

Giraffa camelopardalis giraffa – South African Giraffe



Regional Red List status (2016)	Least Concern
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2016)	Vulnerable A2acc
TOPS listing (NEMBA)	None
CITES listing	None
Endemic	No

Although many Giraffe subspecies and populations are declining, the South African Giraffe remains widespread throughout southern Africa.

Taxonomy

Giraffa camelopardalis giraffa Schreber 1784

ANIMALIA - CHORDATA - MAMMALIA -
CETARTIODACTYLA - GIRAFFIDAE - *Giraffa* -
camelopardalis - *giraffa*

Common names: South African Giraffe, Cape Giraffe (English), Giraf, Kameelperd (Afrikaans), Intudla, Indlulamithi (Ndebele), Thutlwa, Thitlwa (Sepedi), Thuhlo (Sotho), Indlulamitsi, Lihudla (Swati), Nhutlwa, Nthutlwa (Tsonga), Thutlwa (Tswana), Icowa, Thuda, Thudwa (Venda), Umcheya (Xhosa), Indlulamithi (Xhosa, Zulu)

Taxonomic status: Subspecies

Taxonomic notes: Currently, nine subspecies classifications have been proposed for Giraffe (Ansell 1972; Dagg & Foster 1982; Kingdon 1997; East 1999; Grubb 2005; Ciofolo & Pendu 2013). There is considerable uncertainty surrounding the geographic and taxonomic limits of all described subspecies (Fennessy et al. 2013). Furthermore, recent genetic work suggests that several subspecies may even represent distinct species (Brown et al. 2007). Globally, only the forms *G. c. peralta* from West Africa, which recent genetic evidence has confirmed is indeed distinct (Hassanin et al. 2007), and *G. c. rothschildi* have been assessed at the subspecies

level. Giraffe taxonomy of the various populations in Africa has largely been reliant on the variation of pelage pattern and geographic range. However, this has long been inconclusive. Even advances in molecular methods have left many aspects uncertain, often because of limited sampling (Fennessy et al. 2013). A good knowledge of Giraffe genetics, however, is critical for their long-term sustainable management with an estimated population of less than 80,000 remaining in the wild. In particular, the taxonomic assignment and phylogeography of two populations in southern Africa, the South African Giraffe (*G. c. giraffa*) and the Namibian Giraffe (*G. c. angolensis*), remains uncertain. To resolve this and estimate the divergence times among Giraffe populations, an increase in sampling effort across this region as well as more broadly across Africa is very important (Bock et al. 2014). The South African, or Cape, Giraffe was formerly classified as *G. c. capensis*. In this assessment, we treat *G. c. giraffa* as a subspecies in southern Africa (Seymour 2001; Brown et al. 2007; Dagg 2014).

Assessment Rationale

This subspecies remains widespread across the assessment region with a total estimated mature population of 11,746–15,024 individuals. Numbers are increasing and occupancy is expanding due in part to the game ranching industry in South Africa. Giraffe are highly favoured by most game ranchers for their added tourism value. However, many exist outside the natural distribution range (extra-limital introductions) and may be intensively managed on properties that are too small for self-sustaining subpopulations (or could include extra-limital *G. c. angolensis*). If we exclude the private subpopulations and include only the subpopulations in national parks within the natural distribution (Kruger, Augrabies Falls, Mapungubwe, Marakele and Mokala National Parks) as a minimum count of mature population size, there is a minimum mature population size of 4,896–7,533 individuals. Data from 13 formally protected areas show an estimated population increase of 54% over three generations (1985–2015). Thus, with no immediate threats severe enough to cause population decline in the foreseeable future, we continue to list this subspecies as Least Concern. Although some populations remain stable or are even increasing across the rest of this subspecies' range, others may be threatened and thus there may be future population declines, highlighting the importance of South Africa as a stronghold for *G. c. camelopardalis*. Key interventions include protected area expansion and conservancy formation to create larger, more functional spaces for subpopulations, and the development of a Biodiversity Management Plan. As many private subpopulations are kept on small reserves or game farms, often outside of the species natural distribution where they can cause habitat damage, conservationists and private landowners should work together to ensure Giraffe are stocked sustainably and do not impact on natural resources.

