



## Quarterly conservation update – Kordofan giraffe (*Giraffa camelopardalis antiquorum*), Garamba National Park, Democratic Republic of Congo

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### Introduction

Garamba National Park (GNP) in the Democratic Republic of Congo (DRC) was first established in 1938 by virtue of its uniqueness, one of the first Parks in Africa. Throughout its long history the Park was initially made famous with the world's only elephant domestication program, coupled with its high numbers of elephant and buffalo, and home to the world's last northern white rhino (*Ceratotherium simum cottoni*) population. The Park was designated a UNESCO World Heritage site in 1980 and on the List of World Heritage in Danger in 1996. Sadly, the Park's infamy has increased through losing the last northern white rhino, and being plagued by numerous groups of rebels, in particular the Lord's Resistance Army.

In fact, the Park, being nestled in the far north-eastern corner of the country, is writing history every day again, not because of the countries' own destabilised politics (the 2000km between the Park and the countries' capital creates an efficient buffer), but because of its war against armed militia coming from within and neighbouring countries.

GNP, and its adjacent Hunting Reserves, are also home to DRC's only population of giraffe, historically named 'Congo giraffe' (Amube et al. 2009; De Merode et al. 2000; East 1999) but reclassified as they are genetically identical to other Kordofan giraffe (*Giraffa camelopardalis antiquorum*) across Central Africa (Fennessy et al. 2016). Most recently, the Kordofan giraffe has been proposed as a subspecies of the Northern giraffe species (*Giraffa camelopardalis*) (Fennessy et al. 2016).

Due to illegal hunting, current giraffe numbers in the Park and surrounding areas were reported to be less than 40 individuals – a small percentage of the less than 2,000 Kordofan giraffe remaining in the wild (Muller et al. 2016). The numbers have never been so low since the first aerial census of GNP was undertaken in 1976, when 350 giraffe were estimated (Savidge et al. 1976).

Interestingly, poaching of giraffe by local tribes living in the adjacent Hunting Reserves to Garamba NP has been relatively limited. This is because they historically believed that consuming giraffe meat causes leprosy. However, giraffe have been poached in the last decade, predominantly for their tail hair which is a status symbol for tribal chiefs (African Parks, 2012). Amube Ndey et al. (2009) reported that the traditional taboos have largely died out with the influence of modern society and the invading *muharaleen* horsemen, who specifically value giraffe tails as part of their bride dowries, subsequently increasing illegal hunting of giraffe. Moreover, a decline in general wildlife populations in the Park is furthermore linked to post war instability, power struggles and exploitation of resources, particularly from neighbouring countries (Hillman Smith & Amube Ndey 2005).

