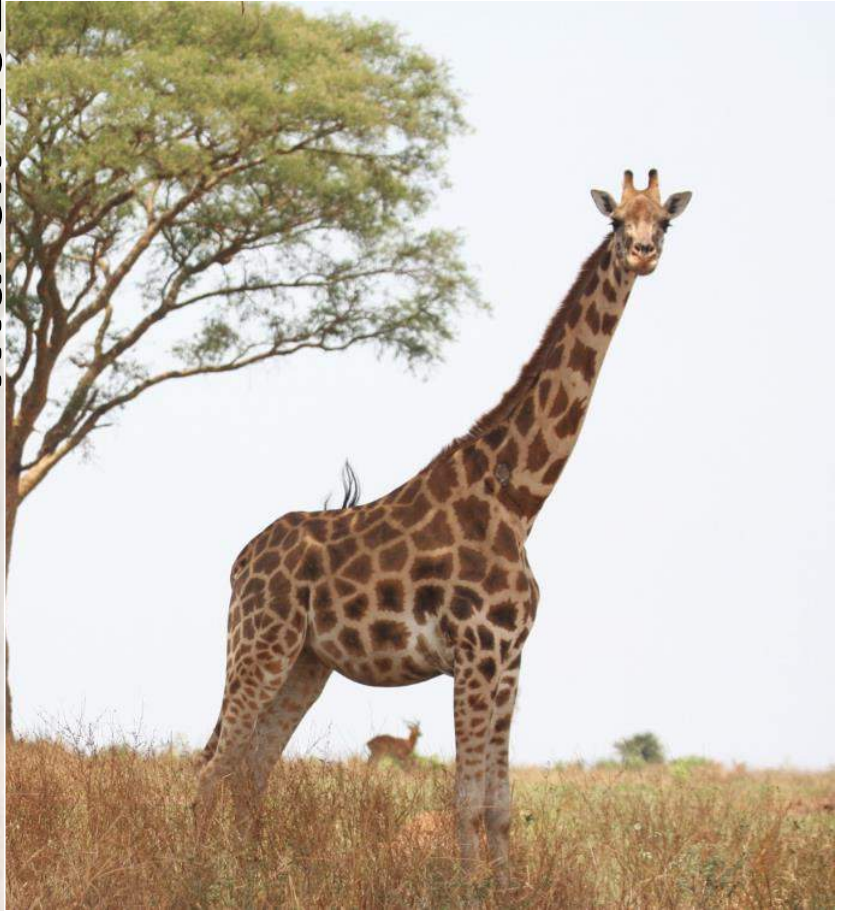


# Murchison Falls Giraffe Project

Giraffe Conservation Foundation

## Field Report March 2015



Michael B. Brown  
June 2015



## **Expedition Overview**

In March 2015, researchers from the collaborative research partnership of Giraffe Conservation Foundation and Dartmouth College travelled to Murchison Falls National Park, Uganda to continue the ongoing efforts to assess the population status and study the population dynamics of the largest wild population of the endangered Rothschild's giraffe. Having already established fixed survey routes during prior field trips, this expedition provided a useful opportunity to continue the survey efforts to establish accurate baseline population size numbers and to develop a database for studying potential spatiotemporal variation in giraffe survival and reproduction.

Building off of relationships, permits and protocols established during prior survey efforts, the field trip was smoothly executed.

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

## **Objectives**

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.

## **Team Personnel**

Michael Butler Brown ~ Dartmouth College

Dr. Douglas Bolger ~ Dartmouth College



## Study Area

Murchison Falls National Park is located in north-western Uganda (02°15' N, 31°48'E), and encompasses an area of 3,840 km<sup>2</sup> (Fig 1). 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 km<sup>2</sup>). 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, which encompasses an area of approximately 1,600 km<sup>2</sup>. We restricted our survey efforts to fixed routes in the northern portion of the Park.

The effects of the dry season and subsequent fires across the landscape increased visibility and enabled us to identify better off-road tracks that were grown over with tall grasses during the wet season surveys. In this way, we were able to better navigate off-road areas that were made inaccessible by the high grasses and mud of the wet season.



