Assessing the distribution and habitat use of chimpanzees in the corridor forests located between Budongo and Bugoma Forest reserves in the Murchison-Semliki Landscape- REDD+

Ayebare.S., Kihumuro.P., Leal.M, & Nampindo.S

March 2018

Executive Summary

This report summarizes the findings of a chimp survey conducted in the forest fragments located within Hoima district in the Murchison – Semliki landscape under the Murchison-Semliki REDD+ (MSREDD+) project. A total of 209 chimp nests were observed during the survey with an average encounter rate of 0.76 nests per km per parish. Chimp nests were observed in 11 (Birungu, Budaka, Bulimya, Bulindi, Igwanjura, Katanga, Kibanjwa, Kibugubya, Kiragura, Kiryangobe, Munteme) of the 25 parishes that were surveyed.

The highest number of chimp nests (91) were observed in Kibugubya parish with an encounter rate of 8.5 nests per km walked, followed by Bulindi (27) with an encounter rate of 4.8 nests per km walked, Kibanjwa (24) with an encounter rate of 0.92 nests per km walked, Munteme (21) with 0.68 nests per km walked. Other primates that were observed in the corridor forests are Uganda Mangabey (*Lophocebus ugandae*), Blue monkey (*Cercopithecus mitis*), Baboon (*Papio anubis*), Black & white colobus (*Colobus guereza*), Red tailed monkey (*Cercopithecus Ascanius*) and vervet monkey (*Chlorocebus tantalus*). The Uganda mangabey, an endemic species to Uganda was observed in nine of the twenty five parishes that were surveyed and the blue monkey was only observed in the parish of Bulyango. Black & white colobus, red-tailed monkey and vervet monkey were generally common throughout the survey area while the Baboon was observed in six of the twenty five parishes observed.

The results of the survey indicate that the forest fragments between Bugoma and Budongo Forest reserves provide connectivity for the movement of chimpanzee and other primate species in the landscape. The number of chimpanzee nest counts showed stabilized populations over three years of the project time frame compared to previous survey results in the landscape. A 2008 chimp survey estimated 154 nests and a survey conducted between 2011 and 2013 estimated a population that ranged between 256 to 357 chimpanzees. There is still tremendous pressure (43% of the recce walks was modified habitat) on corridor forests due to conversion to agriculture. To maintain the functionality of the forest fragments as corridors for chimps and other primates, and increase resilience to climate change in the landscape in the long term, there is need to continue engaging the local governments and communities on reforestation of river banks, conservation farming and agribusiness.

Acknowledgements

Table of Contents

Tables

Figures

Introduction

The Murchison – Semliki landscape is located within the Albertine Graben along the eastern shores of lake Albert and is bounded by Murchison Falls National park in the North and Semliki Wildlife Reserve in the South (Figure 1). Additional protected areas in the landscape include Bugungu, Karuma and Kabwoya Wildlife Reserves (WR) and the Kaiso-Tonya Community Wildlife Area (CWA), Wambabya, Budongo and Bugoma Forest Reserves (FR) as the largest Forest blocks. There are also several smaller Central Forest Reserves and Forest fragments in the landscape. The landscape is interconnected by natural and modified habitat that includes savannah, tropical high forest, riverine forest, woodland, wetlands and agriculture. It supports a variety of flora and fauna that are of global and national conservation concern (Plumptre et al, 2010, Plumptre et al 2016). However, due to the increasing human population in the landscape, there has been tremendous pressure on natural habitat mainly through conversion to agriculture (WCS & eCOUNTABILITY, 2016). The Wildlife Conservation Society(WCS) with funding from the Darwin Initiatives implemented a project that focused on addressing the underlying drivers of unsustainable natural resource use that have led to loss of biodiversity in the Murchison –Semliki Landscape. The project's aim was to engage with the local government and the communities in Hoima district (13 parishes) to stimulate policy reform that would directly targets the reduction of pressure on biodiversity and to promote conservation farming and provide farmers with direct access to end user and wholesale agribusinesses.
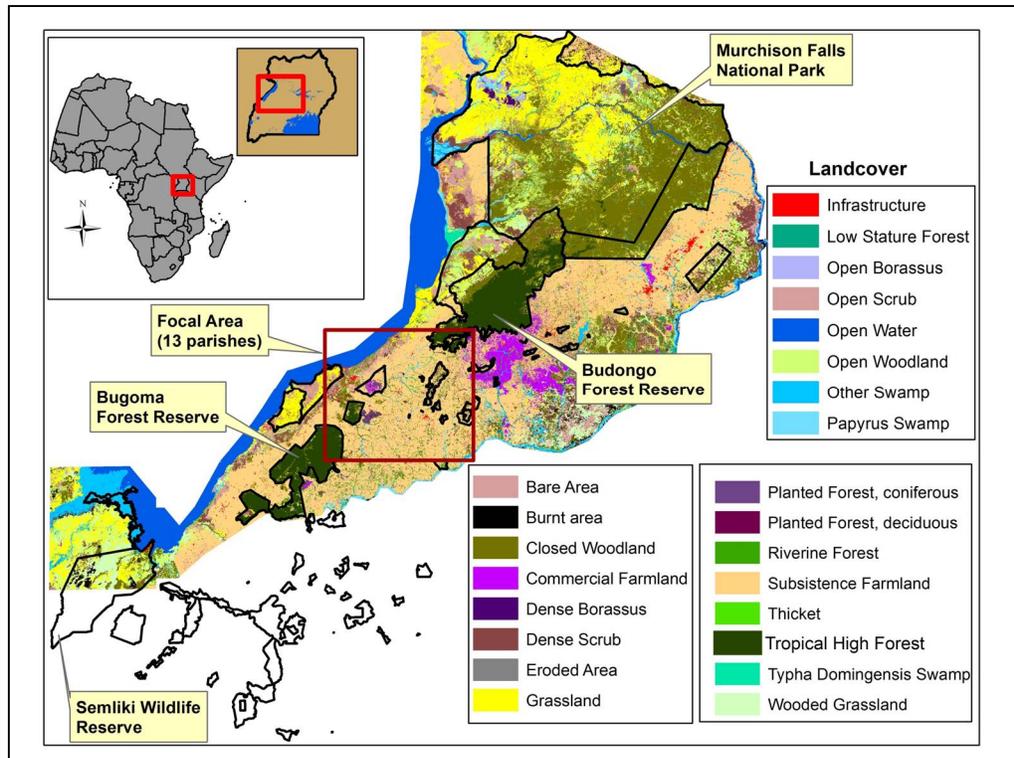