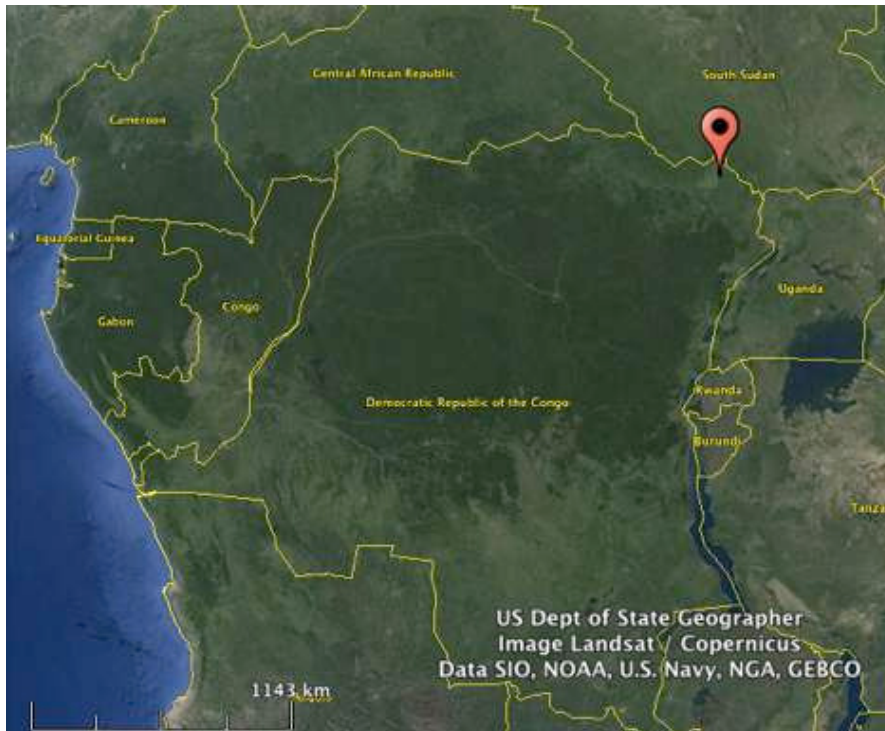


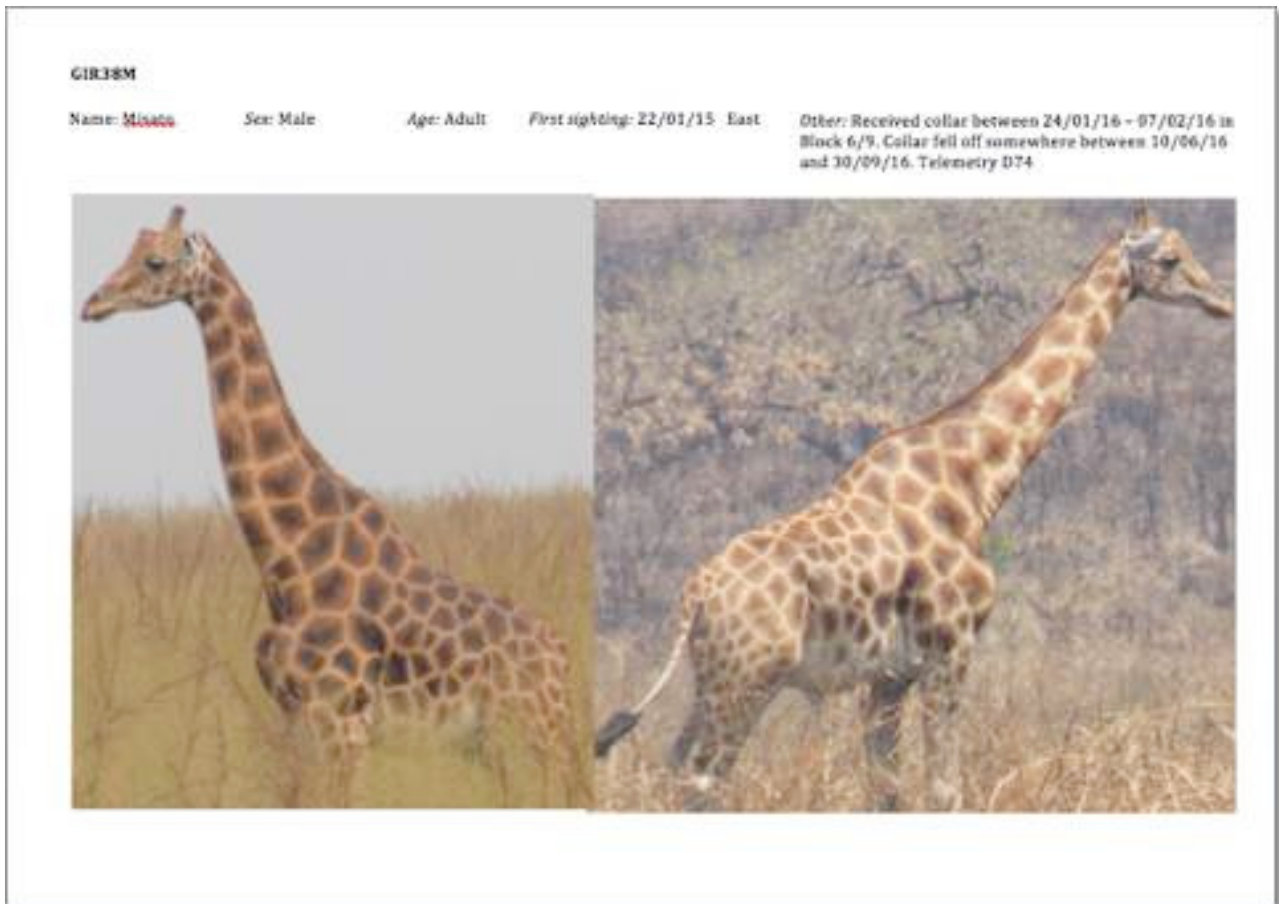
Figure. Garamba National Park, in the far north-eastern corner of the Democratic Republic of Congo

In the context of the above, the DRC wildlife authority (ICCN) and African Parks Network has been undertaking key conservation and management of the Park, and more recently a focus has been on preserving the last remaining few. The Giraffe Conservation Foundation (GCF), with support from its partners, has since 2014 provided some technical and financial support for the conservation of the giraffe in the Park, and the latest is through this conservation research effort to assess the situation and to develop an adequate management plan for the remaining Kordofan giraffe population. This quarterly conservation update provides an overview of the work undertaken from October until December 2016, but also highlights some previous data to contextualise the current status.

