

Country Profile  
**United Republic of Tanzania**  
*Giraffe Conservation Status Report*



**Sub-region:** East Africa

**General statistics**

Size of country: 947,303 km<sup>2</sup>

Size of protected areas / percentage protected area coverage: 38%

**Species and subspecies**

Until recently, it was widely recognised that there was only one species and nine subspecies of giraffe. New genetic research, conducted by the Giraffe Conservation Foundation (GCF) and partners, has shown that there are in fact four distinct species and five subspecies of giraffe. These ground-breaking findings will enhance future giraffe research, conservation and management. To confirm these findings, further research is currently carried out by GCF and partners to correlate current and new genetics findings with the traditional classification taxonomy methods, based on morphology and geography.

Based on these findings the new taxonomy has been used in the Country Profile and the following giraffe species and subspecies occur in Tanzania (Fennessy et al. 2016):

Masai giraffe – *Giraffa tippelskirchi* (formerly *Giraffa camelopardalis tippelskirchi*)

Local name: Twiga (Kiswahili)

**Conservation Status**

IUCN Red List (IUCN 2016)

The IUCN currently recognises one species and nine subspecies of giraffe (see above).

*Giraffa camelopardalis* (as a species) – Vulnerable

*G. c. tippelskirchi* – not assessed

## In Tanzania

Giraffe are the national animal of the United Republic of Tanzania (referred to as 'Tanzania' in this report), and as such, are protected under the Wildlife Conservation Act No. 5 of 2009, which prohibits any killing, wounding, capturing and hunting. Punishment for violating this act includes fines and imprisonment. While there is no direct mention of giraffe as Tanzania's national animal in the constitution, giraffe have been prominently used in Tanzanian symbolism. For instance, giraffe were used as watermarks on Tanzanian banknotes issued since independence in 1961 to the 2011 series (Linzmayr 2011). In fact, the Bank of Tanzania unveiled the 'Giraffe banknote series' in 1997 whereby the 500, 1,000, 5,000, and 10,000 denominations had giraffe as the obverse (principal design), while the 5,000-banknote retained giraffe as the reverse as well (Fig. 1). Giraffe are also used widely in marketing and promoting various products and services in Tanzania including beer (i.e. Twiga Brew), tourism (e.g. Twiga Campsite & Lodge), building material (e.g. Twiga Cement), banks (i.e. Twiga Bancorp), and chemical products (e.g. Twiga Chemical Industries), to name but a few.



Fig. 1: The 1997 'Giraffe banknote series' that prominently featured the Masai giraffe, Tanzania's national animal (Retrieved: [http://banknote.ws/COLLECTION/countries/AFR/TAN/TAN.htm#\(1997\) Giraffe Issue](http://banknote.ws/COLLECTION/countries/AFR/TAN/TAN.htm#(1997)GiraffeIssue)).

## Issues/threats

Tanzania is home to the Masai giraffe only, distributed throughout northern and central areas of the country. The most important contemporary threats to the Masai giraffe are illegal hunting, land use change and disease.

Masai giraffe are illegally hunted using guns, snares and dogs for meat, as well as for products such as hide, bones and tail hairs (Caro 2008; Strauss et al. 2015). In Serengeti National Park (NP), adult giraffe are illegally hunted with wire snares hung in tree canopies (Strauss et al. 2015). Although a single giraffe can provide a large quantity of meat, it is not clear that giraffe are preferred as a source of bushmeat (e.g. Strauss et al. 2015). Giraffe products are also recorded in traditional medicine in some areas of Tanzania, in particular giraffe bone marrow and brains are believed to cure HIV/AIDS (Arusha Times 2004; Nkwame 2007). Additionally, tail-hair and other products are used to make bracelets and trinkets for tourists (Mbogoni 2013). Between the 1970s and 2000s, Masai giraffe numbers declined in Serengeti NP, partially due to poaching (Strauss et al. 2015), while Rentsch et al. (2015) estimated annual giraffe poaching caused a 2-10% decline in the Serengeti population. Poaching of Masai giraffe appears to be also widespread in the Katavi-Rukwa ecosystem (Caro 2008) and the West Kilimanjaro corridor (Nkwame 2007). Illegal hunting has potentially



resulted in the near total absence of giraffe in the game controlled area in the western part of the Tarangire-Manyara ecosystem (Kiffner et al. 2015). However, the disappearance of giraffe in this area is also reported to be due to increased livestock influx and grazing (TAWIRI pers. comm.). To better understand the effects of poaching on Masai giraffe, more comprehensive and wide-spread studies need to be done on understanding the drivers.

