



National Giraffe Conservation Action Plan



2020

2024



NATIONAL GIRAFFE CONSERVATION ACTION PLAN (2020 - 2024)

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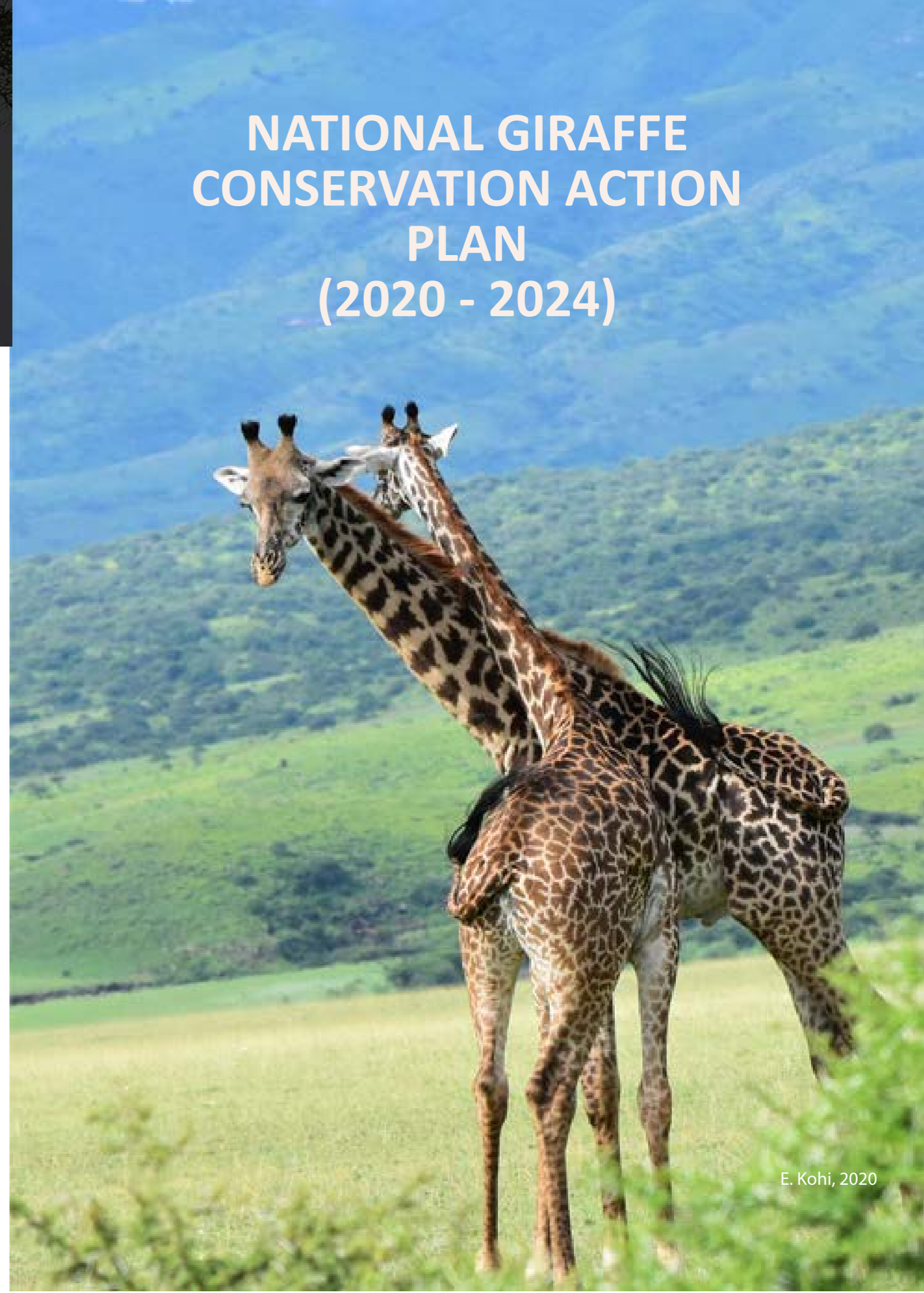
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E. Kohi, 2020

COOPERATION AND COLLABORATION FOR DEVELOPMENT OF THE PLAN

The development of this action plan was a product of thorough planning, hard work and collaboration between government and nongovernmental partners. The following partner institutions supported and collaborated with TAWIRI for the successful development of this plan:



Statement of Endorsement

I hereby endorse this management plan and call upon all stakeholders to support its implementation.

Dr Hamisi Kigwangalla (MP)

MINISTER FOR NATURAL RESOURCES AND TOURISM

Date 4th December 2019



Acknowledgements

Preparation of this document was made possible by extensive support from the Government of the United Republic of Tanzania, through the Ministry of Natural Resources and Tourism. The process received dedicated assistance from numerous organisations and individuals, and we would like to thank them here. First and foremost, we wish to acknowledge the financial, logistical, and strategic support from both the United States Agency for International Development (USAID) Promoting Tanzania's Environment, Conservation, and Tourism (PROTECT) project and the Giraffe Conservation Foundation (GCF) – which enabled us to convene stakeholder workshops, coordinate consultations, and develop multiple drafts of this action plan.

The Tanzania Wildlife Research Institute (TAWIRI) played a critical role in developing this action plan, especially by conducting giraffe population surveys, analysing and communicating the survey data, and providing guidance throughout the planning process. We wish to thank both TAWIRI as an organisation and the many individual staff members who gave so much of their time and expertise. Additionally, we would like to thank the following government institutions namely the Wildlife Division, Tanzania National Parks Authority (TANAPA), Ngorongoro Conservation Area Authority (NCAA), Tanzania Wildlife Management Authority (TAWA), College of African Wildlife Management (CAWM), and Pasiansi Wildlife Training Institute (PWTI) for their valuable support towards development of this action plan. We would also like to extend our sincere appreciation to all the organizations and stakeholders who participated in the conservation planning workshops; a full list of workshop participants is included in the annex. These workshops were crucial for kick-starting the action planning process and keeping it rolling. Various other individuals and organisations were supportive during the course of preparing this document, and we thank them here as well.

Forward

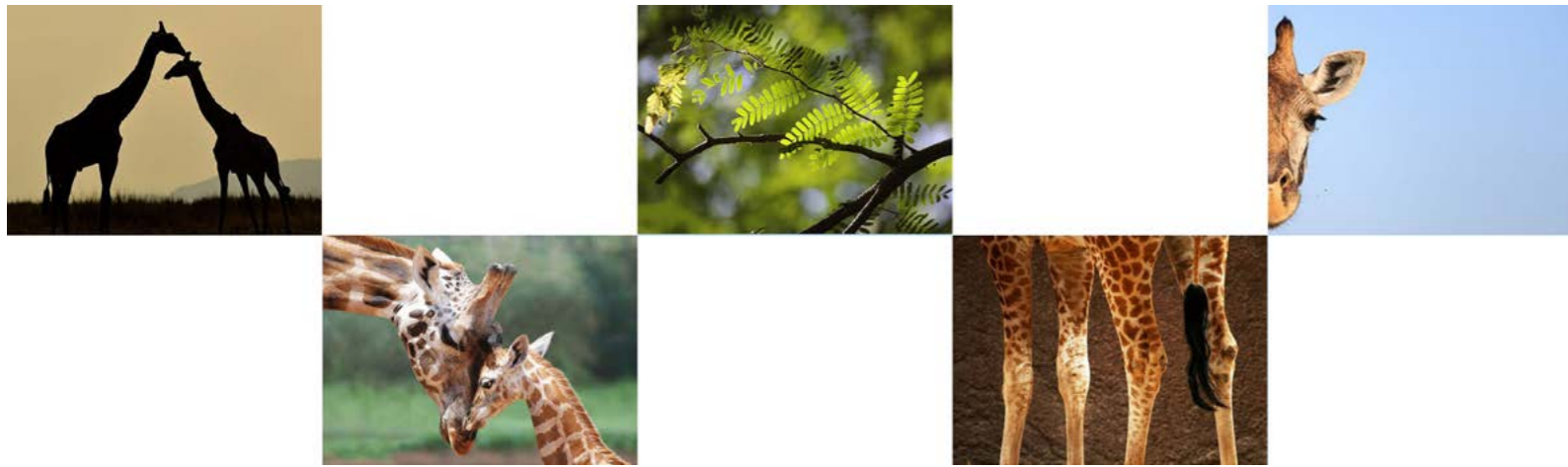
This Giraffe Conservation Action Plan (2020-2024) is designed to guide the implementation of local and national activities to conserve giraffe in Tanzania. Many types of activities are required, including conservation management, research, education and outreach, and law enforcement and other anti-poaching efforts. Tanzanian and international stakeholders with experience and interests in giraffe conservation and management contributed to the development of this document. Their collaboration was essential in ensuring that most important issues concerning giraffe conservation are given due attention. I wish to thank those who provided support during the preparation of this document, and I would like to invite them and all our partners to continue working with us as we implement this action plan over the next five years.

It is in our national interest to see to it that Tanzania maintains healthy giraffe populations. We will, therefore, take all necessary actions to ensure long-term viability of giraffe populations in Tanzania. This is in line with our commitment to conserving wildlife and wild places, as was originally articulated by our founding father of the Nation the late Mwalimu Julius Kambarage Nyerere in the famous Arusha Manifesto of 1961, which reads 'The survival of our wildlife is a matter of grave concern to all of us in Africa. These wild creatures amid the wild places they inhabit are not only important as a source of wonder and inspiration but are an integral part of our natural resources and our future livelihood and wellbeing. In accepting the trusteeship of our wildlife, we solemnly declare that we will do everything in our power to make sure that our children's grand-children will be able to enjoy this rich and precious inheritance. The conservation of wildlife and wild places calls for specialist knowledge, trained manpower, and money, and we look to other nations to cooperate with us in this important task – the success or failure of which not only affects the continent of Africa but the rest of the world as well.'

We are dedicated to this noble ideal, and we look forward to collaborating with anyone who shares our desire to conserve and sustainably manage giraffe and all other wildlife populations in Tanzania.

Prof Adolf Mkenda
Permanent Secretary, MNRT

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LIST OF ABBREVIATION AND ACRONYMS

CAWM	College of African Wildlife Management, Mweka
CIMU	Conservation Information Monitoring Unit
CMS	Convention on Migratory Species
CWMA	Community Wildlife Management Area
GCAP	Giraffe Conservation Action Plan
GCF	Giraffe Conservation Foundation
LGA(s)	Local Government Authorities
MNRT	Ministry of Natural Resources and Tourism
NCAA	Ngorongoro Conservation Area Authority
NGO(s)	Non-Government Organization(s)
NGWG	National Giraffe Working Group
NM_AIS	Nelson Mandela African Institution of Science and Technology
PWTI	Pasiansi Wildlife Training Institute
SUA	Sokoine University of Agriculture
TAFORI	Tanzania Forest Research Institute
TANAPA	Tanzania National Parks Authority
TATO	Tanzania Association of Tour Operators
TAWA	Tanzania Wildlife Management Authority
TAWIRI	Tanzania Wildlife Research Institute
TFS	Tanzania Forest Services
TNC	Tanzania Nature Conservancy
TPSF	Tanzania Private Sector Foundation
TTB	Tanzania Tourist Board
TWMC	Tanzania Wildlife Monitoring Centre
UDOM	University of Dodoma
UDSM	University of Dar es Salaam
VECs	Village Environmental Committees
VGS	Village Game Scouts
WD	Wildlife Division
WMA(s)	Wildlife Management Areas(s)
WNI	Wild Nature Institute
WWF	World Wide Fund for Nature

Chapter One

Introduction

Summary Outline

This Giraffe Conservation Action Plan (GCAP) consists of four chapters:

Chapter one briefly describes giraffe biology, ecology, and taxonomy; summarizes the population distribution, abundance, and conservation status of giraffe across Africa; and reviews the planning context and process for this GCAP.

Chapter two outlines key threats to giraffe conservation in Tanzania and describes the geographic distribution of Tanzanian giraffe populations, their conservation status, and historical trends.

Chapter three includes the vision, scope, strategic objectives, key activities and targets, and partners responsible for implementing this GCAP.

Chapter four provides a brief stakeholder analysis and a guide to ongoing implementation and adaptive management.

Giraffe Biology and Ecology

The giraffe is the world's tallest living terrestrial animal. An African icon, it is well-known for its spotted pelage patterns, long legs, long neck, and habit of browsing vegetation from high branches. Giraffe are social animals that live in loose, non-territorial, open herds that range in size from a few individuals to more than one hundred. They inhabit large ranges in semi-arid subtropical savannah habitats varying from open to closed woodlands and dense shrubby thickets (Furstenburg 2013; Muller et al. 2018). Giraffe are mainly browsers and spend most daylight hours feeding on a variety of trees and shrubs, leaves, stems, flowers, and fruits (Dagg 2014; Pellew 1984). In general, giraffe prefer open scrub and woodlands; they commonly inhabit areas dominated by Acacia (*Vachellia* and *Senegalia*) trees, and they tend to avoid dense forests. Giraffe also tend to avoid areas where predators such as lions (*Panthera leo*) and hyaena (*Crocuta crocuta*) may be located.

Male giraffe stand at about 5.2 m tall on average, with a body mass of about 1,200 kg; female giraffe stand about 4.3 m tall, with a body mass of about 800 kg (Dagg 2014). Shoulder height varies in adult males from 2.4-3.5 m and adult females from 2.1-3.0 m. Giraffe reach adult body size when they are 5-7 years old (Furstenburg 2013). Giraffe are even-toed ungulates; a healthy giraffe lives about 25 years in the wild (sometimes longer); and on average, a giraffe cow gives birth to five calves during her lifetime, with a gestation period of approximately 15 months.

Giraffe Taxonomy

The International Union for Conservation of Nature (IUCN) currently recognizes giraffe as a single species (*Giraffa camelopardalis*) with nine subspecies distributed across sub-Saharan Africa (Muller et al. 2018). These subspecies are: 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*).

IUCN's conservation authority notwithstanding, giraffe taxonomy is still subject to debate, and some groups scientifically show multi-species classification. For example, the Giraffe Conservation Foundation (GCF) and BiK-F Senckenberg have recommended four distinct giraffe species and five subspecies based on genetic and biogeographic analyses conducted over the last decade (Fennessy et al. 2016; Winter et al. 2018). These four species of giraffe include: (1) Masai giraffe (*Giraffa tippelskirchi*), which includes the formerly recognised Thornicroft's giraffe; (2) Northern giraffe (*Giraffa camelopardalis*), which has three subspecies—Nubian giraffe (*G. c. camelopardalis*) [and subsumes Rothschild's giraffe as they are genetically identical], Kordofan giraffe (*G. c. antiquorum*), and West African giraffe (*G. c. peralta*); (3) reticulated giraffe (*Giraffa reticulata*); and (4) Southern giraffe (*Giraffa giraffa*), which has two subspecies—Angolan giraffe (*G. g. angolensis*) and South African giraffe (*G. g. giraffa*). Tanzania is home only to the Masai giraffe.

