



## FIELD REPORT

# NUBIAN GIRAFFE CONSERVATION ASSESSMENT IN MWEA NATIONAL RESERVE AND RUMA NATIONAL PARK, KENYA

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## **Introduction**

Giraffe populations are under threat, having declined by almost 40% in the last 30 years (Muller et al. 2016). Among the nine currently recognised subspecies of giraffe (*Giraffa camelopardalis*), only the Rothschild's (*G. c. rothschildi*) and West African (*G. c. peralta*) giraffe are listed as endangered on the IUCN Red List. These two subspecies have declined significantly over time and lost a majority of their natural habitat, and importantly, remain vastly understudied. More recently, the Giraffe Conservation Foundation (GCF) and partners found that the Rothschild's giraffe is identical to the Nubian giraffe (*G. c. camelopardalis*) and as such should be subsumed into it as Nubian giraffe was named first and the nominate species of giraffe (Fennessy et al. 2016).

Habitat loss and conversion of land due to pastoralism, agricultural development and human encroachment (Ogotu et al. 2016), combined with illegal hunting, are significant threats to the survival of giraffe throughout their range, in particular East Africa. This highlights a critical need to better understand these two contrasting Nubian giraffe populations and their habitat in Kenya to provide informed conservation management decisions.

In November 2016, the GCF and the African Fund for Endangered Wildlife (AFEW) initiated a project to gather new data and update the conservation status of Nubian giraffe in Mwea National Reserve (NR) in central Kenya and Ruma National Park (NP) in western Kenya. Such initiatives are intended to support the implementation of the Kenya Wildlife Service (KWS) draft National Giraffe Conservation Strategy of Kenya, and in the long-term, provide new information for the revision of the Strategy and reassessment of the Nubian giraffe on the IUCN Red list.

The project was launched in March 2017, where we conducted reconnaissance field surveys in the two sites. The objectives of the surveys were to:

1. Collect preliminary data for population and habitat assessments of Rothschild's giraffe in Mwea NR and Ruma NP;
2. Map the accessible road network in both sites for spatial mark-recapture surveys;
3. Liaise and network with local ecologists and authorities (KWS) for future collaborations; and,
4. Assess the logistics of developing and implementing a monitoring and conservation research program in both sites.

This project intends to generate much needed data on the conservation status of Nubian giraffe in Kenya. Through extensive field surveys and individual identification of the giraffe, this project will also provide data that can be used to evaluate the success of previous translocations undertaken by the Giraffe Center/AFEW in previous years to the populations, and propose future conservation efforts.

## **Study areas**

Mwea NR is a protected area in Kenya, which was gazetted in 1979 and is characterised by bushy vegetation and scattered *Acacia* (*Vachellia*) and Baobab trees. Much of the Park is typical savannah ecosystem characterised by open grasslands with dispersed woody bushes. Thick *Acacias* with occasional dense undergrowth line the main rivers. Game species range from African elephant (*Loxodonta africana*), lesser kudu (*Tragelaphus imberbis*), Nile crocodile (*Crocodylus niloticus*), Grant's gazelle (*Nanger granti*),

common zebra (*Equus quagga*), buffalo (*Syncerus caffer*), bushbuck (*Tragelaphus scriptus*), waterbuck (*Kobus ellipsiprymnus*) and Olive baboon (*Papio anubis*) among others. Some of the plants species that were identified include; *Acacia mellifera*, *Comiphora africana*, *Combretum* spp., *Euphobia* spp, and *Eclea* spp. The area undergoes a hot, dry season from December to March, and a wet season from April to June.

Ruma NP is located in the Lambwe Valley between the Kanyamwa Escarpment and the Gwasu Hills, and was initially gazetted as the Lambwe Valley Game Reserve in April 1966. In June 1983, it was upgraded to a National Park mainly to protect the roan antelope (*Hippotragus equinus*) that are only found in this part of Kenya and the Lelwel hartebeest (*Alcelaphus buselaphus lelwel*). The Park is approximately 120 km<sup>2</sup> and traverses Suba, Mbita and Ndhiwa sub counties of Homa Bay County. Some of the common wildlife species include Roan, Oribi (*Ourebia ourebi*), black rhino (*Diceros bicornis*), common zebra, impala (*Aepyceros melampus*), waterbuck and bushbuck. Similar to other parts of the country, giraffe numbers drastically declined in the 1980s but were supplemented by conservation translocation from other parts of the country. KWS ecologists estimate that there are an estimated 170 Nubian giraffe in the Park from the annual surveys. This study will employ the state of the art survey techniques to complement and update available KWS data.

