals therefore, pangas were used to cut through to ease movement.

For purposes of animal identification various methods of counts were used. Direct counts were used to identify common conspicuous species like bushbucks, duikers, reedbucks and waterbucks. Indirect counts using spoors such as animal dung and footprints were used to verify the presence or absence of buffaloes and elephants reported to exist in the reserve. From this particular study the elephant presence was recorded through its dung though buffalo presence was not recorded. For species like (Sitatunga and hippos) found mainly within inaccessible habitats along swamps of the Katonga River due to their behavior, sample point counts were used to find out if they still existed but could not yield much information during the survey to warrant estimates.

Counts along tracks and roads within a limited area of the reserve towards the KTWR headquarter were undertaken for approximately 60 minutes to assess the abundance of animal species living in the sites where habitat manipulation through removal of invasive *Lantana camara* and other thickets by UWA and the management partner of KTWR took place. Data collected from transect count was entered into an excel spread sheet and through use of program DISTANCE analyses were undertaken to estimate animal species numbers and the distribution patterns of all wild animals within the reserve. Encounter were also used respectively.

3.1. Survey design

A survey design as used in 2008, 2013 and 2015 was used for this 2017 survey as shown in *Figure 2* below;

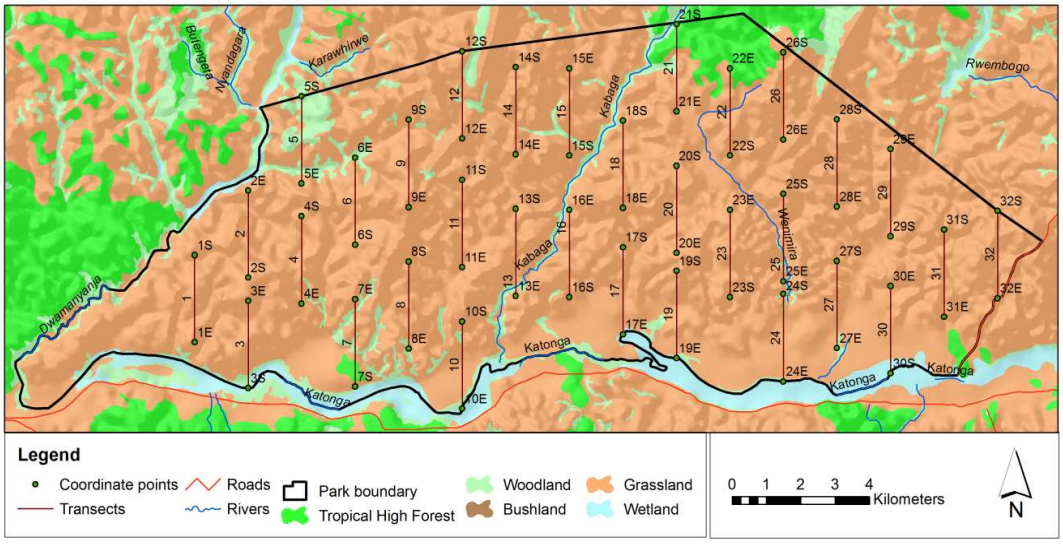


Figure 2: Location of transects in Katonga Wildlife Reserve

4.0. Results

4.1. Transect observations

During the ground sample count, the following animals were directly sighted; Bushbuck, duiker, waterbuck, reedbuck, Black & White colobus, Giant forest hog, impala, Red colobus and hippopotamus. Black and White colobus (1,290); this was followed by bushbuck (952), waterbuck (871), reedbucks (597) and duikers (393) in order of reducing population (Table 1). The Giant forest hog, impala, Red colobus and hippopotamus numbers recorded were so small to be analysed in DISTANCE.

Table 1: Population estimate for mammals in KTWR, 2017

Species	Density	Population Estimate	SE	95% Confidence interval	
				LCL	UCL
Bushbuck	8.29	952	132	722	1,256
Duiker	3.02	393	89	250	619
Reedbuck	4.59	597	190	321	1,110
Waterbuck	6.70	871	304	442	1,717
Black& White Colobus	16.97	1,290	248	882	1,888
Bush pig	4.65	237	86	118	477

4.1.2. Road counts

Road counts along tracks towards Katonga WR headquarters were undertaken. Within 60 minutes of walking along the tracks we encountered more diversity in wild animals than any other area in the reserve. For example, we recorded waterbucks, impalas, bushbucks, warthogs, vervets, duikers, zebras and reedbucks respectively. Waterbucks (292) were more abundant followed by warthogs (133), impalas (103), vervets (52), bushbucks (21), zebra (1) and duikers (1) in order of reducing numbers (Figure 3).