Giraffe Population Distribution, Abundance, and Conservation Status Across Africa

Historically, giraffe ranged throughout sub-Saharan Africa in open savannah, shrublands, and dry forests (Muller et al. 2018). Today giraffe occupy only a fraction of their former range—in parts of West and Central Africa, increasingly fragmented regions of East Africa, and parts of Southern Africa (Table 1 and Fig. 1) in 21 countries: Angola; Botswana; Cameroon; Central African Republic; Chad; Democratic Republic of the Congo; Eswatini; Ethiopia; Kenya; Malawi; Mozambique; Namibia; Niger; Rwanda; Somalia; South Africa; South Sudan; Uganda; United Republic of Tanzania; Zambia; Zimbabwe (CMS 2017). Giraffe have gone locally extinct in at least seven countries: Burkina Faso, Eritrea, Guinea, Mali, Mauritania, Nigeria, and Senegal (Muller et al. 2018).

Recent studies have identified dramatic declines in many giraffe populations. For example, IUCN's most recent status assessment determined that the total number of giraffe across Africa has plunged by approximately 38% in 30 years—from about 157,000 in 1985 to about 97,500 in 2015 (Muller et al. 2018). GCF, however, indicates that the population currently is estimated at 111,000, based on more up-to-date data (GCF 2019). While the overall trend for giraffe is downward, trends vary significantly for the different taxon. Population distributions and size estimates for these subspecies are briefly described here and summarized in Table 1 (below):

- Angolan giraffe have been extirpated from their historic range in Angola, but they are currently widely distributed across Botswana and Namibia. Some populations also occur in southern Zambia, western Zimbabwe, and South Africa. Angolan giraffe populations have increased from about 15,000 in the 1970s to an estimated 30,000 in 2016 (Marais et al. 2018).
- Kordofan giraffe are currently found in Cameroon, Central African Republic, Chad, and the Democratic Republic of the Congo. Populations have declined from about 4,000 in 1986 to about 2,000 in 2016 (Fennessy et al. 2018).
- Masai giraffe currently inhabit much of northern and central Tanzania and southern Kenya. Populations have declined from about 66,450 in 1980 to about 31,610 in 2015 (Bolger et al. 2019).
- Nubian giraffe are found only in remnant populations in western Ethiopia and eastern South Sudan. Populations have declined from about 21,000 in 1982 to about 650 in 2015 (Wube et al. 2018).
- Reticulated giraffe currently range across much of northeastern Kenya and can also be found in remnant populations in southern Ethiopia. Populations have declined from about 40,000 in the 1990s to about 15,700 in 2018, with a majority occurring in northern and northeastern Kenya (Muneza et al. 2018).
- Rothschild's giraffe are currently located only in isolated populations in Uganda and Kenya. Populations have been severely reduced across their range and now number about 1,670 individuals (Fennessy et al. 2018).
- South African giraffe currently range across much of northeastern South Africa as well as northeastern Eswatini, southwestern Mozambique, and southern Zimbabwe. The total population has increased from about 8,000 in the 1970s to about 21,390 in 2016 (Muller et al. 2018).

- Thornicroft’s giraffe are currently found only in northeastern Zambia. Populations have declined from about 1,160 in the 1990s (East 1999) to about 600 in 2016 (Bercovitch et al. 2018).
- West African giraffe are currently found in southwestern and central Niger. There were fewer than 50 individuals in 1996, but populations have since rebounded to approximately 600 (Fennessy et al. 2018). Because of its small population size and restricted range, the West African giraffe is among the most threatened subspecies, despite its recent increase in numbers.

Table 1. Giraffe subspecies, principal distributions and population size estimates. Note: *IUCN current taxonomic status, ^Four species taxonomic status

IUCN Scientific name*	Common name	Four species name	Principle distribution	Popn. size estimate	References
<i>G.c.peralta</i>	West Africa	Northern giraffe(<i>G. camelopardalis</i>)	Niger	600	Fennessy et al.2018
<i>G.c. antiquorum</i>	Kordofan		Cameroon, Central African Republic, Chad, Democratic Republic of the Congo	2,000	Fennessy et al.2018
<i>G.c. camelopardalis</i>	Nubian		Ethiopia, South Sudan	650	Wube et al. 2018
<i>G.c. rothschildi</i>	Rothschild’s		Kenya, Uganda	1,670	Fennessy et al.2018
<i>G.c. reticulata</i>	Reticulated		Reticulated giraffe (<i>G.reticulata</i>)	Ethiopia, Kenya	15,700
<i>G.c. tippelskirchi</i>	Masai	Masai giraffe (<i>G.tippelskirchi</i>)	Kenya, Tanzania	31,610	Bolger et al. 2019
<i>G.c. thornicrofti</i>	Thornicroft’s		Zambia	600	Bercovitch et al. 2018
<i>G.c. angolensis</i>	Angolian	Southern Giraffe (<i>G. giraffa</i>)	Botswana, Namibia, Zambia, Zimbabwe	30,000	Marais et al. 2018
<i>G.c giraffa</i>	South African		Eswatini, South Africa, Mozambique, Zambia, Zimbabwe	21,390	Muller et al. 2018

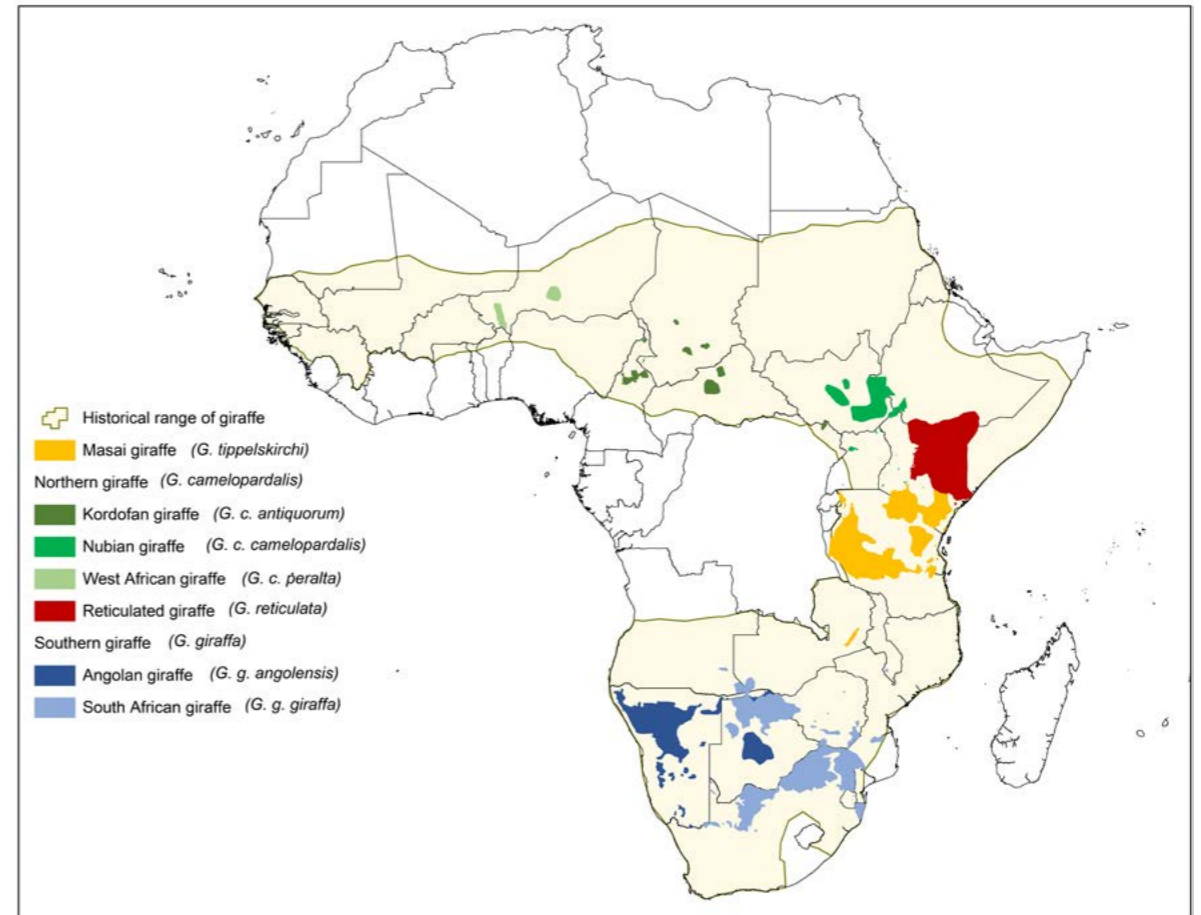


Fig. 1: Distribution of giraffe across Africa based on the taxonomic categorisation that divides giraffe into four species and five subspecies (Fennessy et al. 2016; Winter et al. 2018; O’Connor et al. 2019).

Until recently, many had assumed that giraffe were abundant across Africa given that the IUCN listed giraffe as a Least Concern species. But the recent conservation status assessment (Muller et al. 2018) prompted IUCN to list giraffe as Vulnerable on the species Red List (<http://www.iucnredlist.org/details/9194/0>). In 2018 and 2019, the IUCN SSC Giraffe and Okapi Specialist Group published the assessment of all giraffe subspecies except for the South African giraffe. The Rothschild’s and West African giraffe were downgraded from Endangered as per their previous assessments to Near Threatened and Vulnerable respectively. Other subspecies were assessed and listed on the IUCN Red List for the first time ever; two subspecies listed as Critically Endangered (Kordofan and Nubian giraffe), two subspecies as Endangered (Masai and reticulated giraffe), Thornicroft’s giraffe as Vulnerable and only the Angolan giraffe (and likely South African giraffe) listed as Least Concern. This new assessment further shows that concerted conservation efforts are helping some subspecies (Rothschild’s and West African), whereas more efforts are required in other places.

Similarly, in 2017 a group of conservation researchers and stakeholders in the United States reviewed the evidence of giraffe population declines and petitioned the US Fish and Wildlife Service to list giraffe as endangered under the US Endangered Species Act, which includes provisions for conserving species in other countries (Hofberg et al. 2017). However, no action has been undertaken. In August 2019 giraffe were added to Appendix II of CITES.

Giraffe populations are declining mainly because of human activities, including overexploitation and illegal local hunting; habitat loss and fragmentation, especially when people clear land for agriculture, settlements, and other infrastructure; diseases; and changes in climatic conditions (Strauss et al. 2015; Ogutu et al. 2016; GCF 2017; Hofberg et al. 2017).

Giraffe as a National Animal in Tanzania

The giraffe is the national animal of Tanzania and as such is protected under the Wildlife Conservation Act No. 5 of 2009, which prohibits people from killing, wounding, capturing, or hunting giraffe. Punishment for violating this act includes fines and imprisonment. Although Tanzania's constitution does not directly mention the giraffe as Tanzania's national animal, giraffe is prominent and important symbols in Tanzania. For example, the giraffe was used as watermarks on Tanzanian banknotes issued from independence in 1961 to the 2011 series (Linzmayr, 2011). The Bank of Tanzania unveiled the 'Giraffe banknote series' in 1997, whereby denominations of 500-, 1,000-, 5,000-, and 10,000-shilling banknotes had a giraffe on the obverse side of the notes, while the 5,000-banknote retained giraffe on the reverse as well (Fig.2). Giraffe are also widely used in marketing and promoting various products and services in Tanzania, including beer (Twiga Brew), tourism (Twiga Campsite & Lodge), building materials (Twiga Cement), airline travel (Air Tanzania), banking (Twiga Bancorp), and chemical products (Twiga Chemical Industries).



Fig. 2: The 1997 'Giraffe banknote series' that prominently feature the Masai giraffe, Tanzania's national animal (Retrieved from: [http://banknote.ws/COLLECTION/countries/AFR/TAN/TAN.htm#\(1997\)_Giraffe_Issue](http://banknote.ws/COLLECTION/countries/AFR/TAN/TAN.htm#(1997)_Giraffe_Issue)).

Contextualising the Giraffe Conservation Action Plan (GCAP) and the Planning Process

This GCAP aims to contribute to the implementation of Tanzania's Wildlife Policy (2007) and Wildlife Conservation Act (2009), which recognize Tanzania's commitment to protect and conserve wildlife with an emphasis on endangered, threatened, and endemic species and their habitats. This GCAP provides an assessment of the high-level threats, strategies, and implementation actions necessary to conserve giraffe in Tanzania and a standard template for designing, managing, and monitoring conservation projects at regional and local scales. Systematic application of this GCAP should enable a smooth flow of information about giraffe conservation and allow prompt feedback between national, regional, and local stakeholders.

For over 30 years, many groups have undertaken conservation planning in Tanzania, and most protected areas have developed management plans. However, action planning for single species has been limited. This GCAP will provide a roadmap for giraffe conservation that involves many stakeholders, including Tanzanian conservation management agencies, research and academic organisations, local and international organisations, Tanzanian communities, and the private sector.

Background information and documents for the development of this GCAP were collected and compiled through analysis of published and unpublished sources—such as field surveys conducted by the Tanzania Wildlife Research Institute (TAWIRI), reports from wildlife management institutions and NGOs, and the 2017 Tanzania Giraffe Country Profile developed by the GCF and TAWIRI – and also through direct consultations at a national workshop held in Arusha in June 2018. It was essential to convene a workshop for stakeholders to kickstart the drafting of this plan and to develop a shared vision, goal, and strategic objectives, along with activities, timeframe, and responsibilities required for implementation. The inclusive process at the 2018 national workshop helped to ensure that all those with a stake in giraffe conservation and management in Tanzania share buy-in and ownership of this GCAP. Participants in the national workshop are listed in Annex 1.



Photo: Gettyimages

Chapter Two

Giraffe population distribution, status, trends and key threats in Tanzania

2.1 Population Status and Distribution

Historical Estimates

There is limited data on the distribution and abundance of giraffe in Tanzania prior to the mid-1900s. Some researchers estimate that Masai giraffe were abundant and widespread in the early 1900s, with stable populations and not in danger of extinction (Sidney 1965). Whilst rinderpest killed a large number of giraffe between 1890 and 1950 (Barrett et al. 2006), it probably did not have a lasting impact on the Masai giraffe population (Sidney 1965). Interestingly, and potentially important for future conservation management, giraffe have never been seen in Tanzania's Southern Province, likely because their range is restricted by the Rufiji River (Sidney 1965).

In the 1950s, giraffe were widespread throughout northern and central Tanzania, with sightings common both inside and outside of protected areas (Sidney 1965). People frequently saw giraffe across the Serengeti Plains, Ngorongoro Conservation Area, Masai Steppe, Sanya Plains, and around Mt. Kilimanjaro. A ground survey conducted in January 1958 estimated 750 giraffe in Serengeti National Park alone, mostly near Banagi (Sidney 1965).

