

**Field Report**  
**Kidepo Valley National Park**  
**Uganda**

**Understanding the Status and Ecology of Nubian  
Giraffe**  
**March 2020**



## Introduction

Tucked in the picturesque mountains of northeastern Uganda, Kidepo Valley National Park (NP) is a vital refuge for the Nubian giraffe. As a nation, Uganda supports the greatest numbers of this critically endangered taxa, and Kidepo Valley NP, in addition to Murchison Falls NP, is one of the only two remaining naturally occurring populations in country. Despite its significance for global Nubian giraffe numbers, the Kidepo Valley NP giraffe population is in a period of recovery. In the early 1960s Kidepo Valley NP supported one of Uganda's largest giraffe populations (East 1999; Brown et al., 2019), with some studies estimating abundance of over 400 individuals in the late 1960s and early 1970s (NEMA, 2009; Rwetsiba, 2005; Nampindo et al., 2005). A period of civil unrest and intense poaching took its toll on the giraffe populations and by the early 1990s, only three giraffe were thought to remain in Kidepo Valley NP (Reynolds, 1993). The Uganda Wildlife Authority (UWA) considered the situation so dire that it collaborated with the government of Kenya to translocate three additional giraffe from Lake Nakuru NP in Kenya to augment the Kidepo Valley NP population (Kalema, 1998). Since then, the population has slowly grown with abundance estimates of nine giraffe in 2002 (Rwetsiba & Wanyama, 2005), 14 giraffe in 2005 (Rwetsiba & Wanyama 2005), and 20 individuals in 2014 (Wanyama et al., 2014).