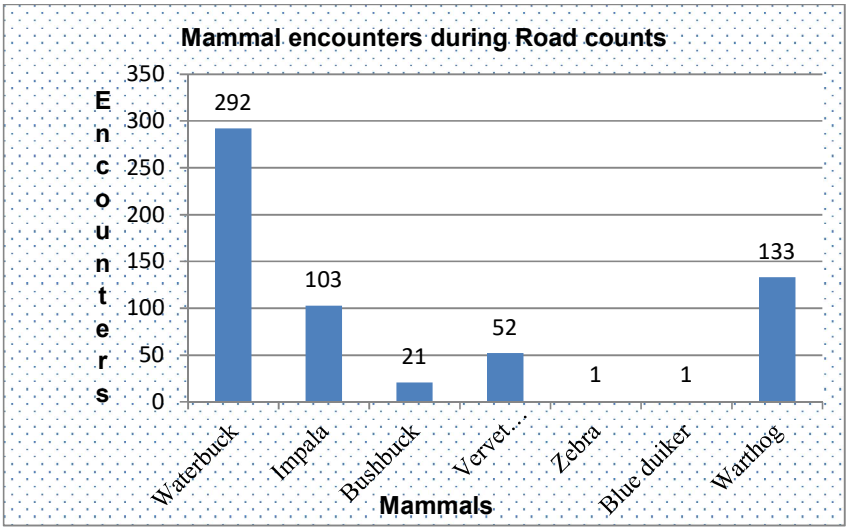


Figure 3: Mammal encounters during road counts in KTWR

4.2. Habitat dynamics

Katonga Wildlife Reserve has undergone tremendous changes in its flora. Observations made during the survey indicate that quite large areas of the reserve were covered by wooded vegetation and invasive plant species such as *Lantana camara* (Plate 1). Katonga could be undergoing ecological succession or from grassland and woodland to bush land and colonising forests. Surveys as early as 90s classified the vegetation into woodland comprising of *Acacia hockii* and *A. seiberiana,* riverine forest, papyrus swamp, pockets of tropical forests and grassland areas dominated by *themeda, imperata* and *cymbopogon* which are common in overgrazed areas of the reserve.

Plate 1: *Lantana camara* in KTWR

4.3. Human Activities in Katonga Wildlife Reserve

During the survey, several human activities currently in Katonga Wildlife Reserve were recorded. Among those recorded were; tree cutting, poaching (Plates 2 and 3) and cattle grazing (Plate 4 and figure 4). These activities undermine wildlife conservation efforts and need to be prevented.