Other studies conducted in various locations in Tanzania during the 1960s and 1970s found giraffe populations to be stable and in some cases increasing. For example, after a series of surveys in the Tarangire ecosystem in 1960-61 Lamprey (1964) concluded that the density of giraffe remained stable throughout the year at 0.95 per km². A 1976 aerial survey of Serengeti National Park found that giraffe numbers had increased by 6% since 1971 (Pellew 1983). In 1977 aerial surveys of Ruaha National Park, the Rungwa and Kizigo Game Reserves,

and the proposed Mloa-Ilambi Game Controlled Area, detected 3,478 giraffe, which was an increase of more than 30% compared to similar surveys conducted five years earlier (Norton-Griffiths 1975; Barnes & Douglas-Hamilton 1982).

Recent Estimates

Giraffe are still widely distributed in northern and central Tanzania. Since 1986 TAWIRI has conducted Systematic Reconnaissance Flight (SRF) field surveys for giraffe approximately every three years in Tanzania's major national parks and ecosystems (Fig. 3). The total giraffe population estimate in Tanzania in 2002 was 33,389±4,887; and that in 2014, the total giraffe population in the country was estimated at 26,079 ±2,772 individuals (TAWIRI, 2014; unpublished data). Long term population trend in Tanzania has shown that the giraffe population is increasing in West Kilimanjaro-Lake Natron ecosystem, Katavi-Rukwa ecosystem and Tarangire-Manyara ecosystem. On the other hand, giraffe population estimates have shown a stable trend in the Serengeti ecosystem, Saadani National Park and Ruaha-Rungwa ecosystem. However, the giraffe population estimates have shown a decreasing trend in Mkomazi National Park, Moyowosi-Kigosi ecosystem and Selous-Mikumi ecosystem. Annex 2 provides TAWIRI's most recent SRF survey results for giraffe, including graphs of population estimates over time and maps depicting the density and distribution of populations in ten major ecosystems and protected areas: (i) Burigi-Biharamulo ecosystem, (ii) Katavi-Rukwa ecosystem, (iii) Mkomazi National Park, (iv) Moyowosi-Kigosi ecosystem, (v) Ruaha-Rungwa ecosystem, (vi) Saadani National Park, (vii) Selous-Mikumi ecosystem, (viii) Serengeti ecosystem, (ix) Tarangire-Manyara ecosystem, and (x) West Kilimanjaro-Lake Natron ecosystem.

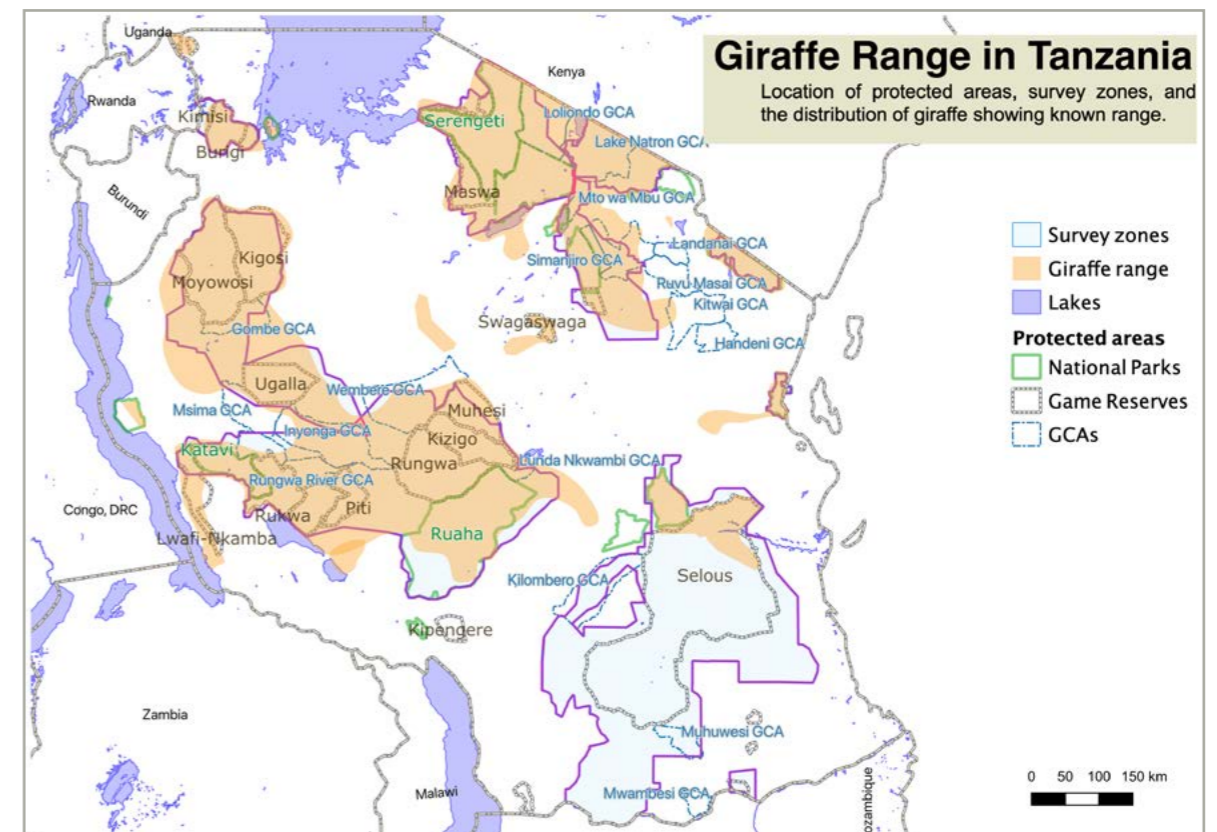


Fig. 3: Distribution of Masai giraffe populations in Tanzania's major conservation protected areas

TAWIRI's SRF survey data constitute one of Tanzania's longest and most robust data sets describing the distribution and abundance of giraffe. These and future survey data from TAWIRI will be essential for researchers and other stakeholders to continue analysing the status of Tanzania's giraffe populations and monitoring the effectiveness of conservation actions.

Although giraffe are still widespread in northern and central Tanzania, their major threats – habitat loss and fragmentation, hunting and disease – are causing populations to decline (Hofberg et al. 2017; Bolger et al. 2019). A recent summary of relevant research in the country draws the following conclusions (Muneza et al. 2017): (i) giraffe populations in Tanzania have been declining for the past 30 years, and (ii) if the rate of decline and major threats to giraffe are not reversed, there is a high risk of losing the last strongholds of giraffe in Tanzania.

2.2 Key Threats

During the 2018 national workshop, participants analysed and identified key threats to giraffe in Tanzania, which they ranked in order of importance as habitat loss and fragmentation, diseases, illegal hunting, and road kills.

Habitat Loss and Fragmentation

In recent decades, exponential human population growth has caused rapid land-use changes throughout Tanzania (e.g. Soini 2005), and human activities have encroached on land across much of the Masai giraffe range (Marais et al. 2013). As people convert giraffe habitats to farms, rangeland for cattle and human settlements, and develop infrastructure projects such as railways and roads, remaining giraffe habitats have become both smaller and more fragmented. Such land-use changes are causing giraffe population to decline not only in Tanzania but also across East Africa (Hofberg et al. 2017). Habitat loss is reducing Tanzania's capacity to support large giraffe populations, and habitat fragmentation isolates giraffe populations in patches of formerly contiguous habitat. Thus, fragmentation impedes natural movements across landscapes, restricts gene flow between populations, and forecloses options for giraffe to migrate in response to climate-driven range shifts.

Disease

Giraffe skin disease (GSD) is an increasing threat to giraffe survival in Tanzania (Epaphras et al. 2012; Karimuribo et al. 2014; Muneza et al. 2016; 2017; 2019). GSD is an infection characterised by greyish-brown lesions that appear on the forelimbs and necks of adult and sub-adult giraffe (Fig. 4). The etiological agent of the disease in Tanzania is yet to be identified, 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). Soil conditions might play a role in the development of the disease because parasites such as nematodes and tsetse flies could be involved in transmitting GSD, and differences in soil properties can influence the ground-dwelling life stages of these parasites (Bond et al. 2016; Lee 2018). Further, poor soils with poor quality vegetation can impact the nutritional status of giraffe, and poor nutrition can potentially make giraffe more susceptible to GSD (Lee 2018).

In Tanzania, GSD was first observed in Ruaha National Park in 2000 (Epaphras et al. 2012). Although no study has shown that GSD is fatal to infected individuals (TANAPA pers. comm.), GSD is now considered to be among the major threats to giraffe populations in the country. Because the disease manifests primarily on the limbs, researchers have suggested that GSD could lead to lameness, reduced mobility, and eventually increased vulnerability to lion predation (Epaphras et al. 2012; Epaphras et al. 2014; Muneza et al. 2017). Tanzania is a hotspot for GSD, with the highest reported rates in Africa: 86% of observed giraffe in Ruaha National Park have symptoms of GSD, while as many as 63% of giraffe in Tarangire National Park and 23% of giraffe in Serengeti National Park show signs (Muneza et al. 2016; Muneza et al. 2017).



Fig. 4: Variation in the severity of GSD on the limbs of Masai giraffe in Ruaha National Park, Tanzania. Panels (a), (b), and (c) show mild, moderate and severe GSD, respectively (Muneza et al. 2016). Giraffe ear disease (GED) is another threat to giraffe populations in Tanzania (Karimuribo 2014; Muneza et al. 2016). GED is characterised by lesions appearing on the ears, which become droopy and/or damaged (Karimuribo 2014). Preliminary results suggest that GED is caused by the Kikoboga worm, named after the location in eastern Tanzania, where it was first discovered, near Mikumi National Park. Some researchers refer to GED as 'Giraffe Pinna Dermatitis' (GPD) because it affects the skin on the ears (Lyaru 2010). The disease has been recorded in other parts of Tanzania including Grumeti Game Reserve, Ruaha National Park and Katavi National Park (Fig. 5.). More research is needed to better understand the causes and effective treatments for GSD and GED.

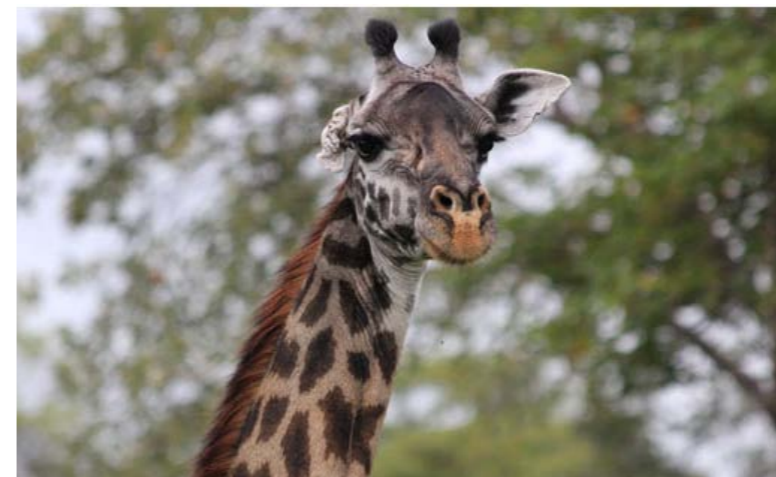


Fig. 5: Manifestation of GED on a female giraffe in Katavi National Park. It remains unknown the extent to which the disease affects individual giraffe though droopy ears are the most indicative symptom.
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Illegal Hunting

Tanzanians illegally hunt (poach) giraffe primarily for meat, hides, bones, and tail hair (Caro 2008; Strauss et al. 2015). They consume and/or sell giraffe meat in local markets, and to a lesser extent have used bones, tail hair, and other body parts to make bracelets and trinkets for tourists (Mbogoni 2013). In some parts of the country, Tanzanians also use giraffe products for traditional medicine, in particular, bone marrow and brains, which are believed to cure HIV/AIDS (Arusha Times 2004; Nkwame 2007).

More studies are needed to better understand the scale, drivers, and consequences of illegal hunting on Masai giraffe, but several studies indicate links between illegal hunting and the Masai giraffe population declines. In Serengeti National Park, for example, Masai giraffe numbers declined approximately 2-10% annually between the 1970s and 2000s, largely because of illegal hunting, frequently with wire snares (Strauss et al. 2015; Rentsch et al. 2015). Illegal hunting of Masai giraffe also appears to be widespread in the Katavi-Rukwa ecosystem (Caro 2008) and the West Kilimanjaro corridor (Nkwame 2007). Illegal hunting has also contributed to 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 may also be related to an increase in livestock influx and grazing pressure (TAWIRI pers. comm.).

Road kills

The extent to which road kills threaten giraffe in Tanzania is unclear, but road kills have been reported in various areas where highways cross giraffe habitats. Stakeholders at the June 2018 national workshop identified the problem as likely to be a serious threat. In particular, the Mikumi and Tarangire-Manyara ecosystems were highlighted as notorious areas where giraffe are commonly killed by collisions with trucks and cars. Such collisions may increase as truck-based shipping increases, Tanzania builds more roads, and more people purchase personal cars. To date, most reports of giraffe road kills are anecdotal; more studies are needed to evaluate the severity of this threat and steps to mitigate it.



Photo: Askideas.com

Fig. 6: Road kills cost life of several large mammals in Tanzania including giraffe

Chapter Three

Vision, Goals and Strategic Objectives

This chapter describes the GCAP vision, goals, and strategic objectives that stakeholders agreed to, at the 2018 national workshop held in Arusha in June 2018. Each objective is described separately along with its objective target, rationale, and conservation activities needed to support the objective. Also included are indicators for each activity, a suggested timeframe, and parties responsible for implementing the activities.

Vision

Conserving and managing viable giraffe populations and their habitats across ecosystems in Tanzania while maintaining giraffe's cultural importance for the benefit of present and future generations.

Goals

This GCAP has two primary conservation goals:

- To broaden understanding and awareness of giraffe conservation status in Tanzania.
- To reduce threats to giraffe populations and their habitats in Tanzania while increasing benefits to people.

Strategic Objectives (SOs)

In addition to the goals listed above, the GCAP has six conservation strategic objectives:

- SO-1: Institutional capacity for giraffe conservation is strengthened
- SO-2: Research capacity to assess giraffe population status is enhanced
- SO-3: Public education and awareness of giraffe are increased
- SO-4: Giraffe habitats and connectivity between giraffe populations are maintained and restored

SO-5: Illegal hunting of giraffe is controlled
 SO-6: Action Plan is effectively implemented

These strategic objectives, along with the rationale for each, associated implementation activities, timeframes, indicators, and key actors responsible for implementation are described in detail below.