## Data collection

Photographing of individual giraffe in the Park was initiated in February 2012 to assist in population estimates and assessing their conservation status. Up until September 2016, 1,456 photos were obtained on 48 different days and from September to December 2016, this study period, an additional 416 photos were obtained on 16 different days. All photos were analysed in order to create identification (ID) sheets of each known different giraffe. From the

analysis, 44 individual giraffe ID sheets were developed, and all current individuals, as well as some recently deceased.



*Figure. Example of ID sheet GIR38M, showing information about its ID, sex, age, first sighting and 'other', which gives information about mother-kin relations and or collar data. Also clear photos of its right and left side are added.*

Based on the data obtained combined with the ID sheets created, each observation was collated into an online Google Sheet database for current and future analysis and monitoring. All historical data (dating back to February 2012) and recent observations were imported into this database and included 7,069 GPS Satellite Collar data points (eight giraffe were collared during January and February 2016 with support of partners), 246 ID-linked data points (observations of which the ID of the giraffe could be determined) and 235 non-ID-linked data points (observations of which the ID could not be determined).

Information about the following items was collected and entered into the database:

- **Date:** date of observation.
- **Time:** Time of observation.
- **ID:** a unique code for each giraffe (GIR followed by two numbers, then M, F or U, for Male, Female or Unknown e.g. GIR15M).
- **Name:** all collared individuals were named, as well as animals of which mother-kin relations are known.
- **Sex:** Male, Female or Unknown.
- **Age:** Juvenile, Subadult, Adult (see Brand 2007).
- **Group size:** number of individuals in the herd.

- **Other individuals:** in order to carry out a link analysis, each animal in the herd is recorded and linked to each other animal.
- **Method:** airplane, helicopter, vehicle, collaring operation, foot patrol or observation post.
- **Type:** seen (observed), collar data, tracks/dung or carcass.
- **Block:** the number of the block the animal is seen in (GNP is divided into blocks for management purposes, mostly using roads and rivers as block boundaries).
- **Latitude & Longitude:** GPS recording.
- **Photo:** Yes/No, indicating whether a photo was taken or not.
- **Photo information:** link to the photo.
- **Observers:** who was the observer.

Age class categories outlined by Brand (2007) were followed. Giraffe were considered to be a Juvenile up to the age of ~18 months, by which they have generally stopped suckling and have left their mother (Leuthold & Leuthold 1978b; Leuthold 1979). Giraffe older than 18 months, and up to ~four years were classed as Subadults (e.g. males that still had a fringe of hair around the horn tips were considered Subadults (Leuthold & Leuthold 1978b)). All individuals over four years, of approximately adult height, are considered potentially sexually active (Dagg & Foster 1982) and thus classed as Adults.

To provide better age estimations, individuals observed since January 2015 were also linked to historic observations between February 2012 and January 2015. Unknown animals, photographed between February 2012 and January 2015, and who have not been photographed recently, were not described.

### Population dynamics

Based on the information described above, preliminary results on the population's status are estimated. The table below shows all individuals observed and photographed since January 2015, and there is no proof that they have died. Animals with no observations in the last 12 months are marked with an asterisk (\*).

Five giraffe, which are not included in the table below, were confirmed as dead in 2016:

- GIR25F (Juvenile) – likely died between 9 and 23 April 2016. No carcass was found but the mother was observed on 23 April 2016 without any calf. Animal was too young to be independent.
- GIR07M – found poached in a group of three on the 30 June, 2016
- GIR18M – found poached in a group of three on the 30 June, 2016
- GIR36M – found poached in a group of three on the 30 June, 2016 – had a GPS Satellite Collar
- GIR40M – found dead on 9 June, 2016 – had a GPS Satellite Collar

**Table:** A summary of all known individual giraffe including number, sex and age class in Garamba National Park, Democratic Republic of Congo as of December 2016.

