Murchison Falls National Park Giraffe Survey

UPDATE REPORT

December 2018

A Season of Transition

December in northern Uganda typically represents a transitional period from the heavy rains to the long dry season. The sun rises low over the Nile River, the passing clouds release their final rains in violent torrents, and the park managers begin their prescribed burns across the savannas. As the plant communities take advantage of the last substantial precipitation until March, we worked to continue our ongoing giraffe demographic studies in Murchison Falls National Park (NP). This particular survey represents our 13th seasonal photographic survey since 2014 and contributed to the growing database for the study of giraffe population ecology in the largest known population of Nubian giraffe. Murchison Falls NP is also nearing an important transition as oil development in the protected area is nearing production phase, so our four years of giraffe demographic data provide an invaluable baseline to carefully monitor and study the subsequent effects of oil development on this critical population. During this field season, we also trained new research personnel in surveying protocols to ensure a seamless transition as we continue to build and maintain this long-term conservation research programme. It is certainly an exciting time for giraffe conservation research in Uganda.

Demographic Studies of a Critical Giraffe Population

In November 2018, the IUCN SSC Giraffe & Okapi Specialist Group released a series of subspecies-specific RedList conservation assessments for giraffe across their geographic extent. A ground-breaking earlier assessment in December 2016 had indicated that as a species, *Giraffa camelopardalis* was in conservation peril, with the RedList status being updated from *Least Concern* to *Vulnerable* with an estimated decline of ~40% over the last 30 years. The subsequent subspecies assessments, however, added nuance to the complicated conservation narrative of the various giraffe taxa across Africa. Some taxon, such as the Kordofan giraffe and the Nubian giraffe, have exhibited such precipitous population declines that they were listed for the first time as *Critically Endangered*. Conversely, our work in Uganda over the past four years has suggested that the taxa currently recognised by IUCN as the Rothschild's giraffe has exhibited an increase in abundance which has resulted in its status being changed from

Endangered to *Near Threatened*. This increased abundance can be attributed mostly to the recent rapid growth of the Murchison Falls NP population, which currently contains the overwhelming majority of this giraffe taxa on the planet – and in turn a growing conservation success story. Genetic studies led by GCF show that the Rothschild's giraffe is genetically indistinguishable from the Nubian giraffe and should therefore be taxonomically subsumed by the Nubian giraffe and combined with other IUCN recognised subspecies, the Kordofan giraffe and the West African giraffe, to form a separate species, designated as the northern giraffe. Regardless of how they are classified, Murchison Falls NP represents the single largest known population of this giraffe taxa anywhere on the planet.

From a conservation perspective, it is imperative to closely study the population status of the Murchison Falls NP giraffe to better understand their demographic mechanics, and to determine the ecological interactions that support such a prolific giraffe population. Furthermore, given the critical role that this population plays in the future of this unique and imperiled giraffe taxa, and especially in light of future production oil development planned for areas within Murchison Falls NP, population ecology research is an essential component to informing conservation management strategies for these giraffe.

To address these goals, the Giraffe Conservation Foundation, in partnership with Dartmouth College and the Uganda Wildlife Authority, has worked since 2014 to develop and implement a population level, individual based photographic survey in Murchison Falls NP. During these surveys, which have occurred at 4-month intervals, our research team drives two rounds of systematic routes over the entire extent of Murchison Falls NP that is north of the Nile River – which was the only area that supported giraffe until the recent *Operation Twiga* Conservation translocations (2016 & 2017). During these surveys, we scan the savannas and woodlands for herds of giraffe and photograph every giraffe that we encounter. Because giraffe have spot patterns that are unique and unchanging over time, we use digital photographs of these spots in association with a pattern recognition software to identify all unique individuals that we observe. In addition to collecting images, we also note the age class, sex class, the presence of skin disease lesions, any signs of illegal snare wounds and the geographic coordinates of each observation. Over time, we use these spatially explicit encounter histories to monitor changes in individuals' location, group association or body condition. Additionally, we can estimate demographic parameters at the population level to better understand the spatial and temporal components of population dynamics.

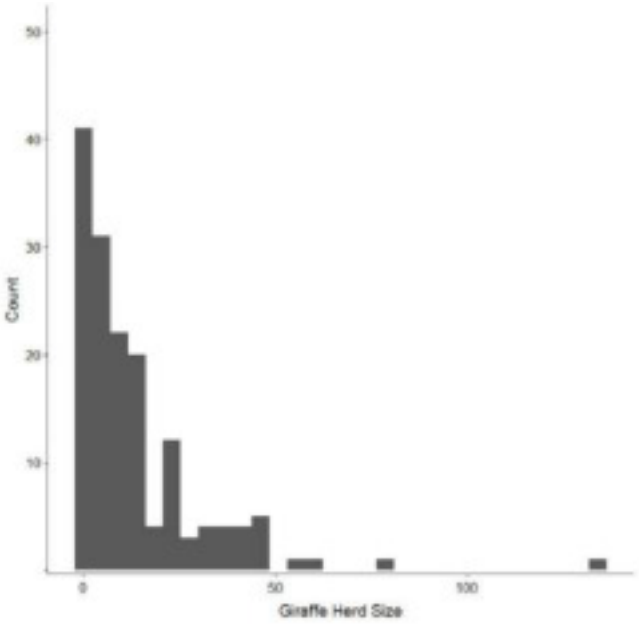

Fig.1: A histogram of observed giraffe herd size during the December 2018 surveys.

