

The South African giraffe *Giraffa camelopardalis giraffa*: a conservation success story

FRANCOIS DEACON and ANDY TUTCHINGS

Abstract Across Africa the majority of giraffe species and subspecies are in decline, whereas the South African giraffe *Giraffa camelopardalis giraffa* remains numerous and widespread throughout southern Africa. By 2013 the number of giraffes in South Africa's Kruger National Park had increased by c. 150% compared to 1979 estimates. An even greater increase occurred on many of the estimated 12,000 privately owned game ranches, indicating that private ownership can help to conserve this subspecies. The estimated total population size in South Africa is 21,053–26,919. The challenge now is to implement monitoring and surveillance of *G. camelopardalis giraffa* as a conservation priority and to introduce sustainable practices among private owners to increase numbers and genetic variation within in-country subspecies.

Keywords Conservation, ecotourism, *Giraffa camelopardalis giraffa*, giraffe, management, South Africa, sustainable ownership, translocation

The discussion around the classification of giraffe species and the separation of subspecies is ongoing (Fennessy et al., 2016; Bercovitch et al., 2017). The South African giraffe has been classified as *G. camelopardalis giraffa*, *G. camelopardalis capensis* and *G. camelopardalis wardi*. Here we refer to the subspecies as *G. camelopardalis giraffa*, adopting the widely accepted nomenclature and taxonomy that recognizes nine subspecies (Brown et al., 2007; Dagg, 2014). We examine the status of the South African giraffe in private and public reserves, and National Parks and Provincial Nature Reserves, and the factors that have contributed to an increase in the population of this subspecies.

The current range of the South African giraffe is shown in Fig. 1. Within South Africa the subspecies' preferred natural habitat is predominantly the savannah/woodland areas of Limpopo Province, the lowveld areas of Mpumalanga Province, northern sections of North West Province, and the north-east of Northern Cape Province. The natural distribution of the subspecies also includes sections along both sides of the Mozambique/South Africa border north of Swaziland, the South Africa/Zimbabwe border and the

South Africa/Botswana border along the Limpopo River (Deacon & Parker, 2016). We consider the giraffes residing in the Kgalagadi Transfrontier Park to be an extralimital species, given the lack of data on whether there has been interbreeding between the subspecies *G. camelopardalis angolensis* and *G. camelopardalis giraffa* (Kruger, 1994; Nico van der Walt, pers. comm.), and therefore this population was omitted from our estimates.

In 1898 the Sabi Game Reserve, which later developed into Kruger National Park, was estimated to have a population of < 30 giraffes (Koedoe, 1996). By 1938 the Park's giraffe population had increased to 200 individuals, reaching 3,300 by the late 1960s, and in 1979 the Park's population was estimated to comprise c. 5,000 individuals, with an estimated 8,000 within the whole country by the beginning of the 21st century (Fennessy, 2009).

A drastic decline in wildlife across South Africa as a result of European colonization and intensive hunting (Selous, 1908) prompted the establishment of National Parks and Reserves during 1926–1937 (National Agricultural Marketing Council, 2006; Carruthers, 2008). As the idea that wildlife should be researched began to take hold in the middle of the 20th century (Kingdon, 1988), as did the idea that wildlife ranching could provide as productive a livelihood as domestic animal ranching (Dasmann & Mossman, 1960; Carruthers, 2008; Tutchings & Deacon, 2016). Since the 1960s wildlife numbers on commercial farms have continued to rise, as has their economic value (Smit, 2006; Carruthers, 2008). In the early 1980s there were c. 250 privately owned giraffes in South Africa, but following their introduction into numerous private and provincial game reserves (reserves managed by governmental nature conservation authorities; Theron, 2005) it is now estimated there are giraffes on most of South Africa's estimated 12,000 game farms and ranches (WRSA, 2014). Populations comprise 1–250 individuals, with a mean of 30 per property stocking giraffes (M. Child, unpubl. data).

To assess the number of *G. camelopardalis giraffa* occurring in South Africa, we collected data during 2014–2016 by liaising with the managers/owners of the various private reserves, official Provincial Nature Reserves and National Parks. A modified method based on the IUCN Red List Categories and Criteria version 3.1 (IUCN, 2001) was used to calculate the Extent of Occurrence (EOO), defined as 'the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy' (IUCN, 1994). Using

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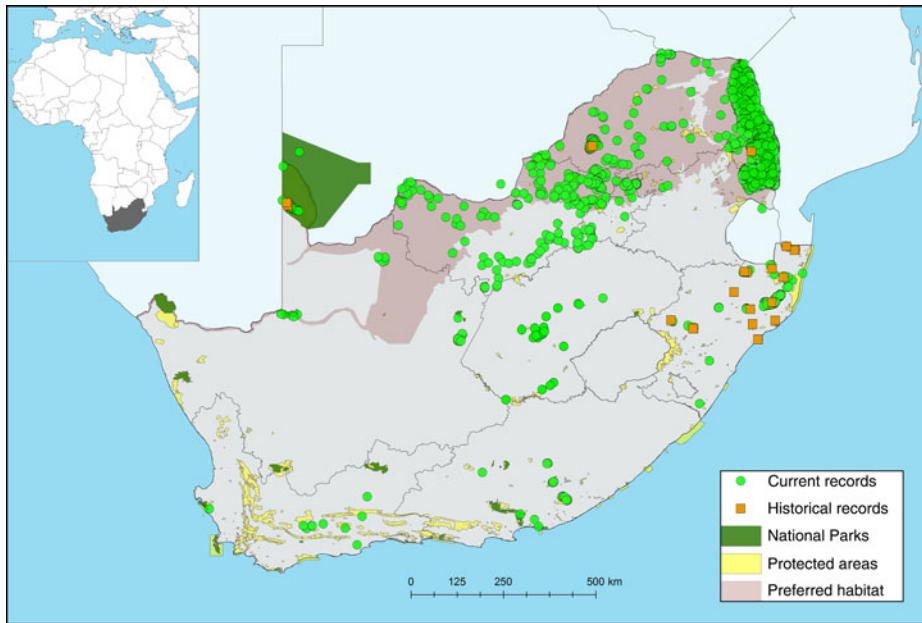


FIG. 1 Current and historical records of the South African giraffe *Giraffa camelopardalis giraffa*. Current numbers include private game farms, private nature reserves, Provincial Nature Reserves and National Parks, totalling 26,919–30,368 individuals.