Extensive land use change has occurred across some parts of the Masai giraffe range. The majority of Tanzania's human population rely on subsistence farming, yet increasing human populations are leading to a reduction in habitat (Soini 2005), and areas with human settlement and agriculture have reduced species richness (Kiffner et al. 2015). In the Mt. Kilimanjaro area, habitat loss and fragmentation, coupled with the expansion and appearance of settlements, is increasing (Soini 2005). While management areas (inhabited by both livestock and wildlife) show no reduction in species richness, they do show a difference in species composition (Kiffner et al. 2015). This might be a special case however, as areas with livestock in Tanzania have smaller wildlife numbers. Importantly, the coexistence of livestock and wildlife is fundamental to the continued survival of many large mammal species in Tanzania (and other areas of Africa). While such a situation may increase the likelihood of broader human-wildlife conflict, the impact on giraffe is likely minimal as disease transmission, competition for resources and illegal hunting may be more serious threats (Kiffner et al. 2015).

Increasingly, giraffe skin disease (GSD), an infection characterised by greyish-brown lesions that appear on the forelimbs and neck of adult and sub-adult giraffe (Fig. 2), appears to be an indirect threat to giraffe survival in Tanzania (Epaphras et al. 2012, Karimuribo et al. 2011). While GSD was first observed in Ruaha NP in 2000 (Epaphras et al. 2012), the Tanzania National Parks Authority (TANAPA) now considers it to be among the most urgent threats to giraffe populations in the country (TANAPA pers. comm.). Tanzania is a hotspot for GSD with the highest reported rates in Africa: 86% of the observed giraffe population in Ruaha NP have symptoms of GSD, while as many as 63% and 23% of the giraffe population in Tarangire NP and Serengeti NP respectively show signs of the skin condition (Muneza et al. 2016, 2017).

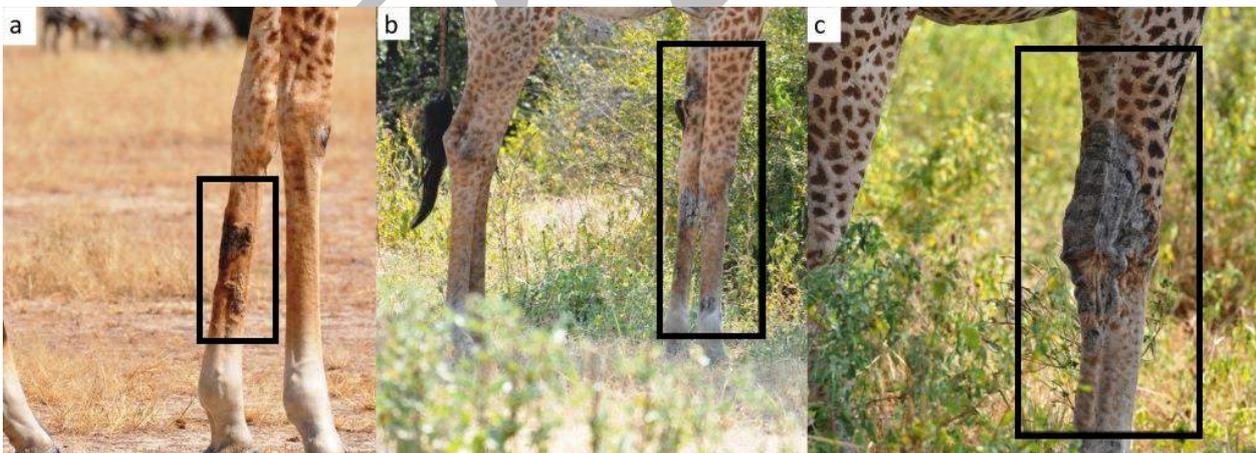


Fig. 2: Variation in the severity of GSD on the limbs of Masai giraffe in Ruaha NP, Tanzania. Panels a, b, c: mild, moderate and severe GSD (Muneza et al. 2016).