Plate 2: **T**ree cutting (right) in KTWR

Plate 3: **W**ire snares set by poachers to trap wild animals in KTWR

Plate 4: **Cattle grazing (*left*) and cattle watering site (*right*)** in KTWR

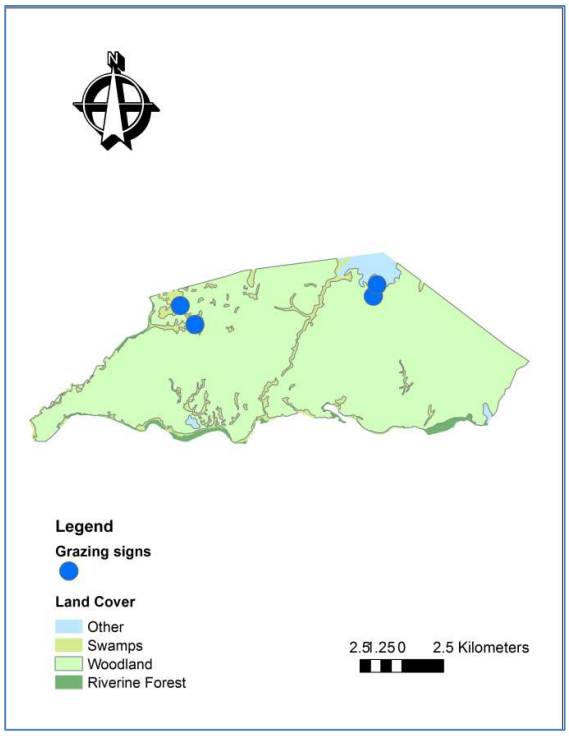
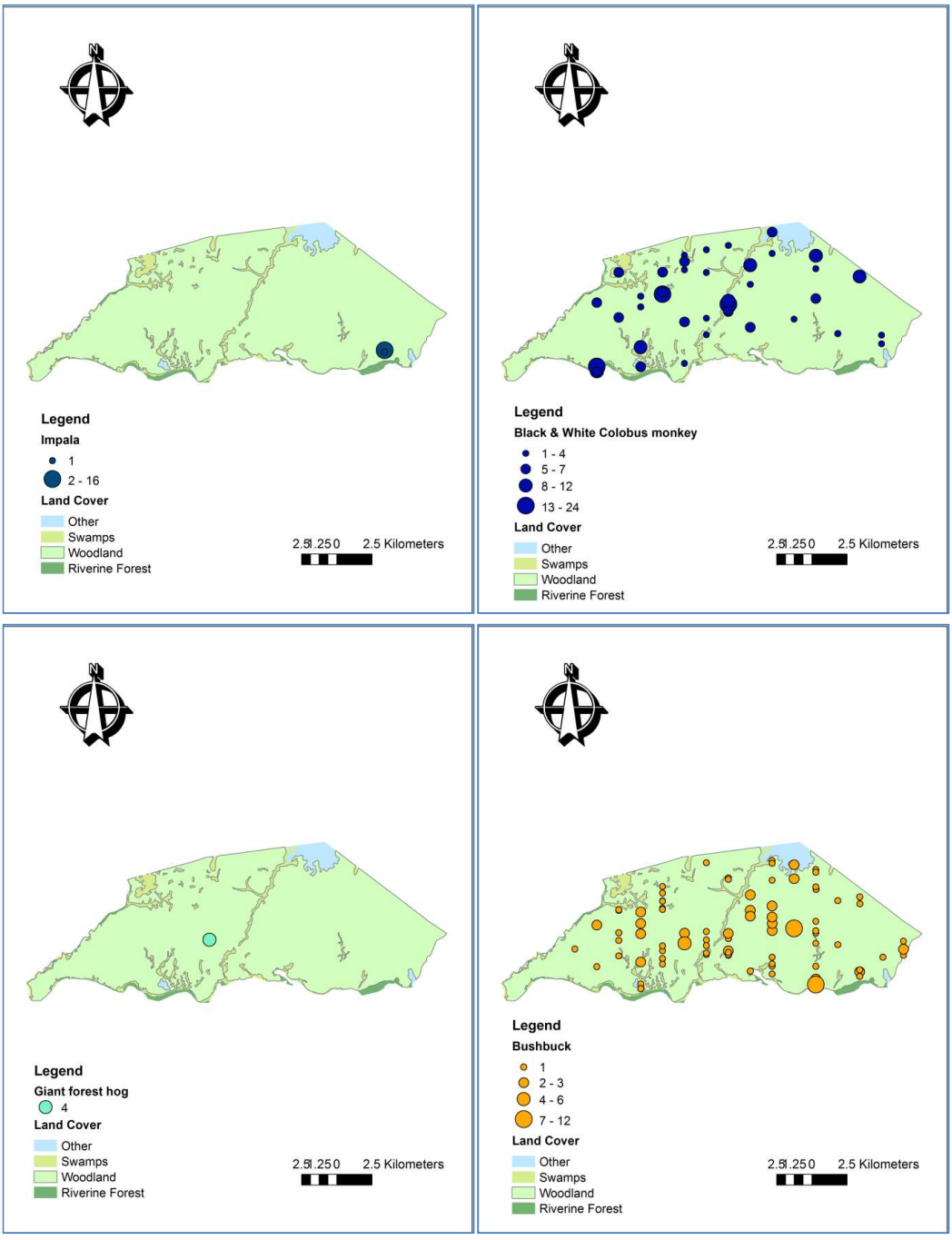
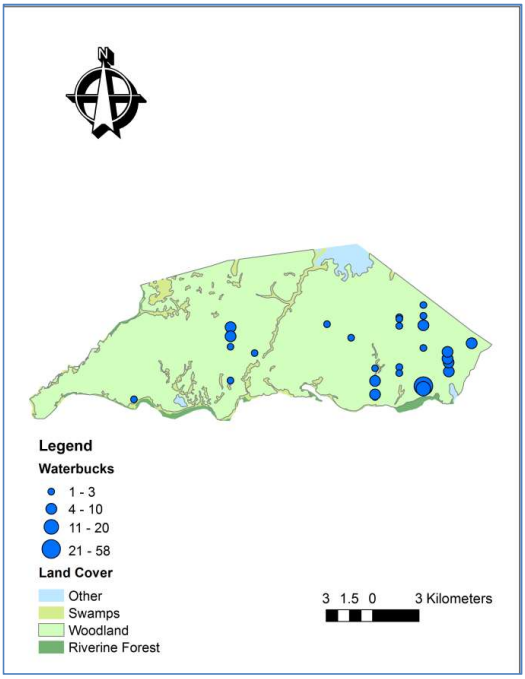