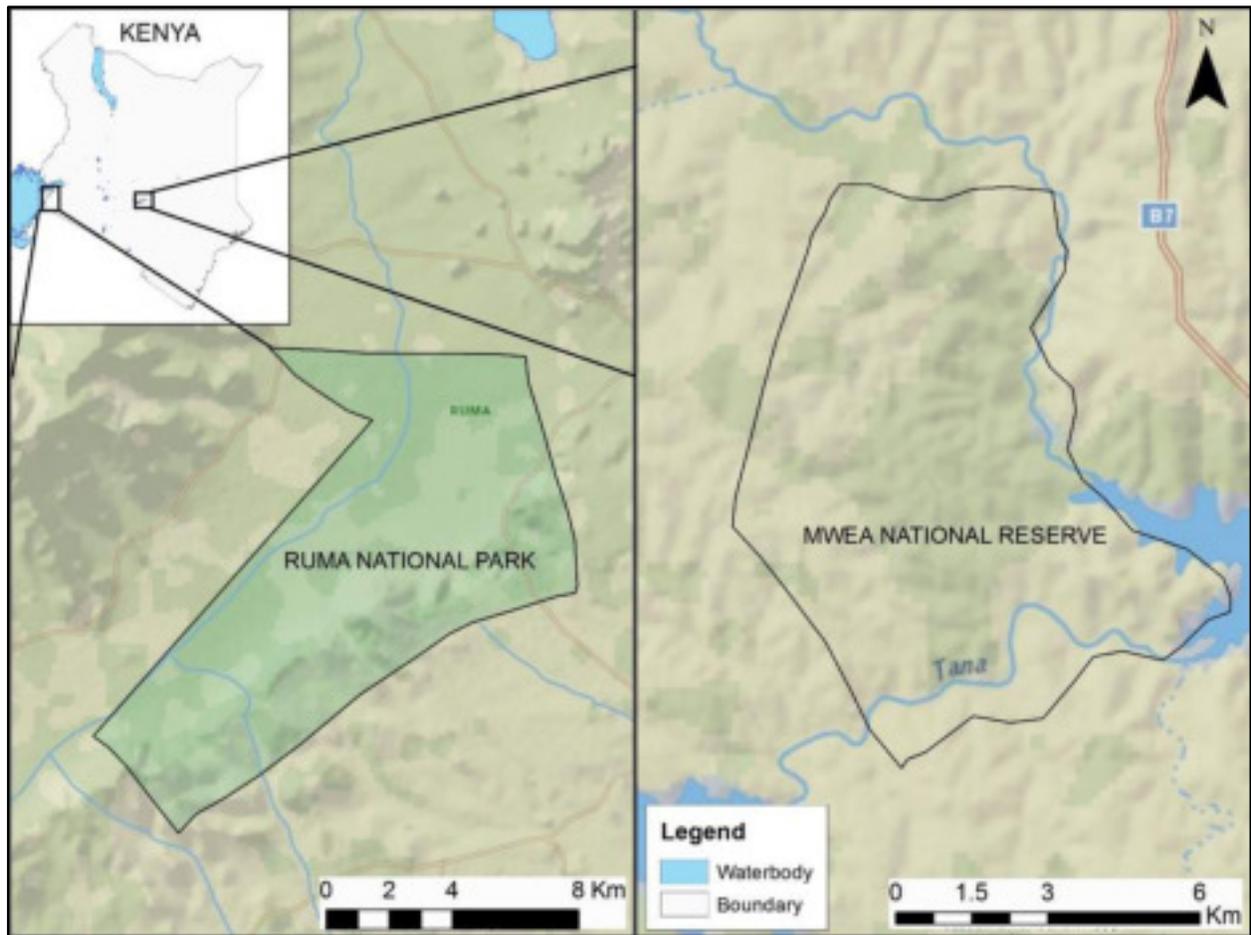


Fig. 1: The two study areas where the surveys were conducted: Ruma NP in western Kenya and Mwea NR in central Kenya. Inset: Map of Kenya.