SO-1 Institutional capacity for giraffe conservation is strengthened

Objective Target: By 2024, improve institutional capacity for giraffe conservation

Rationale: Tanzanian conservation stakeholders need to improve institutional capacity through training, gathering and keeping up-to-date data on giraffe (e.g. with a national giraffe database), increasing and adequately equipping both professional and lay personnel dedicated to giraffe conservation, and developing strategies to communicate and disseminate information about giraffe conservation research. Capacity building for giraffe conservation should be directed at all levels from local to national and include governmental, non-governmental, and community actors. The following activities are essential for strengthening institutional capacity for giraffe conservation in Tanzania.

Activity	Indicator	Timeframe	Responsible parties
1.1 Assess training needs for giraffe conservation and management	Report in place	Year 1	MNRT, TAWA, TANAPA, TAWIRI, WD, CAWM, SUA, UDOM, UDSM, NCAA, Pasiansi, Likuyu Sekamaganga NM-AIST, LGAs & NGOs
1.2 Develop training program(s) on giraffe conservation and management	Number of training programs developed	Year 1	MNRT, all conservation institutions
1.3 Train staff on giraffe conservation and management at all levels (VEC's VGS's, Certificate, Diploma, higher degrees)	Number of staff trained List of trainees	Year 2-5	MNRT, all conservation institutions
1.4 Develop and maintain a national giraffe database	National database developed and maintained	Year 1-5	TAWIRI, WD, TANAPA, NCAA, TAWA, LGAs, WMAs, Researcher(s), NGOs

Activity	Indicator	Timeframe	Responsible parties
1.5 Assess equipment needs for giraffe conservation	Assessment report developed and distributed to stakeholders	Year 1-2	MNRT, TAWA, TANAPA, TAWIRI, WD, CAWM, SUA, UDOM, UDSM, NCAA, Pasiansi, Likuyu-Sekamaganga NM-AIST, LGAs & NGOs
1.6 Provide necessary equipment for giraffe conservation	Type and number of equipment procured for giraffe conservation	Year 1-5	MNRT, TAWA, TANAPA, NCAA, Conservation partners
1.7 Improve communication and cooperation among stakeholder institutions and communities, e.g., MIKES, GCF	MoUs in place	Year 1-5	MNRT, WD TANAPA, TAWA, NCAA, WMAs, Academic institutions
1.8 Appoint National Giraffe Coordinator	Appointment communicate	Year 1	MNRT
1.9 Improve communication and cooperation among stakeholder institutions and communities e.g. CITES MIKES, GCF	MoUs in place	Year 1-5	MNRT, WD TANAPA, TAWA, NCAA, WMAs, Academic institutions
1.10 Assess and harmonize conflicting policies and legislation	Process initiated	Year 1-5	MNRT



Fig. 7: A trained wildlife ranger fitting camera trap

SO-2 Research capacity to assess giraffe population status and threats enhanced

Objective Target: By 2024, build capacity for research to assess giraffe population status and threats

Rationale: Tanzanian conservation stakeholders need up-to-date data describing giraffe populations. Effective management depends on reliable scientific information and robust analyses. Specifically, more information is needed on the size, status, and trends of giraffe populations; demographic parameters; ranging patterns; habitat use; threats; and genetics. The following activities are essential to building capacity for giraffe conservation research.

Activity	Indicator	Timeframe	Responsible parties
2.1 Identify and prioritise research areas in giraffe conservation	Report on research areas that are identified and prioritised	Year 1	MNRT, TAWA, TANAPA, TAWIRI, WD, CAWM, SUA, UDOM, UDSM, NCAA, Pasiansi, Likuyu Sekamaganga NM-AIST, LGAs & NGOs
2.2 Enhance capacity for giraffe research and monitoring	Number of people trained; Number and type of monitoring programs established	Year 1-5	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions
2.3 Determine population status of giraffe	Research reports and publications	Year 1-5	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions, NGOs and Researcher(s)
2.4 Map giraffe habitats and distribution	Research reports and publications	Year 1-5	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions, NGOs and Researcher(s)
2.5 Research giraffe population viability and diseases	Research reports and publications	Year 1-4	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions
2.6 Monitor giraffe populations	Research reports and publications	Year 2-5	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions
2.7 Establish an open-access giraffe research database to facilitate data sharing among conservation institutions	Database established and accessible	Year 2-5	MNRT, TAWIRI

Activity	Indicator	Timeframe	Responsible parties
2.8 Conduct research on giraffe-human interactions and value	Research reports and publications number of research reports and publications on human dimensions of giraffe conservation	Year 2-3	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions, NGOs
2.9 Disseminate giraffe research findings to local and international audiences, e.g. with a TAWIRI conference	Research reports and publications	Year 2-5	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions, NGOs
2.10 Use technology to better understand giraffe ecology	Research reports and publications	Year 1-5	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions, NGOs and researcher(s)
2.11 Examine the genetic diversity of giraffe in Tanzania	Research reports and publications	Year 1-3	TAWIRI, TANAPA, WD, TAWA, NCAA, Academic institutions, NGOs and researcher(s)

SO-3 Public education and awareness of giraffe are increased

Objective Target: By 2024, enhance public education and awareness of giraffe

Rationale: Giraffe conservation requires commitment and support from the general public. Public support, in turn, requires information and education to raise public awareness, increasing the chances of long-term conservation success. The following activities are essential to enhancing public education and awareness of giraffe in Tanzania.

Activity	Indicator	Timeframe	Responsible parties
3.1 Identify target communities (villages, tribes, WMAs, etc.) and establish giraffe education programs	Number of education programs established in target communities	Year 1	MNRT, TANAPA, NCAA, TAWA, LGA, TAWIRI, WMAs
3.2 Conduct baseline surveys to establish peoples' prior knowledge and attitudes toward giraffe	Number of people trained; Number and type of monitoring programs established	Year 1	MNRT, TAWIRI, SUA, UDSM, NCAA, CAWM, WMAs, Academic institutions, NGOs

Activity	Indicator	Timeframe	Responsible parties
3.3 Prepare education materials (booklets, posters, curricula, etc.) appropriate to the target communities, age groups, and needs identified in baseline surveys	Number of different education materials produced	Year 1	MNRT, TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, WMAs, NGOs, Academic institutions
3.4 Develop effective strategies for disseminating information and education materials to enhance community engagement in giraffe conservation	Number of strategies developed Number of strategies developed Report on effectiveness of tools developed to disseminate information for community outreach	Year 1	MNRT, TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, WMAs, NGOs, NCAA, Conservation partners
3.5 Conduct seminars or workshops for target communities	Number of seminars conducted, seminar reports (attendance records, number of communities)	Year 1	MNRT, TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, WMAs, NGOs, NCAA, Conservation partners
3.6 Incorporate and strengthen giraffe conservation education into Malihai clubs within primary and secondary schools	Number of active clubs providing education about giraffe	Year 2-5	TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, WMAs, Malihai, JGI, WNI
3.7 Evaluate program outcomes annually to inform subsequent years'	Annual evaluation reports completed and assessment of outcomes achieved	Year 1-5	MNRT, TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, WMAs
3.8 Initiate giraffe sports competitions and sponsorships	Number of competitions and sponsorships initiated	Year 1-5	TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, WMAs
3.9 Develop and implement a national mass media giraffe education plan (radio, TV, newspapers, etc)	Number and types of education materials disseminated through mass media Number of media outlets engaged Number of people reached	Year 1-5	TANAPA, NCAA, TAWA, TFS, LGA, TAWIRI, TTB, WMAs

Activity	Indicator	Timeframe	Responsible parties
3.10 Celebrate World Giraffe Day annually – 21 June activities	Participation report	Year 1-5	MNRT & TAWIRI, TANAPA, NCAA, TAWA, TFS, LGA, WMAs, GCF
3.11 Develop programs for companies using giraffe in their logos to support giraffe conservation	Number of programs developed Number of companies participating Amount of money companies spend	Year 1-5	TPSF, TTB, TAWIRI, TATO, National Giraffe Advisory Committee (Working Group)
3.12 Develop policy briefs on giraffe conservation issues, distribute to politicians and other stakeholders	Copies of policy briefs produced	Year 1-5	TAWIRI, CSO, National Giraffe Advisory Committee (Working Group)

SO-4 Maintain, protect and restore Giraffe habitats and connectivity between giraffe populations are restored and maintained

Objective Target: By 2024, giraffe habitats and connectivity maintained, protected and restored

Rationale: Giraffe habitats are increasingly degraded and fragmented across much of Tanzania as a result of human activities, such as expansion of agriculture and ranching, human settlements, and other activities that covert giraffe habitats and reduced dispersal areas and corridors between ecosystems. Such pressures restrict giraffe movements within their traditional ranges, thereby limiting access to essential resources such as food and water. There is an urgent need to maintain extensive landscapes for giraffe and restore and maintain connectivity wherever possible. Although land use planning has been carried out for most villages around giraffe strongholds, implementation and enforcement of these plans are inadequate. As human populations continue to grow, so will negative impacts on giraffe habitats and connectivity. Therefore, it is imperative to draft and implement 'giraffe-friendly' policies, plans, and actions that also take into consideration the socio-economic wellbeing of communities in and around giraffe habitats. The following activities are essential to restoring and maintaining giraffe habitats and connectivity in Tanzania.

Activity	Indicator	Timeframe	Responsible parties
4.1 Identify and use GIS to map critical habitats, migratory routes, existing and potential corridors, and dispersal areas for giraffe in line with other ongoing initiatives on wildlife corridors	Number of habitats, migratory routes, corridors, and dispersal areas identified and mapped in GIS (documented with maps and GPS coordinates)	Year 1-2	TAWIRI, TANAPA, NCAA, TAWA, TFS, LGA, Mweka, SUA, WMAs, NGOs
4.2 Assess the ecological status and importance of giraffe habitats, migratory routes, corridors, and dispersal areas	Research reports and publications	Year 2	TAWIRI, TANAPA, NCAA, TAWA, TFS, LGA, Mweka, SUA, WMAs, NGOs
4.3 Facilitate the establishment and implementation of land use plans in areas surrounding giraffe habitat	Land use plans certificates	Year 2-5	NLUPC, MNRT, LGAs, TANAPA, NGOs, NCAA, NLUPC, TAWA, WMAs, TFS
4.4 Facilitate pilot restoration of some degraded giraffe habitats, migratory routes, corridors, and dispersal areas	Reports on restoration	Year 2-5	NLUPC, MNRT, LGAs, TANAPA, NGOs, NCAA, NLUPC, TAWA, WMAs, TFS
4.5 Initiate and implement transboundary giraffe conservation activities with counterparts across borders	Reports on transboundary conservation activities	Year 2-5	MNRT, TANAPA, TAWA, TAWIRI, NCAA, TFS



Fig. 8: Tree planting restores degraded wildlife habitats

Photo: Komaza, 2018

SO-5 Illegal hunting of giraffe is controlled

Objective Target: By 2024, illegal hunting of giraffes controlled

Rationale: Illegal offtake of giraffe is widespread across Tanzania. Giraffe are illegally killed primarily for food but also because of traditional beliefs, e.g., that giraffe's bone marrow is a cure for HIV/AIDS. Therefore, efforts to combat giraffe poaching need to take an integrated approach. The following activities are essential to controlling illegal giraffe hunting.

Activity	Indicator	Timeframe	Responsible parties
5.1 Identify and use GIS to map giraffe poaching hotspots using existing data	Maps of giraffe poaching hotspots	Year 1	TAWA, TANAPA, NCAA, TAWIRI, WMAs, DGOs, NGOs
5.2 Recruit more rangers and village game scouts	Number of rangers and village game scouts recruited	Year 1-5	TAWA, TANAPA, NCAA, WMAs, LGA, NGOs
5.3 Train rangers and village game scouts	Number of rangers and village game scouts trained	Year 1-5	TAWA, TANAPA, NCAA, WMAs, LGA, Conservation Partners
5.4 Equip rangers and village game scouts	Number and type of equipment procured for rangers and village game scouts	Year 1	TAWA, TANAPA, NCAA, WMAs, LGA, Conservation Partners
5.5 Strengthen intelligence unit within the wildlife authorities	Number of personnel in intelligence units within wildlife authorities recruited/trained	Year 1-5	WD, TAWA, TANAPA, NCAA, WMAs, NGOs
5.6 Conduct regular patrols inside and outside protected areas	Patrol reports	Year 1-5	TAWA, TANAPA, NCAA, WMAs, DGOs, Conservation Partners
5.7 Build capacity of prosecutors in wildlife cases	Number of prosecutors trained Number of cases won	Year 1-5	WD, TAWA, TANAPA, NCAA, DGOs, WMAs, Academic institutions
5.8 Track court cases that involve giraffe poaching	Number of cases reported Number of cases tried and won	Year 1-5	TAWA, TANAPA, NCAA, WMAs, DGOs, DPP, AG
5.9 Strengthen collaboration among wildlife authorities and conservation partners	Reports on joint patrols Reports on stakeholder meeting	Year 1-5	WD, TAWA, TAWIRI, TANAPA, NCAA, WMAs, DGOs, TFS, Conservation Partners, Academic institutions

SO-6 Action Plan is effectively implemented

Objective Target: By 2024, all objectives of the Tanzania Giraffe Conservation Action Plan achieved

Rationale: Implementing the Tanzania Giraffe Conservation Action Plan (GCAP) requires commitment from the responsible parties to carry out the activities and monitor progress. Annual Working Group meetings coupled with a mid-term evaluation of the GCAP will allow stakeholders to assess progress made and determine the changes that need to be put in place for the next action plans. The following activities are essential to effectively implementing and monitoring the GCAP.

Activity	Indicator	Timeframe	Responsible parties
6.1 Obtain government endorsement for the GCAP	GCAP endorsed by government	Year 1	WD, MNRT, TAWA, TANAPA, NCAA, WMAs, TAWIRI
6.2 Appoint giraffe National Coordinator	National Coordinator in place	Year 1	MNRT, WD, TAWIRI, TANAPA, TAWA, NCAA
6.3 Form a technical giraffe Working Group with TORs	Technical giraffe Working Group established	Ongoing, Annual meeting	MNRT, TAWA, GCF, TANAPA, WD, TAWIRI, LGO's, NCAA, TFS, CWMAC
6.4 Develop annual work plans to implement the GCAP	Work plans developed and approved Progress reports	Year 1, reviewed annually	National Coordinator
6.5 Develop monitoring and evaluation (M&E) framework to track implementation of GCAP activities	M&E framework Implementation reports	Year 1, reviewed annually	National Coordinator
6.6 Disseminate GCAP to targeted stakeholders in Tanzania	Dissemination reports	Year 1	TAWIRI, WD, TANAPA, TAWA, NCAA, WMA, NGOs, CBOs, CSOs, DGOs
6.7 Obtain adequate funding for GCAP implementation	Funding reports	Annually	National Coordinator, TAWIRI, WD, TANAPA, TAWA, NCAA, WMA, NGOs, CBOs, CSOs, DGOs

Chapter Four

Stakeholder analysis and implementation plan

During the planning process stakeholder analysis was conducted to identify institutions and organisations that have a vested interest in the conservation and management of giraffe in Tanzania. Stakeholders identified fall into four main groups:

- Conservation management agencies: Wildlife Division (WD), Tanzania National Parks (TANAPA), Tanzania Wildlife Management Authority (TAWA), Tanzania Forest Services, and Community Wildlife Management Areas Consortium (CWMAC).
- Research and academic institutions: including but not limited to Tanzania Wildlife Research Institute (TAWIRI), College of African Wildlife Management–Mweka, University of Dar es Salaam, Sokoine University of Agriculture, and foreign research and academic institutions.
- Local and international non-governmental organisations and community-based organisations (CBOs): GCF, IUCN, WWF, TNC, HGF, USAID, WNI, etc.
- Local and international conservation experts: academia, captive breeding, government, non-governmental and research institutions, private sector and communities.

