

# Republic of Mozambique



## *Giraffe Conservation Status Report*

May 2023

### General statistics

Size of country: 801,590 km<sup>2</sup>

Size of protected areas/percentage protected area coverage: 29.5%

### Species and subspecies

In 2016 the International Union for the Conservation of Nature (IUCN) completed the first detailed assessment of the conservation status of giraffe (*Giraffa* spp.), revealing that their numbers are in peril. This was further emphasised when most of the IUCN recognised subspecies were assessed in 2018 – some as *Critically Endangered*. While this update further confirms the real threat to one of Africa's most charismatic megafauna, it also highlights another key threat which is impacting their conservation: how many (sub)species of giraffe are there? And as such, are we undervaluing their conservation status? The IUCN recognition of one species (*G. camelopardalis*) and nine subspecies of giraffe (Muller *et al.* 2018) is outdated, historically based on limited and inaccurate scientific evidence of their morphology and geographic range. They recognize the following subspecies: Angolan giraffe (*G. c. angolensis*), Kordofan giraffe (*G. c. antiquorum*), Masai giraffe (*G. c. tippelskirchi*), Nubian giraffe (*G. c. camelopardalis*), reticulated giraffe (*G. c. reticulata*), Rothschild's giraffe (*G. c. rothschildi*), South African giraffe (*G. c. giraffa*), Thornicroft's giraffe (*G. c. thornicrofti*) and West African giraffe (*G. c. peralta*).

However, over the last one and a half decades, GCF together with their primary partner Senckenberg Biodiversity and Climate Research Centre (BiK-F) and others, including Smithsonian Conservation Biology Institute, various African Governments, and conservation partners, performed the first-ever comprehensive DNA sampling and analysis (genomic, nuclear, and mitochondrial) of giraffe from all major natural populations throughout their range in Africa. This long-term study has revealed four distinct species of giraffe and seven subspecies (Coimbra *et al.* 2021; Winter *et al.* 2018; Fennessy *et al.* 2016). The four species are Masai giraffe (*G. tippelskirchi*), northern giraffe (*G. camelopardalis*), reticulated giraffe (*G. reticulata*) and southern giraffe (*G. giraffa*). Nubian giraffe (*G. c. camelopardalis*), Kordofan giraffe (*G. c. antiquorum*) and West African giraffe (*G. c. peralta*) are the three subspecies of the northern giraffe, while Angolan giraffe (*G. g. angolensis*) and South African giraffe (*G. g. giraffa*) are subspecies of the southern giraffe. Masai giraffe now consist of two subspecies – the Masai giraffe (*G. t. tippelskirchi*) and the Luangwa (formerly Thornicroft's) giraffe (*G. t. thornicrofti*). Rothschild's giraffe is genetically and morphologically identical to the Nubian giraffe, and thus subsumed into it. In all programmes and publications GCF refers to the updated giraffe taxonomy of four species.

The following species and subspecies of giraffe occur in Mozambique:

**Species:** Southern giraffe (*Giraffa giraffa*)

**Subspecies:** South African giraffe (*Giraffa giraffa giraffa*)

## Conservation Status

### IUCN Red List (IUCN 2018):

*Giraffa camelopardalis* (as one species, outdated taxonomy) – Vulnerable (Muller *et al.* 2018)

*Giraffa giraffa* – Not assessed

*Giraffa giraffa giraffa* – Not assessed

### In the Republic of Mozambique:

Giraffe in the Republic of Mozambique (referred to as Mozambique in this report) are protected under the Forestry and Wildlife Law (Law No. 10/99) and Regulations of the Forestry and Wildlife Law (Decree No. 12/2002). Giraffe are listed in Annexure 2 of the Regulations as a protected species that may not be hunted. They are listed as one of the eight mammals on Mozambique's National Red List that are either extinct or in danger of extinction (MICOA 2009).