## Population assessment

Our methodology is geared towards photographically marking individual giraffe during a given survey, then recapturing them in subsequent surveys to estimate their abundance in each of the two survey areas. Thus, our first task was to map the accessible road network to determine the transects that will be used for future surveys. We randomly drove around the study areas at a speed of 30km-40km/hr to ensure maximum detection and encounter of giraffe. One observer took the photos, and communicated the accompanying metadata to a recorder, who also marked the GPS way points. The metadata includes number of individuals, sex, signs of snaring or giraffe skin disease (GSD), time of sighting and photo number. For these (and future surveys) we prioritized right-side images of individual giraffe for WildID (Bolger et al. 2012) and Giraffe Wildbook analysis.

Given its smaller size and proximity to Nairobi, we first surveyed Mwea NR. We mapped a total of 41.2km that were accessible using a 4x4 vehicle. In order to randomize our survey patterns and limit bias, we then divided the accessible road network into three transects: the upper transect, lower transect and Tana transect measuring 13.2km, 13.3km and 15.2km, respectively (SD = 0.95; Fig. 2). The Park rangers in Mwea NR estimate that there could be as many as 35 giraffe. In Ruma NP, we mapped a road network of 66.4km, which we subsequently divided into three transects: Kamato transect, Wiga transect and Lambwe transect of 21.9km, 22.3km, and 22.2km, respectively (SD = 0.18; Fig. 2). Ruma NP is completely fenced to deter poachers and protect wildlife, and this limits any movement of giraffe. The Park's Research Scientist estimates the giraffe population to be between 170-200 individuals. Our study will quantify the abundance of giraffe populations in Mwea NR and Ruma NP.

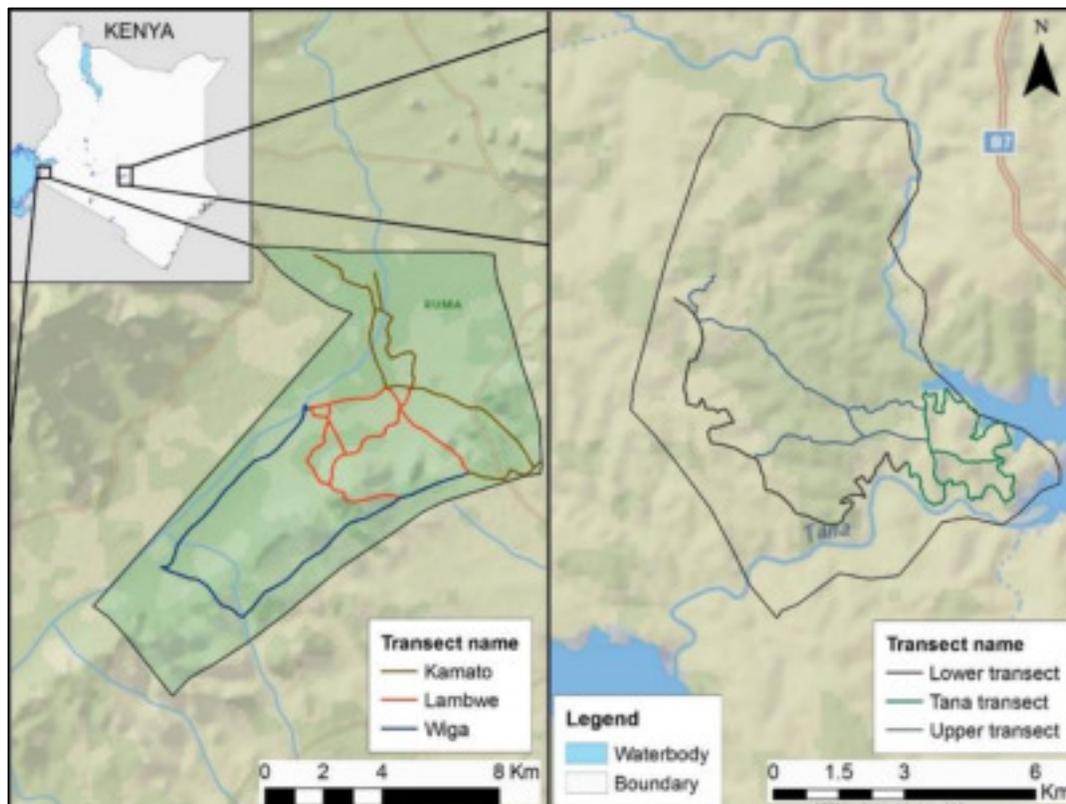


Fig. 2: The different transects that will be used for the surveys in Ruma NP (left) and Mwea NP (right).