Figure 1: Location of the 13 Project parishes within the Murchison- Semliki landscape

As a result of poor land management practices and climate variability, agricultural yields are decreasing, and food insecurity is increasing in Hoima. In response, farmers are slashing and burning more forest for farmland to grow the same amount of food and cash crops. They are planting more crops in wetlands to overcome increasing water shortages. In our 13 focal parishes, 90% of the 16,000 hectares of forest is degraded and will be converted to farmland in less than 10 years if the current deforestation rate of 2, 044 hectares per year remains unchecked. These parishes contain critical wildlife corridors and wetlands, and if these remaining forest and wetlands are cleared, habitat connectivity across the district will be seriously compromised. Increased isolation due to habitat fragmentation will limit gene flow between animal populations and ultimately result in local extinction of species such as chimpanzees, grey crowned cranes and other unique Albertine rift endemics. Farmers recognize that forests act as a safety nets during droughts and hunger periods, and that their forested areas are getting smaller, but increased poverty makes it difficult for them to avoid using resources that also provide critical habitat for unique and threatened species. Promoting conservation farming and agribusiness practices would lead to increased income to farmers in the 13 parishes within Hoima district. In doing so, the need for farmers to use forest and wetland resources that provide habitat for several endangered or endemic species will be reduced.

Indicator 4 under this project stated that the "Number of chimpanzee nest counts and grey crowned cranes sightings showing stabilized populations over three years compared to the decreasing trend shown in estimates from 2000 and 2010".

A total of 4950 chimpanzees (*Pan troglodytes schweinfurthii*) were estimated to occur in Uganda during the 1999 to 2003 nationwide chimp census by WCS and The Jane Goodall Institute (Plumptre et al., 2003). Budongo and Bugoma Forest Reserves (FR) are the largest Forest blocks in the Murchison Semliki landscape and the chimpanzee population estimates in the two blocks during the nationwide chimp census were 584 and 570 respectively. The forest fragments between Bugoma and Budongo Forest reserves in the 13 parishes within Hoima district provide connectivity for the movement of chimpanzee and other species of conservation concern in the landscape. Conserving these forest fragments will ensure that animals have a viable network of forests to move through, which will prevent local extinction and increase resilience to climate change. Previous studies that have assessed the status and distribution of chimpanzees in the forest fragments linking Budongo and Bugoma forest reserves, have estimated 154 nests (0.66 individuals/km2 at one site) in 2008 and a population estimate that ranged between 256 to 357 chimpanzees with surveys conducted from 2011 through 2013 (Mclennan, 2008; McCarthy, et al 2015).

Surveys of the chimpanzees (*Pan troglodytes schweinfurthii*) were conducted in the project area during the months of November and December 2017 to assess use of forest corridors.