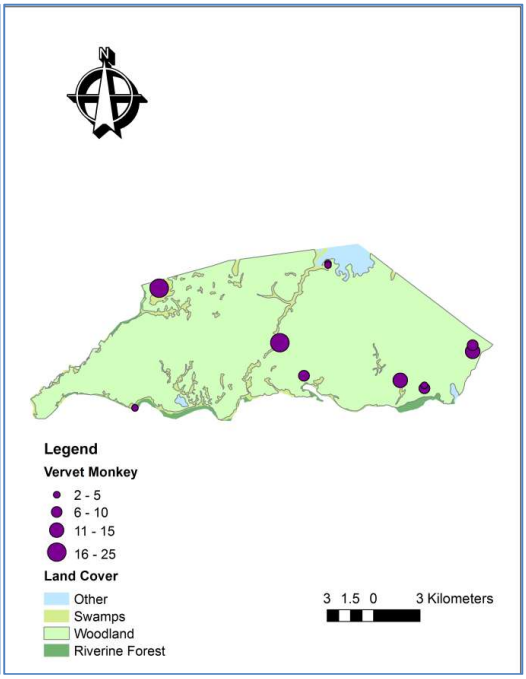
Figure 4: Distribution of cattle signs in KTWR

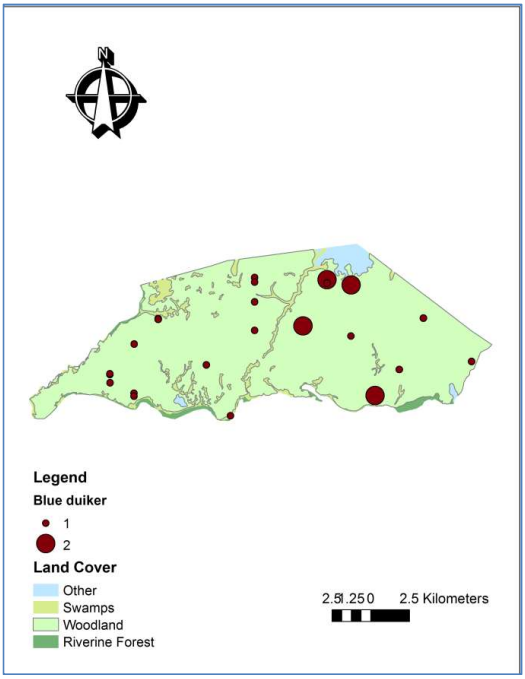
4.4. Density distribution maps for mammals in KTWR

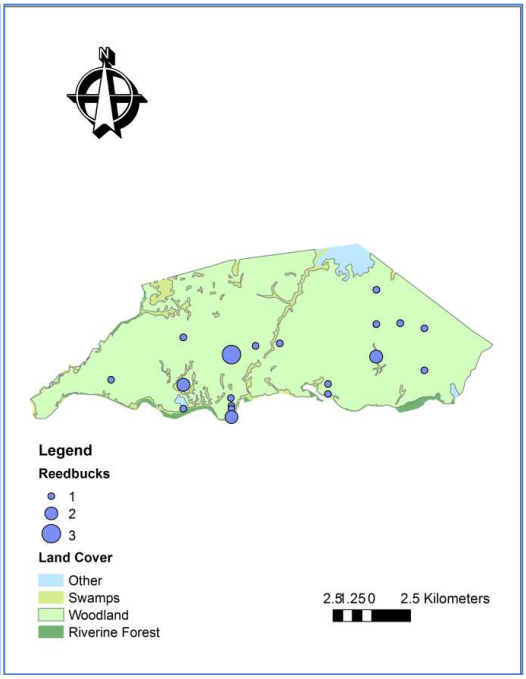
Spatial distribution maps for animal species recorded during the survey were geographically referenced using the GIS computer package Arc GIS 10.2.2. Black and White colobus monkeys were widely distributed more than any other species from direct observations. This was followed by duikers, reedbucks and warthogs respectively (*see* Figure 5). Impalas were found close to the reserve headquarters and along the track to the education centre. This is believed to be their ranging area when we consider their distribution in the past surveys in KTWR also (*see* Figure 5).

