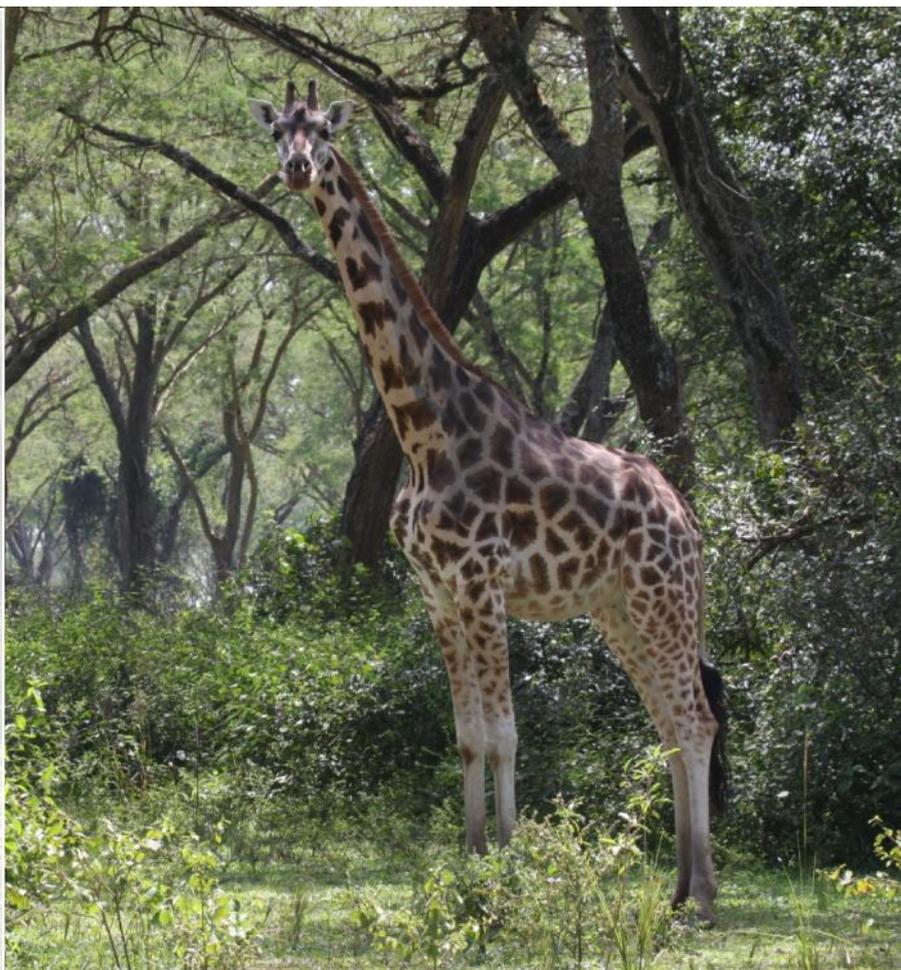


Murchison Falls Giraffe Project

Giraffe Conservation Foundation

Field Report December 2014



Michael B. Brown
March 2015



Expedition Overview

In December 2014, as part of the collaborative efforts of Giraffe Conservation Foundation (GCF) and Dartmouth College in partnership with the Uganda Wildlife Authority (UWA) and Uganda Wildlife Education Centre (UWEC), PhD student and researcher Michael B. Brown travelled to Murchison Falls National Park, Uganda to continue ongoing research and monitoring of the largest wild population of Rothschild's giraffe. This expedition provided an invaluable opportunity to establish monitoring protocol and lay a solid foundation for efforts to understand the population dynamics of the Rothschild's giraffe in Murchison Falls National Park. In addition to solidifying monitoring methods and conducting targeted giraffe surveys in the Park, this expedition provided useful time in-country to address the less glamorous but crucial aspects of field research including permit applications and developing partnerships in country. Building off of July 2014 field work, this expedition represents an important step in developing the first-ever comprehensive population study of Rothschild's giraffe in Uganda.

The report below outlines the expedition activities and *preliminary* findings from our study efforts.

Objectives

1. To establish survey routes for subsequent giraffe monitoring efforts.
2. To continue ongoing Rothschild's giraffe monitoring efforts and conduct the systematic photographic capture-recapture surveys of the entirety of the northern region of the park.
3. Establish relationships in Murchison Falls National Park to facilitate partnerships for long-term monitoring programme.