In Mwea NR, we took 111 images of giraffe from 51 sightings. On the first day, we sighted 34 giraffe, while on the second day, we sighted 17 giraffe. We observed 11 male adults, 14 adult females, 2 male sub-adults, 16 calves, and 16 sightings of giraffe were not identified. In Ruma NP, we took 459 images of giraffe from 253 sightings. These were sightings of 46 adult males, 108 adult females, 20 sub-adult males, 30 sub-adult females, 39 calves, and 8 unidentified sightings of giraffe were not identified. WildID analysis is ongoing to determine the number of unique individuals that were sighted and recaptured after the first survey. Further analysis will be undertaken in the newly developing Wildbook for Giraffe ([www.GiraffeSpotter.org](http://www.GiraffeSpotter.org)).

Kaburu dam, located in the eastern section of the Reserve and near human settlements, is usually fed by the Thiba River, although it was dry during the time of survey due to the drought situation in Kenya. We observed animal tracks across the dam, suggesting that animals can access the adjacent local farmland outside the Reserve regularly raiding farms during the dry season, fueling human-wildlife conflict. Further, the dry condition increases likelihood for snaring for bush meat (KWS, pers. comm.), though during our survey we did not observe any snare injuries on giraffe. This was highlighted during our discussion with some of KWS rangers and community members. Animals venture to the southern area to drink water from Tana River but the reserve's management installed water troughs (Fig. 3) in the western section of the Reserve to limit this movement.



Fig. 3: Female giraffe drinking from one of the many water troughs installed in the northern section of Mwea NR.

Contrary to the situation in other parts of the country, Ruma NP has experienced long rains and the Park has an expansive area covered by green, leafy vegetation. Further, a small area of the Park had been flooded during our survey period. During the survey it was common to encounter large herds of giraffe, with the largest being 72 individuals.

In Mwea NR, there were no sightings of individuals with signs of GSD (see Muneza et al. 2016). However, we noted that individuals in the Reserve had a high tick-load, potentially increasing the risk of contracting tick-borne diseases (Akinyi et al. 2013). In Ruma NP, only one individual showed signs of GSD on the neck (see Fig. 4 below). We will continue to monitor signs of GSD and snares throughout the project.



Fig. 4: Adult female giraffe in Ruma NP with GSD lesions on the neck.

### **Challenges/points of interest**

- a) A section of Mwea NR was inaccessible due to a bridge that collapsed months prior to our arrival (see Fig. 5 & 6). Using images from Google Earth, we mapped the road network in the inaccessible area and found that there could be an additional transect for giraffe surveys once the bridge is fixed (Fig. 6).



Fig. 5: The broken bridge in the northern section of Mwea NR.