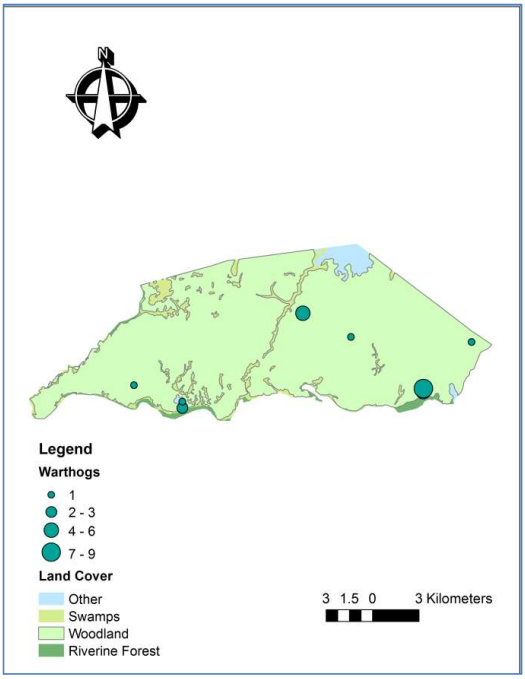


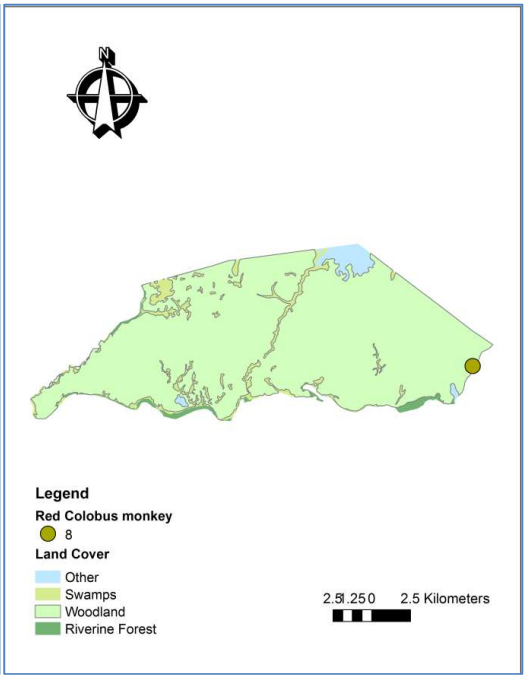

Legend
Waterbucks
1 - 3
4 - 10
11 - 20
21 - 58
Land Cover
Other
Swamps
Woodland
Riverine Forest
3 1.5 0 3 Kilometers

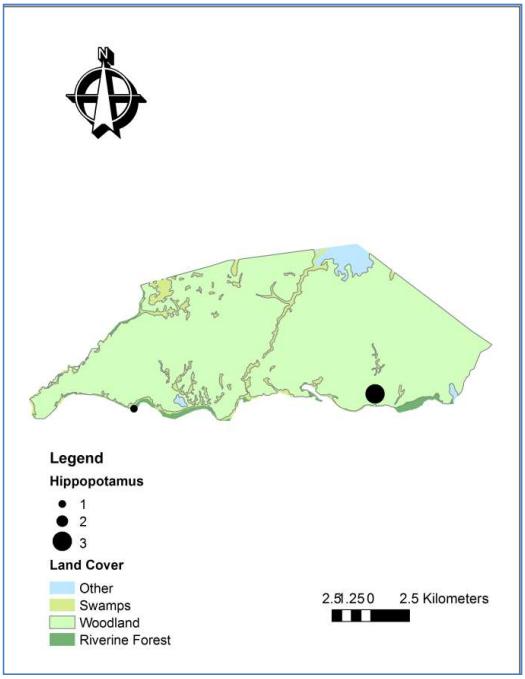

Legend
Vervet Monkey
2 - 5
6 - 10
11 - 15
16 - 25
Land Cover
Other
Swamps
Woodland
Riverine Forest
3 1.5 0 3 Kilometers

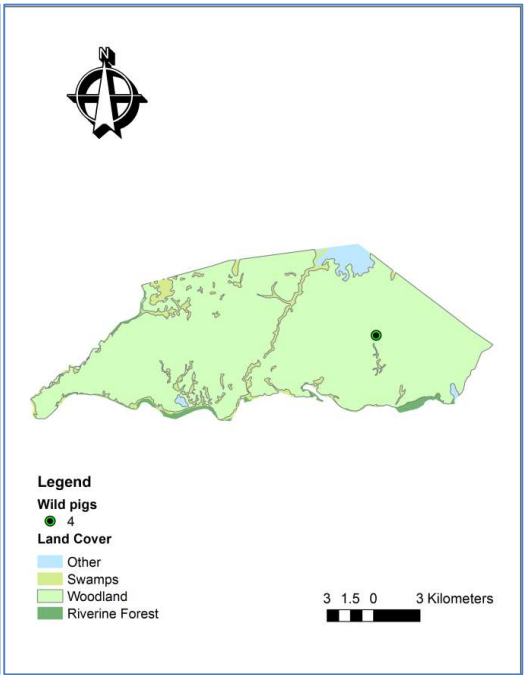

Legend
Blue duiker
1
2
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Reedbucks
1
2
3
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Warthogs
1
2 - 3
4 - 6
7 - 9
Land Cover
Other
Swamps
Woodland
Riverine Forest
3 1.5 0 3 Kilometers