Team Personnel

Michael Butler Brown ~ Dartmouth College

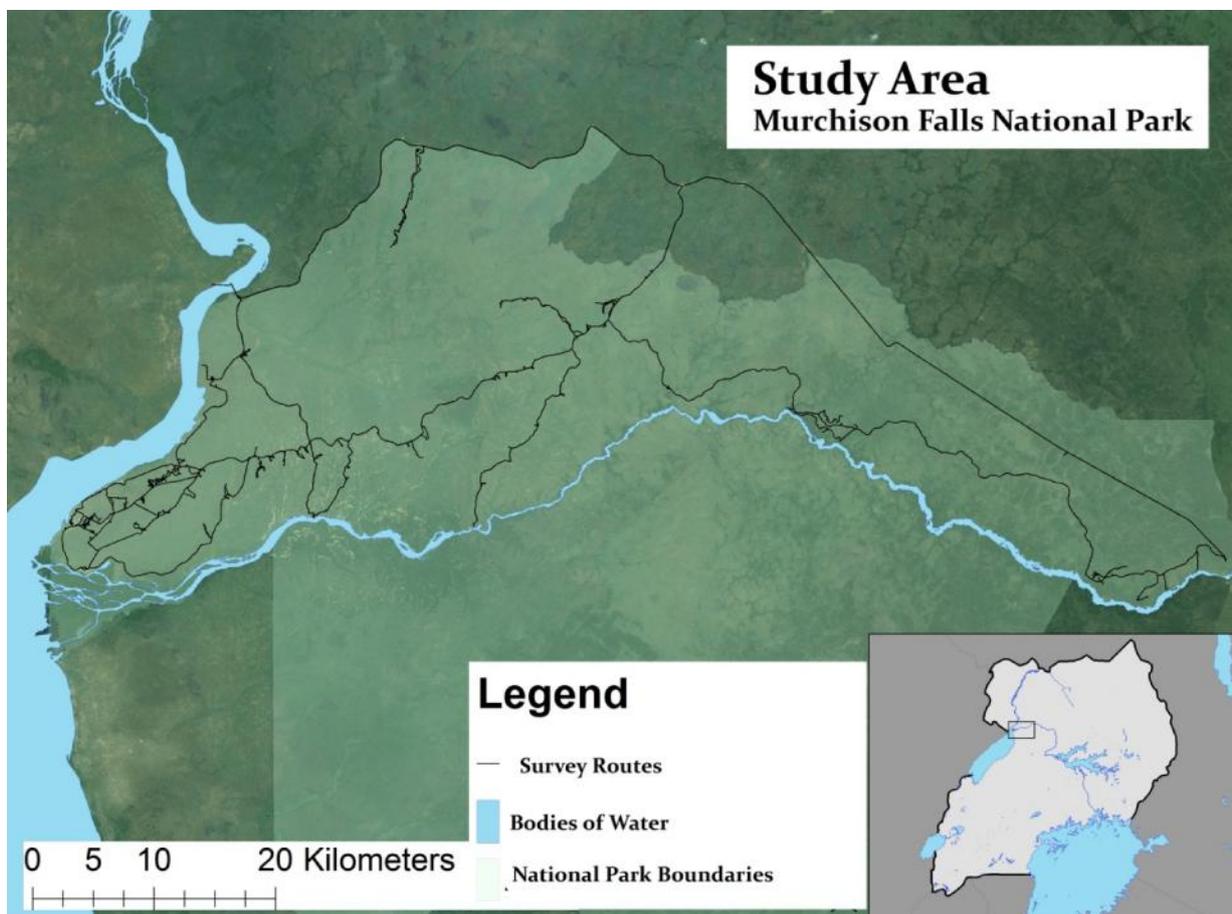


Study Area

Murchison Falls National Park is located in northwestern Uganda (02°15' N, 31°48'E), and encompasses an area of 3,840 km². Murchison Falls National Park is Uganda's largest Park and, combined with the adjacent Karuma Wildlife Reserve and Bugungu Wildlife Reserve, forms part of the greater Murchison Falls Conservation Area (5,308 km²). The Park itself is bisected by the Victoria Nile River, with the southern portion of the Park dominated by dense forest and the northern portion characterised by savanna, borassa palm woodland and riverine woodland. The current distribution of Rothschild's giraffe is limited to the northern portion of the Park, and as such restricted our giraffe surveys to this area.