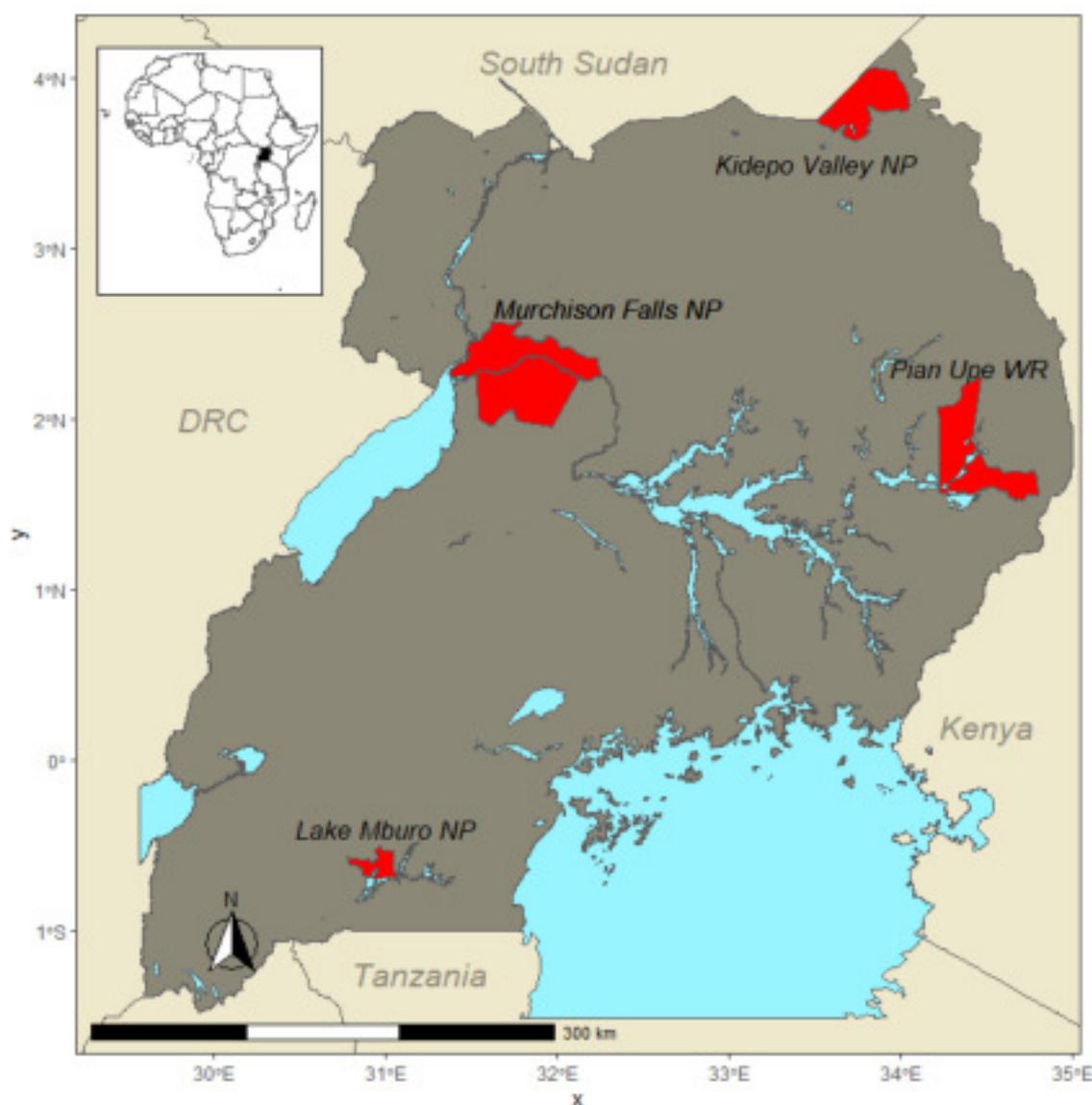


In August 2015, the Giraffe Conservation Foundation (GCF) in collaboration with UWA and international partners, developed rigorous, systematic individual based photographic survey protocols to monitor the Kidepo Valley NP giraffe population and better inform conservation strategies. These surveys have provided essential data for understanding their population dynamics and have generated solid evidence for continued population growth, with abundance estimates of 34 individuals in March 2018 (Brown et al., 2019). Furthermore, these data have informed additional conservation measures to safeguard the future of giraffe in Kidepo Valley NP. In August 2018, UWA with support from GCF and other partners translocated 14 Nubian giraffe from Murchison Falls NP to Kidepo Valley NP to augment the small population. Since then, the population has continued to grow, with photographic surveys in 2019 yielding abundance estimates of 61 giraffe.



In addition to these population studies, GCF also supports local giraffe spatial ecology studies using GPS telemetry to better understand giraffe movements and habitat utilisation. These studies use specially designed ossicone-mounted GPS units (so called ossi-units) to remotely track the locations of individual giraffe in the Kidepo Valley NP, generating a real-time understanding of giraffe space use to inform management and conservation measures.

In March 2020, our GCF team returned to Kidepo Valley NP (Figure 1) to work with UWA and continue the regular annual photographic surveys. The work was conducted as the COVID-19 pandemic began limiting travel restrictions and country-wide shutdowns, and as such the protocols were slightly modified to account for a smaller team and time restrictions. Nevertheless, the GCF and UWA team successfully executed a systematic survey to continue long-term population monitoring of the Kidepo Valley NP giraffe population. This report enumerates the results of the March 2020 survey and describes the movements of the GPS tracked giraffe during 2020.



**Figure 1:** A map of the current distribution of all giraffe populations in Uganda. Protected areas highlighted in red support giraffe. Kidepo Valley NP is in the far northeastern region of the country, bordering South Sudan.