Implementation of the Giraffe Conservation Action Plan (GCAP)

Because of the extensive nature of Tanzania's conservation landscape, implementation of the GCAP shall be done in partnership with various actors from governmental authorities and institutions, NGOs, CBOs, and the private sector. The overall coordination shall be vested to Tanzania's WD working in close collaboration with national conservation authorities such as TAWA, TANAPA, TAWIRI, NCAA, and TFS. TAWIRI shall be vested with follow-up and administration of research and monitoring aspects related to this plan and shall provide the Secretariat (appointed from wildlife management authorities and TAWIRI) for the monitoring and evaluation of the plan.

Following recommendations from TAWIRI and WD, the Ministry of Natural Resources and Tourism shall appoint a National Giraffe Working Group (NGWG) in the first year of implementation that shall be responsible for coordination and management of activities regarding the implementation of this plan. The NGWG shall regularly report to the WD and TAWIRI for follow-up with issues that require actions from all partners.

In fulfilling its roles and responsibilities, the NGWG shall meet at least once a year to review progress on activities implemented in the preceding year and recommend immediate actions to partners for the following year. Reports from the NGWG and recommended actions shall be widely circulated to interested parties, including all stakeholders who attended the June 2018 workshop.



Fig. 9: National stakeholders consultative workshop held at Arusha, 25-27 June 2018

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Annex 1

List of Tanzania Giraffe Conservation Action Plan Woprkshop Participants:
25-27 June 2018 at Gold Crest Hotel, Arusha

Sn.	Name	Institution
1	Alphonse Mallya	TNC
2	Antonia Antoni Raphael	WD
3	Arthur Muneza	Giraffe Conservation Foundation
4	Benedict Kusare	KATAVI NP
5	DamariSamwel	SERENGETI NP
6	Daniel Wanna	TAWIRI
7	DevolentMtui	TAWIRI
8	Emmanuel Lyimo	TAWIRI
9	Emmanuel Mmassy	TAWIRI
10	Epaphras Muse	RAHANP
11	Freddy Lendid	Ngorongoro DC
12	Gladys Ng'umbi	TARANGIRE NP
13	Halima Kiwango	RUAHA NP
14	IddiMakengo	Babati DC
15	James Madeli	Wild nature Institute
16	Jessica Manzak	North Carolina Zoo
17	Jestina Katandukila	UDSM
18	John Noronha	USAID PROTECT
19	John Salehe	Nature Tanzania
20	Julian Fennessy	Giraffe Conservation Foundation
21	Julius Keyyu	TAWIRI
22	Julius Kibebe	NCAA
24	Lendoyani John	SERENGETI NP
25	KeziaOola	TAWIRI
26	Obeid Mahenya	CAWM-Mweka
27	Ramadhan Ismail	WMA
28	Robert Aruho	Uganda Wildlife Authority
29	Rose Kicheleri	SUA
30	SadikiLothalaiser	TAWA
31	SingiraParsaisNgoishye	TAWA-Matambwe
32	Wilfred Marealle	TAWIRI
33	YusufuManyanda	WNA
34	Zaina Suleiman	NCAA

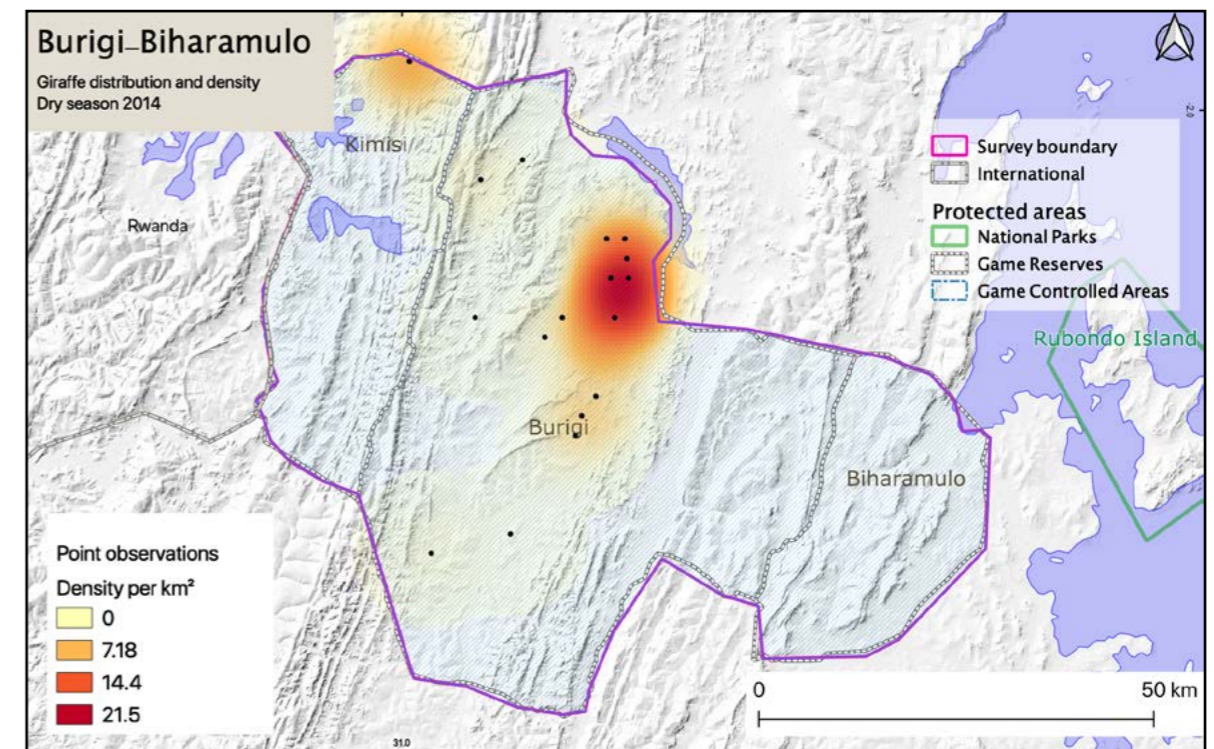
35	Jennifer Taibot	USAID PROTECT
36	ZuwenaKikoti	TAWA (CITES)
37	ZephaniaUbwani	The CITIZEN
38	David Minja	
39	Alex W. Kisingo	CAWM-Mweka
40	Nicole Barry	RTI/USAID Project

Annex 2

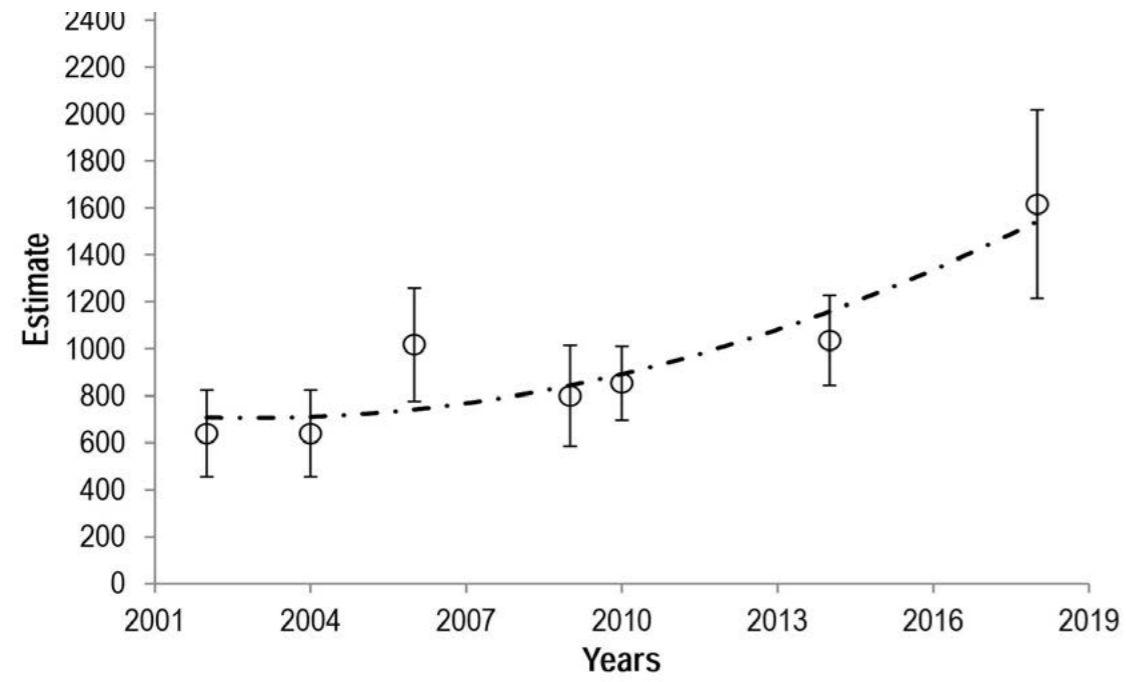
Giraffe population estimates, density, and distribution in major protected ecosystems in Tanzania (from TAWIRI SRF surveys)

Burigi-Biharamulo Ecosystem

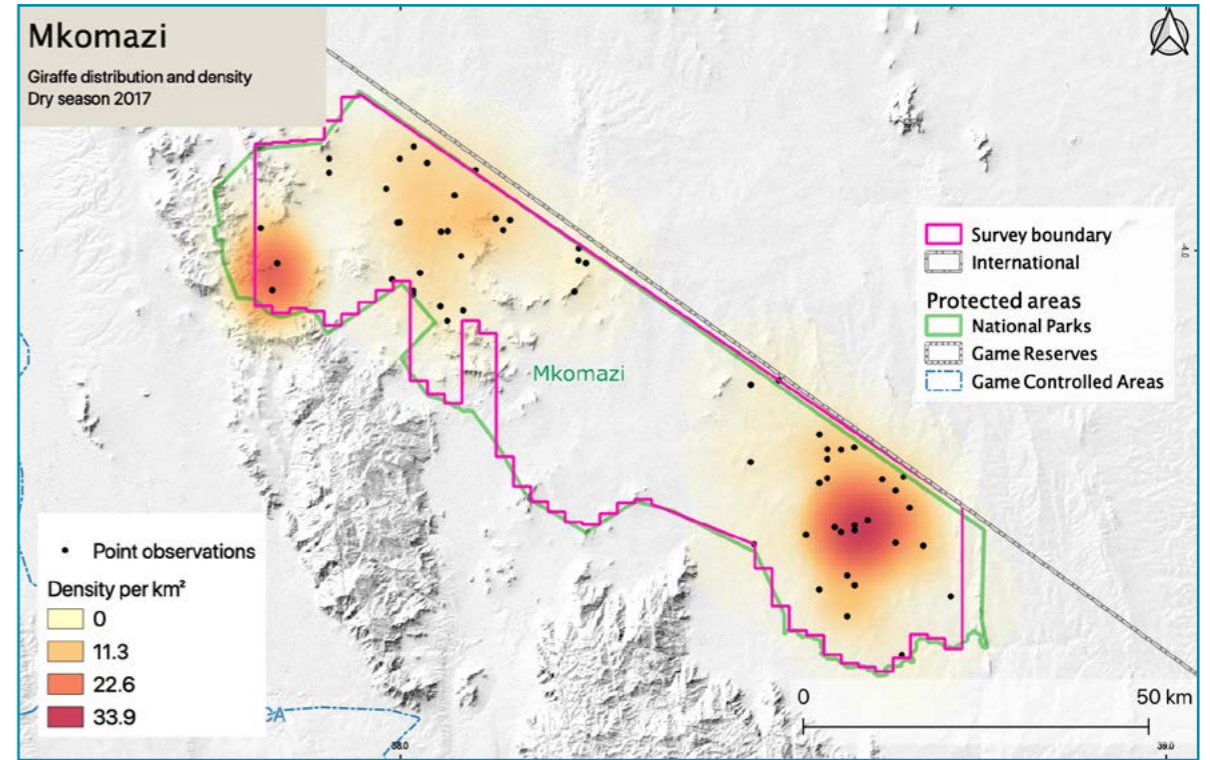
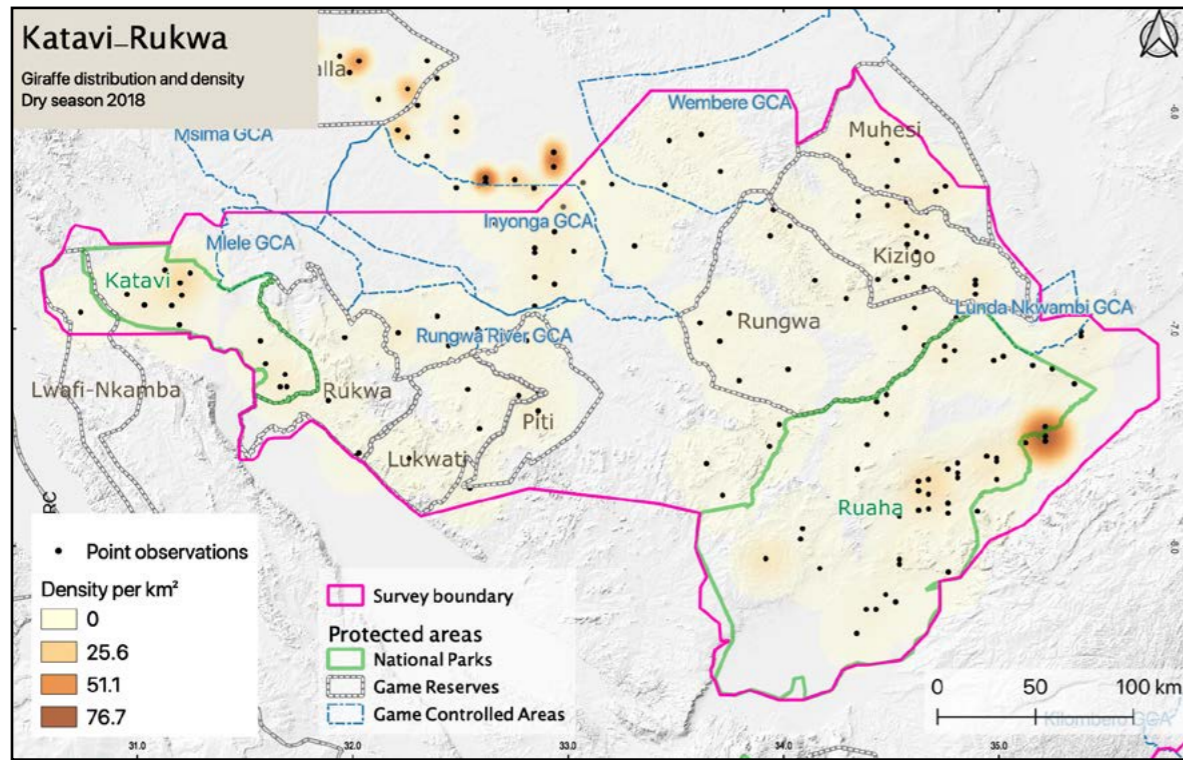
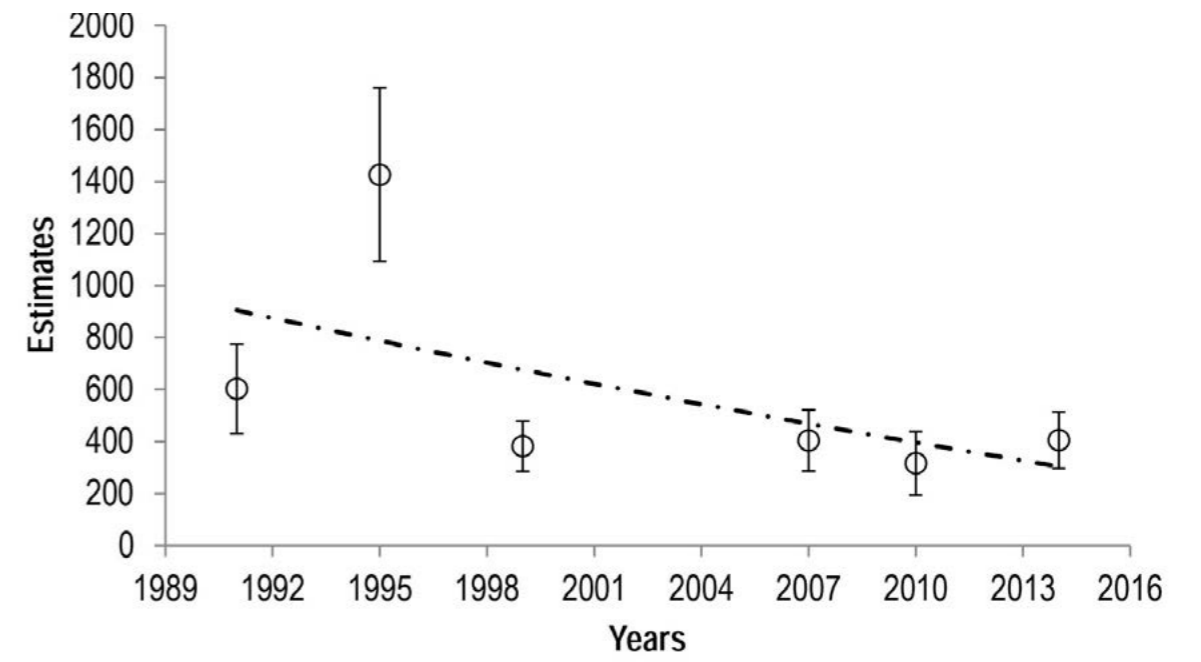
Note: Giraffe populations in Burigi-Biharamulo are too small for estimates to be generated and a graph produced.