One of the major objectives of this field trip was to establish a systematic survey route throughout the Park which would enable a representative sampling of the Park's giraffe population. As such, our first priority on the ground was to establish a standardised route for all subsequent survey efforts. During this process, we drove nearly every maintained road (and most unmaintained roads) and identified off-track routes to the more inaccessible areas of the Park. Visibility in the western delta region of the Park is outstanding, with clear views for kilometres across the open savanna. The eastern portion of the Park is comprised largely of dense woodland, limiting visibility and heavily restricting off-track navigation.

Our efforts to establish survey routes throughout the Park led us to identify several off-road courses to access areas of the central Wankwar Region of the park that have never been explored for photographic giraffe surveys.



Population Assessment

The giraffe population in Murchison Falls National Park is the largest remaining natural Rothschild's giraffe population in the wild, with recent aerial surveys in 2012 suggesting a population of approximately 757 individuals (Rwetsiba *et al.* 2012). As such, conservation strategies for this unique subspecies of giraffe hinge on a comprehensive understanding of population dynamics of this specific population. Since conservation translocation has been identified as a potential goal for a future Uganda National Giraffe Conservation Strategy, a detailed understanding of population structure, recruitment and survival in the Murchison Falls National Park source population is an essential component to safely removing individuals and using them to propagate viable populations in other areas of Uganda. Additionally, the knowledge of group structure, preferred associations and social dynamics can provide a social consideration for selecting individuals for translocations.

Methods

To evaluate the current population status of Rothschild's giraffe in Murchison Falls National Park, we conducted a photographic survey of giraffe throughout the Park. This survey builds off previous survey efforts initiated in July 2014. We plan to conduct population surveys at 4-month intervals for the next 4 years to understand population growth and potential factors contributing to individual survival and reproductive rates throughout the different regions of the Park. The timing of these surveys coincides with seasonal transitions in the area so that we can monitor any potential influences of season and rainfall on survival and recruitment. We planned routes throughout the Park's road network to maximize coverage and drove the track network over the course of five days. On each survey, we stopped at every group of giraffe encountered and recorded the number in the group, the sex and age class of each giraffe and GPS coordinates. Additionally, we collected information on the presence of visible signs of skin disease and snare injuries on each giraffe (see following sections). We then photographed each individual giraffe. Using pattern recognition software (Wild-ID), we were able to identify the number of unique giraffe observed and begin to create individual observation records for each unique giraffe (Bolger *et al.* 2012).

Results

During this second survey of the Rothschild's giraffe population in Murchison Falls National Park, we photographed **356 unique individual giraffe** in **42 different herds**. Herds ranged in size from 2 - 51 individuals (Fig 1). Giraffe were distributed unevenly throughout the Park, with the greatest observed density in the western delta region (Fig 3). Of the uniquely identified individuals, **179 were males, 151 were females and 26 were of an unknown sex**, suggesting a relatively even sex ratio of approximately 1:1. The majority of observed giraffe were classified as adult (see Figure 2). Approximately 20% of the observed giraffe were classified as juveniles, indicating a potential for increased population growth.