**Fig 1:** Murchison Falls National Park in north-western Uganda supports the largest known wild population of Rothschild's giraffe

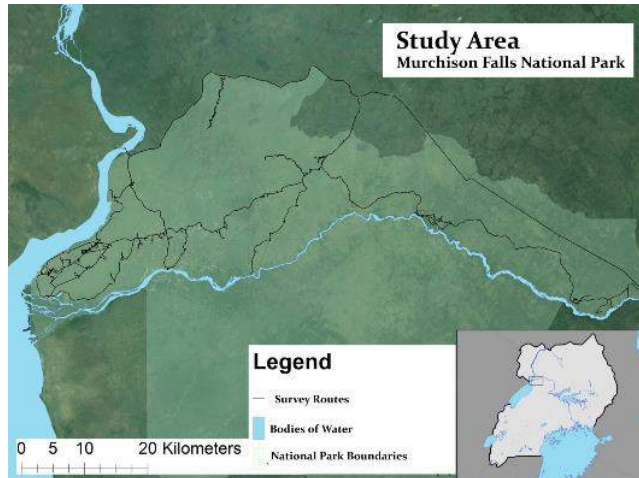
## Population Assessment

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 2014. This survey is a continuation of plans to conduct population surveys at 4 month intervals for at least 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 to allow for the monitoring

of any potential influences of seasonal variation and rainfall on survival and recruitment. We followed survey protocols previously established and drove along the planned routes throughout the Park's road network to maximize coverage of the Park (Fig 2). In accordance with our designed robust survey protocols, we drove the entire park road network twice, taking four days for each round of surveys. 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 the geographic coordinates of the observation.



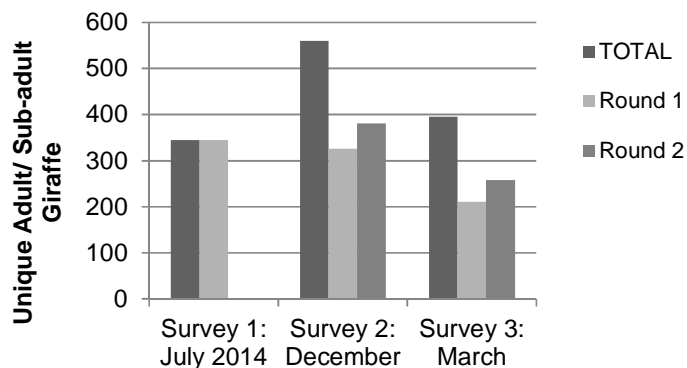
**Fig 2:** Map of the survey routes in the northern portion of Murchison Falls National Park. These survey routes follow both maintained vehicle tracks and off-road paths

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 and used pattern recognition software (Wild-ID), 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 our third survey of the Rothschild's giraffe population in Murchison Falls National Park, we photographed at least **435 unique individual giraffe** over the course of both rounds. The combined number of unique giraffe observed for both of the March surveys was less than the December 2014 surveys (Fig 3); however, it is likely that differences in these numbers are affected by seasonal space use and seasonal variation in giraffe encounter rates. Additional surveys and a more comprehensive examination of seasonal variation in space use may provide insights into the basis of these discrepancies.