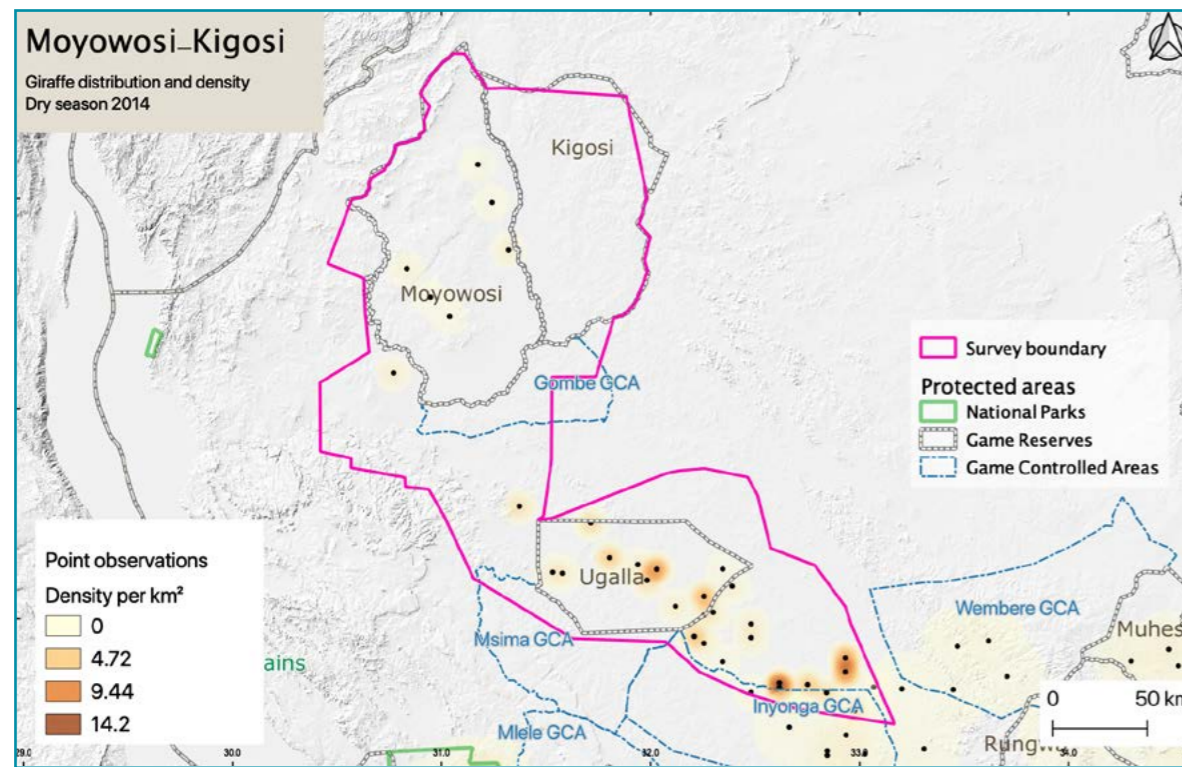
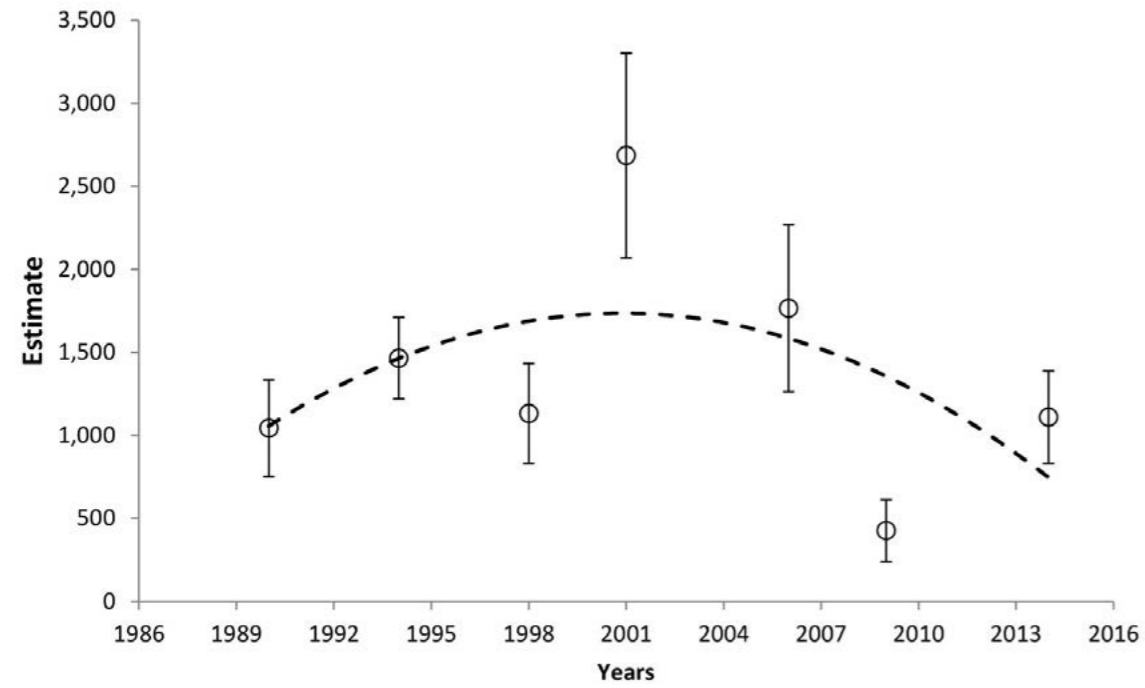
Katavi-Rukwa Ecosystem



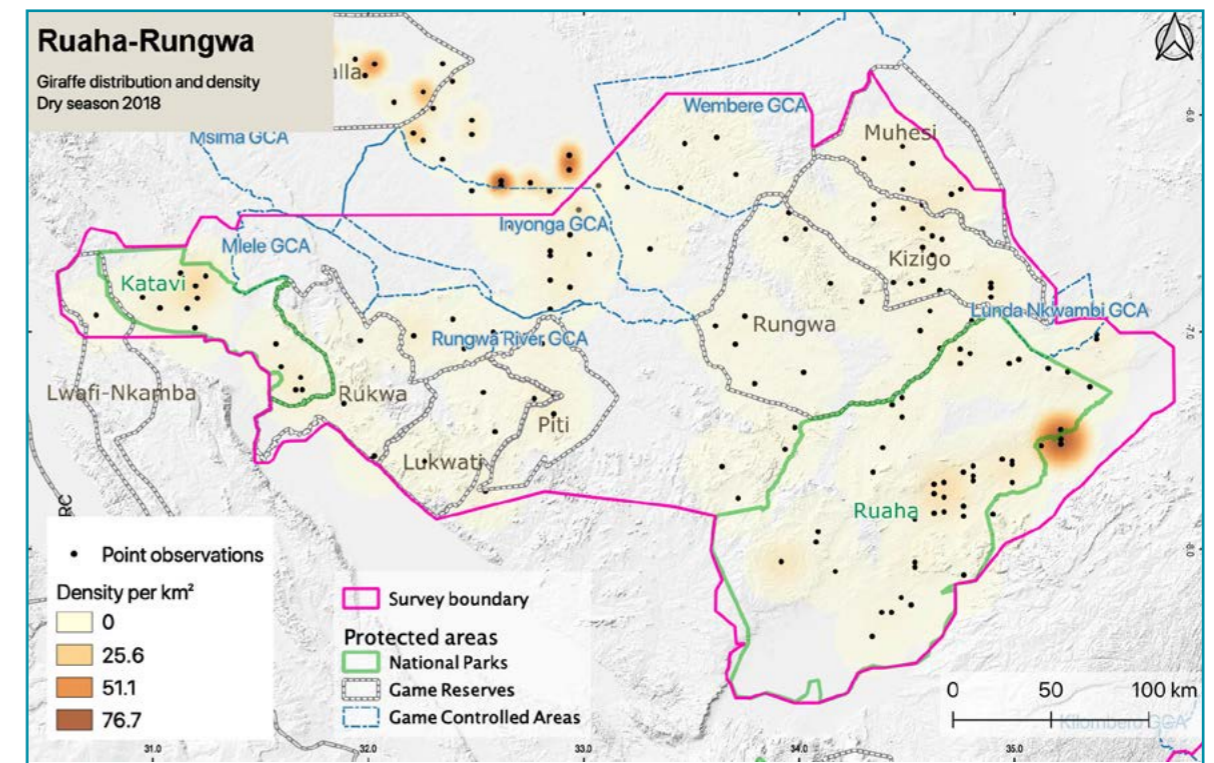
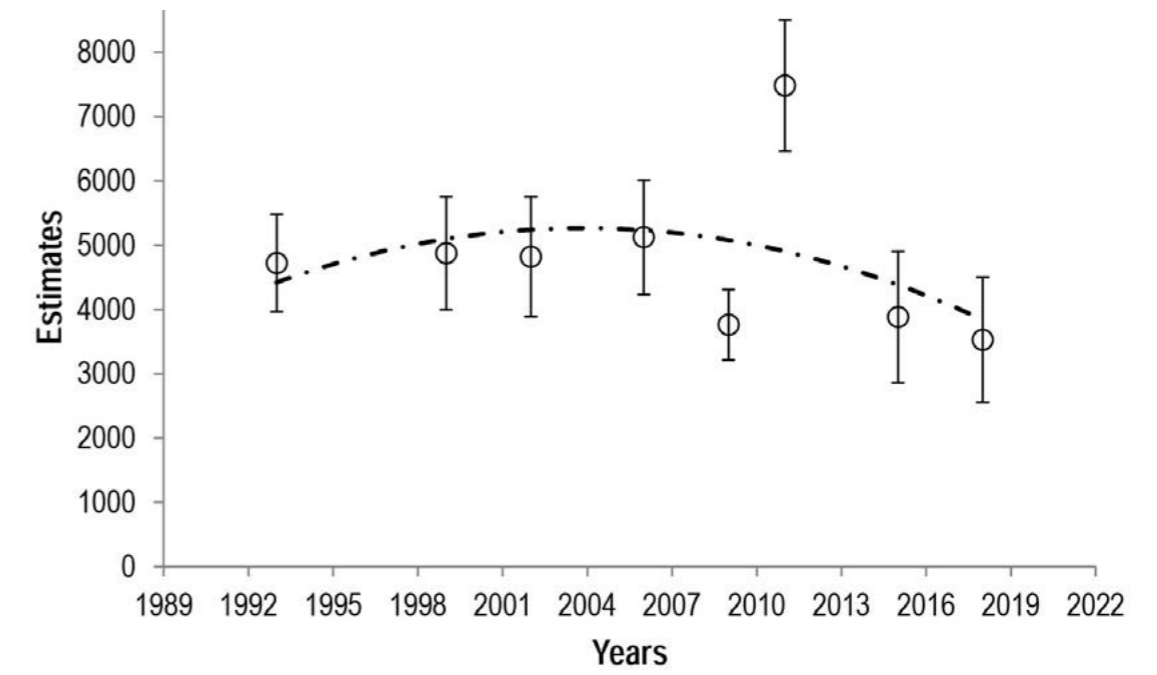
Mkomazi National Park