Histogram of Observed Giraffe Herd Size

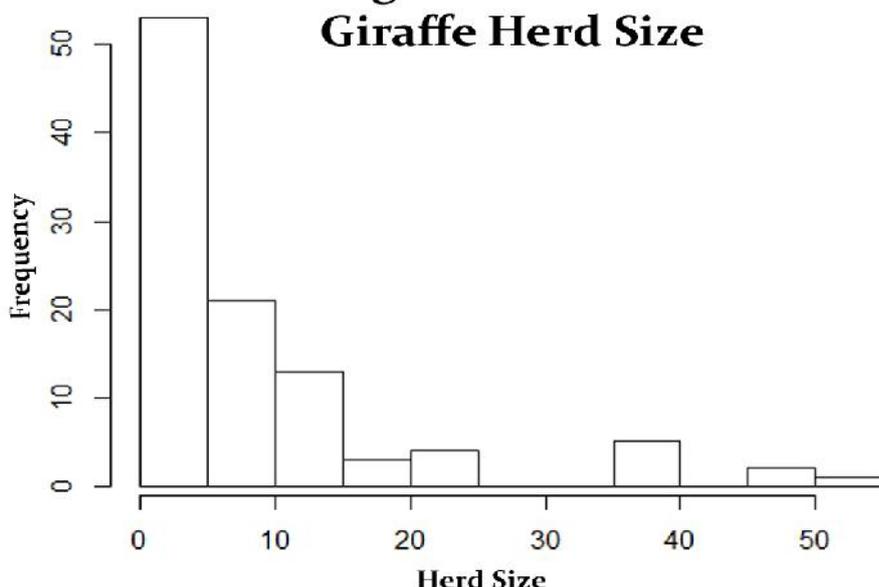


Fig 1: Histogram of the observed giraffe groups size. Surveyed herd size reached a maximum of 51 individuals. The largest observed single group was located at the far western region of the Park in the savanna areas of delta area.

Giraffe Database Status

This survey represents the continuation of ongoing Rothschild's giraffe monitoring efforts following July 2014 where we conducted the first preliminary photographic survey in the Park. As we continue successive survey efforts, we hope to develop a more complete representation of the giraffe population within the Park. During the first round of December surveys, of the 356 uniquely identified individuals, we re-sighted 118 individuals from the July survey, which represents **32% recapture rate**. During our combined survey efforts of July 2014 and December 2014, we have identified **650 unique Rothschild's giraffe** in Murchison Falls National Park. As we continue to conduct comprehensive surveys of the Park, we will be able to more closely monitor survival of giraffe and vital reproductive rates that will give a better understanding of population dynamics in the Park. Additionally, we will develop a more complete representation the entire giraffe population in the database.

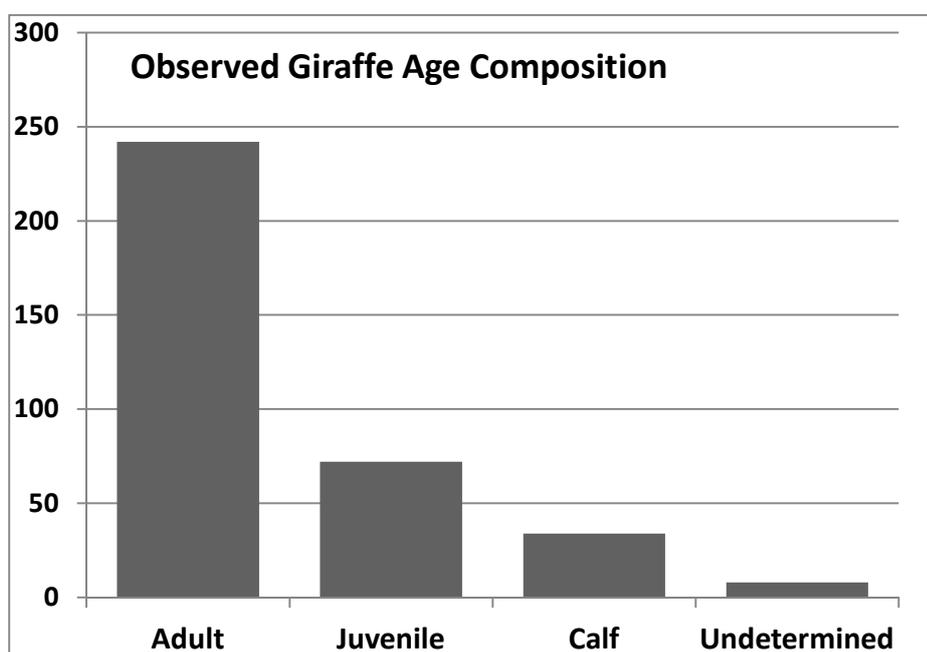
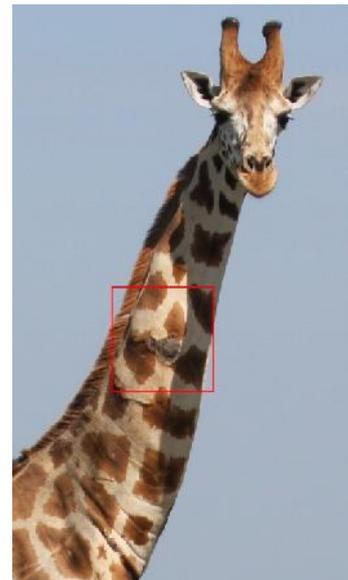


Fig 2: Observed age sex structure of Rothschild's giraffe in Murchison Falls National Park, Uganda in December 2014