The December surveys are characteristically busy, since giraffe tend to congregate in large groups in the western delta area of the park. This particular survey was certainly no exception, with preliminary analyses of the data suggesting that we collected photographs and encountered

1,096 unique giraffe including 83 uniquely identified calves. During both rounds of surveys, we documented 154 herds of giraffe throughout the park. Giraffe sightings ranged in group size from single individuals to the largest herd of 135 giraffe, which is among the largest recorded for giraffe in the wild. Herd sizes ranged considerably, but the mean herd size was giraffe 13.64 giraffe (standard deviation = 17.42) (Fig1).

The age class distribution was heavily skewed towards mature adults (~72.3% of all unique observed giraffe) with subadults representing ~18.3% of the population, and calves under a year of age representing ~7.8% of observed total. This age structure is consistent with previous surveys in Murchison Falls NP. During this survey, sex distribution of observed giraffe was slightly male skewed across all age classes (Fig. 2).

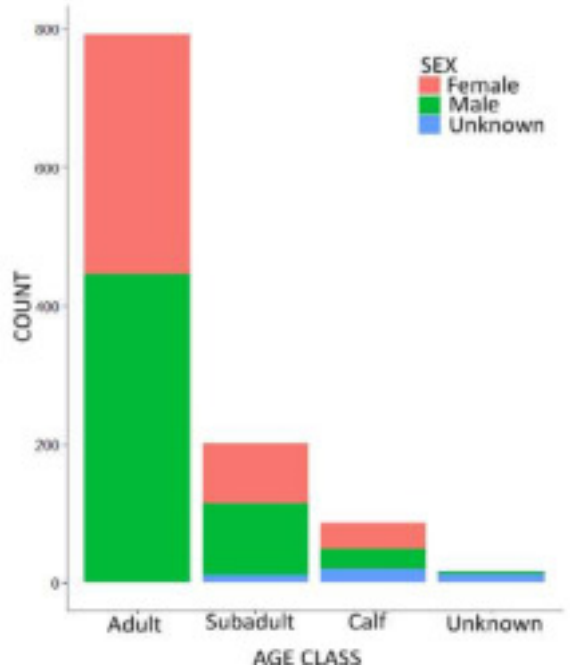

Fig. 2: The sex composition across age classes in Murchison Falls NP (n= 1,096 giraffe)

These spatially explicit, individual-based surveys also allow for the study of other aspects of the ecology of this important population of giraffe. In addition to demography, we also study the spatial distribution and conservation consequences of other identified potential threats in Murchison Falls NP, including giraffe skin disease and the use of illegal wire snaring for bushmeat.

Giraffe skin disease (GSD) is a poorly understood affliction that has been observed in various giraffe populations throughout Africa. In Murchison Falls NP, the disease is characterised by visible symptoms of crusty lesions mainly along the necks of giraffe (Fig 3).

Fig. 3: A photograph of an atypically large skin disease lesion on the neck of an adult male giraffe

To gain a better understanding of the potential effects of GSD on giraffe survival and reproduction, our research programme monitors individuals with skin disease across space and time. During the December 2018 surveys, we visually inspected each photographed giraffe for visible lesions characteristic of GSD. We observed signs of skin disease on 527 unique individuals (representing approximately 49% of all unique observed individuals). Nearly all of the afflicted giraffe were classified as adults. We do not yet know what effect, if any, GSD may have on survival, but as additional surveys are conducted over a longer time span, GCF will continue to evaluate any potential effects of skin disease on giraffe demographic parameters.

To begin to understand the ecological interactions which may facilitate or exacerbate the prevalence of GSD, we evaluate the spatial distribution and environmental conditions that are associated with increased prevalence of GSD lesions. Although giraffe were observed throughout the entire extent of the park, visible lesions were proportionally greater in the western portion (Fig 4).