Regional population effects: There is dispersal across

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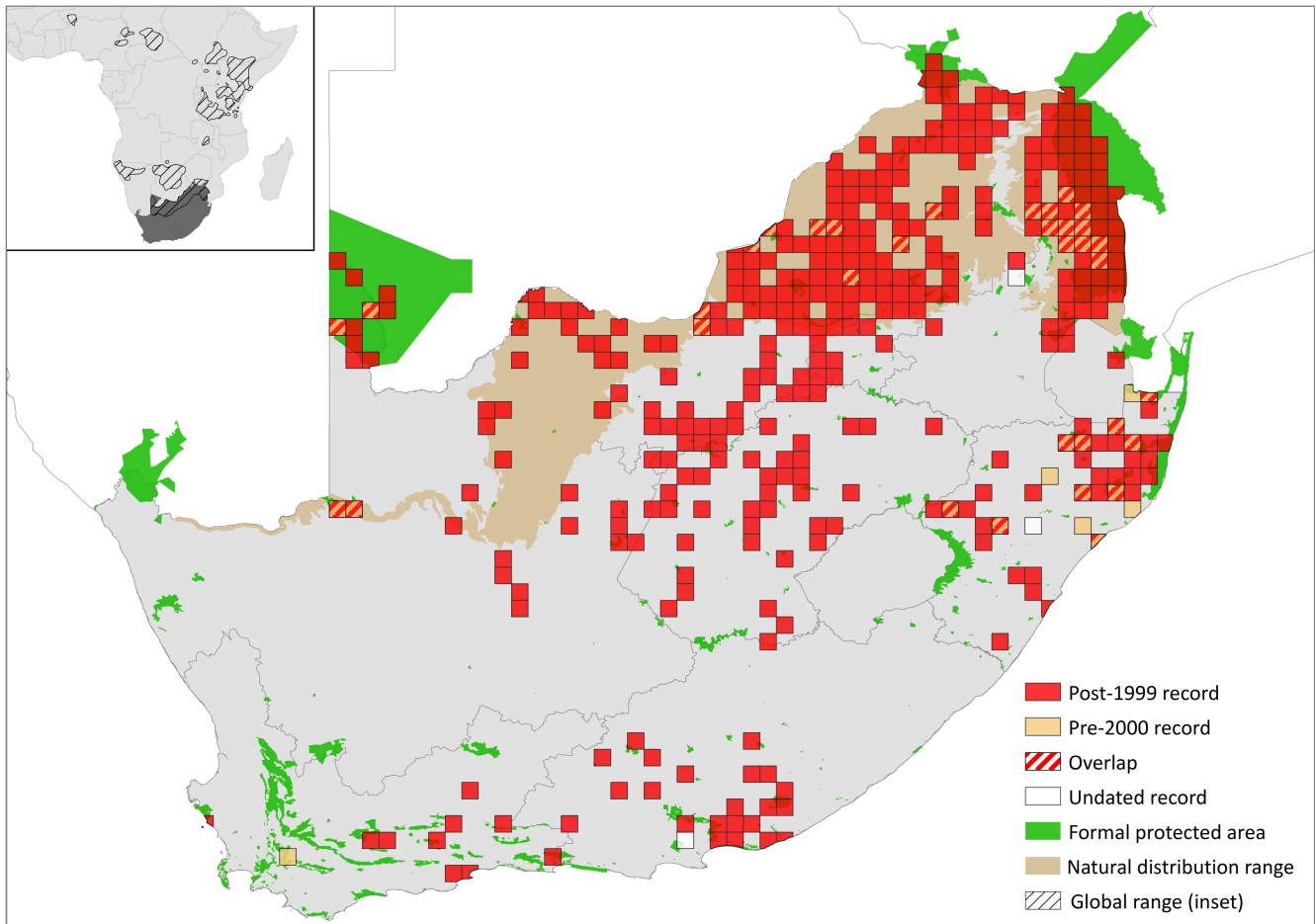


Figure 1. Distribution records for South African Giraffe (*Giraffa Camelopardalis giraffe*) within the assessment region

Table 1. Countries of occurrence within southern Africa

Country	Presence	Origin
Botswana	Extant	Native
Lesotho	Absent	-
Mozambique	Extant	Reintroduced
Namibia	Absent	-
South Africa	Extant	Native, reintroduced and introduced
Swaziland	Extant	Introduced
Zimbabwe	Extant	Native

regional boundaries in the transfrontier parks (Kgalagadi, Great Limpopo and Greater Mapungubwe). Both Kgalagadi and Mapungubwe, however, originate from introductions from Namibia. For the latter, approximately 22 Giraffes were introduced to the Northern Tuli Game Reserve in the late 1980s and originated from two populations – about half were sourced from Langjan Nature Reserve, Limpopo Province, South Africa, and the others from Namibia. For the majority of the population, there is no dispersal between countries and thus we assume that no rescue effects are possible.