## Issues/threats

Giraffe (*Giraffa* spp.) are one of the most threatened large mammal species in Mozambique (Beyers *et al.* 2013). Habitat conversion, loss, degradation and fragmentation of natural habitats, over-exploitation of resources and wildlife, invasive species, pollution or contamination of natural habitats and climate change are some of the main threats facing Mozambique's biodiversity (Beyers *et al.* 2013; Weyerhaeuser 2013; WWF 2013; Wingqvist 2011; MICOA 2009). Agricultural expansion, conversion of land to industrial plantations, logging, firewood cutting, charcoal production, uncontrolled wildfires and illegal hunting have altered natural environments and threaten the survival of many species (Beyers *et al.* 2013, Wingqvist 2011; MICOA 2009).

The Mozambican civil war (1977–1992) was among one of the deadliest conflicts in the world in the last half century and has severely impacted biodiversity conservation in the country (Moving Giants 2018; Lindsey & Bento 2012). This impact was amplified by the fact that most protected areas in Mozambique were established only just prior to the civil war in the 1960s and 1970s (Beyers *et al.* 2013). During the war, these areas were mostly abandoned, and, without adequate management, infrastructure lapsed into a state of degradation (Beyers *et al.* 2013). Protected areas were invaded and occupied by local people from the surrounding areas as well as military troops (Beyers *et al.* 2013; Lindsey & Bento 2012; MICOA 2009). During this time, uncontrolled illegal hunting was rampant and wildlife populations, particularly large mammals, were severely overexploited to the point of depletion (Beyers *et al.* 2013; Lindsey & Bento 2012; Miller *et al.* 2012; Le Bel *et al.* 2011; Wingqvist 2011; MICOA 2009; DEAT 2002). Due to a combination of corruption in law enforcement and ineffective regulations, the illegal hunting crisis continued unhampered even after fighting ceased (Lindsey *et al.* 2015).

Since the end of the war in 1992, the national government has directed efforts on the establishment and rehabilitation of Mozambique's protected areas network, recovering of lost wildlife populations, and bringing back tourism (Moving Giants 2018; Lindsey & Bento 2012; MICOA 1997). These efforts have been challenged by constraints such as weak operational capacity, poor infrastructure, and a lack of funding for the protection of wildlife and human resources (Funk & Kruger 2018; MICOA 1997). Illegal hunting reportedly continues in many protected areas and human population growth combined with people's dependency on natural resources has contributed to an increase in human-wildlife conflict (WWF 2013; Lindsey & Bento 2012; Miller *et al.* 2012; Le Bel *et al.* 2011; MICOA 2009). More recently, criminal gangs have reverted to illegal hunting of wildlife and illegal logging of forested areas (WCS 2015).

On a broader scale, climate change represents the latest in a series of environmental drivers of human conflict that were identified in recent decades characterised by drought, desertification, land degradation, failing water supplies, wildfires, and deforestation (Brown *et al.* 2007). Climate is an important factor that directly affects wildlife populations and their numbers in Africa. To date, climate change research in Mozambique has focused



on the key economic sectors such as agriculture, mining, tourism, and energy (Wingqvist 2013; Osbahr *et al.* 2008). The conservation sector contributes significantly to tourism, however, it is highly susceptible to negative impacts by climate change. The intricate balance between the natural environment and fire is imbalanced due to population growth, conflict, and a breakdown in traditional management practises (Wingqvist 2013; Arndt *et al.* 2011; Hoffmann *et al.* 2009). The gradual process of climate change has the potential to aggravate this process by altering the frequency, intensity, severity, and seasonality of wildfires in Mozambique (Hoffmann *et al.* 2009). Moreover, the country experiences high levels of climate variability and extreme weather events such as drought and floods (Arndt *et al.* 2011). Mozambique lies at the end of numerous transnational rivers and flooding in their basins is a perennial threat which may be worsened by climate change. Mozambique's significant waterbodies (rivers, floodplains, and wetlands) provide key habitat for various wildlife species due to their annual inundation character. As these water resources are not evenly distributed, wildlife must often either cover large distances to rivers or rely on artificial water resources. Potential changes in water regime, timing, quantity, and quality because of extreme weather events can have far reaching impacts for the survival of wildlife as they determine factors such as breeding patterns and productivity of range lands. Taking into consideration that most climate models predict reduced precipitation and rainfall along with higher temperatures in Mozambique, it is critical that measures to enhance resilience of species are investigated and implemented while at the same time advocating for hydrological connectivity of critical freshwater ecosystems and resources. A recent Emissions Gap Report by the United Nations Environment Program (UNEP) Climate Centre predicts that the earth will be warmer by about 1.5°C by 2030 (UNEP, 2021) with temperature in Africa predicted to increase by 1.2°C in the next two decades (Almazroui *et al.* 2020). This would result in significant declines in natural productivity and resource availability in Southern Africa (Stige *et al.* 2006) and may have broader implications on the protection and management of wildlife, including giraffe. In general, possible effects of climate change on species and ecosystems include changes in the timing of life-history events or phenology, effects on demographic rates such as survival and fecundity, reductions in population size, and shifts in species distribution (Chidumayo *et al.* 2011). While existing challenges of climate variability and weather risk are compounded by climate change, little is currently known about how Mozambique may be affected and how it might adapt its policies to offset potential damages (Arndt *et al.* 2011).