Despite these documented high rates of GSD, no study has proven that the infection is fatal to affected individuals. The etiological agent of the disease is yet to be identified as well, but preliminary results indicate that GSD is caused by a nematode, then further complicated by a fungal infection (Epaphras et al. 2014, Muneza et al. 2016). Recent research has proposed that soil might play a role in the development of the disease (Bond et al. 2016). Because the disease manifests primarily on the limbs, researchers have suggested that the disease could lead to lameness, reduced mobility and eventually increased vulnerability to lion

predation (Epaphras et al. 2012, 2014; Muneza et al. 2017). Tanzania is also the only area in Africa where giraffe ear disease (GED) has been observed (Karimuribo et al. 2011, Muneza et al. 2016). The infection is characterised by lesions appearing on the ears, which then become droopy and often lose a portion of them (Karimuribo et al. 2011). Preliminary results suggest that GED could be caused by the Kikoboga worm, named after the location in eastern Tanzania where it was first discovered, close to Mikumi NP (TAWIRI pers. comm.). Both GSD and GED present an unknown long-term threat to giraffe, let alone to other wildlife or livestock as no study has examined yet whether either disease can be transmitted.

## Estimate population abundance and trends

### Historic

Masai giraffe were once widespread in northern and central Tanganyika (now present day Tanzania), with sightings common both inside and outside of protected areas (Sidney 1965). Accurate estimates of giraffe distribution and abundance at the beginning of the last century are hard to come by. Sidney (1965) speculated that although there was no numerical comparison available, giraffe distribution was similar to what it was in the early 1900s. It was known that a large number of giraffe were decimated by rinderpest in the first 60 years after its detection in 1890 (Barrett et al. 2006), but this was not thought to have had a lasting impact on the population, which later recovered somewhat after the global eradication of rinderpest (Sidney 1965). Although no population estimate for Tanzania is available, by the middle of the 1900s Masai giraffe had a widespread, stable population that was in no danger of extermination (Sidney 1965).

Giraffe were commonly seen in many areas including the Serengeti Plains, Ngorongoro Conservation Area, many parts of the Masai Steppe, around Mt. Kilimanjaro and the Sanya Plains. A game count conducted in January 1958 estimated 750 giraffe in Serengeti NP alone, mostly around Banagi (Sidney 1965). Giraffe have never been seen in the Southern Province of Tanzania, their range restricted by the Rufiji River (Sidney 1965). Around the middle of the last century, giraffe herds numbering 30-40 individuals were regularly seen in the Serengeti Plains (Sidney 1965).

Studies conducted throughout the 1960s and 1970s in various locations around the country often found giraffe populations to be stable, if not increasing. Throughout 1960-61, Lamprey (1964) concluded that the giraffe density in the Tarangire ecosystem had remained stable at 0.95 giraffe per km<sup>2</sup> throughout the year. An aerial census of the Serengeti conducted in 1976 found that giraffe numbers had increased by 6% in the 5-year period since 1971 (Pellew 1983). An extensive aerial survey of the Ruaha NP, the Rungwa and Kizigo Game Reserves and the proposed Mloa-Ilambi Game Controlled Area conducted in 1977 observed 3,478 giraffe (Barnes & Douglas-Hamilton 1982). This study found there to be a non-significant increase in giraffe numbers from the previously reported 2,430 giraffe in 1972 (Norton-Griffiths 1975; Barnes & Douglas-Hamilton 1982).

### Recent

East (1999) reported that the giraffe population in Serengeti NP had declined from 8,830 in 1989-91 to 6,170 in 1996. He proposed illegal hunting and/or possibly disease as the apparent cause of decline. East (1999) also stated that there was a total of 28,860 giraffe in Tanzania, mostly inside of protected areas.