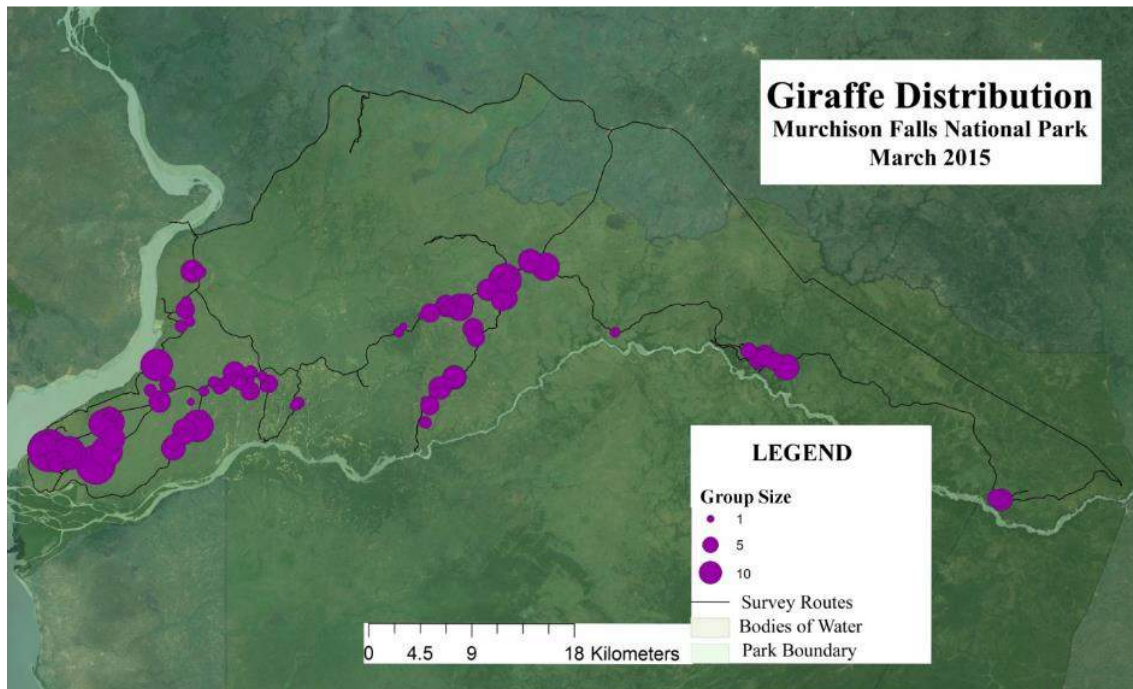
Anecdotally, groups seemed smaller and more scattered during these dry season surveys. Consistent with previous surveys, the giraffe were distributed unevenly throughout the Park, with the greatest observed density in the western delta region (Fig 4). Of the uniquely identified individuals, **227 were females, 185 were males and 23 were of an unknown sex.**



**Fig 3:** We recorded fewer giraffe during the March surveys than during previous surveys. Note: we only conducted one round of surveys during July 2014

The majority of observed giraffe were classified as **adult (74%)** and approximately **9% of all observed giraffe were calves** (similar to previous 10% figures).





**Fig 4:** Distribution of observed giraffe herds during the dry season surveys of March 2015. The size of the dot is proportional to the number of giraffe in each observed herd. We observed the greatest number of giraffe in the western delta region and a large number of giraffe along the periphery of the Wankwar regions and along the track to the north side of Murchison Falls

### Giraffe Database Status

As we continue successive survey efforts, we hope to develop a more complete representation of the giraffe population within the Park. During our combined survey efforts to date we have identified at least **902 unique subadult and adult Rothschild's giraffe** in Murchison Falls National Park, conservatively representing a notable increase over previous population estimates for the Park. We are currently using these survey data to develop more robust population size estimates using capture-recapture techniques.

## Giraffe Skin Disease

Our survey efforts also monitor the prevalence and distribution of giraffe skin disease (GSD) in Murchison Falls National Park. GSD is a poorly understood disorder that occurs across various giraffe populations throughout Africa. In Murchison Falls National Park, the disease is characterized by visible symptoms of crusty sores mainly along the necks of Rothschild's giraffe (see photo). To gain a better understanding of the potential effects of GSD on giraffe survival and reproduction, we monitor individuals with skin disease across time, examining the potential effects of the disease on survival.



During our surveys, we visually inspected each giraffe for visible lesions characteristic of the GSD infection. We observed signs of skin disease on **117 individuals** (approximately 26%) of all observed giraffe during the March 2015 surveys. In combining results from all surveys, we have recorded skin disease on **234 unique individuals** (representing approximately 26% of all known adults and subadults). We do not yet know what effect, if any, this affliction may have on survival, but we plan to conduct additional surveys over a longer time span to examine these factors.