## Estimate population abundance and trends

### Historic

Due to the historical political instability and selective focus directed towards protected areas, the known distribution of mammal diversity in Mozambique is poorly documented (Neves *et al.* 2019). South African giraffe are assumed to have occurred in southern Mozambique, south of the Save and Limpopo Rivers in the Guíja, Uanetze, Saute, and Funhalouro Regions (Agreco 2008; East 1999; Dagg 1962). However, anecdotal evidence suggests that giraffe may have occurred far further north than previously thought and is supported by the rock engravings near Manica Town, located far north of the Save River on the western border of Mozambique, which depict various animals including giraffe (Muianga 2013; Oliveira 1971). It is unlikely that the distribution of giraffe was limited by the Save and Limpopo Rivers, especially considering their distribution to the north in Tanzania and west and south in neighbouring countries. Diseases such as Rinderpest, which severely impacted domestic and wild ruminant numbers and their distribution in the late 1800s and early 1900s, combined with other impacts highlighted earlier, likely resulted in the recent range restrictions (Sunseri 2018; Phoofolo 1993).

By the early 1970s giraffe were extirpated in most of their range in Mozambique and the few surviving individuals were restricted to the area between the Limpopo River and the border with South Africa's Kruger National Park (NP) (East 1999). Mozambique's civil conflict took its toll on the wildlife in the following decades and by the late 1990s, giraffe were thought to have gone extinct in the country (East 1999).

In recent years, giraffe have been re-introduced into Limpopo, Maputo and Zinave NPs in southern Mozambique



(Beyers *et al.* 2013; MICOA 2009). Between 2002 and 2007, 82 giraffe were translocated from Kruger NP to the Limpopo NP as part of developing the Great Limpopo Transfrontier Park (I. Engelbrecht pers. comm). In 2002, sections of the boundary fence between Kruger and Limpopo NPs were removed to allow for cross-border movement of wildlife (Peace Parks Foundation 2012). In 2008, another 33 giraffe were introduced into Limpopo NP (A. Alexander pers. comm.). A country-wide aerial wildlife census conducted in 2008 recorded giraffe only in the Limpopo NP and counted 125 individuals (MICOA 2009; Agreco 2008).

### Current

In 2010, an aerial census of Limpopo NP estimated the giraffe population at 116 individuals (Stephenson 2010). These numbers were likely an undercount as anecdotal observations from patrols suggested higher numbers with range expansions into the eastern sandveld area (A. Alexander pers. comm.). A 2014 aerial survey of Limpopo NP showed a decline in the giraffe populations from the previous estimates to only 71 individuals remaining (Grossman *et al.* 2014). This decline may be attributed to increased anthropogenic factors from both livestock and human presence allowed within the park as well as unchecked illegal hunting of elephant, rhino, and other mammals for bushmeat (J. Almeida pers. comm.; Everatt *et al.* 2014). However, recent interventions and anti-poaching efforts through the provision of paramilitary and helicopter access appear to be effective (J. Almeida pers. comm.). No recent population counts were undertaken in the area.

Karingani Game Reserve (GR) is situated on the western border of Mozambique and shares a boundary fence with South Africa's Kruger NP. Giraffe have moved between the two properties through gaps in the fence and it appears that some individuals have settled in the reserve permanently. The current population remains relatively small yet healthy and is estimated at 75 individuals (E. Worth pers. comm.). Most giraffe reside in the northern and western woodlands where adequate water is freely available. The central section of the reserve is comprised largely of dwarf sand forest and acts as a natural internal barrier that is rarely utilised by giraffe and likely prevents them from accessing the southern and south-eastern areas (E. Worth pers. comm.).