Legend
Red Colobus monkey
8
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Hippopotamus
1
2
3
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Wild pigs
4
Land Cover
Other
Swamps
Woodland
Riverine Forest
3 1.5 0 3 Kilometers

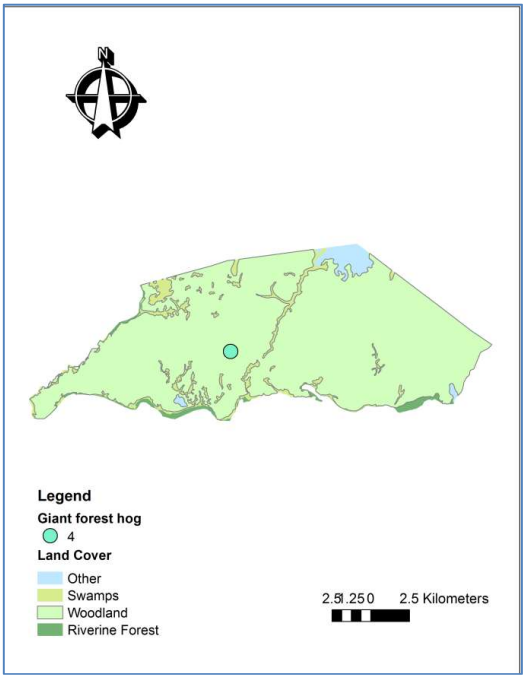
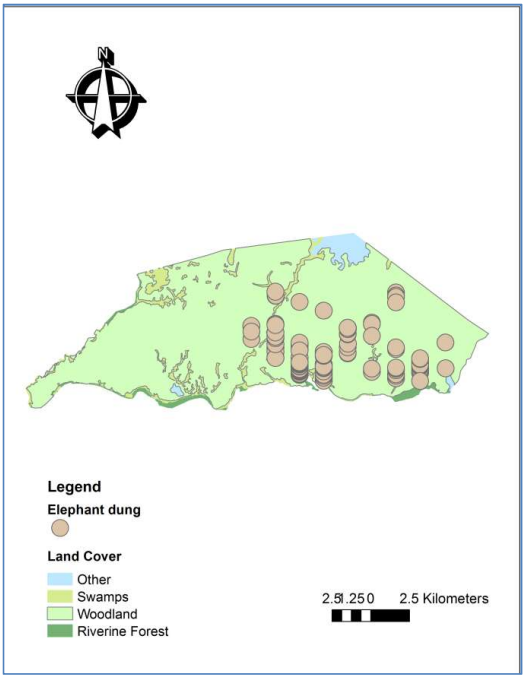


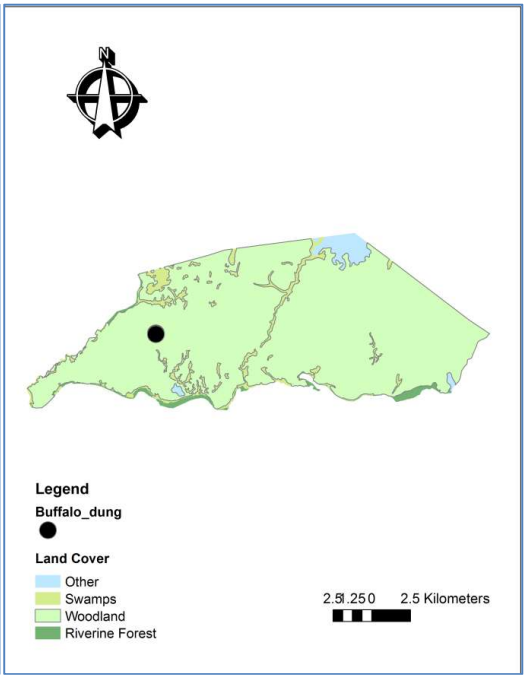
Figure 5: Density distribution maps for impala, Black and White colobus, duiker, reedbuck, warthog, Red colobus, hippopotamus, wildpig and Giant forest hog in KTWR

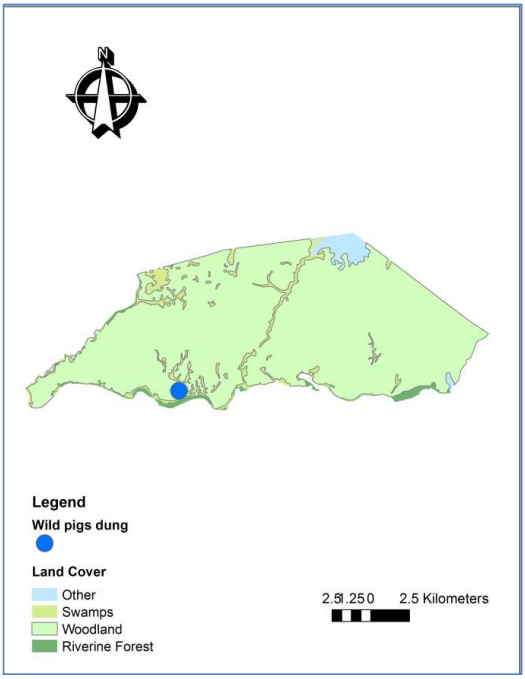
4.5. Mammal distribution by spoors for key species in KTWR