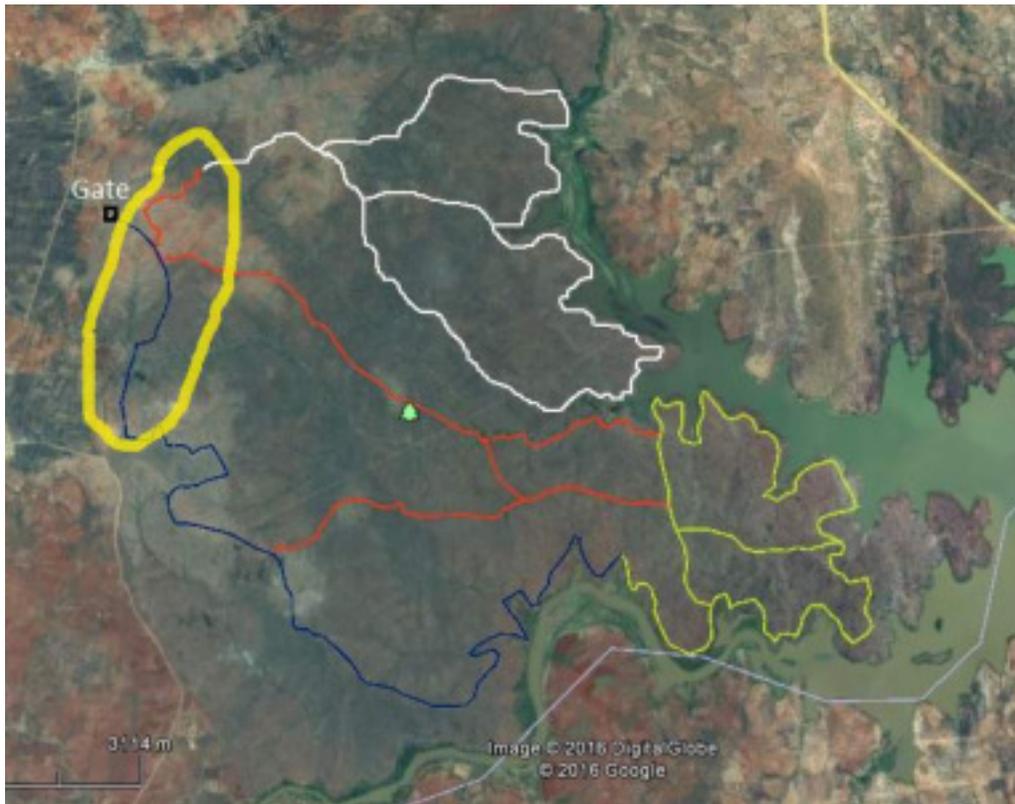


Fig. 6: Map highlighting the areas that was inaccessible (in white) during our survey in Mwea NR. The other colours represent established transects mentioned.

- b) The neighbouring communities around Mwea NR depend on the dam and rivers for their farming activities. Recently, the water levels have dropped considerably, allowing wildlife to move in and out of the Reserve and for poachers to gain easier access into the reserve. While we spotted fresh giraffe droppings and tracks near the dam (southern section), no giraffe was sighted in the area.
- c) The majority of Ruma NP is covered by black cotton soil and requires careful navigation and a good 4x4 vehicle is key, especially after heavy rains.

### **Next steps**

- 1) Finalise report on WildID results to determine minimum giraffe number of individuals in Mwea NR and Ruma NP (Emmanuel and George);
- 2) Conduct further robust (and random) photographic mark-recapture surveys in Mwea NR and Ruma NP following the mapped transects. We propose a total of 20 surveys in both sites to take place in June, July, October and November 2017. General elections will be held in August and as such no surveys will be held then. A zookeeper from Aalborg Zoo will accompany the team for the final surveys in November 2017 as part of building partnerships and field experience.
- 3) Work with local KWS authorities to determine and document threats to giraffe populations in both Mwea NR and Ruma NP.
- 4) Assess possibility of conducting targeted genetic studies of populations to better understand their (sub) specific taxonomy, and assess inbreeding potential.
- 5) Use historic photos of giraffe from the Giraffe Center to track individuals translocated to Mwea NR from the Giraffe Center.
- 6) Prepare and upload images for use with Wildbook for Giraffe when launched.

## References

- Akinyi, M.Y., Tung, J., Jeneby, M., Patel, N.B., Altmann, J. & Alberts, S.C. 2013. Role of grooming in reducing tick load in wild baboons (*Papio cynocephalus*). *Animal Behaviour* **85**(3):559-568.
- Bolger, D.T., Morrison, T.A., Vance, B., Lee, D. & Farid, H. (2012). A computer-assisted system for photographic mark-recapture analysis. *Methods in Ecology and Evolution* **3**:813-822.
- Fennessy, J., Bidon, T., Reuss, F., Kumar, V., Elkan, P., Nilsson, M.A., Vamberger, M., Fritz, U. & Janke, A. (2016). Multi-locus analyses reveal four giraffe species instead of one. *Current Biology* **26**:1-7.
- Muller, Z., Bercovitch, F., Brand, R., Brown, D., Brown, M., Bolger, D., Carter, K., Deacon, F., Doherty, J.B., Fennessy, J., Fennessy, S., Hussein, A.A., Lee, D., Marais, A., Strauss, M., Tutchings, A. & Wube, T. 2016. *Giraffa camelopardalis*. (errata version published in 2017) The IUCN Red List of Threatened Species 2016: e.T9194A109326950. Downloaded on 25 May 2017.
- Muneza, A.B., Montgomery, R.A., Fennessy, J.T., Dickman, A.J., Roloff, G.J. & Macdonald, D.W. (2016). Regional variation of the manifestation, prevalence, and severity of giraffe skin disease: A review of an emerging disease in wild and captive giraffe populations. *Biological Conservation* **198**: 145-156.
- Ogutu, J.O., Piepho, P.H., Said, M.Y., Ojwang, G.O., Njino, L.W., Kifugo, S.C. & Wargute, P.W. (2016). Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes? *Plos One* **11**: e0163249.

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