## Snare Injuries

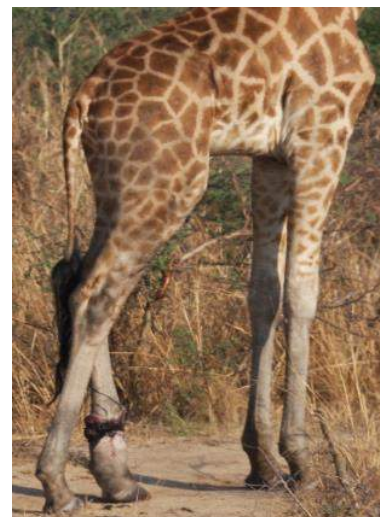
As with previous survey efforts, we monitored the prevalence of snare wounds on giraffe throughout the Park. The Uganda Wildlife Authority (UWA) has previously identified illegal snaring as a threat to wildlife in Murchison Falls National Park and has made outstanding efforts to mitigate illegal wildlife harvesting. Regular de-snaring patrols by UWA rangers continually yield large numbers of wire snares, particularly in areas along the navigable waterways (Fig 5).



**Fig 5:** Wire snares collected by UWA rangers during regular de-snaring patrols

In other protected areas in East Africa, researchers have identified illegal harvesting as a factor that limits giraffe population growth by decreasing survival of reproductive adults (Strauss et al. 2015). To monitor the potential effect that the prolific snaring of Murchison Falls National Park may have on the giraffe populations, we directly observe and visually inspect all photographed giraffe for scars or other signs of snare-related injuries. Over repeated survey efforts, we will then be able to track the individual survival of individuals with known encounters with snares. It should be noted, however, that these observed figures represent conservative estimates of minimum possible number of giraffe snare encounters.

**Fig 6:** A giraffe recorded with a cable snare still attached. UWA veterinarians later found the giraffe and treated its injuries.



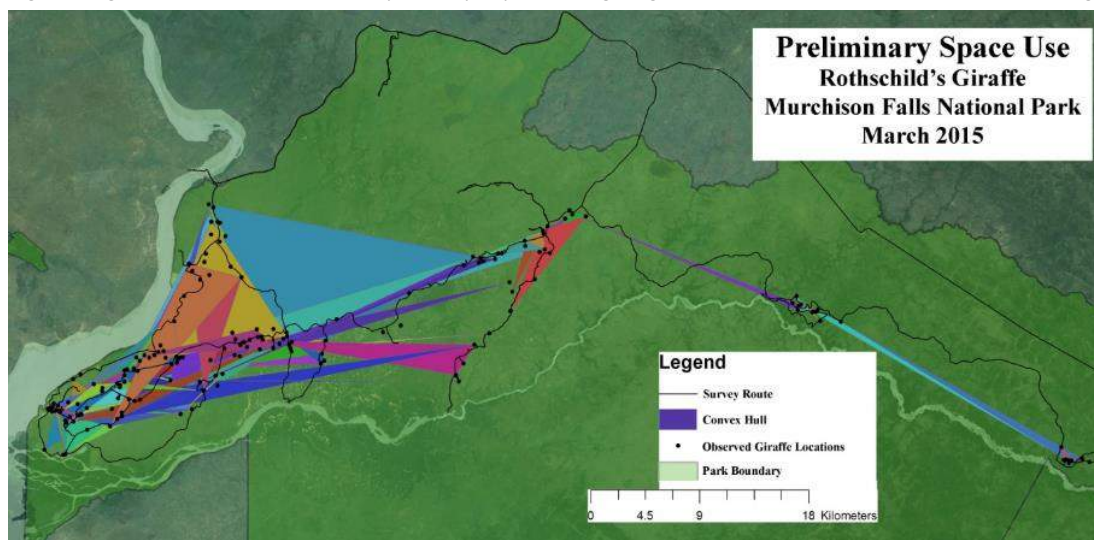
We observed snare injuries on **7 individuals** (approximately 2% of surveyed individuals) during this round of surveys. Two of the individuals observed with snare wounds during this survey were observed to have snare wounds in prior surveys. In total, we have recorded a total of **28 unique giraffe with snare wounds** (representing approximately 3% of all known subadults and adults). Most observed snare injuries were recorded in close proximity to Lake Albert, which is consistent with reported prevalence of illegal snares.