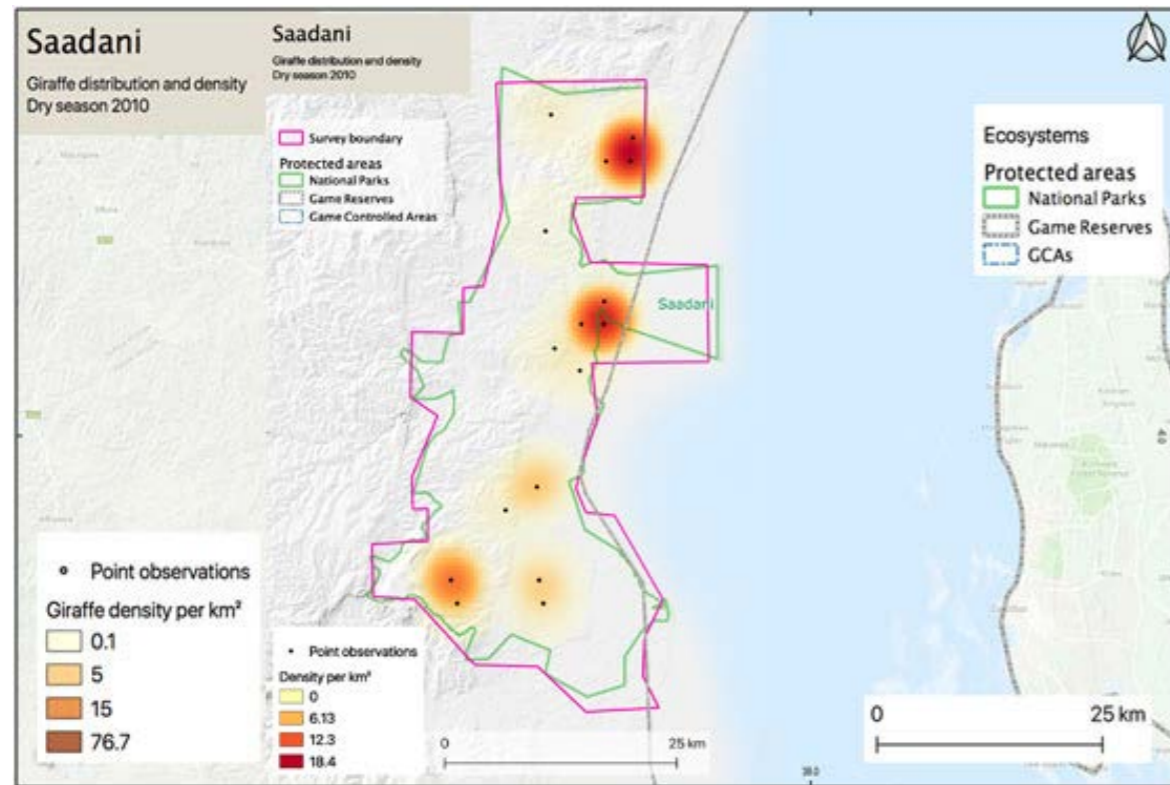
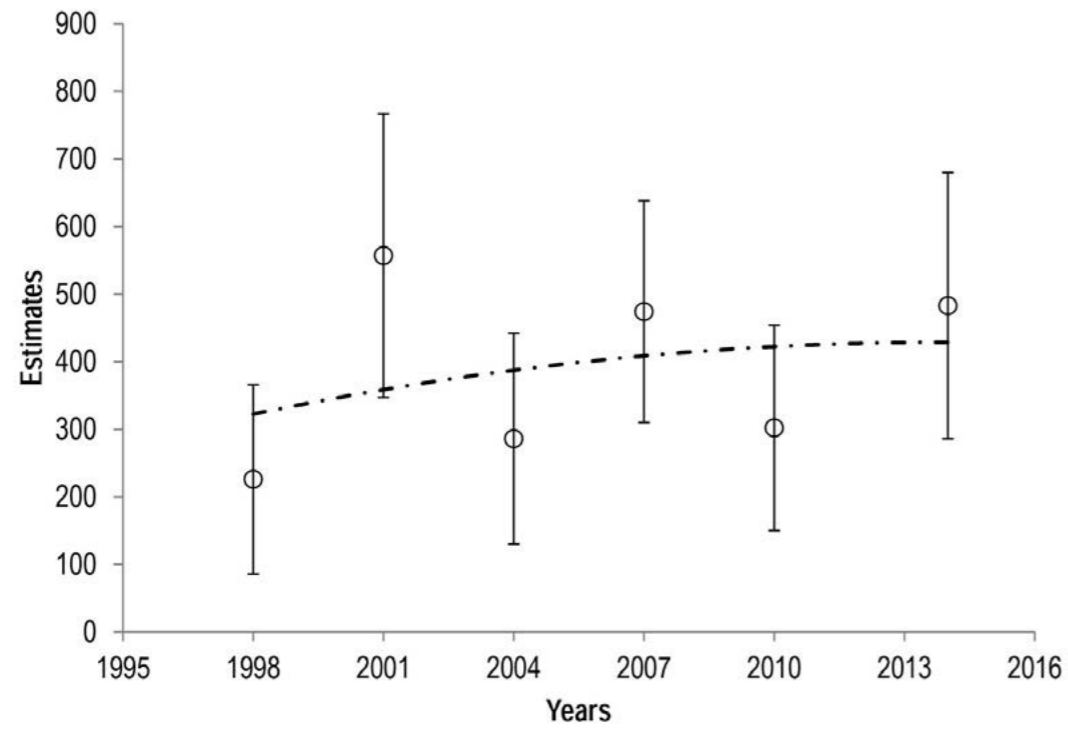
Woyowosi-Kigosi Ecosystem



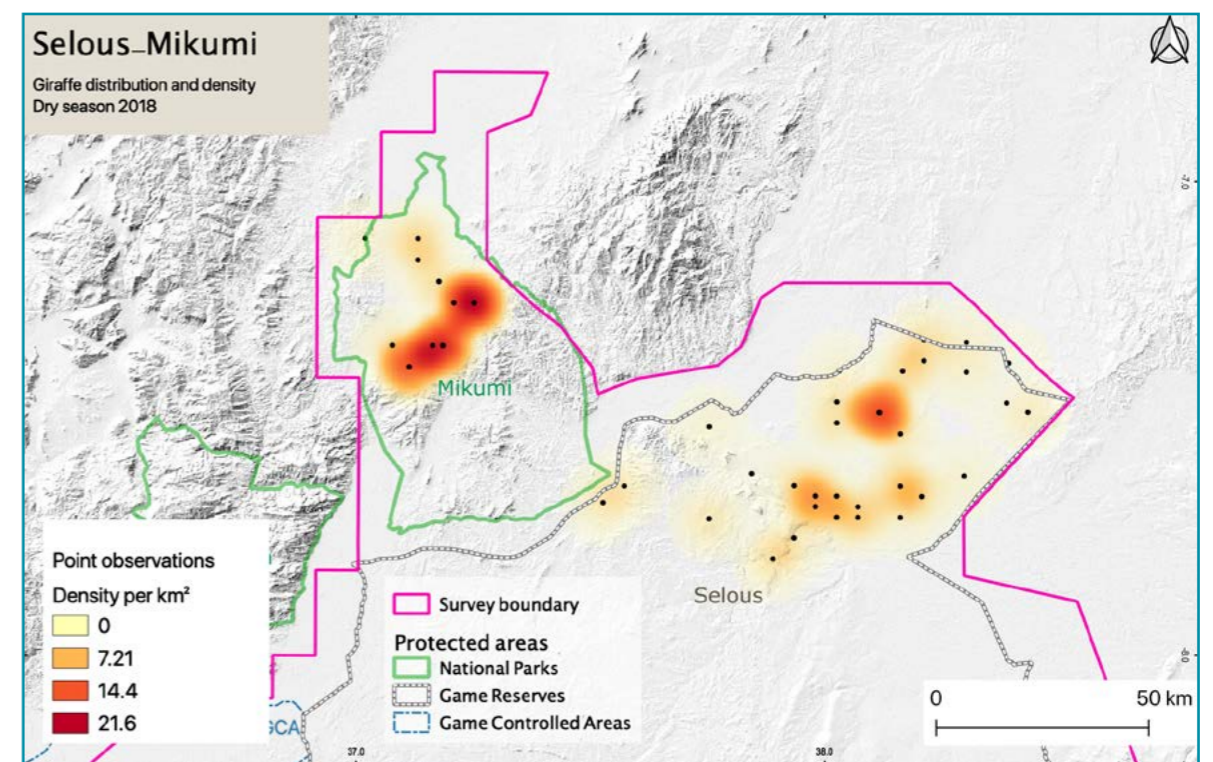
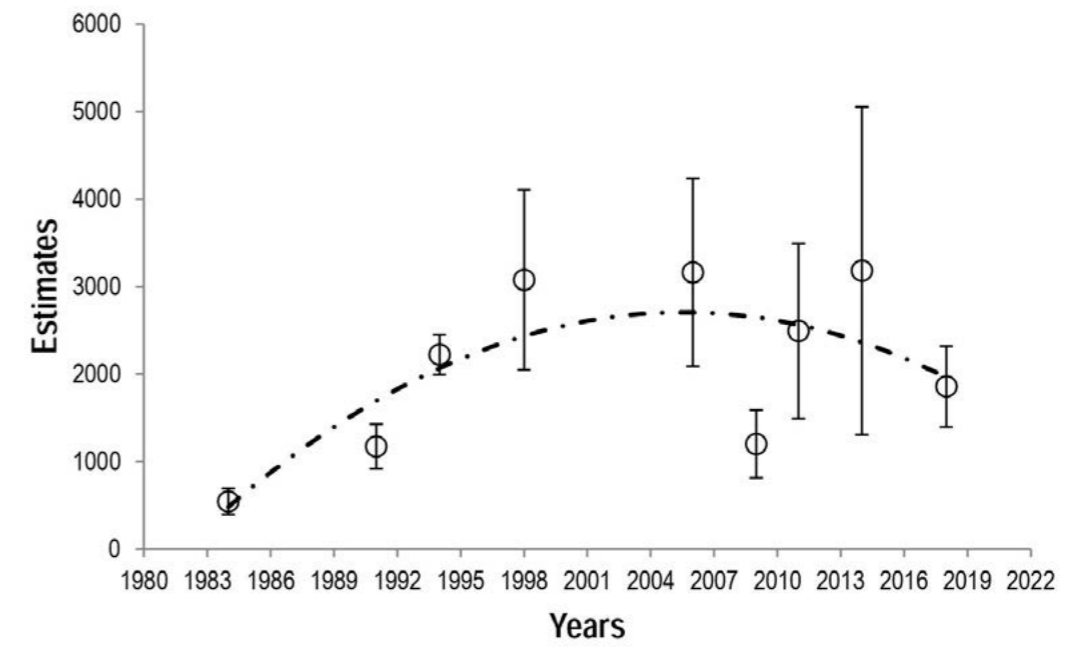
Ruaha-Rungwa Ecosystem



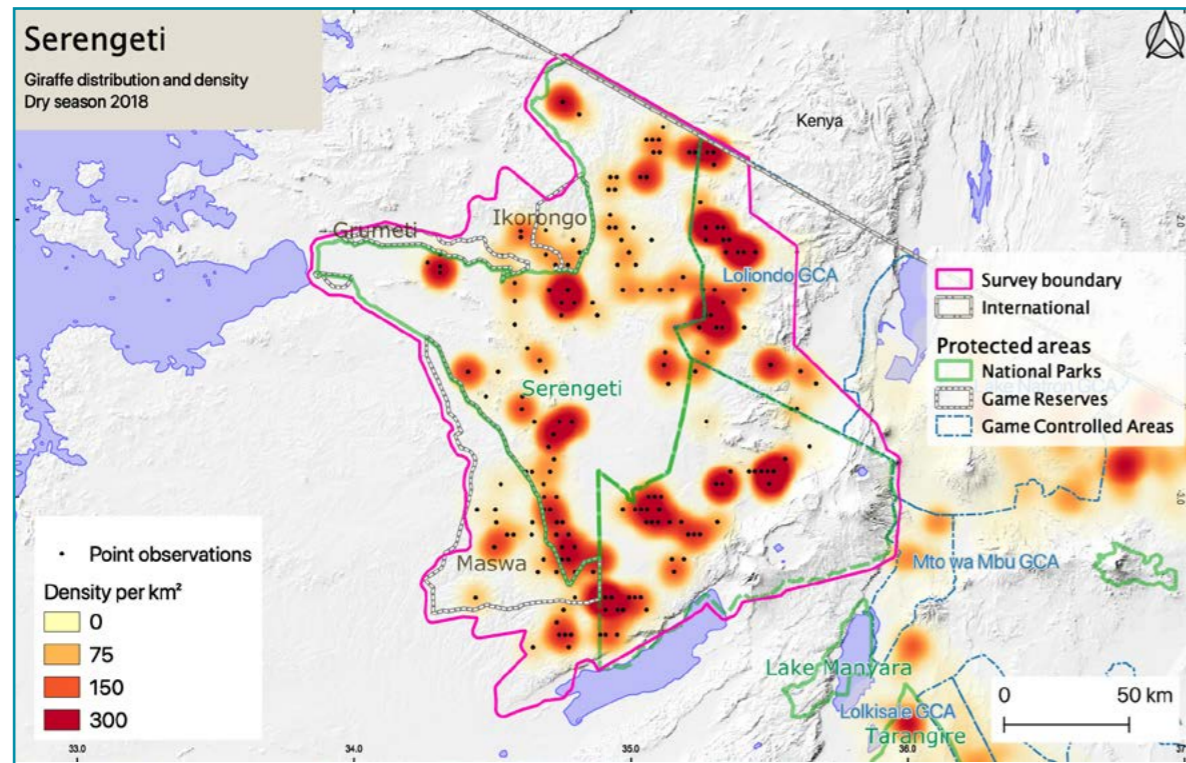
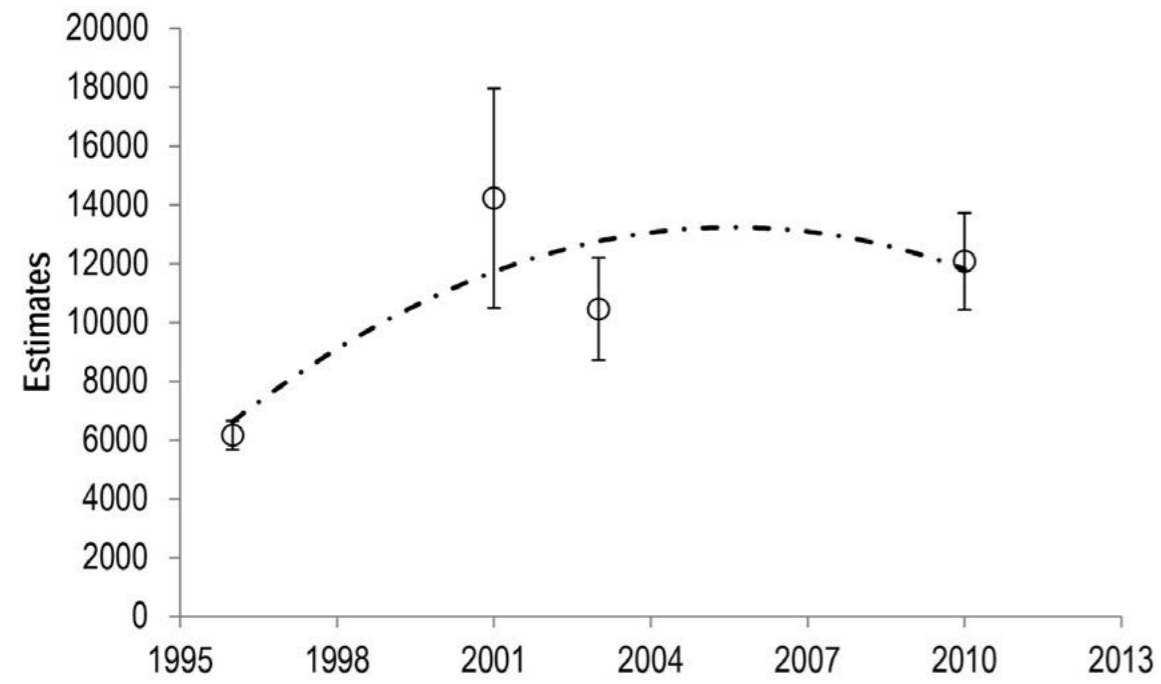
Saadani National Park