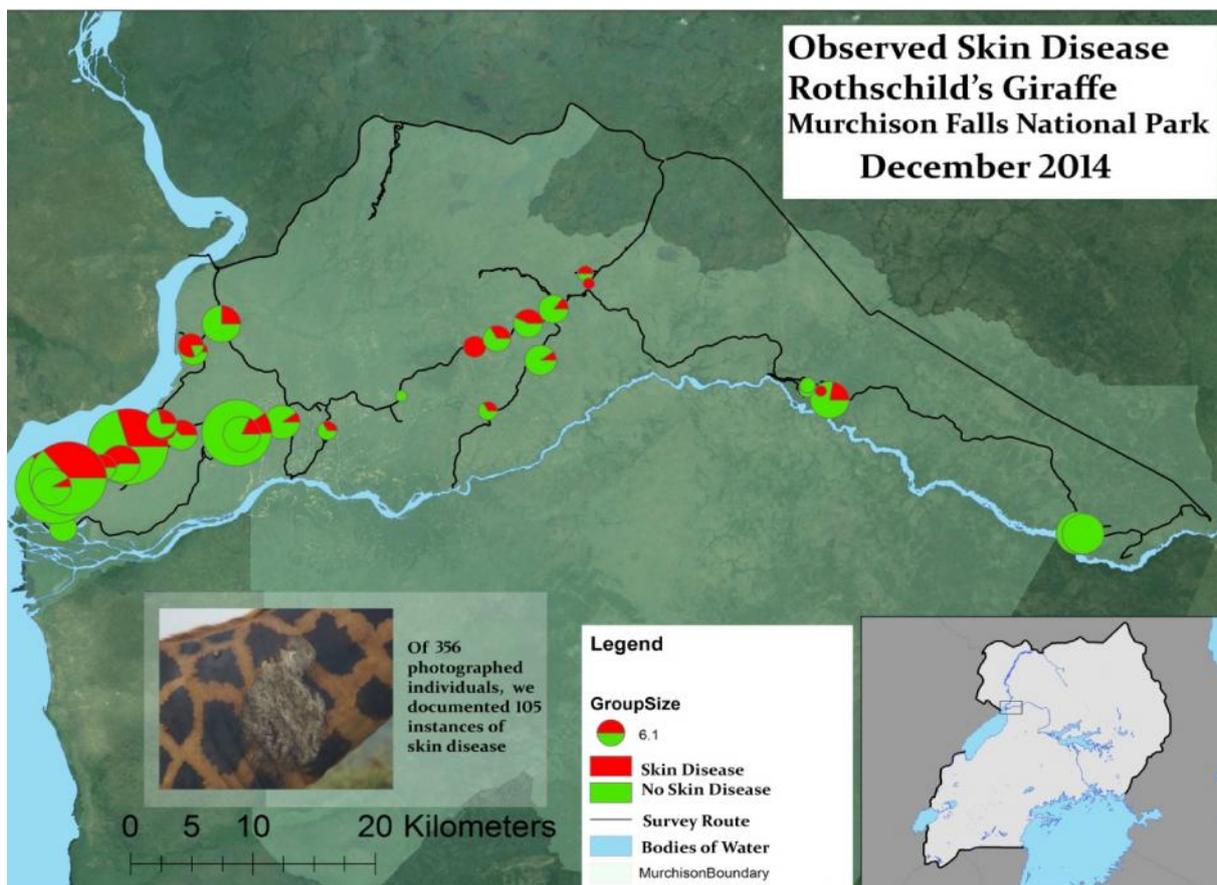
Giraffe Skin Disease

Giraffe skin disease (GSD) is a poorly understood disorder in Murchison Falls National Park with visible symptoms of crusty sores mainly along the necks of Rothschild's giraffe (see photo). GSD have been observed on Masai giraffe in Mikumi, Ruaha, Selous and Tarangire National Parks in Tanzania, and on South African giraffe in northern Botswana and Kruger National Park, although it is unknown if any of these diseases are pathogenically related. It is still unclear what effect, if any, the disease has on survival and reproduction of giraffe in Murchison Falls National Park, and as such, we plan to closely monitor the prevalence, distribution and persistence of skin disease to understand potential impacts on fitness.