Caro et al. (1998) highlighted that illegal hunting was having a negative impact on giraffe populations across the whole of Tanzania. Poachers were known to move into hunting areas once tourism abated in the wet season (Caro et al. 1998). Caro (1999) found a very high local density of giraffe (2.21 giraffe/km<sup>2</sup>) in the Katavi-



Rukwa ecosystem, which was not unusual for the area as the seasonal lakes in the Katavi-Rukwa NP supported very high local populations of large mammals. A later study by Caro (2008) in the same ecosystem noted a non-significant decline in the giraffe population from 1988-2002, as well as other large mammals. This evaluation of long-term data from the Serengeti Ecological Monitoring Program (SEMP), Tanzania Wildlife Conservation Monitoring Program (TWCM) and Conservation Information Monitoring Unit (CIMU) was gathered from systematic reconnaissance flights (SRF) (Stoner et al. 2006). Furthermore, data came from the vehicle surveys carried out in 1995-96 (Caro 1999) coupled with foot surveys undertaken in 2004 (Waltert et al. 2008), which estimated a density of 0.71 giraffe/km<sup>2</sup>. Caro (2008) concluded that the decline in giraffe was mainly due to illegal hunting pressure.

While the Katavi-Rukwa system saw a decline in giraffe numbers, Treydle et al. (2005) assessed ground survey and aerial survey data from 1991-2003 and observed an increase in the giraffe population in Saadani NP. Between 2001 and 2003, 152 giraffe were counted throughout the Park.

A comprehensive study of all the SRF data from 1988-2001 was conducted by Stoner et al. (2006; 2007). Six regions of Tanzania were surveyed, encompassing large protected areas such as national parks and game reserves. These analyses found that only the Katavi-Rukwa habitat showed a decline in giraffe population. Throughout the other five survey areas, giraffe populations were stable.