Survey Design

Reconnaissance walks (Recces) were used to survey the riverine forests in the study area for chimps and signs of chimpanzee activities (Figure 2). Recces involve the observers following a compass bearing along a path of least resistance (Arandjelovic et al., 2014). A total of 70 recces were established across the study area with an average length of 4.9 km. Two observers recorded locations of sightings of chimps, chimp nests, age of chimp nests, other mammals seen, signs of species' presence and the habitat type along the recces. The habitat type along the recces was recorded every 250m and when an observation of a species was made. The location of transects were determined by extracting riverine forest/ tropical high forest from the Murchison-Semliki Landcover map and assigning end and start points of the recces (WCS & eCOUNTABILITY, 2016). It was not practical to use systematic sampling (transects), given that the surveys were targeting a river course in a highly fragmented landscape.
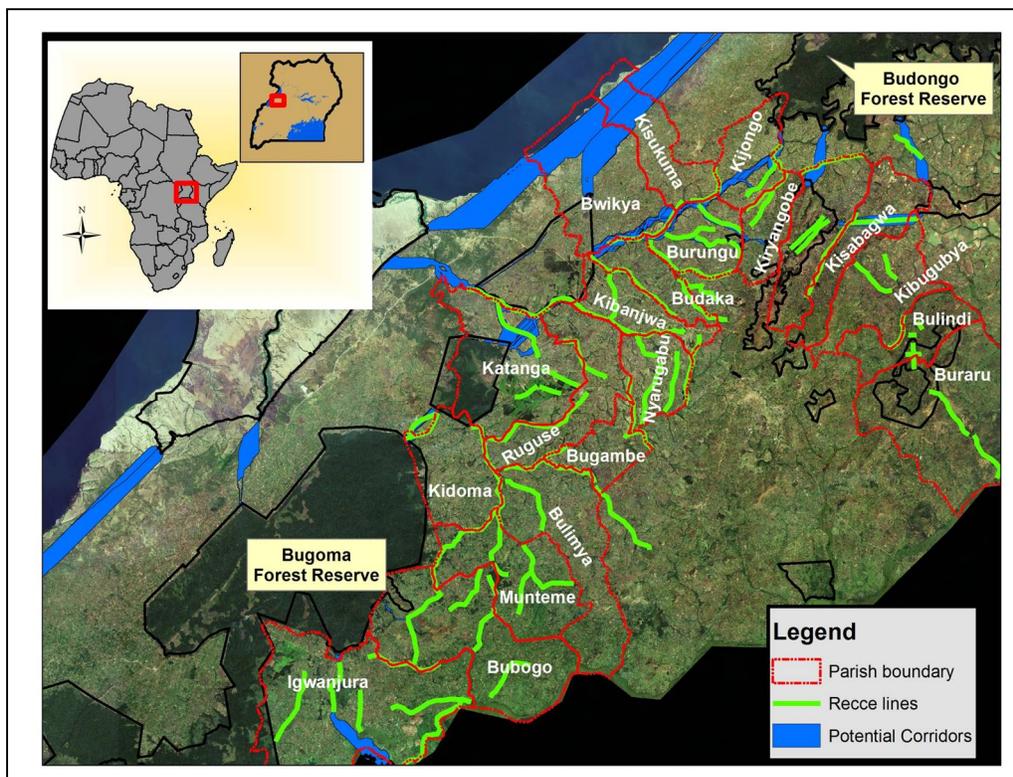
Figure 2: Location of recces in the study area

Results

Recces were used to calculate encounter rates for chimps per kilometre walked and to identify the locations where other mammals were observed. A total of 341 kilometres were walked in the 25 parishes that were surveyed (Table 1). Encounter rates were calculated for all species per parish that were observed along the recces (Table 1). A total of 7 primate species were observed during the survey (Chimps (nests), Uganda Mangabey (*Lophocebus ugandae*), Baboon (*Papio anubis*), Black & white colobus (*Colobus guereza*), Blue monkey (*Cercopithecus mitis*), Red tailed monkey (*Cercopithecus Ascanius*) and vervet monkey (*Chlorocebus tantalus*). A total of 209

chimp nests were observed during the survey with an average encounter rate of 0.76 per km per parish.

Table 1: Number of times mammals were observed along recces and encounter rates per km walked in brackets in each parish (Chimp counts are shown in bold in column 6)

Parish	Distance walked per Parish (km)	Baboons	Black & White Colobus	Blue monkey	Chimp (nests)	Uganda Mangebey	Red-tailed monkey	Vervet monkey
Birungu	19.91		27(1.36)		**10 (0.5)**			33 (1.6)
Bubogo	12.34		27(2.2)			10(0.81)	22(1.8)	
Budaka	3.97		13(3.3)		**7 (1.8)**			10 (2.5)
Bugambe	8.32		42(5)					17 (2)
Bulimya	20.55	15(0.72)	67(3.3)		**2(0.09)**	1 (0.04)	8(0.39)	45 (2.2)
Bulindi	5.66		4(0.71)		**27(4.8)**			
Bulyango	8.95		74(8.3)	16(1.8)		5 (0.56)	70(7.8)	
Buraru	9.54	15(1.57)	37(3.9)				6(0.63)	30(3.14)
Bwikya	5.55		8 (1.4)				2(0.36)	22 (3.9)
Igwanjura	33.04		2 (0.06)		**1(0.03)**	56(1.69)	16(0.48)	20 (0.6)
Karongo	14.86	15 (1)	5 (0.34)				22(1.48)	
Kasongoire	4.66		12 (2.6)					20 (4.3)
Katanga	22.75		78 (3.4)		**16 (0.7)**	2 (0.09)	69(3.03)	35 (1.5)
Kibanjwa	26.03	10(0.38)	16(0.61)		**24(0.92)**		15(0.57)	61(2.3)
Kibugubya	10.67		52 (4.9)		**91 (8.5)**		19 (1.8)	41 (3.8)
Kidoma	15.88		12(0.76)			32(2.01)		14(0.89)
Kiragura	8.60		6 (0.69)		**8 (0.93)**		38(4.41)	47 (5.5)
Kiryangobe	6.73				**2 (0.29)**			6 (0.89)
Kisabagwa	11.90		8 (0.67)				8 (0.67)	15 (1.3)
Kisukuma	3.91							45(11.5)
Kyabisagazi	5.75		14 (2.4)				12 (2.08	
Kyamucumba	4.75		2 (0.42)				3 (0.63)	
Munteme	30.52	12(0.39)	68(2.22)		**21(0.68)**	65(2.12)	30(0.98)	22(0.72)
Nyarugabu	19.93		95(4.8)				91 (4.6)	108(5.4)
Ruguse	26.37	30(1.1)	28(1)			5(0.18)	34(1.3)	24(0.91)