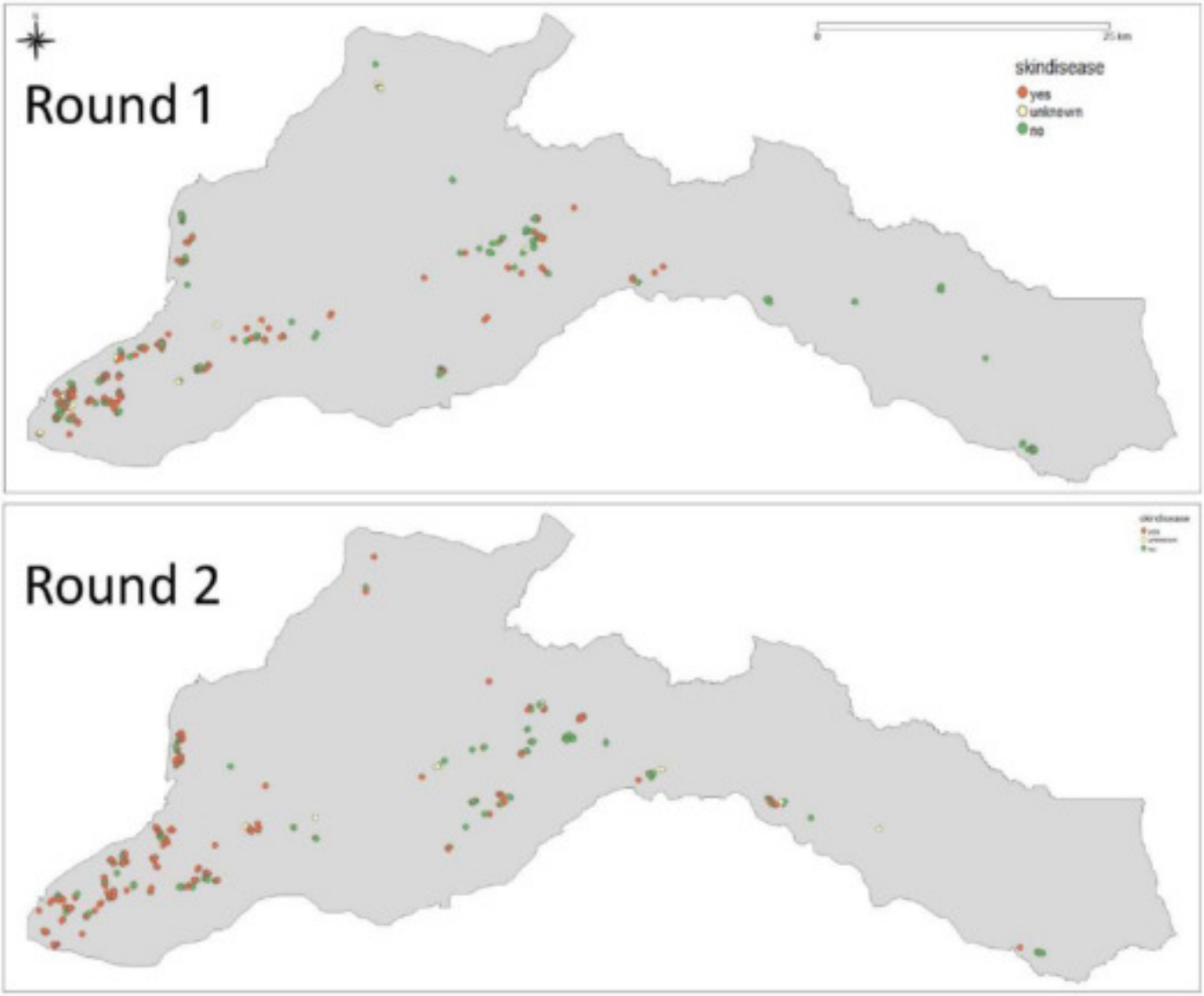

Fig. 4: The spatial distribution of all observed giraffe during both rounds of photographic surveys in Murchison Falls National Park. Visible signs of skin disease are denoted with red points.

Our partners in the Uganda Wildlife Authority have also identified illegal wire snaring as a considerable threat to wildlife in the park. Parts of Murchison Falls NP are readily reachable by boat on the river or motorbike along the highway, providing easy access to the park's wildlife for snare-setting poachers. To help monitor the impacts of wire snaring on giraffe and to understand the spatial distribution of these threats, during our surveys we visibly inspect each photographed giraffe for the tell-tale ringed scars, swollen fetlocks or other signs of snare encounters. During the December 2018 surveys we observed snare injuries on 27 individuals (2.2% of total observed giraffe), mostly in the western delta area. Among these individuals was a giraffe that still had the wire snare attached to his leg (Fig. 5). We reported this

individual to the park's veterinary response unit and they could subsequently immobilised and treated the individual.

Fig. 5: A male giraffe with a wire snare still attached to its leg

The natural history of giraffe makes the study of their population ecology a long-term investment; they are large, mobile animals with a long gestation period. Over the four years that we have been collecting data, our initial findings suggest that this investment was well worth the efforts. Our preliminary analyses suggest a remarkable conservation narrative for giraffe in Uganda, with lessons that are valuable not only for Nubian giraffe conservation but also potentially for the conservation of giraffe across Africa. By studying large and growing populations of giraffe, we can understand the interplay between the ecology of the system and the demographic responses in the population, giving us clearer indicators of the elements that contribute to a healthy giraffe population. As we sort through the data in the coming months, we look forward to learning these lessons and applying this knowledge towards the conservation of these important populations.

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