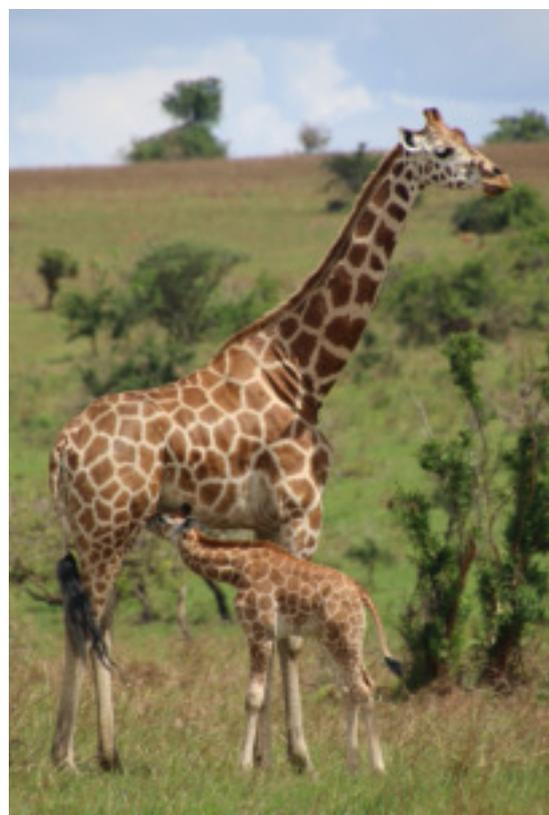
## Project Objectives

1. To continue ongoing population monitoring and threats assessment using photographic population surveys.
2. To develop a deeper understanding of giraffe spatial ecology in Kidepo Valley NP through the analyses of GPS telemetry data.
3. To assess the post-translocation status of giraffe translocated from Murchison Falls NP in August 2018 during Operation Twiga III.
4. To provide ongoing capacity building and support for UWA research and monitoring personnel in Kidepo Valley NP.
5. To generate additional data for the *Uganda National Giraffe Conservation Strategy and Action Plan 2020-2025*.

## Methods

### Photographic Population Surveys

The primary data collection method for population monitoring was a vehicle-based fixed route photographic survey to obtain a total count of giraffe over the survey period. These protocols were slightly modified from previous years to account for the smaller survey team resulting from public health concerns during the COVID-19 pandemic. Since each individual giraffe has a unique pelage pattern, photographs of observed giraffe were compared with previously photographed giraffe to ensure that repeated sightings of an animal did not result in inflated population estimates. We conducted daily surveys between 19-21 March 2020. Using survey routes and protocols established in 2015, combined with data from ossi-units fitted to giraffe in the park, the southern section of the park has been identified in the Kidepo Valley NP as the preferred habitat for giraffe. Unlike previous years, we only used a single survey team to drive each route during every survey day, although this team covered the majority of previously established survey routes, with the northern section being omitted from these surveys.



The survey vehicle contained a driver, a research team member with survey equipment and an UWA ranger. The UWA ranger proved invaluable support in guiding the survey teams to vantage points within the park along the various routes. When giraffe were encountered, photographs were taken of all individuals and the location, age class (calf: 0-1 year; subadult: 1-5 years; adult: 5+ years), sex, group composition, injuries and any visible signs of disease were also noted. Using pattern recognition software, the database of unique individual giraffe in the park was updated to include observations from 2015-2019 surveys and was subsequently added to our GiraffeSpotter database, an online photographic database ([www.giraffespotter.org](http://www.giraffespotter.org)). As part of long-term monitoring, the capture history records of individual giraffe were generated from repeated photographic surveys which enable the monitoring of both individual space-



use and population distribution over time. All individual giraffe encounters and matches were visually confirmed by researchers to ensure positive identifications.

### Spatial Ecology

During previous years, GCF and UWA fitted focal giraffe with specially designed, solar charged, ossicone-mounted GPS units (ossi-units). These ossi-units were programmed to record locations of giraffe at hourly intervals and transmit these locations through the Iridium satellite network in near real time to rangers/researchers via an online system. To evaluate giraffe space use during the study period, we subset the data to include only fixes from 1 January to 1 April 2020. We calculated descriptive statistics of total distance moved as the cumulative sum of hourly step lengths. To calculate overall space use, we generated utilization distributions using kernel density estimates (KDE) with a reference bandwidth. We defined the total range during this study period as the 95% KDE contour and the core area as the 50% KDE contour.