Of the 7 primate species observed in the study areas, only the chimps are threatened and classified as endangered on the IUCN global redlist. Chimp nests were observed in 11 of the 25 parishes that were surveyed. The highest number of chimp nests (91) were observed in Kibugubya parish with an encounter rate of 8.5 chimp nests per km walked, followed by Bulindi (27) with an encounter rate of 4.8 chimp nests per km walked, Kibanjwa (24) with an

encounter rate of 0.92 chimp nests per km walked, Munteme (21) with 0.68 chimp nests per km walked (Tables 1& 2).

There is a correlation between reconnaissance encounter rates of chimpanzee nests and densities of chimpanzee in Uganda forests (Plumptre, et al 2003). We used an equation that was derived from the nationwide chimp census in Uganda to estimate chimp density in the study area (Plumptre, et al 2003).

The correlation equation is shown below:

$$\text{Density of chimpanzees} = 0.471 \text{ (Encounter Rate)}$$

Table 2 below shows rough estimates of densities from the correlation equation. Kibugubya and Bulindi parishes had the highest density of chimpanzees followed by Budaka, Kiragura, Kibanjwa, Katanga, Munteme, Birungu.

Table 2: Rough density estimates in the parishes where chimp nests were recorded and encounter rates per km walked in brackets.

Parish	Distance walked per Parish (km)	Chimp (nests)	Density (km^2)
Birungu	19.91	**10 (0.5)**	0.24
Budaka	3.97	**7 (1.8)**	0.85
Bulimya	20.55	**2 (0.09)**	0.04
Bulindi	5.66	**27 (4.8)**	2.26
Igwanjura	33.04	**1 (0.03)**	0.01
Katanga	22.75	**16 (0.7)**	0.33
Kibanjwa	26.03	**24 (0.92)**	0.43
Kibugubya	10.67	**91 (8.5)**	4.00
Kiragura	8.60	**8 (0.93)**	0.44
Kiryangobe	6.73	**2 (0.29)**	0.14
Munteme	30.52	**21 (0.68)**	0.32

Figure 3 shows the distribution of chimp nests and Figure 4 shows the encounter rate per km walked per recce for chimp nests in the study area.
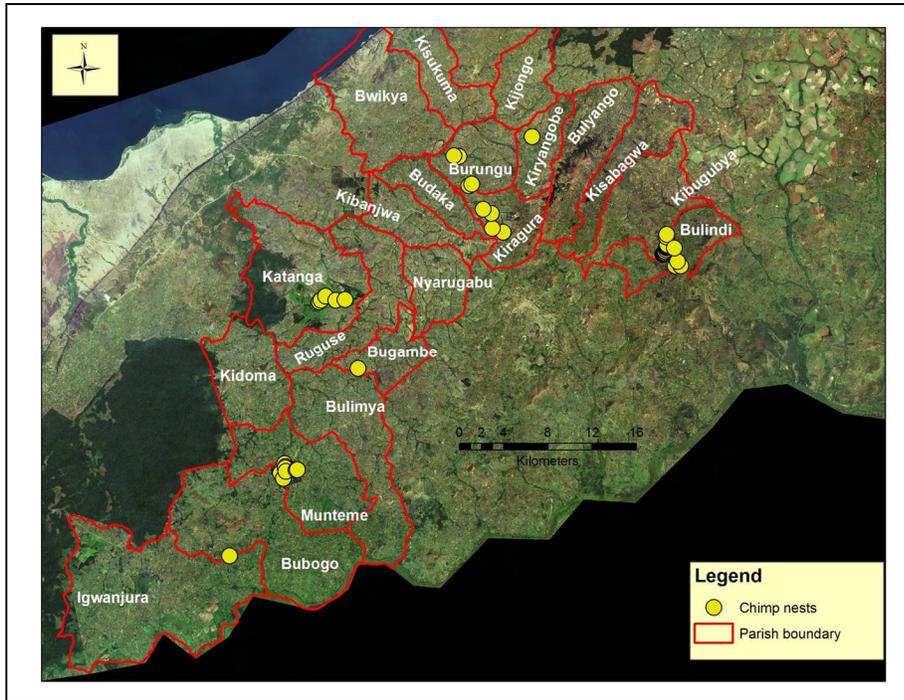
Figure 3: Location of sightings for chimp nests.
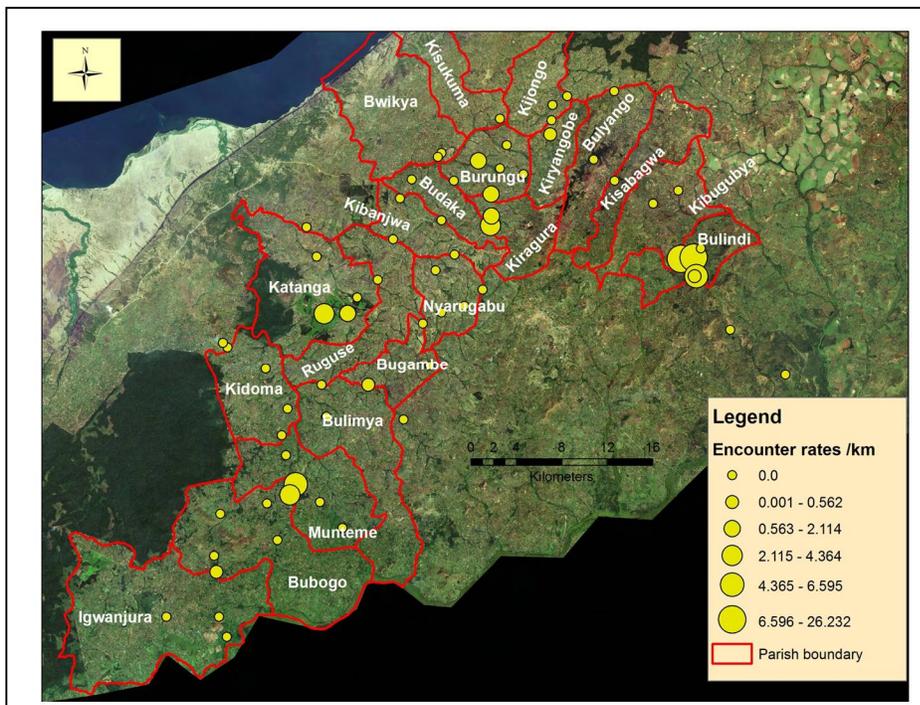
Figure 4: Encounter rate per km walked per recce for chimp nests.