The Greater Lebombo Conservancy consists of four private concessions adjacent to Kruger NP and south of Karingani GR. In recent years, movements of giraffe between Kruger NP and the conservancy were observed, with some individuals remaining permanently in the conservancy (J. Almeida pers. comm.). The current population for giraffe in the Greater Lebombo Conservancy is estimated at 80-100 individuals (J. Almeida pers. comm.).

In 2011, seven giraffe were translocated from South Africa's Kruger NP to Zinave NP as part of an initiative to rehabilitate the park as part of the larger transfrontier conservation area surrounding the Great Limpopo Transfrontier Park (Mashala 2012; Miller *et al.* 2012). A further 11 giraffe were introduced from Kruger NP in 2019 (J. Almeida pers. comm.). An aerial game count in 2021 reported a total count of 31 giraffe in the Sanctuary with a further 3-4 individuals in the larger park (Sunrise Aviation CC 2021). Based on a ground survey in late , GCF calculated an estimate of 42 giraffe (with a standard error of 10.8) in the Sanctuary (GCF 2021). It is unknown whether the giraffe in the larger park occurred naturally, as no giraffe appear to have escaped from the Sanctuary and anecdotal evidence suggests that no giraffe survived the civil war. Only skeletal remains were discovered during vegetation mapping of Zinave NP in 2009 (M. Stalmans pers. comm.).

Sabi Game Park (GP) is a 30,000ha property bordering the Lower Sabie section of South Africa's Kruger NP and falls within the Greater Lebombo Conservancy. The park is managed as a sport hunting concession and plays a pivotal role in the conservation of several species in the country, especially of white rhino. The giraffe population originated from individuals moving through fence gaps from Kruger NP. Some giraffe appear to have settled permanently and the current population is estimated at 30 individuals (J. Almeida pers. comm.).

In 2012, as part of a collaborative wildlife restocking initiative by the Mozambican and South African governments, eight giraffe were introduced to Maputo NP from Hluhluwe GR (six animals) and Tembe Elephant



Park (two animals) in South Africa's KwaZulu-Natal (KZN) province respectively (Peace Parks 2013; A. Guenha pers. comm.). Later in the same year, an aerial census confirmed that the translocated animals had adapted well to their new environment and in 2013, an additional 12 giraffe, six from Ndumo GR and six from Pongola Nature Reserve in KZN, were introduced (Peace Parks 2013; A. Guenha pers. comm.). In 2017, a further 12 giraffe were translocated from KZN to Maputo NP (Peace Parks 2017; J. Almeida pers. comm.). Game counts in 2021 estimated 67 giraffe indicating a steady growth in the population (B. Neubert pers. comm.).

In summary, while most of the South African giraffe in Mozambique were re-introduced, a few migrated naturally or survived the threats of civil war. The total giraffe population is estimated at 378 individuals, based on estimates of 71 in Limpopo NP, 35 in Zinave NP, 67 in Maputo NP, 75 in Karingani GR, 30 in Sabi GP and 80-100 in the Greater Lebombo Conservancy.

### Future Conservation Management

The following are proposed conservation management options for giraffe in Mozambique:

- Development of the first-ever National Giraffe Strategy and Action Plan for Mozambique;
- Review of historical explorer literature and ancient rock art to better understand historical distribution of giraffe in the country;
- Conservation translocations of South African giraffe to Mozambique to help bolster the existing populations and establish an increased founder population. Ideally, genetic analysis of the existing giraffe populations should confirm the taxonomic status of all giraffe in the country to ensure that future giraffe introductions will focus on the same (sub)species that already occurs.
- Anti-poaching efforts to conserve the key population in Limpopo NP and other key giraffe expansion areas;
- GPS satellite tagging of all key giraffe populations to provide targeted monitoring and anti-poaching support;
- Targeted surveys of giraffe in all key populations; and
- Support to dedicated giraffe conservation, habitat protection, education, and awareness initiatives (government, NGO and academic).

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**Map**