Methods and Results

During our surveys, we visually inspected each giraffe for visible lesions which represent the signs of GSD. We observed signs of GSD on **105 individuals** (approximately 29%) of all observed giraffe during surveys. This figure represents a much larger percentage of afflicted individuals than previous surveys suggested. Additionally, we observed evidence of GSD in portions of the Park east of the Ayago River, which is an area where we did not observe any GSD during the July 2014 surveys. This finding indicates that GSD is even more prevalent in the Murchison Falls National Park population than we initially suspected.



Snare Injuries

UWA Park officials identify illegal snaring as a conservation threat to Rothschild's giraffe in Murchison Falls National Park (see photo). The Park borders areas of relatively dense human population and as such, the large populations of wildlife within the Park represent a readily available source of protein for local communities. Giraffe are likely not the primary target of snares, but fall victim to the indiscriminate nature of these traps, resulting in debilitating injuries. Anecdotally, Park officials suggested that much of the snaring pressure comes from individuals in the areas across Lake Albert who boat into the delta region of the Park under the cover of darkness to set and check snare sets.



This giraffe lost its hind foot to injuries sustained from a snare. It was observed in a large herd but was still managing to move on three legs.

Methods and Results

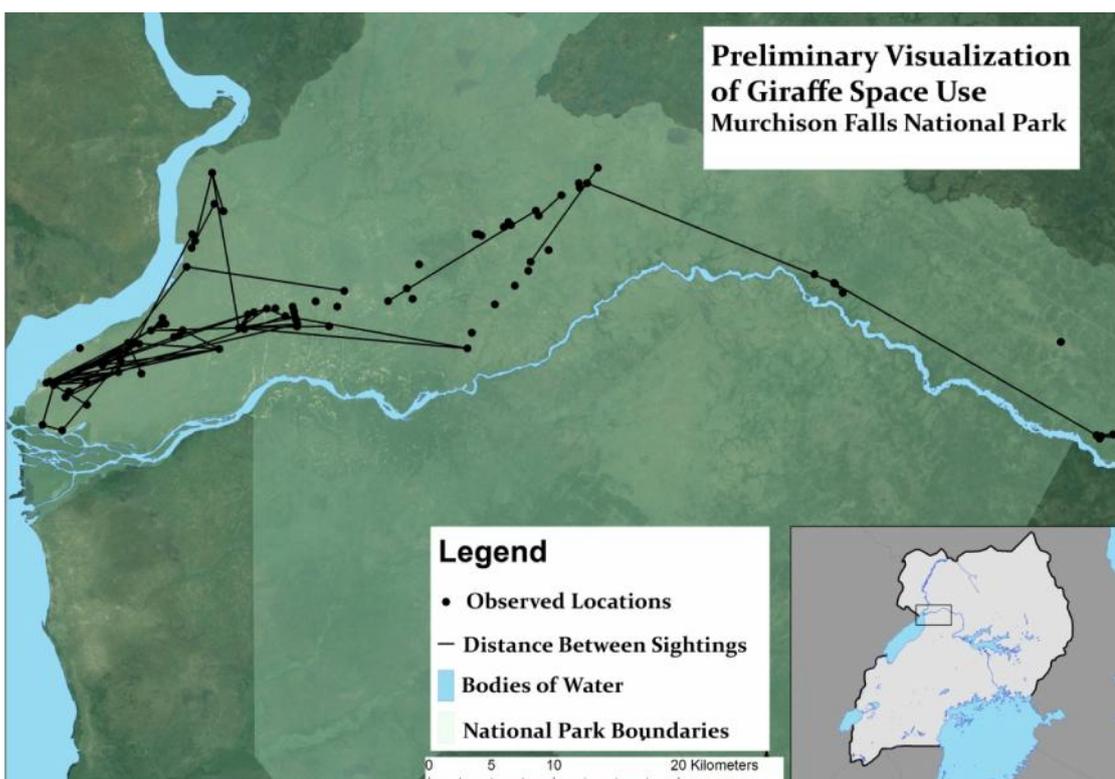
To monitor the distribution and prevalence of snare-related injuries of Rothschild's giraffe in Murchison Falls National Park, we conduct field observations as well as visually inspect each photographed giraffe for signs of scarring and injury. Using the pelage pattern as a unique identifier, we are able to track the recovery or decline of individual giraffe that have been identified with prior snare injuries. We observed snare damage on **7 individuals** (approximately 2%). Interestingly, none of these individuals were the same individuals observed to have had snare damage during July 2014. Of the 7 giraffe observed to have snare damage during July 2014, we re-sighted 3 individuals, but did not note any obvious signs of snare damage in December. The observed instances of snare damage were in close proximity to the waterways, supporting the claim that giraffe are most at risk for incidental snare damage in the western portion of the Park closest to Lake Albert.