In addition to the snare wounds, during this particular round of surveys we also observed two individual giraffe with metal cable snares still attached to their legs (Fig 6). After documenting the individuals, we reported their locations to the Uganda Wildlife Authority veterinarians who were able to locate, immobilize and treat one of the snared giraffe immediately.

### 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 develop a more nuanced understanding of factors contributing to patterns of giraffe space use and the potential population level effects. Having conducted three surveys events, we examined the individuals sighted on at least three surveys to examine potential differences in location between multiple survey events. We developed convex hulls around the multiple sightings of each unique giraffe to illustrate the spatial extent of individual giraffe (Fig 7). It is important to note that these representations do not represent home range estimates, but rather very coarsely illustrate the degree to which individual giraffe can potentially move across the landscape. As expected, many giraffe were observed on multiple occasions in the open savanna woodland systems of the western delta portion of the Park. There appears to be regular movement from the western delta to the central Wankwar portion of the Park. Additionally, despite numerous small rivers and dense woodlands in the eastern portion of the Park, giraffe have been observed in both the Chobe game tracks and the Ayago game tracks, as well as the Ayago game tracks and the central Wankwar region. Although survey data provide a valuable and cost-effective first look at coarse space use, a more mechanistic approach to habitat utilization will provide a deeper understanding of the landscape and habitat level factors that influence space use across scales.

**Fig 7:** Convex hulls constructed around known locations of all giraffe with at least 3 different sightings over the span of all survey events (n= 249). Although most giraffe were observed in close proximity to previous sightings, some individuals exhibited movement throughout the Park.





## Project Vehicle Improvements

During our previous surveys, we identified several improvements to the vehicle that would enable us to more efficiently and safely conduct our surveys throughout Uganda. We conduct most of our studies of giraffe from inside a 4x4 vehicle, which we very often drive off-road in adverse conditions; so properly maintaining a functional vehicle is essential to success of our research and monitoring efforts. Before the recent survey, we customized the project vehicle to transform it into a bona fide giraffe research vehicle, adding a roof hatch for a better perspective on observation and photography, adding a bull bar for body and headlight/grill protection, adding a rear mount for spare tyres and purchasing a highlift jack to more easily replace punctured tyres. The newly improved and customized research vehicle easily withstood the rigors of the surveys and made field work much more efficient.



The trusty steed appropriately customized for the purpose of giraffe research

## Additional Field Notes

Seasonal patterns of rainfall can strongly influence the landscape in tropical savanna/woodland systems. Since our surveys examine the effects of seasonality on giraffe populations, we time our trips to coincide with transitions between wet and dry seasons. Although the timing of seasons follow general temporal patterns, the precise dates of the onsets of the rains and the ceasing of the rains is sometimes difficult to predict. Given the unpredictable nature of timing of the seasons, we have been tremendously lucky in the planning of our field trips to date. During the December 2014 survey, which was meant to coincide with the end of the wet season, we experienced the last major precipitation event halfway through the survey. During this survey, we arrived to a parched and burnt landscape which had not received a significant precipitation event since late 2014. Halfway through this survey, the skies opened and provided some much needed, and extremely impressive thunderstorms. Again, we had the pleasure of watching the seasonal transition occur, with the onset of the rains transforming the drab tan landscape into a lush, greener grassland over the course of the week. The night skies were lit up with powerful thunderstorms as heavy rain beat on our tin roof shelters with such ferocity that it woke me on several occasions. During our surveys, we also encountered some of the more unique birdlife that occasionally visit Murchison Falls National Park including the sometimes elusive shoebill stork, putting the cherry on top of a successful survey trip.



Powerful thunderstorms sweep across the savanna, transforming the landscape with the onset of the wet season



## Next Steps – Short- to Medium-Term

- 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
- Examine the spatial distribution of different tree species that giraffe regularly forage.
- Assess the south side of the Nile River in Murchison Falls National Park for potential giraffe translocation suitability using the IUCN Guidelines for Conservation Translocations, with a focus on social and ecological analysis
- Develop post-translocation monitoring techniques to understand both potential giraffe responses to novel environments and potential ecological impacts of giraffe translocations
- 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