<b>Juvenile (4)</b>	<b>Subadult (9)</b>		<b>Adult (28)</b>	
<b>Male/Female</b>	<b>Male (4)</b>	<b>Female (5)</b>	<b>Male (11)</b>	<b>Female (17)</b>
GIR31U	GIR02M	GIR01F	GIR04M	GIR03F
GIR44U	GIR15M	GIR26F	GIR09M	GIR05F
	GIR17M	GIR29F	GIR10M	GIR06F
	GIR35M	GIR30F	GIR14M	GIR08F
		GIR34F	GIR19M	GIR11F
			GIR21M	GIR12F
			GIR27M *	GIR13F
			GIR32M	GIR16F *
			GIR38M	GIR20F *
			GIR39M	GIR22F
			GIR41M	GIR23F *
				GIR24F
				GIR28F
				GIR33F
				GIR37F
				GIR42F
				GIR43F

## Distribution and Movements

All individual giraffe observations are recorded with GPS coordinates, and as such distribution maps can be created. Because of poaching in the Park, sensitive information cannot be disclosed, including specific names of rivers or regions in the Park.

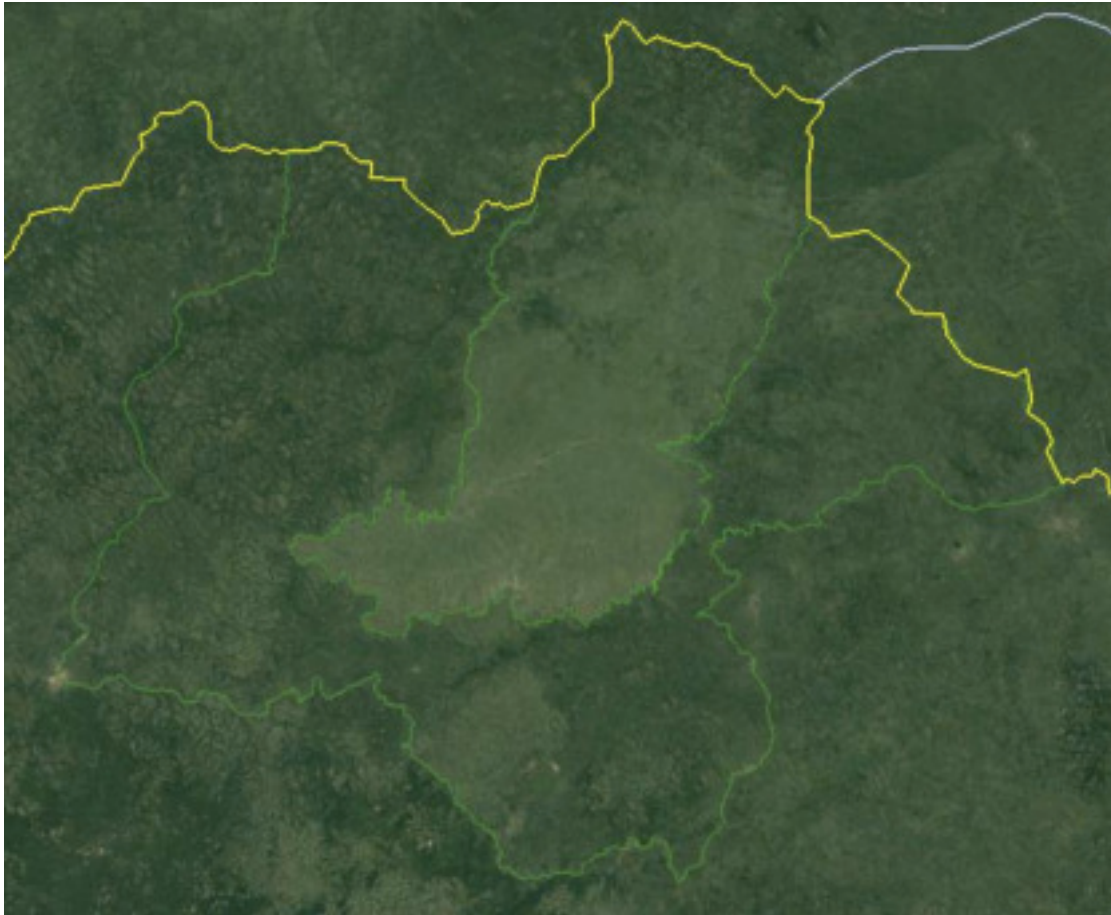
All observations of giraffe have been mapped and used to analyse their movements and distributions. A satellite image of GNP is added and can be used by the reader to visualise the information discussed.