Figure 5 shows the distribution of other primate species that were observed in the study area. The Uganda mangabey an endemic species to Uganda was observed in nine of the twenty five parishes that were surveyed. Encounter rates show that the parishes of Munteme, Kidoma and Igwanjura had the highest numbers of Uganda mangabey (Table 1). The interesting fact is that the Uganda mangabey, was recorded even further north close to Budongo Forest in Bulyango, a record that has erstwhile only been limited to Ruguse/Bugambe areas in previous surveys. The Blue monkey was only observed in the parish of Bulyango at encounter rates of 1.8 per km walked.

Figure 6 shows the location of sightings for Black & white colobus, red-tailed monkey, vervet monkey and Baboon. Black & white colobus, red-tailed monkey and vervet monkey were generally common throughout the survey area while the Baboon was observed in six of the twenty five parishes observed. The highest number (Six) of primate species (Chimps (nests), Uganda Mangabey, Baboon, Black & white colobus, Red tailed monkey, vervet monkey) were observed in Bulimya and Munteme parishes. In Igwanjura, Katanga, Kibanjwa and Ruguse parishes, five species were recorded per parish, followed by Bulyango, Buraru, Kibugubya, Kiragura with four primates recorded in each parish, and with Birungu, Bubogo, Budaka, Bwikya, Karongo, Kidoma, Kisabagwa and Nyarugabu having three primates each. The lowest number of primates were observed in Bugambe, Bulindi, Kasongoire, Kiryangobe, Kisukuma, Kyabisagazi and Kyamucumba.
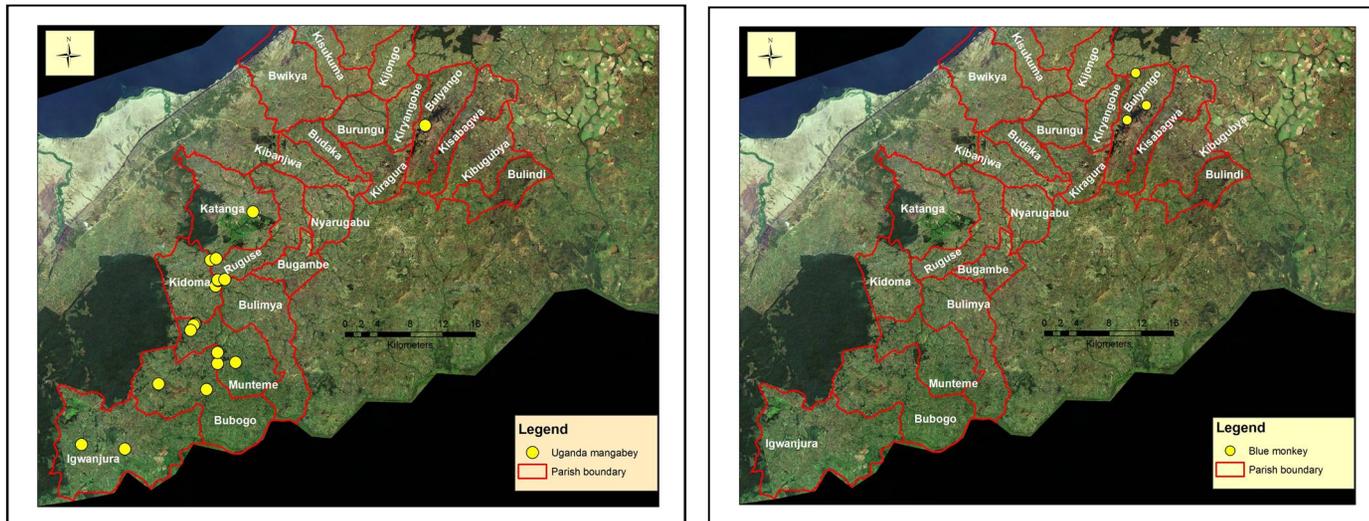