## **Results**

### Photographic Population Surveys

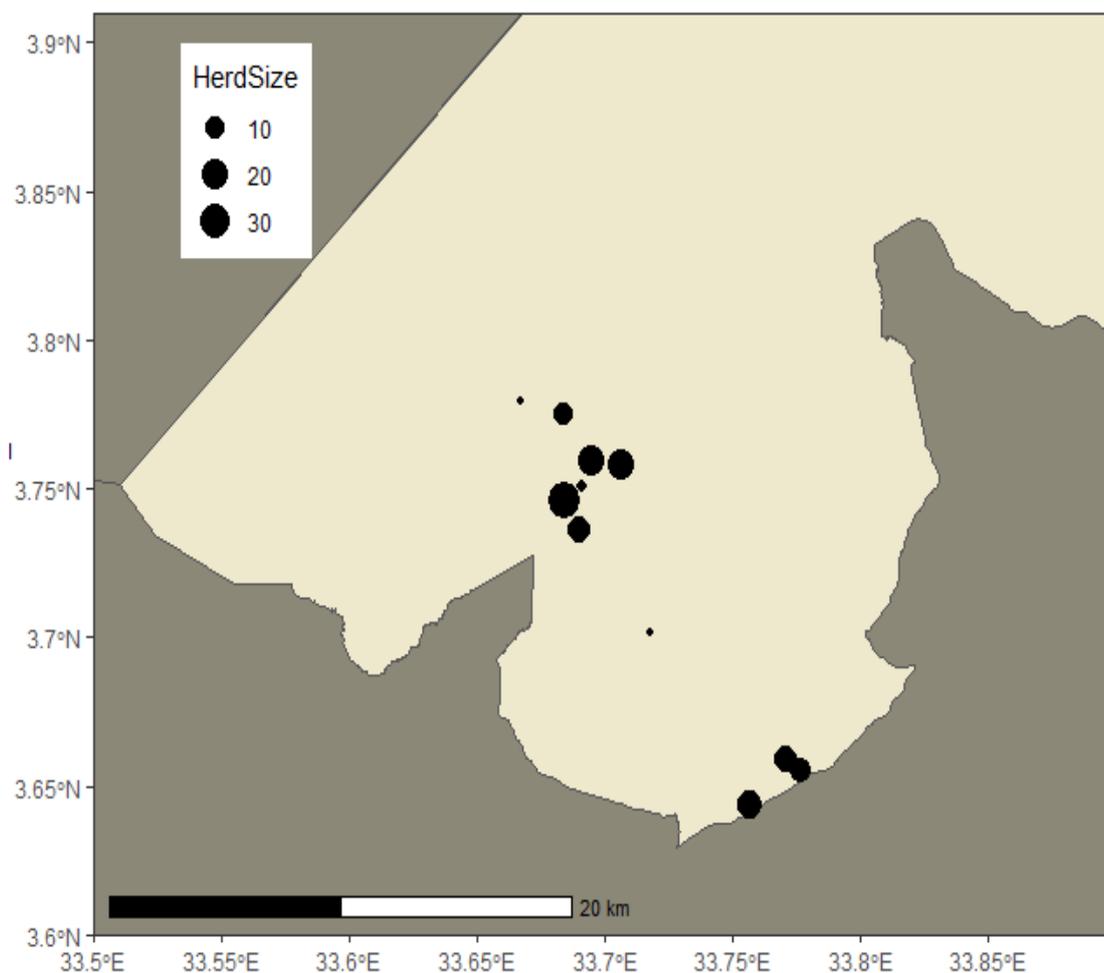
Over the three-day survey period, we documented 155 individual giraffe observations among 12 herd observations. From these encounters, we identified 60 unique individual giraffe in Kidepo Valley NP, including seven newly identified calves/subadults (see Table 1).