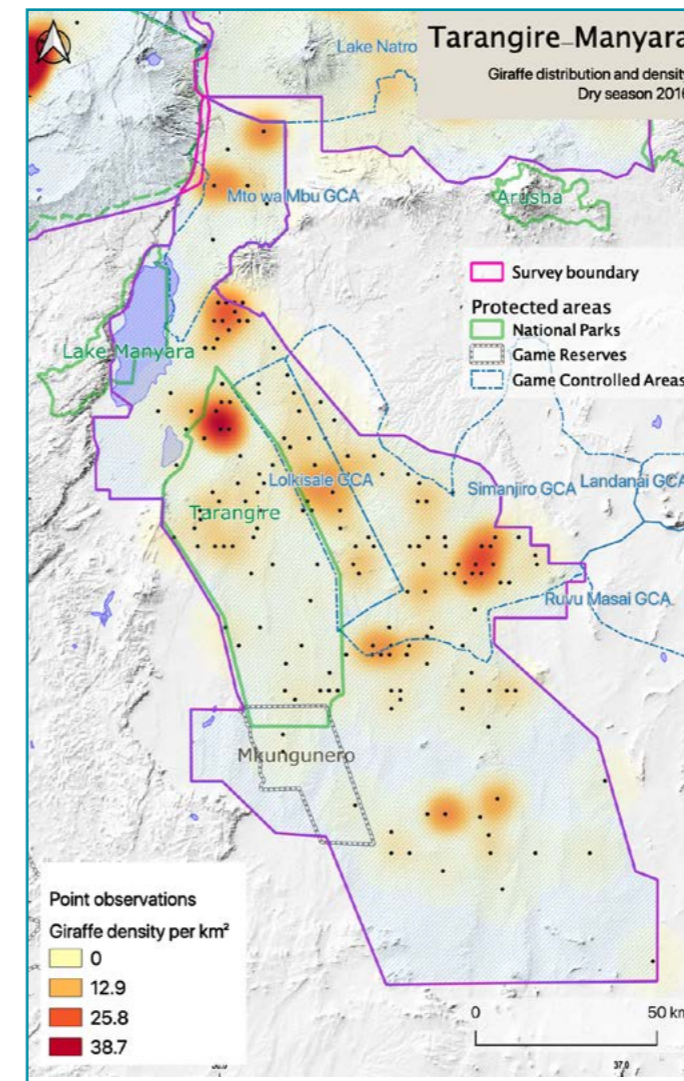
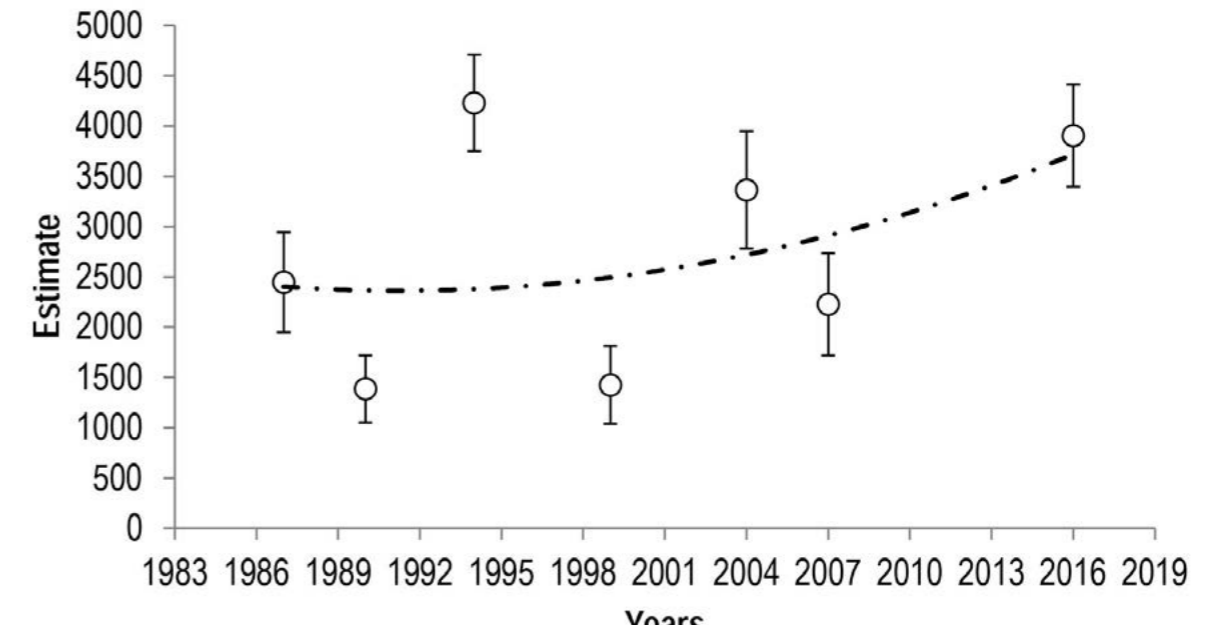
Selous-Mikumi Ecosystem



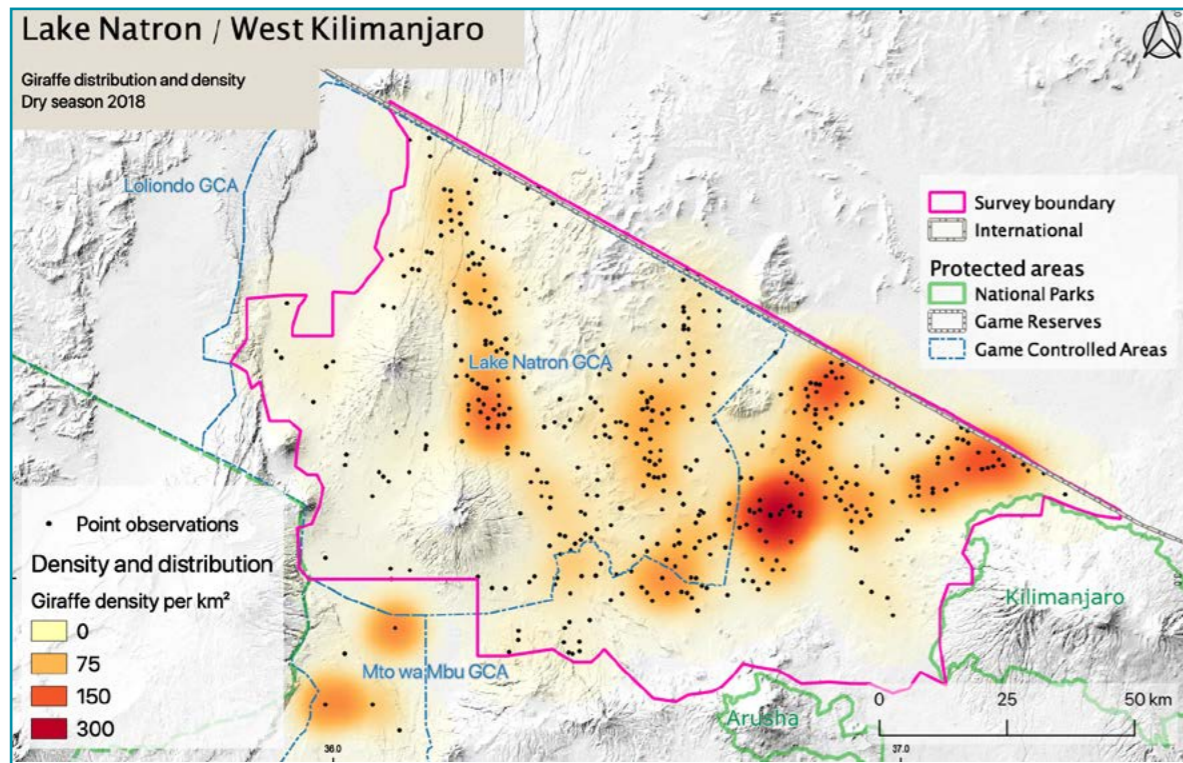
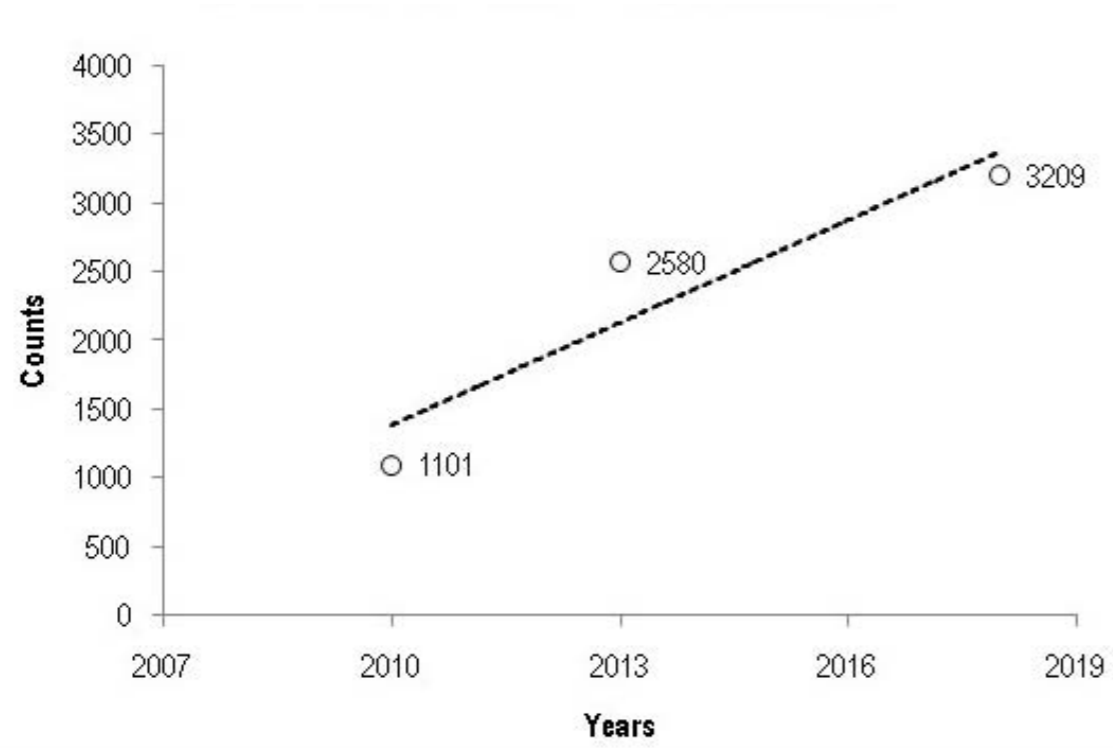
Serengeti Ecosystem

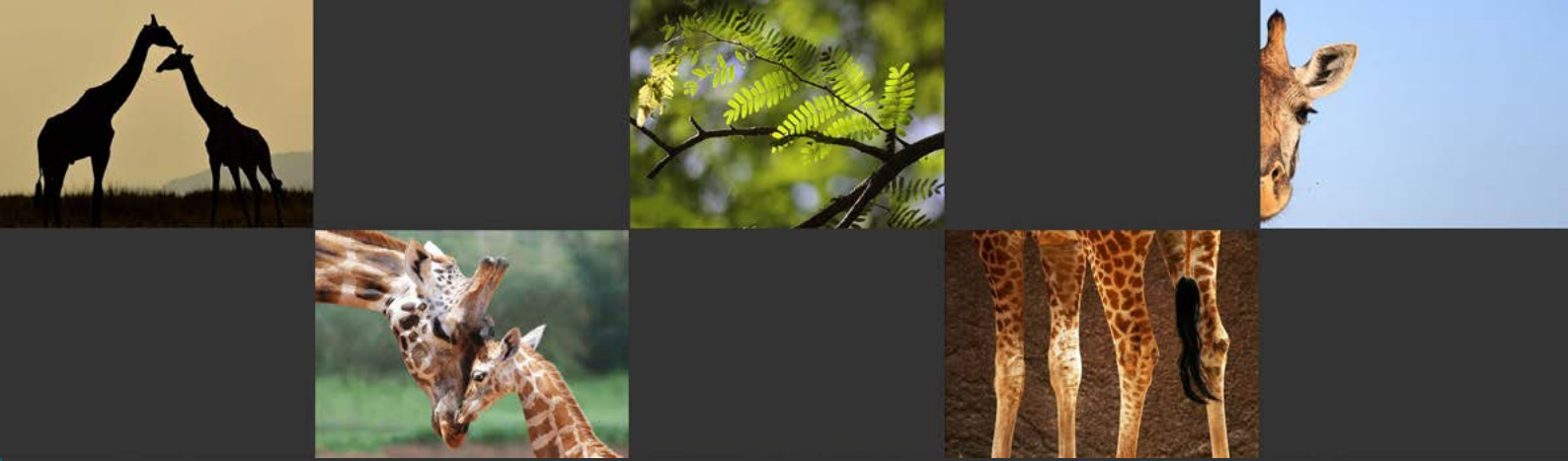


Tarangire-Manyara Ecosystem



West Kilimanjaro Ecosystem





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