Figure 5: The location of sightings of Uganda Mangabey (left) and Blue monkey (right).
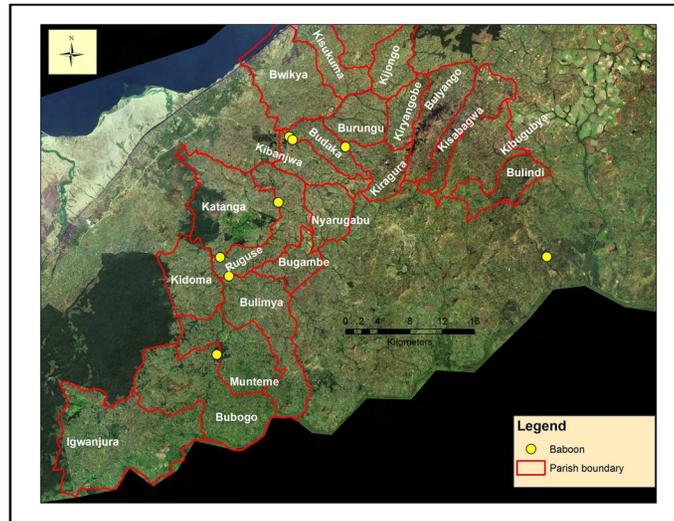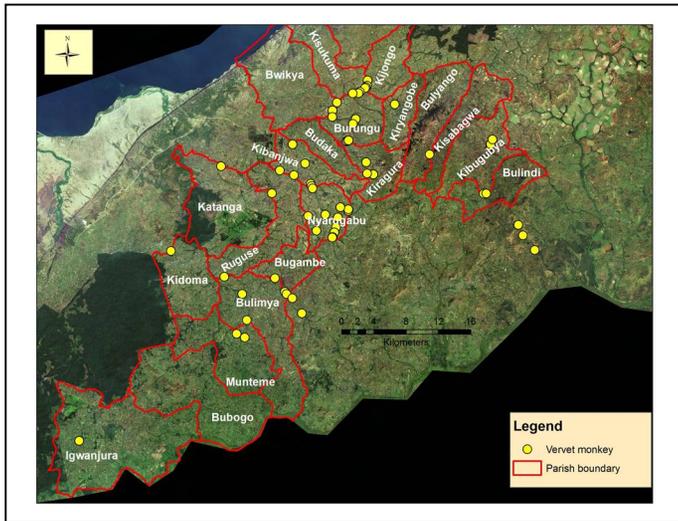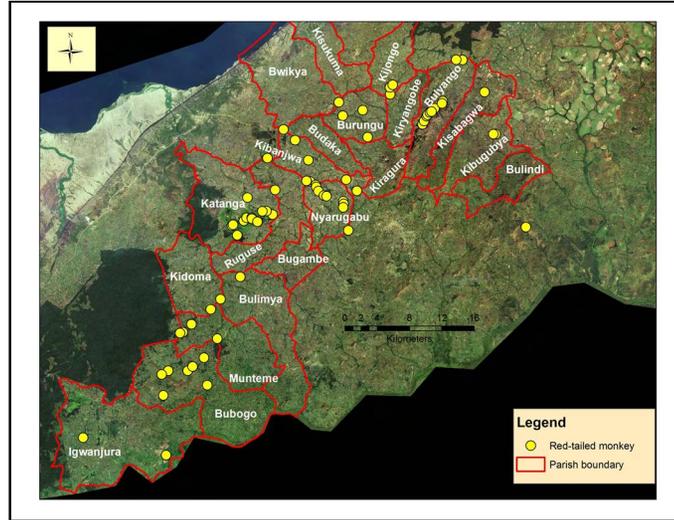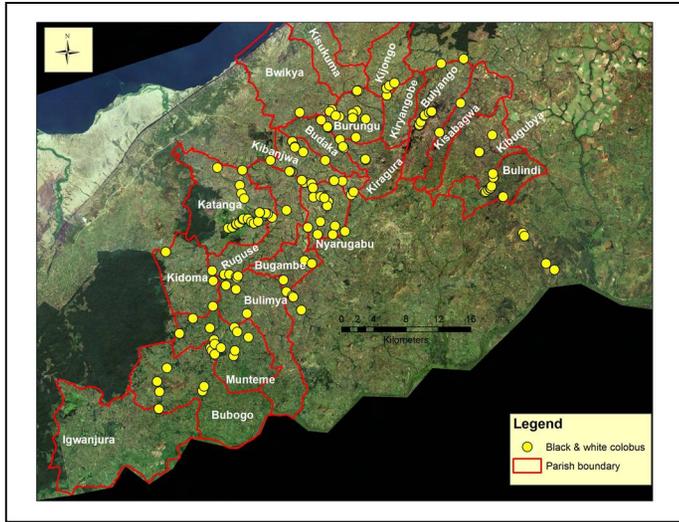
Figure 6: The location of sightings of Black & white colobus (top left), red-tailed monkey (top right), vervet monkey (bottom left) and Baboon (bottom right).