TABLE 1 Numbers of South African giraffes *Giraffa camelopardalis giraffa* as of 2016 on private farms and/or ranches in South Africa (modified from Deacon & Parker, 2016), by province, with number of farms registered with Wildlife Ranching South Africa (WRSA), number of responses (% response rate) and mean number of giraffes per farm provided by owners, estimated total number of giraffes (extrapolated from the number of registered farms), Extent of Occurrence (EOO, see text for details of calculation), total number of giraffes on private farms based on the EOO within each province, and number of giraffes in governmental Provincial Nature Reserves.

Province	No. of farms registered with WRSA	No. of responses (% response rate)	Mean no. of giraffes per farm	Estimated total number of giraffes (based on responses)	EOO (% of Province)	No. of giraffes (based on EOO)	No. of giraffes in Provincial Nature Reserves
Gauteng	90	19 (21)	5	450	50	225	15
Limpopo	870	173 (20)	10	8,700	100	8,700	815
Mpumalanga	80	13 (16)	6	480	35	168	339
KwaZulu-Natal							1,593
Free State							61
Eastern Cape							458
Northern Cape	105	10 (10)	5	525	50	263	
Northwest	238	26 (11)	8	1904	15	286	500
<i>Total</i>	1,383	241		12,059		9,642	3,781

the range map (Fig. 1) as a baseline, the EOO for each district was considered to be the proportion of land within the district boundaries that encompassed the natural habitat of *G. camelopardalis giraffa*. We used the counts provided by ranch owners/managers to estimate the number of giraffes on each farm within a district. Ranch and reserve owners who provided census numbers conduct annual game counts via helicopter, fixed-wing aircraft or repeatable drive counts as part of their sustainable game ranching practice, to stock the farm appropriately according to its carrying capacity (Deacon et al., 2016, unpubl. data). We used the EOO to calculate the approximate number of giraffes on game ranches and farms in each district and within the natural habitat of the subspecies. Based on the EOO we estimated there are

9,642 South African giraffes occurring on privately owned game farms or ranches that are registered with the national wildlife ranching organization (Wildlife Ranching South Africa), and an additional 3,781 in Provincial Nature Reserves.

We made an alternative estimate of the number of privately owned giraffes by multiplying the number of registered farms by the mean number of giraffes per farm, as provided in the farmers' responses (Table 1). The result (12,059) is higher than that estimated from the EOO. Combining these two alternative estimates with the numbers in South Africa's National Parks (Table 2) yields a current population estimate of 21,053–24,502 (based on the EOO) or 23,470–26,919 (based on farmers' responses)

TABLE 2 Numbers of *G. camelopardalis giraffa* in South African National Parks as of 2013 (Ferreira et al., 2013).

Province	National Park	No. of giraffes
Northern Cape	Augrabies Fall	36
	Mokala	57
Mpumalanga	Kruger	7,427–10,876
Limpopo	Mapungubwe	60
	Marakele	50
<i>Total</i>		7,630–11,079

G. camelopardalis giraffa in South Africa, with approximately half the estimated population on privately owned land.

Both the genetic purity and the genetic diversity of the South African giraffe are of concern. The unrestricted exchange of giraffes by non-state entities could result in the hybridization of the subspecies where extralimital *G. camelopardalis angolensis* are, or have been, exposed to populations of the endemic *G. camelopardalis giraffa*, such as in Kgalagadi Transfrontier Park. Therefore the monitoring of giraffe subpopulations and regulation of associated translocations is imperative to maintain the purity and genetic diversity of the giraffe subspecies.

Globally *Giraffa camelopardalis* is categorized as Vulnerable on the IUCN Red List (Muller et al., 2016); however, with no immediate threats severe enough to cause a population decline in the foreseeable future, it has been recommended that the *G. camelopardalis giraffa* subspecies in South Africa remains categorized as Least Concern (Deacon & Parker, 2016; Deacon et al., 2016, unpubl. data). This recommendation was made in a detailed report by the IUCN Species Survival Commission Giraffe and Okapi Specialist Group (Muller et al., 2016). The threats, or lack thereof, were discussed in detail by the Endangered Wildlife Trust and are compiled in their status report (Deacon & Parker, 2016). The increase in private ownership of giraffes across South Africa and the economic interest in conserving a thriving, healthy and viable population, and by default a suitable environment for giraffes, have stimulated an increase in giraffe numbers. However, continued monitoring and surveillance of protocols and adherence to best practice are essential to retain a healthy subspecies population, especially as habitat loss and fragmentation, along with landscape changes, continue to reduce the number of suitable environments across the rest of the continent (Reid et al., 2004).

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Author contributions

FD collected the study data and liaised with all managers/owners of private ranches and National Parks. FD and AT jointly wrote the article.

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Biographical sketches

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