**Table 1:** Observed giraffe population structure in Kidepo Valley NP during the March 2020 survey.

	<i>Male</i>	<i>Female</i>	<i>Unknown</i>
<i>Calf</i>	2	3	2
<i>Subadult</i>	11	10	1
<i>Adult</i>	10	21	0

Since the previous study, one adult male was reported deceased in the swamps of the central Narus Valley by the UWA monitoring team and its identity was confirmed to be the translocated male from Operation Twiga III. All other giraffe translocated during Operation Twiga III were resighted during surveys and have integrated well into mixed herds. There were four giraffe seen during the 2019 surveys that were not accounted during the 2020 surveys, although these absences may be attributed to decreased encounter rates as a function of reduced personnel. In total, we estimate 60-64 individual giraffe in Kidepo Valley NP. None of the observed giraffe showed any sign of snare wounds. The only giraffe to show evidence of giraffe skin disease (GSD) were individuals translocated from Murchison Falls NP that had previously been documented with GSD. All the observed giraffe were encountered in the southern Narus Valley, predominantly in the central areas surrounding Apoka/Nagusokopire as well as the valleys along the southeastern boundary of the park (see Figure 2).





**Figure 2:** A map of Kidepo Valley NP giraffe distribution and group size of all herds encountered during the March 2020 survey.

### Spatial Ecology

During the study period, four ossi-units actively transmitted data although one unit (Kabalega) experienced regular minor gaps in data likely due to a malfunction in the unit power charging mechanism. During the first quarter of 2020, the giraffe (excluding Kabalega) traveled on average 679.5 km (SD 55.5). Although three of the tracked giraffe exhibited a 95% KDE exceeding 120 km<sup>2</sup>, one giraffe (Annie) had a 95% KDE of 20.3 km<sup>2</sup>, demonstrating very localised ranging behaviours (see Table 2).

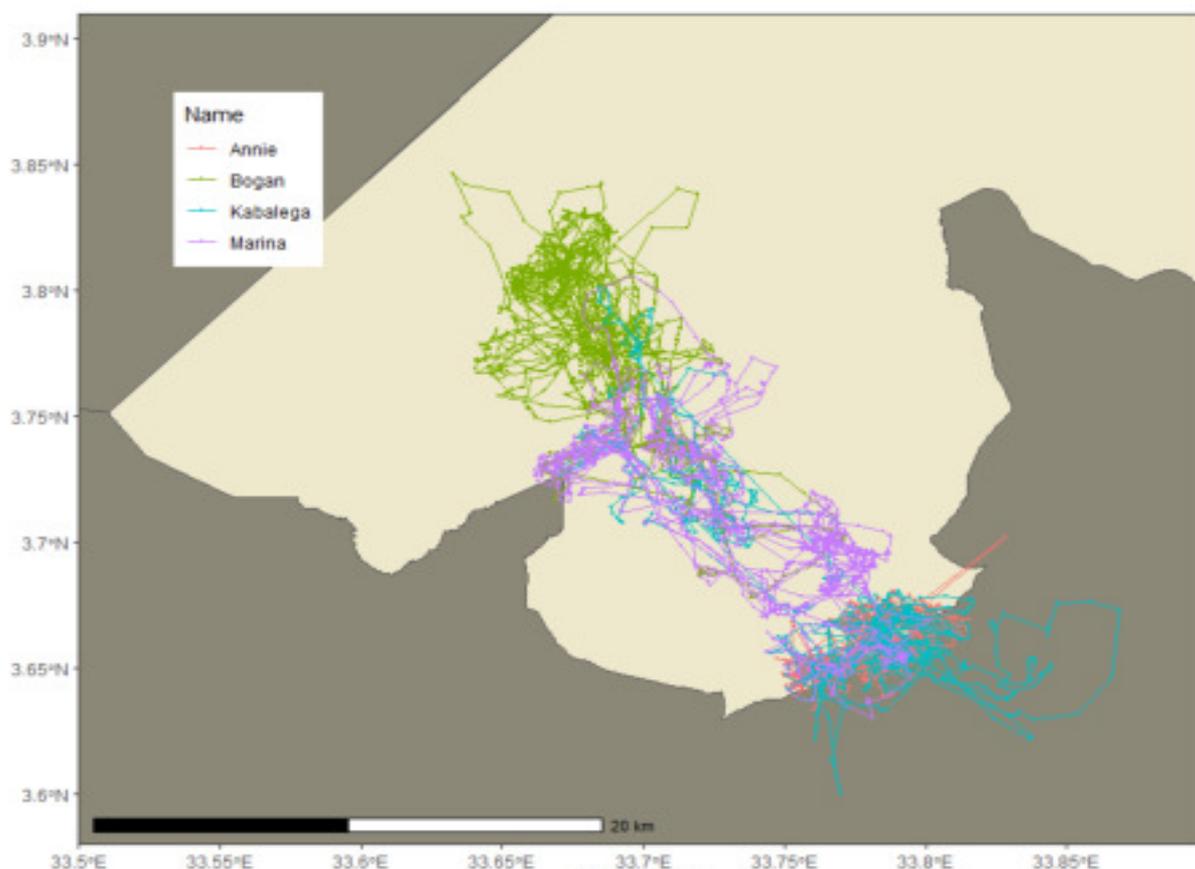
**Table 2:** GPS satellite data of the tagged giraffe in Kidepo Valley NP during the first quarter of 2020.