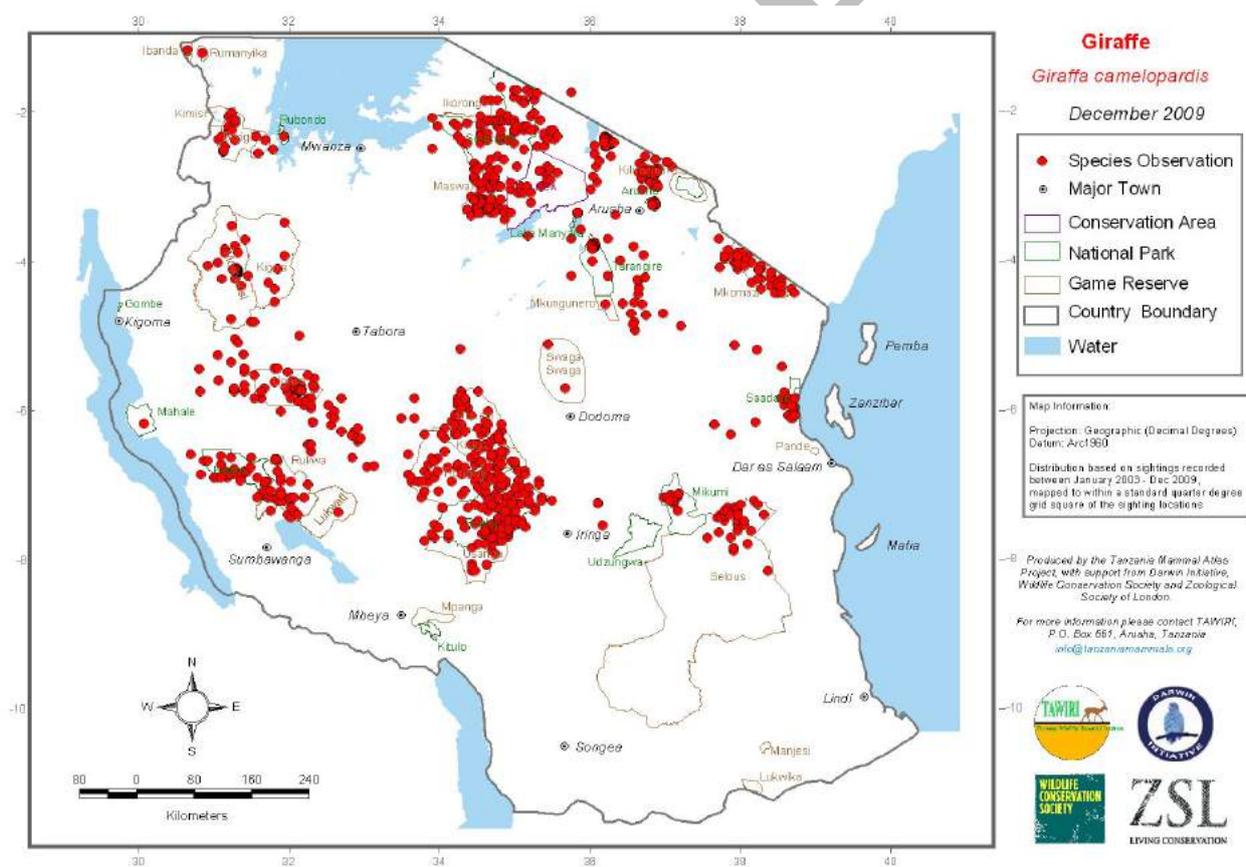


Fig. 3. Giraffe sighting locations from 2003-2008, from the Tanzania Mammal Atlas Project. Giraffe are clustered within protected areas but this may just be a consequence of where the SRF transects bias were flown. Retrieved: [http://www.tanzaniamammals.org/uploads/maps/l079\\_giraffe.jpg](http://www.tanzaniamammals.org/uploads/maps/l079_giraffe.jpg) on 6-24-2015.



## Current

TAWIRI have been conducting SRF's since 1986 and population estimates from them are highly variable with large confidence intervals in some cases, complicating interpretations of trends. It is important to note that this is standard TAWIRI protocol as regular SRF flights are conducted every three years unless an urgent need arises prompted by drastic changes in climatic patterns or other ecological changes. An analysis by Bolger et al. (2016) of the TAWIRI dataset attempted to smooth variation in data by averaging the first ten years of data (1986-1995) and comparing that with the average of the last ten years of data (2002-2011). These time ranges contain different numbers of estimates in each site. This analysis method determined there to be a 29% decline in giraffe numbers across Tanzania from approximately 31,000 to 22,000 giraffe. Statistically significant declines were seen in the Katavi and Ruaha-Rungwa regions. In an attempt to compensate for any underlying trends in the data that averaging over a number of years can create, Bolger et al. (2016) used regression equations using the function  $\ln(\text{population size})$  from 1986-2011. This suggests a more substantial decline of 52% from 39,000 to 19,000 in these six areas of Tanzania over the 25-year period. Nonetheless, it is important to note that this figure is closer to the TAWIRI SRF estimate of 23,000 giraffe (TAWIRI 2016). Thus, despite trend of giraffe population declines across East Africa, Tanzania supports the largest giraffe population of any African country.

A recent study conducted in Serengeti NP by Strauss et al. (2015) used photographic mark-recapture methods to estimate local population densities of giraffe in three locations: Seronera, Kirawira and Bologonja. This density data was used to extrapolate to other areas in the park with a similar habitat. Based on this extrapolation they suggest the total Serengeti NP population was approximately 3,500 in 2008-2010. Recent SRF data from Serengeti NP estimated 5,886  $\pm$ 1,221 giraffe for the same period (TAWIRI 2010). These population estimates, when compared to those of Pellew (1983) in 1975-76, suggest a decline of 67-86%. However, SRF data from the larger Serengeti ecosystem, which includes the Maswa Game Reserve (GR), Ikorongo GR, Grumeti GR, Ikona Wildlife Management Area (WMA), Makao WMA and Loliondo Game Controlled Area (GCA) indicate a population of approximately 12,000 giraffe (TAWIRI 2010). The major reasons for giraffe declines in the Serengeti ecosystem are illegal hunting and snaring (Hoare and Brown 2010; Kilewo and Mpanduji 2010; Marealle et al. 2010), disease (Bond et al. 2016; Muneza et al. 2016) and food limitation caused by the increase in relative abundance of unpalatable tree species, notably *Acacia robusta*. Other threats noted in the Serengeti ecosystem include encroachment (in the west, there is no buffer zone between the PA and farmlands), impacts of climate change, wildfires, erosion of riverbanks, and human activities along the riverbank.