Before going into detail it is important to note that GNP's core area consists of savannah habitat. This, however, does not mean that the Park consists entirely of habitat suitable for giraffe. Giraffe regions are roughly restricted to the areas bordering the forested hunting reserves in the East, South and West of the Park as savannah becomes more wooded. Giraffe living in these "intermediate zones" are somewhat divided in three populations (East, South and West).

Preliminary notes on the distribution and movements of giraffe in the Park:

- The largest population (20 individuals, of whom five have GPS Satellite Collars) predominantly use the eastern frontier. It contains the Park's biggest and best-monitored area and individuals. Based on sightings along the road towards the western parts of the Park, and collar data, most, if not all, giraffe move to and from the western region. Important to note is that there are a lot of data points, all coming from one same, collared giraffe, leaving the population and going far more to the east than usual for this population. These findings are a result of a collared Adult male, which was severely wounded (discussed further under 'Collar and Collar Data').

- There are data points from giraffe movements coming from the eastern population, towards the western population, and back. Interestingly, three out of five giraffe with collars independently moved to and from the western region. The route taken by each was similar, as all three (2 males and 1 female) walked ~25km/day along a road for 2-3 days, until they reached the western region. They stayed in this region for another 2-3 days and returned along a similar route back to the eastern region.



*Figure. Satellite image of Garamba National Park, containing suitable habitat for giraffe but being bordered by densely wooded areas in all four compass directions.*

- Five individuals are assumed to be permanently inhabiting the area on the western frontier, since all observations of them are reported from here. No giraffe in this region were fitted with a collar, nor do we have many observations of these animals. It has been determined that giraffe of the eastern population move to and from this region. Thus far, there has been no record of the five known giraffe in the western population moving to and from the eastern population.
- After being fitted with a collar in the East, one Adult female moved large distances across the Park until she crossed one of the major rivers, where she has remained to date. She crossed the river in the dry season and became confined to the other side as the river rose too high with the rains during the wet season. Since the Adult female is currently isolated from all other giraffe, plans are being made to bring her back over the river and guide her to other giraffe during the next dry season.
- Nine giraffe are living in the South. Most data points in this region are from two giraffe that were fitted with a GPS Satellite Collar. However, actual sightings of giraffe in this region are rare since it is separated from the Park by one of the biggest rivers, which

remains relatively high in the dry season. The giraffe in this region have never been recorded across this river in the Park, and it is assumed that this population is isolated from all other giraffe.

- Four observations (August 2015 and July 2016) of four giraffe were made in the North. These giraffe have never been sighted anywhere else and thus are also believed to be isolated from all other giraffe in the Park.

## Diet preferences

Due to the wet season and high vegetation during this period, all but one observation on giraffe feeding behaviour were made – and this was done from the air. The diet preferences of the giraffe in the Park will hopefully kick off when possible in 2017. A limited list of plant species consumed by giraffe in GNP is provided below based on previous research (Amube Ndey et al. 1989) and local knowledge of rangers. This information will be revised as and when giraffe observations are carried out from the ground.

- *Acacia sieberiana*
- *Acacia seyal*
- *Bridelia scleroneuroides*
- *Calopogonium mucunoides*
- *Combretum binderianum*
- *Crossopterix febrifuga*
- *Helictonema velutina*
- *Nauclea latifolia*
- *Piliostigma thoningii*
- *Stereospermum kunthianum*
- *Ziziphus abyssinica*
- *Vitex doniana*

## Habitat usage

All giraffe in the Park predominantly inhabit the tree savannah habitat (sparsely and intermediately bushed), dominated by *Loudetia arundinaceae* and *Hyparrhenia* species, but have also significant numbers of *Kigelia africana*, *Piliostigma thoningii* and *Vitex doniana*. *Acacia* species are relatively sparse in the East, and rare in the western and the southern regions. Even though similar habitat is present in the southern region, giraffe in this area spend at least as much time in the more densely wooded parts as they do in the savannah types habitats. Giraffe in this region prefer sparse, and even intermediate woodland types, in which *Anogeissus leiocarpus* and *Lophira lanceolata* are abundant. The different habitat selection in this region is probably the reason why giraffe observations here are so uncommon. An attempt to explain this habitat selection is hypothesised below in 'Conservation Notes'. Further data collection and diet preferences will hopefully help to better understand why giraffe prefer these habitats seasonally or year-round.