Distribution

The Giraffe formerly occurred in arid and dry-savannah zones within sub-Saharan Africa, wherever trees (especially *Acacia* spp.) occurred. The natural range of the

South African Giraffe probably consists of northern South Africa, southern Botswana, southeast Zimbabwe, and southwest Mozambique, all of which are either reintroduced individuals or descendants thereof (Marais et al. 2013a). In southern Africa, having been reintroduced to many parts of the range from which they were eliminated, Giraffe are currently common both inside and outside a number of protected areas in South Africa, as well as across the sub-region. Within the assessment region, the species naturally occurs in the savannah/woodland areas of the Mpumalanga Lowveld and north into the Limpopo Province, as well as westwards into the Northern Cape (Figure 1). It has been reintroduced into the North West. Additionally, it has been introduced into all other provinces, where it remains extra-limital.

Though Lynch (1983) mentioned the possibility of Giraffe occurring naturally in the eastern and western Free State (Harrismith and Hoopstad districts, respectively), there is no reliable historical evidence of Giraffe presence in the Free State (Ansell 1972). This province was not included in the current distribution area of Giraffe (Dagg 1962). However, the Free State Provincial Authority initially imported five individuals in 1961 to the central Free State (Griesel 1961). Since then, many Giraffe have been brought into the Free State, regardless of their natural habitat preferences, namely the savannah biome in the lowveld with scattered sweet thorns (*A. karoo*). The reintroduction of Giraffe by Transvaal Nature Conservation (Hirst 1966; Lambrechts 1974) in the 1970s (and beyond) was due to their demand within public and private reserves. Skead (2007) contends that the Eastern Cape vegetation flourished in the absence of browsers like Giraffe and browsing by them could negatively influence

the indigenous flora. According to Bond and Loffell (2001), the composition and distribution of plant types in the Ithala Game Reserve, KwaZulu-Natal, were changed by the presence of Giraffe.

Although South African Giraffes were present in the region of the Kgalagadi Transfrontier Park in the late 1880s, they were exterminated by European colonists. Since 1991, they have been successfully introduced to the Kgalagadi Transfrontier Park in the Northern Cape from Etosha National Park, Namibia (Kruger 1994). Subsequent to that extralimital translocation, South African Giraffe were moved from Kruger National Park to the Kgalagadi in an effort to increase genetic diversity (van der Walt, pers. comm.). As a consequence, potential admixture between the two subspecies might have contributed to the results in Bock et al. (2014). Given the lack of solid scientific data on the type(s) of Giraffes living in the Kgalagadi, we consider them to be an extralimital population not included in our population estimates.

Swaziland is probably outside of the natural range of South African Giraffes as Goodman and Tomkinson (1987), in an exhaustive review of the literature, concluded that the probability of Giraffes living in Swaziland prior to human reintroduction was exceedingly small. Marais et al. (2013b) and East (1999) have speculated that Giraffe might have lived in Swaziland, but present no evidence. As Goodman and Tomkinson (1987) comment, no reliable evidence or solid records exist that demonstrate Giraffes were indigenous to Swaziland in historic times, even if the habitat seemed suitable for their presence. In 1965, *G. c. giraffa* were moved to Swaziland from South Africa, with later imports of *G. c. angolensis* from Namibia and further importation of Giraffes from South Africa (Marais et al. 2013b). Swaziland has approximately 200 Giraffes in both protected areas and on private lands, but these Giraffes are considered extra-limital.

Range expansions are ongoing in South Africa because of the expanding game industry (Theron 2005), with more and more game owners wanting Giraffe on their farms based on aesthetic reasons, rather than natural management concerns. Deacon (unpubl. data) has estimated that at least 12,000 private game ranches exist in South Africa.

The type specimen was a Giraffe killed in 1761 in southern Namibia, just north of the Orange River, in the vicinity of Warmbad (Dagg 2014), an area where the subspecies is now locally extinct. Analyses of maternally inherited mitochondrial DNA loci (cytochrome b and the control region) reveal a fundamental divergence between northern and southern Giraffe populations in Africa. In addition, the distribution of two currently classified subspecies, *G. c. angolensis* and *G. c. giraffa*, and the taxonomic status of Botswana and Namibian populations may need to be redefined. It appears that a cryptic rift valley in Botswana's Kalahari basin area during the Pleistocene acted as a strong barrier to gene flow between the Giraffe populations in central and northern Botswana. The separation of these populations shown for maternally inherited loci may need to be taken into account for future conservation efforts and in the development of appropriate management strategies, as well as for the assessment of the taxonomic status of many Giraffe populations in Africa (Bock et al. 2014). Thus the majority of Botswanan Giraffe would be considered *G. c. angolensis* and not *G. c. giraffa* as we initially thought. The taxonomic resolution of Zimbabwean Giraffe, however, remain uncertain. These findings are yet to be