In the Tarangire-Manyara ecosystem, Lee (2015) used photographic mark-recapture methods and recorded a declining trend in the metapopulation growth rate between 2012-2014. The total population size of adult giraffe within the sample area was estimated at 1,225 individuals (790 adult females and 435 adult males), approximately 1.07 giraffe/km<sup>2</sup>. The most recent data from TAWIRI SRFs, which cover the areas of Tarangire NP, Lake Manyara NP, Manyara Ranch Conservancy, Lolkisale GCA, Lake Burunge WMA and Mto wa Mbu GCA, indicate a giraffe population of 3,904  $\pm$ 507 individuals (TAWIRI 2016). Interestingly, demographic analysis of sub-populations at five locations in the core of the ecosystem found spatial variation in adult female survivorship that was positively correlated with the intensity of anti-poaching patrols by TANAPA rangers (Lee et al. 2016). As is the case with many of the conservation areas in northern Tanzania, poaching and habitat fragmentation are the major threats to giraffe survival in the Tarangire-Manyara ecosystem.

Giraffe populations in the Katavi-Rukwa ecosystem show a declining trend (Stoner et al. 2007b; Caro 2008) and it was suggested that illegal hunting was the most serious threat to giraffe (Caro 2008). Based on interviews with 82 illegal hunters in villages along the southwest boundaries of the park and game reserve, Martin & Caro (2012) estimated that 98 Masai giraffe were illegally hunted annually. In 2005, there were an estimated 4,300 giraffe in the Katavi-Rukwa ecosystem (Meyer et al. 2005), down from an estimated 6,107 giraffe, that were counted via foot-surveys (Caro 2008). Recent TAWIRI data show that the population is stable, with surveys in 2012 and 2014 finding 1,076 giraffe and 853 $\pm$ 157 giraffe respectively. In addition to poaching, the major threats to the Katavi-Rukwa ecosystem include habitat loss due to a) poor agricultural and mining practices and unsustainable irrigation (this has resulted in pollution and siltation of Lakes Katavi,



Chada and Rukwa); b) blocking and damming of major river causeways, which has resulting in emigration and die-off of wildlife downstream; and c) immigration of large herds of livestock and deforestation.

Recent total counts by Kenya Wildlife Service (KWS) between 2005 and 2017 show that the giraffe population in Mkomazi NP has more than doubled from approximately 62 individuals to an estimated 255 (Ngene et al. 2017). This increase can be attributed to Mkomazi NP being upgraded to national park status in 2007 and better management. TAWIRI's SRF data also show that the giraffe population could potentially be higher, with the park supporting  $406 \pm 108$  giraffe. The major threats in Mkomazi NP include cattle invasions and overgrazing, and poaching of giraffe for traditional medicine uses. Despite the upgrading of the status of the conservation area in 2007, Ngene et al. (2017) found a sharp increase of cattle and shoats between 2005 and 2017, from 3,035 heads of cattle to 7,546 and from 800 shoats in 2005 to 2,832 shoats.

Recent estimates of Masai giraffe numbers in the West Kilimanjaro area were  $237 \pm 48$ , while  $726 \pm 130$  giraffe were counted in the Lake Natron area between 2010 and 2013 (Okello et al. 2015). These estimates were averaged across seasons and years. In the West Kilimanjaro and Lake Natron areas, no consistent trend in giraffe numbers was observed. However, the same estimates show variations in giraffe movement and habitat use when compared to total aerial counts conducted by KWS and TAWIRI in April 2013, during the wet season, which observed 1,767 giraffe in the Natron area and 813 giraffe in the West Kilimanjaro area (Kenana et al. 2013). Both the Lake Natron and West Kilimanjaro areas have recently been under intense human pressure; Kenana et al. (2013) observed 159,281 shoats, 55,486 cattle, 1,382 donkeys and 21 camels in the Natron area, and 81,517 shoats, 41,954 cattle, 1,138 donkeys and 12 camels in West Kilimanjaro.