These observations should be interpreted with caution. We do not yet know effects of snare injuries on giraffe survival. As such, this figure of 2% of the observed population represents only live individuals with visible scarring, injury or disfigurement attributed to snare wounds. Furthermore, tall grass throughout the Park prevents a close inspection of the lower legs of all giraffe, so the estimate is conservative. It should be noted that individuals with verified snare injuries exhibited decreased mobility and poor body conditions. As we continue to collect longitudinal data on giraffe survival in the Park, we will be able to better assess the risk that snares can pose on giraffe survival and population trends throughout the Park.

An understanding of the prevalence and distribution of snare injuries can support UWA's ongoing efforts to patrol high-risk snare areas. De-snaring patrols are already a priority for rangers and Park officials in Murchison Falls National Park, with rangers regularly recovering hundreds of wire snares and dozens of leg hold traps.

Preliminary Space Use Analysis

Through repeated survey efforts, we are beginning to examine coarse patterns in giraffe space use within Murchison Falls National park to better understand how intra-population movement might impact population level processes. Having conducted two rounds of surveys, we examined the individuals sighted on multiple surveys to look for differences in location between the two survey events. Preliminary analyses of re-sight data yielded some potentially interesting results. Much of the displacement between re-sights occurred within the savanna on the western region of the Park. Perhaps more interestingly, however, some individuals were sighted in both the eastern Chobe region and the central Ayago region and the Ayago region and Wankwar Region respectively. This preliminary finding suggests that the dense woodlands of the north-central portions of the Park and the Ayago River are not significant barriers to movement and that giraffe have capacity to move throughout these areas. It is not yet clear how much movement might occur between these areas of the Park. Survey data represent only a coarse view of space use, and more detailed mechanistic movement studies are required to better understand how Rothschild's giraffe move across this landscape. We are currently working to develop further studies that provide a more nuanced understanding of environmental factors contributing to giraffe space use within Murchison Falls National Park. These preliminary survey-based findings cast light on the potential role that movement might play in population-level processes throughout the Park and highlight the need for further studies on giraffe movement ecology in the Park.



Note: The lines depicted on this map do not represent the movement paths of animals but rather the shortest distance between two sightings of the same individual

Uganda Wildlife Authority Ranger Support

As part of our mission to conserve the Rothschild's giraffe in Uganda, we support the efforts to UWA rangers in the field. These rangers are on the front line of giraffe conservation and very often spend days in the bush on patrol. While on patrol, they work to find and remove poachers' snares and identify threats. In addition to patrol and policing, the rangers also accompany researchers (including us!) during our field work. Their intimate knowledge of landscape and experience in bush helps immensely in navigating the Park and putting our studies into the greater context of the Park as a whole. These men and women are an extremely dedicated and professional work force that risks their own safety to ensure the wildlife and resources of the Park are well protected.

During this expedition, we donated more binoculars and GPS units to the UWA staff in Murchison Falls National Park. These binoculars and GPS units will be used by the rangers on patrol to map snares and poaching incidents throughout the Park, allowing for a more detailed understanding of the spatial distribution of poaching intensity. This knowledge can then be used to better direct patrol efforts to maximize their efforts to conserve and protect the wildlife of the Park.



UWA Rangers are on hand to receive a donation of equipment to support their patrols



GCF donated 5 GPS units and 5 pairs of binoculars to UWA in Murchison Falls National Park to help support their monitoring and conservation initiatives

Additional Field Notes

As we further develop the research programme in Murchison Falls National Park, I look forward to learning more about the ecological systems of the Park. The UWA research rangers proved to be extraordinarily valuable contributors to this endeavor. With their in depth knowledge of the Park, unparalleled professionalism and enthusiasm for contributing to the study, they consistently help us to find and photograph giraffe as well as provide useful anecdotes to help contextualize our studies. Since our trip was in December we witnessed the transition from the wet to the dry season. During our relatively short stay this change was quite remarkable. In our first week of surveys rain fell almost every afternoon causing the roads and grounds to turn into an inauspicious quagmire. By the time we left, however, the ground had dried and fire had emerged as the dominant force on the landscape. Indeed the Park officials plan and manage fires throughout the park grassland systems to maintain this disturbance regime and maintain a healthy grassland. It was quite an impressive thing to see.