Figure 7 shows the proportion of habitats observed per parish along recces in the twenty five parishes that were surveyed. The habitats along 341 km of the recces in the study area were dominated by farmland (36%), followed by tropical high forest (20.6%), Swamp (16.7%), Scrub (12.8%), grassland (7.3%) and planted forest (6.2%). The parishes with the highest proportion of tropical high forest along the recces were Katanga (46.7%), Birungu (40.5%), Kibugubya (39.5%), Kyamucumba (36.3%), Munteme (35.7%), Kiragura (34.5%), Budaka (34.7%), Bulimya (31.6%), Bulyango (26.8%), Nyarugabu (22.5%), Bugambe (20%) and Bubogo (19.7%). The parishes with the highest proportion of modified habitat (farmland) along the recces were Igwanjura (77.2%), Kidoma (58.9%), Kisabagwa (58.6%), Bwikya (57.1%), Bubogo (56.1%), Bulyango (47.8%), Ruguse (45.7%), Kiryangobe (41.2%), Munteme (40.7%), Bulimya (37.7%), Kibanjwa (37.9%), Kyabisagazi (37%), Kiragura (36.4%), Kyamucumba (36.4%), Budaka (34.8%) and Kasongoire (34.8%). Parishes with the lowest proportion of modified habitat were Nyarugabu (3.6%), Birungu (15.1%), Bulindi (16.7%), Kisukuma (18.6%), Kibugubya (19.8%), and Bugambe (20%).
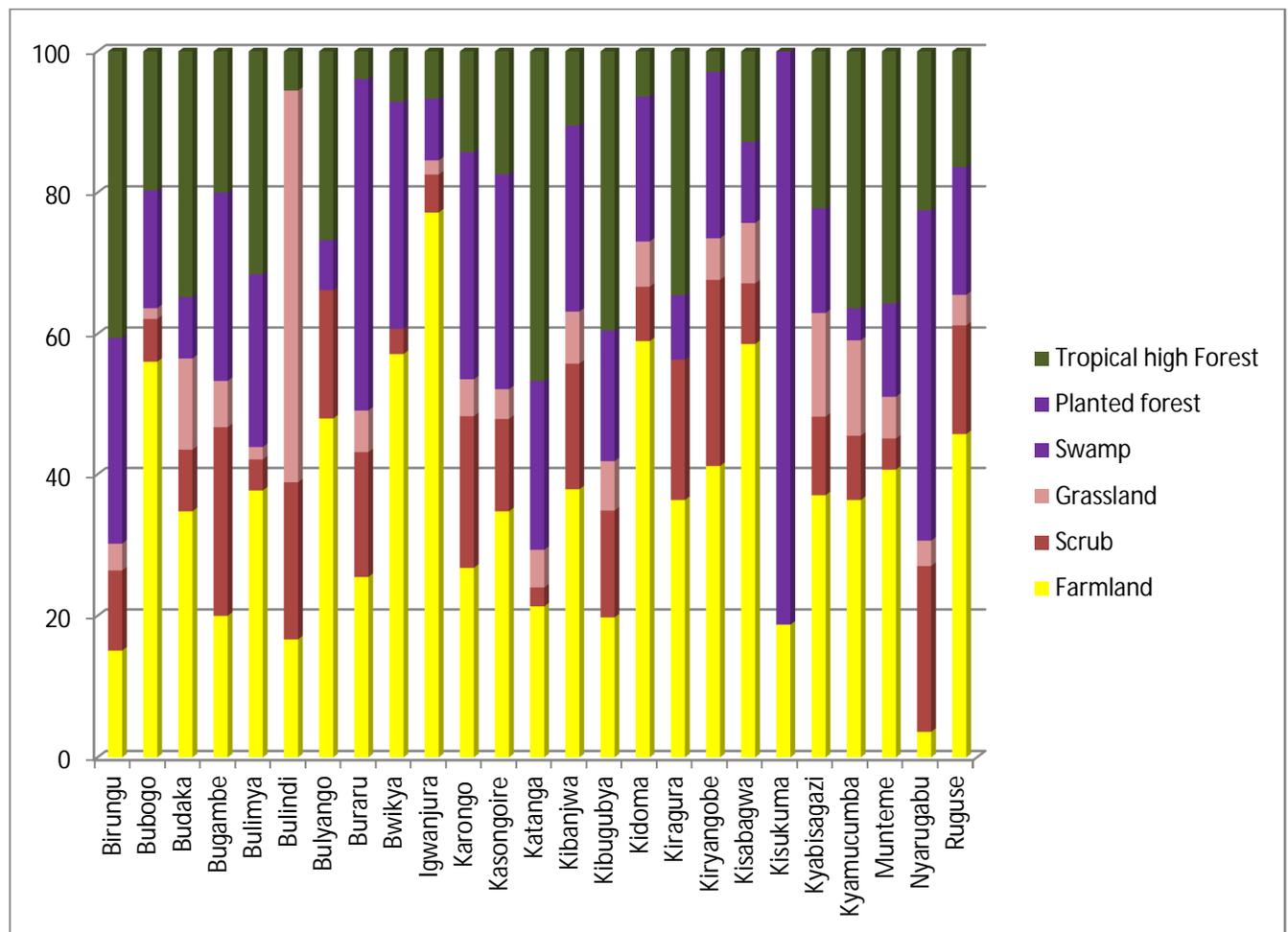

Figure 7: shows the proportion of habitats observed per parish along recces.