Road-based transect surveys estimated 100 giraffe in Arusha NP (Mahenya et al. 2016). Existing TAWIRI data from SRF surveys indicate that the giraffe population in Saadani NP is stable at  $483 \pm 187$  giraffe. Major threats in Saadani NP are illegal hunting for bushmeat and parts, and disease. Giraffe estimates are still lacking in various areas including the Burigi-Biharamulo-Kimisi ecosystem, Swaga GR, Mahale ecosystem, and Ibanda-Rumanyika ecosystem.

Conservation areas in western and southern Tanzania are less studied compared to the ones in the north, an effect of their large size and logistic difficulties in remote areas. For instance, the Ruaha-Rungwa ecosystem covers  $52,464 \text{ km}^2$  and includes Ruaha NP, Rungwa WMA, Kizigo WMA, Muhesi WMA and Lunda-Mkwambi GCA. Ruaha NP alone is  $20,226 \text{ km}^2$ , East Africa's largest national park and covers almost half of the ecosystem. Road-based photographic mark-recapture surveys in south-eastern Ruaha NP estimated 1,614-2,040 giraffe in the study area, which interestingly is also a hotspot for GSD (Muneza et al. 2017). Recent SRF data observed  $3,525 \pm 980$  giraffe across the ecosystem (TAWIRI 2015a). Major threats identified in the Ruaha-Rungwa ecosystem include GSD (Coppolillo 2004; Epaphras et al. 2012; Muneza et al. 2017; TANAPA pers. comm.), poaching and snaring (Coppolillo 2004; TANAPA pers. comm.), and habitat fragmentation.

The Selous-Mikumi ecosystem in southern Tanzania is home to one of the largest wildlife reserves in world. An estimated 3,183 giraffe occur in the ecosystem (TAWIRI 2015b), and importantly they only occur in the smaller northern section of the ecosystem as the Rufiji River forms a natural barrier and no giraffe have been sighted in the expansive southern section of the park or Selous-Niassa Corridor. Giraffe in the Selous-Mikumi ecosystem are threatened by both GED (Osofsky 2005; Karimuribo et al. 2011) and GSD (Muneza et al. 2016), large influx of livestock, road kills and habitat degradation (TAWIRI 2015b).

Lastly, the giraffe population in the Malagarasi-Mwoyovosi ecosystem in western Tanzania, covering an area of  $44,809 \text{ km}^2$ , is estimated at 1,300 individuals (TAWIRI 2015c). The ecosystem, which includes Mwoyovosi GR, Kigosi GR, and Ugalla GR, has undergone a 58% decline in giraffe population numbers between 2001 and 2014. This reduction in is attributed to habitat loss due to pollution, effects of climate change, expansion of agricultural and pastoral activities, and influx of refugees (TWCM 1998). The increase of human populations in the ecosystem has coincided with increased poaching of giraffe, with giraffe killed using modern and traditional weapons.



As highlighted in the data above, Masai giraffe populations in Tanzania have declined over the past 30 years – a trend which has also been observed in Kenya. If this rate of decline and the major threats to giraffe survival in the region remain unabated, there will be a high risk of losing the last habitat strongholds of Masai giraffe. Tanzania currently has an estimated 19,000-23,000 giraffe, the largest of any African nation, and immediate action is required to secure the future of the country's national animal. While Tanzania's human population increases, and continue to place pressure on natural resources, the government has put in a framework to protect biodiversity. Tourism and biodiversity have been identified as key components to realising Tanzania's Development Vision of 2025. It is envisaged that giraffe will also benefit from the increased efforts put in place to further develop tourism and the better manage the country's natural resources, which are key to developing Tanzania's economy.

### **Future Conservation Management**

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

- Development and implementation of a National Giraffe Strategy and Action Plan for Tanzania in partnership with government and relevant stakeholders;
- Increased support to giraffe conservation initiatives, habitat protection (including wildlife corridors), and education and awareness creation initiatives;
- Examine the pathology and aetiology of GSD and GED for giraffe population management and assess potential for zoonotic diseases;
- Assess giraffe population numbers and conservation status in the country;
- Greater understanding and mitigation of social, cultural, and economic drivers of giraffe poaching in the country;
- Conduct more robust studies to examine the giraffe population structure in key conservation areas to inform conservation policies;
- Increase transboundary giraffe conservation and management initiatives with Kenya; and,
- Identification of priority conservation efforts and continuation of robust and systematic population monitoring programmes.