corroborated with nuclear DNA. East (1999) combined Angolan and South African Giraffes into one super-group called southern Giraffes, since he was not convinced that they were two separate taxa. Seymour (2001) had a limited sample size of Angolan Giraffes, and was also not convinced that Angolan and South African Giraffes were separate subspecies, but he recommended retaining the two subspecies designations pending further investigation. Brown et al. (2007) did not have samples from Botswana, but, recommend retaining a separation in taxonomic designation between the Angolan and South African Giraffes.

Population

Although many subspecies and populations are declining, South African Giraffes remain widespread throughout southern Africa. They reside in both protected areas and on private land, and a number of them have been translocated to extralimital areas in South Africa, as well as to other countries. South African Giraffes (*G. c. giraffa*) have been moved from South Africa to countries such as Zambia and Senegal, while Angolan Giraffes (*G. c. angolensis*) have been transferred from Namibia and Botswana to South Africa. East (1999) estimated the total African population of Giraffe at about 140,000 animals, predominantly in areas dominated by *Acacia* woodlands and shrublands. More recent estimates put the total population at less than 80,000 animals (Giraffe Conservation Foundation unpubl. data 2013). For *G. c. giraffa*, data from the four range countries (South Africa, Botswana, Zimbabwe, Mozambique) reveal that an estimated 21,553 South African Giraffes live in both government protected areas and on private land (F. Deacon unpubl. data), with an estimated increase of about 150–250% over three Giraffe generations (c. 30 years).

Within the assessment region, there are an estimated 7,630–11,079 individuals in national parks alone (4,896–7,533 mature, Table 2). Kruger National Park comprises the bulk of the population, where there are currently an estimated 7,427–10,876 (2012 count, distance sampling) individuals (Ferreira et al. 2013). This subpopulation appears to be stable or increasing as it was estimated to be between 5,500 and 7,208 in Friedmann and Daly (2004). Provincial protected areas within the natural range add at least another 1,373 individuals (in 28 subpopulations; counts between 2013 and 2014). This yields a total of 9,003–12,452 individuals on protected areas, which corresponds to 5,672–8,467 mature individuals (assuming a 63–68% mature herd structure;

Table 2. Giraffe subpopulation sizes in SANParks reserves as provided by SANParks Scientific Unit (Ferreira et al. 2013).

Province	National Park	Giraffe count
Northern Cape	Augrabies Falls National Park	36
	Mokala National Park	57
Mpumalanga	Kruger National Park	7,427–10,876
Limpopo	Mapungubwe National Park*	60
	Marakele National Park	50
Total		7,630–11,079

*Please note that this is a transboundary population and that numbers will fluctuate between the three countries. Total population for the Greater Mapungubwe Transfrontier Conservation Area is estimated at ~ 240 based on 2012 count.



F. Deacon unpubl. data).

In South Africa thousands of Giraffes populate the estimated 12,000 game farms and ranches across the country (Deacon unpubl. data). Many of these Giraffes were purchased from national parks and provincial nature reserves and are in-country translocations. In a number of cases, ranches and private nature reserves are moving this subspecies to regions outside of its historic natural range (Parker & Bernard 2005). In addition, Angolan Giraffes have been moved to some of the private game ranches in South Africa. Private subpopulations of Giraffe have been expanding and increasing within the assessment region. There is estimated to be between 11,299 and 13,850 on private farms across the country. Many of these Giraffe have been introduced into areas that historically may not have been part of the Giraffe's natural range (extra-limital introduction), and are therefore not included in this assessment (IUCN Standards and Petitions Subcommittee 2014). There are an estimated 9,642 individuals occurring within the natural range (F. Deacon unpubl. data). Although many are suspected to be wild and free-roaming individuals (not captive bred or kept in enclosures, not supplementary fed and kept on adequately sized properties), some game ranches as small as 0.2 km² keep and breed Giraffe (F. Deacon unpubl. data). Average property size for privately owned Giraffe subpopulations is 68.7 ± 146 km² with a minimum of 0.1 km² and a maximum of 1,030 km² (Endangered Wildlife Trust unpubl. data; N = 118 properties), which demonstrates the wide range in management regimes for private Giraffe subpopulations. Similarly, average subpopulation size is 30 ± 41 individuals (median = 16 individuals), ranging from 1–250 individuals (Endangered Wildlife Trust unpubl. data; N = 118 properties). If the Giraffe are relying only on the natural resources and no supplementary feeding, then a typical property size to sustain a viable population to breed successfully should be > 30 km² in size (but will vary from biome to biome), taking into account the critical period when Giraffe experience feeding stress (July–September). This will limit the destruction of vegetation and possible mortalities. Prior to the introduction of Giraffe into an area outside of their natural distribution range, a proper habitat risk assessment should be conducted and a management plan which includes feeding and disease monitoring should be submitted.