The trip was also important for exploring the area around the Park and learning more about the surrounding communities. This program is planned to continue for several more years, so developing ties to support local education and awareness, along with learning about the best supply locations will most certainly pay dividends down the road. Finding a reliable mechanic and identifying the best place to purchase fuel are indeed some of the most important aspects of our work. It also never hurts to make a friend or two.



Throughout Murchison Falls National Park and the surrounding communities, managed burning of grasslands

I look forward to learning more about Murchison Falls National Park, it's wildlife, it's history, and the surrounding communities over the coming field seasons.



Next Steps – Short- to Medium-Term

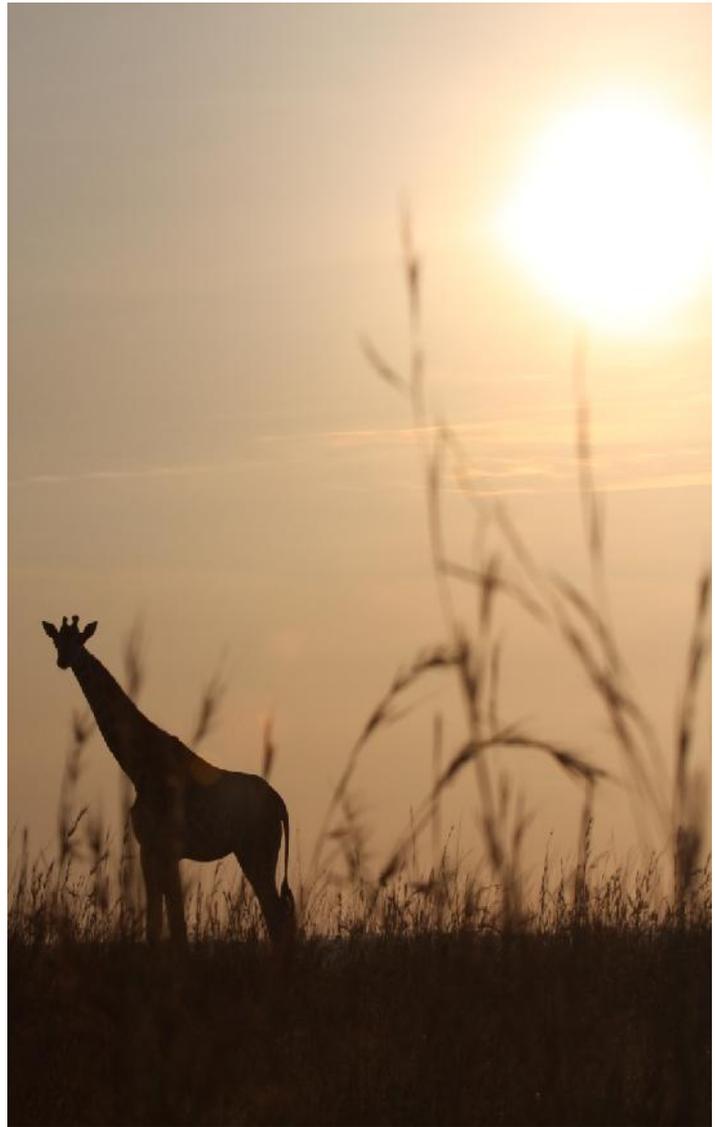
- Further develop the Rothschild's giraffe research programme in Murchison Falls National Park.
- Continue regular photographic surveys of Murchison Falls National park at 4-month intervals.
- Develop robust photographic capture-recapture population models for the Rothschild's giraffe population in Murchison Falls National Park.
- Analyze spatial distribution and movement data collected from Murchison Falls National Park giraffe survey.



- Assess the south side of the Nile in Murchison Falls National Park and Lake Mburo for potential giraffe translocation suitability using the IUCN Guidelines for Conservation Translocations, with a focus on intensive ecological surveys and in-depth stakeholder analysis.
- Conduct a survey of Kidepo Valley National Park Rothschild's giraffe population to better inform a national conservation strategy in Uganda.
- Using parameters derived from the Murchison Falls National Park population, create a species distribution model to identify viable translocation sites throughout Uganda.

References

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Acknowledgements