Table 3 gives the number of observations per species in each habitat type along the recces. The highest species richness (7) of primates were recorded in the tropical high forest, followed by scrub and farmland habitats with 6 species, and swamp habitat with 5 species.

Table 3: Number of observations per species in each habitat.

Habitat	Baboons	Black and White Colobus Monkey	Blue monkey	Chimps (nests)	Uganda mangabey	Red tailed monkeys	Vervet monkey
Farmland	1	11	1	8		2	4
Grassland		3		3			
Planted Forest		4		2		2	2
Scrub		9	1	1	1	13	10
Swamp	2	24			2	6	24
Tropical High Forest	5	97	1	62	17	47	20

Tropical high forest habitat accounted for 64% of the individuals of each species that were observed along the recess. This was followed by swamp habitat with 15.1% and Scrub habitat with 7 %. Grassland and planted forest habitats had the lowest proportion of individual species that were observed along recess with 1.6 and 2.6 % respectively.

Discussion

The results of the survey indicate that the forest fragments between Bugoma and Budongo Forest reserves within Hoima district provide connectivity for the movement of chimpanzee and other primate species in the landscape (*Lophocebus Ugandae, Papio anubis, Colobus guereza, Cercopithecus mitis, Cercopithecus ascanius, Chlorocebus tantalus*).

A total of 209 chimp nests were observed during the survey with an average encounter rate of 1.75 per km per parish. Recent studies that have assessed the distribution and status of chimpanzees in the forest fragment linking Bugoma and Budongo forest reserves have estimated 154 nests (0.66 individuals/km2 at one site) in 2008 and a survey conducted between 2011 to 2013 estimated a population that ranged between 256 to 357 chimpanzees. The number of chimpanzee nest counts showed stabilized populations over three years of the project time frame.

A total of 146km (43%) were mapped as modified habitat (farmland) along the recce walks. To maintain the functionality of these corridor forests in the long term and ensure that animals have a viable network of forests to move through, which will prevent local extinction and increase resilience to climate change, there is a need to continue engaging with the communities in activities that are likely to directly/indirectly reduce the rate of forest loss. Swamp, tropical high forest and scrub habitats have accounted for 86% of all the individuals of species that were recorded in the study area.

Some of the activities that are likely to directly/ indirectly reduce pressure on biodiversity and maintain functionality of corridors in the study area include; reforestation of degraded river banks with indigenous trees, conservation farming, agribusiness practices, household livelihood improvement programs and engaging the local government to enforce the laws governing the protection of river banks.

Conclusion
a) The results indicate that the fragment forests are still being utilised as a corridor for wildlife although this varies with location. There should be efforts to address the continued degradation of the same through linking conservation and livelihood approaches so that people are able to coexist.
b) There is need to further understand the attitudes of the community members towards primates in the landscape and provide solutions that could alter the generally increasing species habitat loss in the landscape.
c) Given the different drivers occurring in the landscape amongst others infrastructure developments for oil and gas, there is need for effective engagement with the private sector to provide assurances and mechanisms for continued wildlife conservation through innovative approaches that have been tested.

References

Arandjelovic, M. et al. Guidelines for research and data collection for the cultured chimpanzee Pan African programme- field protocol, (2014). http://panafrican.eva.mpg.de/english/approaches_and_methods.php

McLennan, M. R. (2008). Beleaguered Chimpanzees in the Agricultural District of Hoima, Western Uganda. Primate Conservation, 23(1), 45–54. http://doi.org/10.1896/052.023.0105

McCarthy, M. S., Lester, J. D., Howe, E. J., Arandjelovic, M., Stanford, C. B., & Vigilant, L. (2015). Genetic censusing identifies an unexpectedly sizeable population of an endangered large mammal in a fragmented forest landscape. BMC Ecology, 15(1). http://doi.org/10.1186/s12898-015-0052-x

Plumptre, A.J., Ayebare, S., Segan, D., Watson, J. & Kujirakwinja, D. (2016) Conservation Action Plan for the Albertine Rift. Wildlife Conservation Society Report to Governments of Uganda, Rwanda, Burundi, Tanzania and Democratic Republic of Congo

Plumptre A.J., Cox, D. & Mugume, S. (2003) The Status of Chimpanzees in Uganda. Albertine Rift Technical Report Series No. 2. Wildlife Conservation Society

Plumptre, A; Akwetaireho, S; Hänni, D C; Leal, M; Mutungire, N; Kyamanywa, J; Tumuhamye, D;Ayebale, J; Isoke, S (2010). Biodiversity surveys of Bugoma forest reserve, smaller central forest reserves,and corridor forests south of Bugoma. Uganda. Unpublished report to GEF

WCS & eCOUNTABILITY, 2016. Volume 4, Land cover analysis of LADB: Incorporating vegetation classification and land cover change.