Overall, there is a current (2013–2015) population estimate of between 18,645 and 22,094 South African Giraffes living in their natural habitat within the assessment region (on all land types). This equates to a mature population size of 11,746–15,024 individuals. Generation length is estimated

to be between 10 and 14 years (Pacifi et al. 2013), making the three generation window 30–42 years. While no adequate long-term data are available to measure population trends over three generations, a sample of 13 formally protected areas, with long-term data over at least two generations, reveals an estimated population increase of 54% over the three generation period.

Current population trend: Increasing

Continuing decline in mature individuals: No

Number of mature individuals in population: 11,746–15,024

Number of mature individuals in largest subpopulation: 4,679–7,396 in Kruger National Park.

Number of subpopulations: 5

Severely fragmented: Yes, in all areas besides the transfrontier parks.

Habitats and Ecology

Acacia savannah/woodland and open woodland landscapes are the preferred habitats for this subspecies, especially where there are abundant woody trees. Giraffes in the Kalahari preferred tree densities of 744 to 1,084 plants / ha where they can select very specific woody species to browse (Deacon 2015). Theron (2005) found that, in the Free State, active browsing was responsible for 53% of the daily activities of the animals. During the day, browsing activities mostly took place in direct sunlight. Minimal time was spent in full or partial shade. During light rain showers, their ears were flattened and browsing continued undisturbed, but a hard rain shower usually caused a temporary cessation of browsing. Though individuals sometimes smelled the leaves of trees before browsing, especially in the Franklin Nature Reserve in South Africa with its unusual composition of potential feeding plants, no relation was found between wind and browsing direction (Theron 2005). The simultaneous browsing of the same plant by more than one Giraffe was observed regularly by most authors. In contrast to the assumption of Dagg (1960) and Spinage (1968) that feeding activity also dominated the night-time activities, browsing was responsible for less than a third (31%) of the total time budget during the night. In the early evening and the early morning hours, the browsing frequency was high (84%), but in the middle of the night it dropped to a low frequency (16%). In contrast, throughout the day, browsing took place at a relatively constant rate with an initial increase of 20% in the early morning and again in the late afternoon. Theron (2005) observed that mature bulls browsed significantly less than cows, supported by the findings of Du Toit (1990) and Pellew (1984). Young calves normally spend less time browsing, as mothers' milk largely fulfils their nutritive requirements. Browsing represents the dominant activity of adult Giraffe in both the wet and dry seasons. In both sexes, browsing time increased slightly during periods of food scarcity.

Giraffes are exceptionally well-adapted to dry and arid habitats, with food availability during the dry season probably a fundamental regulator of Giraffe distribution (Berry & Bercovitch 2016). Although *Acacia* is often considered the limiting factor, such is not necessarily the case (Berry & Bercovitch 2016). One possible unfortunate consequence of this misperception is that many Giraffe translocations in South Africa are to places with *Acacia* trees, but Giraffes can cause substantial damage to the

Table 3. Use and trade summary for the South African Giraffe (*Giraffa camelopardalis giraffa*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	No	-	-	-
Commercial use	Yes	Live game sales and trophies.	Majority	Increasing, based on expansion of wildlife ranching industry.
Harvest from wild population	Yes	Mainly live animal sales from formally protected areas.	Minority (c. 5%)	Stable
Harvest from ranches population	Yes	Mostly trophy hunting and live animal sales.	Majority (10-20%)	Increasing
Harvest from captive population	Yes	Trophy hunting and live animal sales.	Minority	Unknown

habitat when residing in small enclosed areas, especially to the *Acacia* trees (Bond & Loffell 2001; Parker & Bernard 2005; Deacon et al. 2012).