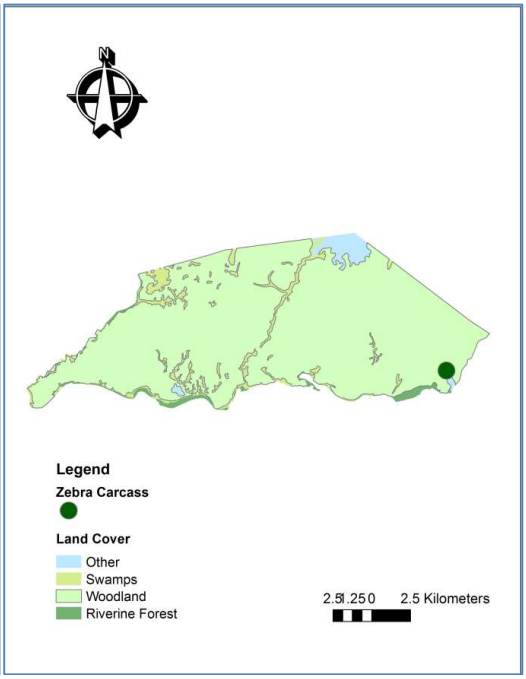
Mammal spoors sighted during the ground count as opportunistic observations for monitoring purposes were also recorded. Worthy to note, are the spoors of elephants (Plate 5) and buffalo (Figure 6). Others recorded include carcasses for waterbucks, zebra and bushbucks as well as spoors for wild pigs/bush pig (Figure 6). Transect 27 had most recorded carcass encounters followed by transects 22 and 31.Bushbuck carcass encounters were recorded most then zebra and waterbuck respectively.

Plate 5. Elephant dung (left) and a tree destroyed by elephants in KTWR


Legend
Elephant dung
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Buffalo_dung
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Wild pigs dung
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers


Legend
Zebra Carcass
Land Cover
Other
Swamps
Woodland
Riverine Forest
2.5 1.25 0 2.5 Kilometers

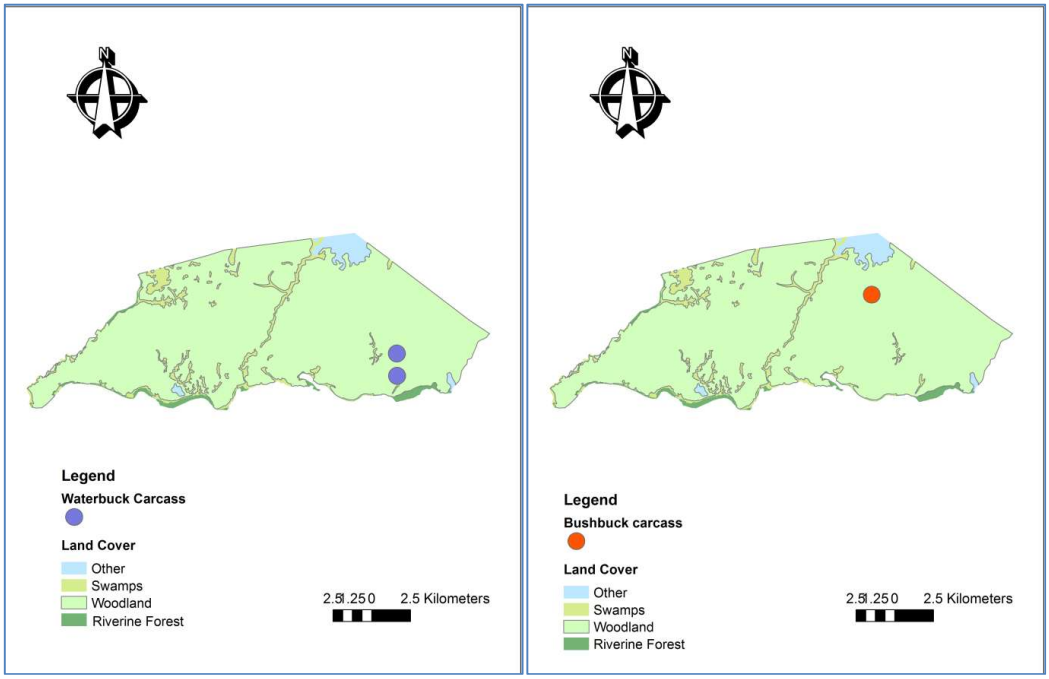


Figure 6: Spatial distribution by spoors for Elephants, buffalo, zebra, waterbuck, bushbuck and wild pigs in KTWR