<i>Giraffe</i>	<i>Sex</i>	<i>Number of Fixes</i>	<i>Total Distance Traveled (km)</i>	<i>95% KDE (km<sup>2</sup>)</i>	<i>50% KDE (km<sup>2</sup>)</i>
Annie	Female	2202	670.7	20.3	5.1
Bogan	Male	2206	738.9	120.2	26
Kabalega	Female	1644	489.5	197.7	32.1
Marina	Female	2207	629.0	154.6	44.4

The GPS satellite tagged giraffe predominantly traversed the Narus Valley, however, one giraffe (Annie) exhibited very localised space use in the area along the southeastern boundary of the park. During photographic surveys, Annie was in close association with young calves, potentially explaining these



restricted ranging behaviours. Three different giraffe (Annie, Kabalega and Marina) left the boundaries of Kidepo Valley NP along its southeastern edge during the first quarter of 2020 (see Figure 3). This area is community land and includes a hunting concession, however, this concession does not include hunting of giraffe.



**Figure 3:** Movement map of the GPS satellite tagged giraffe in Kidepo Valley NP during the first quarter of 2020.

### Conservation Outcomes

Kidepo Valley NP is a significant, historically valuable population of critically endangered Nubian giraffe, and the conservation of this important population requires scientific understandings of the threats and ecology of this system. Results from ongoing population monitoring programmes and the GPS tracking research are integrated into adaptive management strategies for this critical population. So far, these studies have already informed conservation translocations to augment giraffe in the park, and ongoing monitoring of these translocated individuals will continue to guide best practices for potential future conservation translocations throughout Uganda (and Africa).

Effective conservation strategies should be scientifically motivated and continually assessed with the best available data. Our ongoing monitoring efforts provide robust, accurate population and demographic status updates to evaluate the value of proposed and implemented conservation strategies. Additionally, an understanding of spatial ecology and habitat utilisation has demonstrated core areas and features of Kidepo Valley NP that offer important resources for the giraffe population.

Real-time visualisation of the location of focal giraffe using the GPS satellite technology has enabled UWA rangers to monitor these giraffe even as they leave the relative safety of the protected area boundaries. With the ongoing monitoring of the Kidepo Valley NP giraffe population, a better understanding of giraffe



by all stakeholders can help to further develop their long-term conservation and management. This work will continue to inform the implementation of the first-ever National Giraffe Conservation Strategy and Action Plan of Uganda.

### **Next Steps: 2020-21**

Ongoing giraffe population monitoring and spatial ecology studies are essential components of informing long-term conservation strategies for this critical population of Nubian giraffe. In close collaboration with UWA and in accordance with the National Giraffe Conservation Strategy and Action Plan for Uganda, GCF will continue to support the conservation and research in Kidepo Valley NP with the following activities:

- Plan and conduct another annual population survey in March/April of 2021
- Provide additional technical and material support for ongoing population monitoring in Kidepo Valley NP by UWA Research and Monitoring personnel.
- Evaluate successes and lessons learned from post translocation monitoring following Operation Twiga III.
- Provide additional technical and veterinary support for anti-poaching and wildlife disease issues in Kidepo Valley NP.
- Analyse and disseminate results of giraffe spatial ecology studies.



### **Acknowledgements**

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## Partners and Supporters



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