As with their diet, Giraffes in Africa demonstrate an enormous amount of variability in their home range size, but limited flexibility in their daily movement patterns. Home range size reflects resource availability and distribution, with dry season foods probably exerting a major impact on Giraffe ranging patterns and reproductive rates. McQualter et al. (2015) summarised results across Africa, reporting average home range sizes varying from about 10 km² to close to 500 km². In the Kalahari, the average home range (206 km², calculated from eight collared females; highest 438 km², lowest 65 km²) is larger than any average Giraffe home ranges previously reported (Deacon 2015): 25 km² in South Africa (Langman 1973), 68 km² in Zambia (Berry 1978) and 200 km² in Namibia (Fennessy 2009). Van der Jeugd and Prins (2000) reported mean home ranges of Giraffe in Lake Manyara National Park, Tanzania to be between 5 km² (males) and 9 km² (females), but with much variation: 0.1–22 km² (for males) and 0.5–27 km² (for females). Berry (1978) observed that average male home range (82 km²) was greater than female home range (68 km²), and the largest for a male was 145 km² in the Luangwa Valley, Zambia. Fennessy (2009) estimated one bull's home range (in the Namib desert in northern Namibia) to be 1,950 km² and for one female 1,098 km². In the same study, the female's mean annual home ranges varied from 200 km² to 220.7 km² (using the 100% minimum convex polygon) and from 24 km² to 119 km² (using the 95% minimum convex polygon).

Ecosystem and cultural services: Giraffe are an iconic

species of the African savannah. Giraffe are widely loved symbols of wildness and the beauty of nature.

Use and Trade

Giraffe are utilised non-consumptively for ecotourism and consumptively for trophy hunting. The tails are also used by traditional leaders and tribesmen for pride and status. Live animals are also traded privately and at government sanctioned game auctions distributed across South Africa (for example, sold for R32,000 per individual, Buffalo Ranch Game Auction, 9 October 2015; F. Deacon pers. obs.). Trading of Giraffe is controlled by each province's nature conservation offices. Trade and utilisation are not expected to impact negatively on the population. Rather, legal sustainable hunting contributes to the overall increase in Giraffe numbers across the country, where, after compliance with certain regulations, the owners of wildlife ranches, private game reserves and game farms are allowed to keep Giraffes on their land for commercial purposes such as ecotourism, live sales and hunting. The wildlife ranching industry is unique to southern Africa. However, little research has been done to evaluate the natural resources that are necessary to sustain the animals. Thus, few of these privately owned wildlife species receive proper attention regarding their needs in extensive farming practices.

Although the private sector has been largely responsible for restoring this species to many parts of its former natural range in South Africa, ranchers and private nature reserves are also introducing this species widely outside of its natural range (Parker & Bernard 2005). Deacon et al. (2012) document the damage Giraffe can cause within small, fenced game farms, and they are especially

Table 4. Possible net effects of wildlife ranching on the South African Giraffe (*Giraffa camelopardalis giraffa*) and subsequent management recommendations

Net effect	Positive
Data quality	Observed
Rationale	Economic gains have largely driven the increase in Giraffe numbers and large property sizes are required to reintroduce this species, plus the lack of intensive management practices for this species mean that they are self-sustaining or lightly managed in the long term.
Management recommendation	If the Giraffe are relying only on the natural resources and no supplementary feeding, then a typical property size to sustain an average Giraffe herd should be > 30 km ² in size, taking into account the critical period when Giraffe experience feeding stress (July – September). Do not overstock Giraffe on small properties as this can cause habitat degradation. A habitat evaluation/risk assessment should be performed before introducing Giraffes onto a farm.

destructive towards certain *Acacia* species (Bond & Loffell 2001; Parker & Bernard 2005). However, there is no real evidence of negative effects caused by Giraffe in the Eastern Cape. Anecdotal reports from parts of the Karoo (Asante Sane near Graaff-Reinet) indicate that there is insufficient food for them during the winter and they require supplemental feeding (D. Parker pers. obs. 2006). Jacobs (2008 unpub. data) showed very little impact of Giraffe browsing on two species of *Schotia* in the Eastern Cape. Similarly, D. Parker (unpubl. data) indicated that certain tree species may be targeted (depending on location) but that Giraffe numbers were not high enough to result in the same sort of effects that Bond & Loffell (2001) observed in KwaZulu-Natal if overstocked. Thus, a nuanced management approach is required for Giraffe in different habitat types and depending on Giraffe density.

Regulation of translocations is required to enhance the conservation value of current extra-limital movement. Permits should be issued on a case-by-case basis following appropriate assessment and used to restore Giraffe to their historical range (Bernard & Parker 2006). A big concern is that there are no regulations or guidelines set for minimum habitat requirements for Giraffes, and currently the literature on the subject is lacking specific scientific information for managing Giraffe populations nationally and specifically in arid regions. Wildlife ranchers may also be hybridising this subspecies with exotic subspecies or ecotypes to increase sale or hunting value, which should be legislated against. However, studies confirming (or refuting) the existence and extent of the practice are required.