## **GPS Satellite Collars and Data**

During January and February 2016, eight giraffe were fitted with a GPS Satellite Collar (head harness) to help better understand the ecology of the GNP giraffe population. Below the functionality of these collars is briefly discussed.

1. GIR36M (adult male) was fitted with a collar on 24 January 2016. The collar worked until 30 June 2016 when the animal, together with two other giraffe, was poached.
2. GIR37F (adult female) was fitted with a collar on 25 January 2016. The collar was functional until 17 August 2016. This animal is still alive and is observed relatively often and is still fitted with the collar.
3. GIR38M (adult male) was fitted with a collar on 25 January 2016. The collar was functional until 17 May 2016. On 10 June 2016 it was observed again with the collar, but on 30 September 2016 the animal was seen without the collar.
4. GIR39M (adult male) was fitted with a collar on 27 January 2016. The collar was functional until 2 November 2016, when the collar was removed due to impacting the giraffe. The giraffe made a good recovery.
5. GIR40M (adult male) was fitted with a collar on 27 January 2016. The collar worked until 9 June 2016 when the animal was found dead.
6. GIR41M (adult male) was fitted with a collar on 28 January 2016. The collar worked until 18 March 2016 but ceased working. The animal is still alive and the collar is still on – it will be removed when feasible.
7. GIR42F (adult female) was fitted with a collar on 30 January 2016. The collar worked until 20 March 2016 but ceased working. The animal is still alive and the collar is still on – it will be removed when feasible.
8. GIR43F (adult female) was fitted with a collar on 3 February 2016. The collar is still working. However, as previously mentioned, this giraffe crossed one of the main rivers and is restricted to that area after the water rose too high with the rains. Since the animal is isolated from all other giraffe, an attempt to chase the giraffe over the river will be made during coming dry season when the river level drops sufficiently. (See 'Distribution and Movements').

To summarise, the data collected from the GPS Satellite Collars is limited due to the array of impacts on the individuals highlighted above, including technology failure. It is hoped that the combination of this data with the other surveys and observations will combine to help provide a better understanding of their movements and distribution over time. Lastly, new GPS Satellite units are under development and it is hoped that these will aid our efforts in the future.

## **Conservation Notes**

From a preliminary assessment, the question we need to understand to better conserve the population is 'why is Garamba's giraffe population so low?'. It is likely that the decline in numbers is not a result of only one cause, but a combination of several, which have resulted in the current situation.

Three giraffe were found poached in June 2016 for only their tails and genitals. This supports the poaching threat described by Amubde Ndey et al. (2009). However, giraffe seem to be of lesser value to poachers compared to elephant and rhino. Giraffe in the South region live in close proximity to people (<5 km), and one would expect increased poaching if they were of



great economic, social or other value to the local people. Therefore, the decline of the population cannot be explained solely because of poaching.

Compared to other areas across Africa, GNP is not ideal giraffe habitat due the limited *Acacia* species. On a precursory assessment, giraffe appear to form small herds of 2-3 individuals on average, possibly to minimise browsing competition. Being in such small herds also may make them more vulnerable to predation by lion.

Because of heavy poaching on all medium and large mammal species in GNP, the Park's wildlife density is low. Having lost the last northern white rhino, and the impacts on the elephant, buffalo, waterbuck, etc., the Park's vegetation has likely altered over the last few decades because of limited foraging pressure, resulting in higher and thicker grasslands. This impact not only limits giraffe forage but also movements and provides camouflage to lion, making giraffe potentially easier prey. This could explain why giraffe in the South prefer more wooded habitat.

It has also been observed by local staff that when patches of vegetation are burned during the beginning of the dry season, giraffe move there even though there is no forage available. Being able to freely move and reduce camouflage for lion could be the trigger for giraffe to come to these burned patches. Whilst only a theory, increased assessment of lion predation of giraffe in the Park needs to be better understood.

GNP has experienced a significant decline in its giraffe population over the last few decades, likely a possibility of various threats and impacts. Coupled with them living at the edge of their ideal habitat, a greater understanding of the population is critical for any future conservation and management plan to be developed.

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