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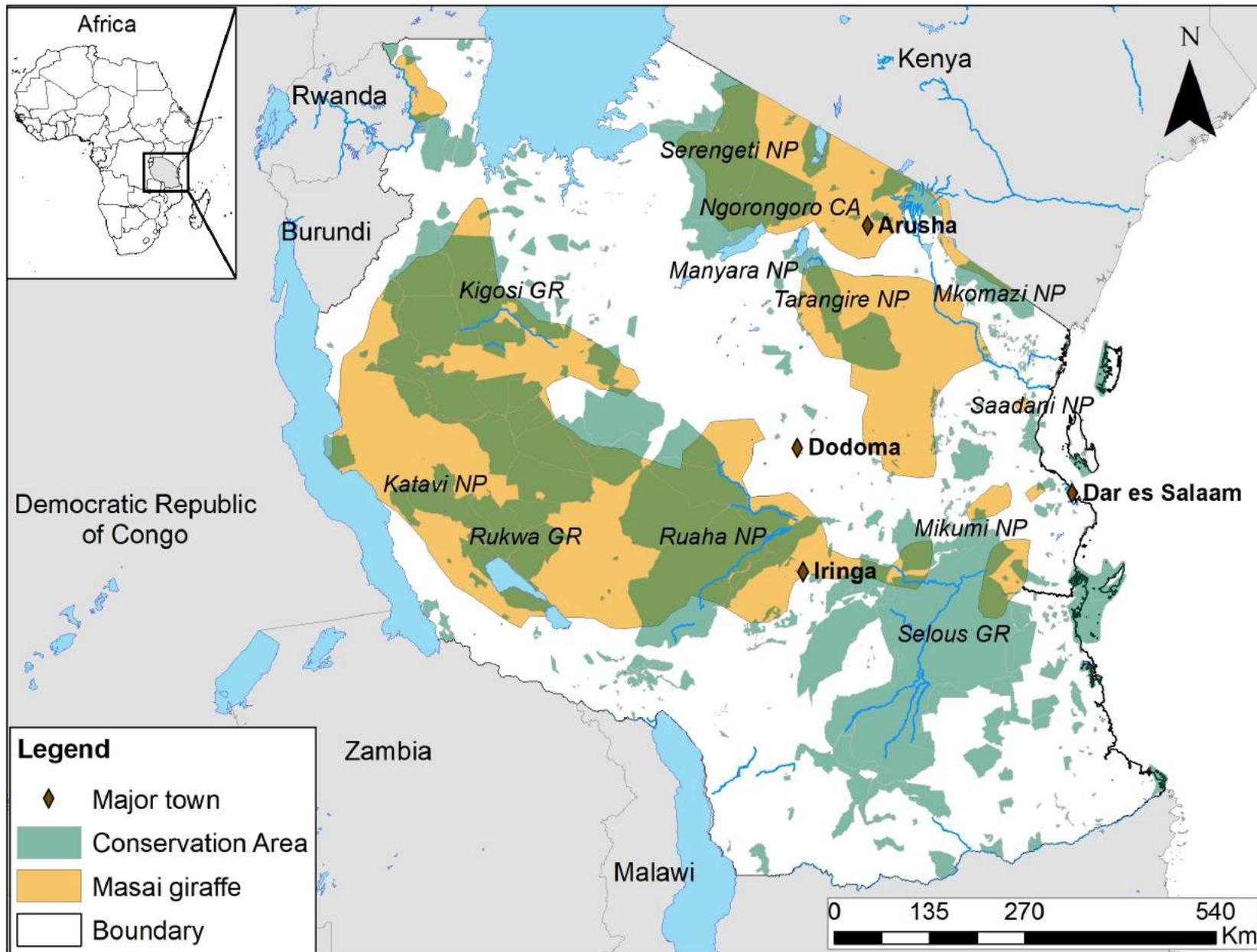
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Map

DRAFT



Distribution of Masai giraffe populations in the major protected conservation areas of Tanzania.