Threats

While some populations of Giraffe in southern African are increasing – although those in Botswana are not and little is known of Zimbabwe currently – populations of Giraffe in East, Central and West Africa have been decreasing, or are low in numbers, due to habitat degradation, habitat loss and poaching. For example, poaching and armed conflict across the range of the Reticulated Giraffe in southwestern Somalia, southern Ethiopia and northern Kenya has reduced the population by more than 80% to fewer than 5,000 individuals in the last 15 years (Giraffe Conservation Foundation unpubl. data 2013).

Within the assessment region of South Africa, the main threat is habitat fragmentation and degradation. The Giraffe's habitat is increasingly fragmented through development, urban sprawl and agricultural intensification. This can cause inbreeding and a weakening of the resilience of the population as a whole. The latest DNA results indicate that genetic diversity within South African Giraffe might be very low because of these small islands of conservation areas and little effort to conserve pure genetic material within the game ranches and conservation islands (P. Grobler pers. comm. 2015). Another potential threat is through hybridisation of different subspecies (Namibian animals mixing with lowveld animals), which may threaten the genetic integrity of the southern subspecies *G. c. giraffa*. Both the Kglagadi Transfrontier Park and the Tuli Game Nature Reserve contain introduced *G. c. angolensis* and *G. c. giraffa*. Because the former subspecies is extralimital to the area, while the latter subspecies is endemic to the area, the combined population creates hazards for conservation

Table 5. Threats to the South African Giraffe (*Giraffa camelopardalis giraffa*) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)

Rank	Threat description	Evidence in the scientific literature	Data quality	Scale of study	Current trend
1	<i>2.1.3 Annual & Perennial Non-timber Crops:</i> habitat loss from agricultural expansion. Current stresses <i>1.3 Indirect Ecosystem Effects</i> and <i>2.3.5 Inbreeding:</i> fragmentation of habitat and associated inbreeding.	P. Grobler unpubl. data	Anecdotal	National	Increasing due to ongoing habitat loss.
2	<i>2.3.3 Agro-industry Grazing, Ranching or Farming:</i> habitat loss from agricultural expansions. Current stresses <i>1.3 Indirect Ecosystem Effects</i> and <i>2.3.5 Inbreeding:</i> fragmentation of habitat and associated inbreeding.	P. Grobler unpubl. data	Anecdotal	National	Increasing due to ongoing habitat loss.
3	<i>1.2 Commercial & Industrial Areas:</i> habitat loss from industrial infrastructure expansion. Current stresses <i>1.3 Indirect Ecosystem Effects</i> and <i>2.3.5 Inbreeding:</i> fragmentation of habitat and associated inbreeding.	-	Anecdotal	-	Increasing due to ongoing habitat loss.
4	<i>1.1 Housing & Urban Areas:</i> habitat loss from human settlement expansion. Current stresses <i>1.3 Indirect Ecosystem Effects</i> and <i>2.3.5 Inbreeding:</i> fragmentation of habitat and associated inbreeding.	-	Anecdotal	-	Increasing due to ongoing habitat loss.
5	<i>2.3.2 Small-holder Grazing, Ranching or Farming:</i> proliferation of small wildlife ranches. Current stresses <i>2.3.1 Hybridisation</i> and <i>2.3.5 Inbreeding:</i> loss of genetic diversity through inbreeding and potential hybridisation with exotic subspecies.	P. Grobler unpubl. data	Anecdotal	National	Increasing due to ongoing expansion of wildlife ranching sector.

Table 6. Conservation interventions for the South African Giraffe (*Giraffa camelopardalis giraffa*) ranked in order of effectiveness with corresponding evidence (based on IUCN action categories, with regional context)

Rank	Intervention description	Evidence in the scientific literature	Data quality	Scale of evidence	Demonstrated impact	Current conservation projects
1	2.1 <i>Site/Area Management</i> : drop internal fences to form conservancies and create larger areas for Giraffe.	-	Anecdotal	-	-	-
2	5.2 <i>Policies & Regulations</i> : development of a Biodiversity Management Plan to manage translocations and introductions.	-	Anecdotal	-	-	-
3	5.1.2 <i>Legislation</i> : pending taxonomic resolution, devise and enforce regulations to prevent subspecies mixing between countries.	-	Anecdotal	-	-	-

management decisions. Whether or not any progeny have been produced, and whether or not any such offspring might be fertile is unknown. A similar situation exists on game farms and ranches. Habitat analysis examining the sustainability of the resource base, along with the animals on the property, is rarely performed prior to movement of animals.