5.0. Discussion

The survey findings show a recovering population in KTWR. The increase in Black and White Colobus Monkey probably could be attributed to habitat change from grassland towards a canopy like forest vegetation preferred by Monkeys. Elephants and buffalos were observed through their spoors for habitat range monitoring as key species. Impalas translocated from Lake Mburo National Park have registered an increase in numbers. However, only one zebra was observed in 2017 compared to the five zebras recorded in 2015. The zebra carcass encounter recorded gives an insight into possible death of the zebras. This is a challenge to conservation and the future of translocation programmes in KTWR. The fact that carcasses of other species were recorded and the poaching tools recorded we are tempted to think that the deaths could be a combination of factors such as poaching, natural death and starvation due to habitat deterioration.

Lantana infestations can sometimes be so persistent that they can completely stall the regeneration of rain forests for several years. For example, Lantana has also been identified as a potential threat to more than 60 plant and animal species of conservation significance in Queensland (FAO).

Human activities (Plates 2,3 and 4)observed during the ground count undermine conservation efforts and could threaten the survival of wild animal species in KTWR making them

vulnerable as a result of the continued loss in productivity of the wildlife habitat as well as poaching. This may in turn lead to the decline in wild animal numbers. For example, since the 2015 count, cattle presence in the reserve was still evident though in small numbers. Evidence of poaching involving use of snares was still evident in the reserve also.

After eviction of the communities from the reserve, we observed an increase in the thicket coverage due to absence of cattle that used to graze and create trails. However, the feeding range for elephants also increased. The elephant numbers are still small to cause habitat modifications that could favor grazers. Whereas grazing in the reserve created competition for pasture, water and space amongst cattle and wild animals, Lantana threatens natural habitats and native flora and fauna. Lantana infestations can sometimes be so persistent that they can completely stall the regeneration of rain forests for several years. For example, Lantana has also been identified as a potential threat to more than 60 plant and animal species of conservation significance in Queensland (FAO).

6.0 Conclusion and Recommendations

The wild animal population in KTWR is slowly growing. We still record a slow increase in species numbers due to the poaching activities recorded as well as the presence of the invasive plant species. The presence of these threats especially the invasive has led to the changes in the distribution of some habitat sensitive species such as the zebra and impala.

Issues to act upon

(i) Aggressively control the spread of invasive plant species especially the *Lantana camara* from the reserve. A combination of methods would provide better solutions.
(ii) Open up trac ks inside the reserve to ease patrols
(iii) Strengthen community sensitization about the dangers of poaching
(iv) Strengthen the law enforcement in KTWR to effectively carry out patrols and flush out human activities.
(v) Review the translocation process for species such as the zebra to improve their chances of survival

Acknowledgement

We thank UWA for funding this activity. Great thanks go out to all the UWA staff who endured the long walks, crossing of wetlands and the *Lantana camara* thickets to make the activity a success.

7.0. Reference

Buckland, S.T., Anderson, D.R., Burnham, K.P., & Laake, J.K (1993): *Distance Sampling: Estimating Abundance of Biological Populations*. Chapman & Hall, London & New York.

FAO. *Invasive Pest Fact Sheet*. [Available]. http://www.fao.org/forestry/13375-06ba52ce294a4e15f8264c42027052db0.pdf.

Annexes

Annex 1: Some of the participants for Katonga Wildlife Reserve census

Annex II: Some of the animal species in KTWR

Plate 6: Impalas (*left*) and Waterbucks (*right*) in KTWR

Annex III: Ground survey data sheet

Observer (TeamLeader) :	Date:	Census Number:
Transect No:	Transect length:	Other observers
Start time:	End Time:	2

Way point	Easting 36M	Northing UTM	Time	Animal species	Perp.Dist (m)	Group size	REMARKS

REMARKS: ***G***=*Grassland;* ***B***=*Bushland;* ***W***=*Woodland;* ***P***=*Poaching,* ***CT***=*Cultivation,* ***Ct***= *Cattle,* ***GR***=*Grazing,*
ANIMAL SPECIES: **A**=Aadvark, **Bf**=Buffalo, **Bb**=Bushbuck, **Bbn**=Baboon, **Z**=Zebra, **Imp**=Impala, **Wg**=Warthog, **Bp**=Bush pig, **Lpd**=Leopard, **WT**=Waterbuck, **HIPO**= Hippopotamus, **Dk**=Duiker, **Cs**= Carcass; e.g. **EL /C** (Elephant Carcass)