Current habitat trend: Stable. The Savannah Biome is not threatened in South Africa (Driver et al. 2012), and the expansion of wildlife ranches and private protected areas is acting to increase area of occupancy for Giraffes. The wildlife ranching industry of southern Africa has expanded significantly over the past few decades and has become a lucrative enterprise, driven mainly by live animal sales, trophy hunting and sport hunting (Damm 2005; Bothma & von Bach 2010). However, due to many game ranches being small areas, habitat quality for Giraffe may be compromised and fragmentation of habitat increased. It is proposed that before any game ranch can own Giraffe, they should undertake a habitat analysis to provide recommendations regarding the viability of the ranch (or similar) and/or the introduction of the species.

Conservation

This species occurs in many protected areas within the assessment region of South Africa and, given that it is an attractive ecotourism and trophy-hunting animal, the private sector will continue to stock, trade and increase their numbers. Private landowners should be encouraged to form conservancies (by removing internal fences and increasing the overall area available to Giraffes) to reduce the effects of habitat fragmentation and reduce habitat degradation from overstocking this species. Unfortunately, little is known regarding the minimum resource (and space) requirements for Giraffe subpopulations to function sufficiently without support and thus, currently, law officials cannot enforce regulations regarding habitat requirements. Defining the home range requirements of Giraffe within conservation areas might provide the necessary information regarding the requirements for Giraffe to be self-sustaining outside protected areas. Determination of seasonal variation in home range can assist game managers and nature conservation officials to make informed decisions regarding the well-being of Giraffe during critical periods. Little exists in the literature on Giraffe spatial ecology (in fenced-off game reserves and game ranches) such as daily distances, home ranges and the influence temperature, rainfall and altitude might have on Giraffe. For this reason, more research is required on these topics.

Regulations should be put in place to prevent the importation and exportation of incongruent ecotypes or subspecies if the taxonomic resolution of such subspecies can be confirmed. Similarly, a large scale 'Stud Book' for Giraffe in South Africa could be established that would help to prevent inbreeding. These interventions could be tied together by the drafting and adoption of a Biodiversity Management Plan for Giraffe.

Recommendations for land managers and practitioners:

- Management guidelines are currently being drafted by Deacon (2015) to advise reserves and private Giraffe owners on how to best manage the Giraffe within natural habitats without degrading or affecting other species negatively.
- Mixing Giraffe ecotypes and subspecies through translocation and hybridisation should be avoided. Legislation should be in place to prevent the importation or exportation of incongruent Giraffe populations.

Research priorities:

- Research providing a better estimate of Giraffe numbers on private land and the effects of this subspecies being extra-liminally introduced outside the natural distribution (including impacts on vegetation and ecosystem processes) is necessary to inform management decisions.
- Molecular and genetic research is needed to resolve subspecies status, and delineate their geographical distributions, and thus inform legislation regarding translocation.

See Bercovitch and Deacon (2015) for further research topics.

Encouraged citizen actions:

- Upload sightings of Giraffe outside protected areas to GiraffeSpotter (www.giraffespotter.org): a citizen scientist tool of the Giraffe Conservation Foundation which seeks to engage people to build a greater awareness about Giraffe distribution and status across Africa. These data also help the IUCN Giraffe and Okapi Specialist Group and the Giraffe Conservation Foundation to perform Red List assessments.
- Participate in the World Giraffe Day – 21 June – by creating awareness and raising support for Giraffe conservation.

Data Sources and Quality

Table 7. Information and interpretation qualifiers for the South African Giraffe (*Giraffa camelopardalis giraffa*) assessment

Data sources	Field study (unpublished)
Data quality (max)	Estimated
Data quality (min)	Estimated
Uncertainty resolution	Maximum/minimum values
Risk tolerance	Evidentiary

- Invite lecturers and researchers working on Giraffe projects to survey private land.
- Drop fences to form conservancies.
- Landowners are encouraged to provide detailed information on their Giraffe herds to the Giraffe Conservation Forum.

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Assessors and Reviewers

Francois Deacon^{1†}, Dan Parker²

¹University of the Free State, ²Rhodes University

[†]IUCN SSC Giraffe & Okapi Specialist Group

Contributors

Andy Tutchings¹, Andri Marais¹, Julian Fennessy^{1†}, Jeanetta Selier², Claire Relton³, Matthew Child³

¹Giraffe Conservation International, ²South African National Biodiversity Institute, ³Endangered Wildlife Trust

[†]IUCN SSC Giraffe & Okapi Specialist Group

Details of the methods used to make this assessment can be found in *Mammal Red List 2016: Introduction and Methodology*.