

Supporting Document

NDF Assessment for *Acinonyx jubatus* (cheetah)

Approved by the Scientific Authority of South Africa: (31 July 2020)

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Summary of findings

Acinonyx jubatus (cheetah) is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the export of specimens for primarily commercial purposes is therefore prohibited. In terms of Article III of the Convention, an export permit shall only be granted for a specimen of an Appendix I species when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species. Specimens of Appendix I species bred in captivity (as defined in Resolution Conf. 10.16 (Rev.)) for commercial purposes are deemed to be specimens of species included in Appendix II (Article VII) of CITES. In terms of Article IV of the Convention, an export permit shall only be granted for an Appendix II species when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species. This non-detriment finding (NDF) for *Acinonyx jubatus* (cheetah) was compiled through deliberations held at an expert workshop convened by the South African National Biodiversity Institute (SANBI) on 27 February 2019 (see list of workshop participants at the end of this document) and amended through further consultations with experts. A comprehensive review of the relevant scientific literature and reports (see reference list) ensured that all available information on the species was considered and captured in this document, current as of August 2025.

Cheetahs are long-lived and have low reproductive rates. Females may live up to 13 years, but male survival is considerably lower. Breeding begins at 29–36 months of age, and females typically produce a litter every 20 months, with litter size ranging from one to six cubs. Data from Kruger National Park (KNP) indicate a cub mortality rate of 50% within the first year. The reproductive rate is considered low owing to the time required for cubs to mature. However, higher reproductive rates are observed under certain conditions, such as in small fenced reserves with abundant prey and few competing predators. From a trophic perspective, cheetahs are hypercarnivores, preying exclusively on animals they can catch. Ecologically, they are considered habitat and prey generalists, surviving across a variety of landscapes, though preferring open habitats for hunting. They require extremely large home ranges, reflecting high dispersal ability, but are sensitive to human disturbance and generally absent from areas with significant human activity.

Historically, cheetahs were widely distributed throughout South Africa across all suitable habitats. Today, the free-ranging population is restricted to the far north, where 90,470–125,150 km² of suitable habitat remains, approximately 55,654 km² of which lies within formally protected areas. The wild cheetah population is estimated at 1,409 individuals (range: 1,166–1,742), divided into three groups according to land use and management intensity: (i) naturally occurring populations in large protected areas (KNP and Kgalagadi Transfrontier Park [KTP]); (ii) subpopulations reintroduced into small and medium-sized fenced reserves; and (iii) a naturally occurring free-ranging population outside protected areas. The KNP population is estimated at 412 individuals, while the South African KTP population is estimated at ~46 mature individuals (0.90 individuals/100 km²). Approximately 455 cheetahs occur in 67 small to medium-sized state and privately owned fenced reserves (end of 2023), collectively forming a single managed wild population or metapopulation. Reliable estimates for the free-ranging wild population remain unavailable. A current census indicates numbers are significantly lower than the earlier estimate of ~400 individuals, aligning instead with the estimate of Weise et al. (2017), who reported 132–263 individuals. Estimates for fenced reserves, KNP, and KTP are reasonably accurate, whereas figures for cheetahs outside protected areas are outdated and highly uncertain. The captive population is estimated to exceed 600 individuals across ~68 facilities in eight provinces.

There is little quantitative information on free-ranging population trends, though anecdotal evidence suggests decline, the extent of which is unknown. Between 2009 and 2012, numbers in fenced reserves declined due to cessation of translocations from the free-ranging population, predation by lions, and sales into captivity. Since 2013/14, however, numbers have increased following improved metapopulation management and stricter control of movements into captivity. Populations in large protected areas appear stable, and overall the national population is considered reduced but currently stable. The main threats to free-ranging cheetahs are persecution by landowners to prevent livestock or wildlife losses, and illegal capture for the captive trade. Other threats include snaring, habitat loss, and the spread of predator-proof fencing. For the metapopulation, the main threat is capture-related mortality during translocation. Although significant for the free-ranging population, threats to the managed metapopulation are considered limited and reversible.

Harvest of wild cheetahs is largely opportunistic or unselective, comprising lethal control of damage-causing animals (DCAs) and illegal capture for the live trade. Information on scale and trends is limited. By contrast, removals from the metapopulation are legal and aimed at generating conservation benefits and regulating surplus. A metapopulation management plan is in development to formalise these processes. Nationally, a Conservation Action Plan was adopted in 2009, and a Biodiversity Management Plan (BMP) is currently being developed under the National Environmental Management: Biodiversity Act (NEMBA) of 2004. South Africa does not maintain an export quota for cheetah hunting trophies, and trophy exports remain negligible. A population viability analysis (PVA) based on 2019–2023 data modelled sustainable offtake levels. Network analysis identified a core population of 49 connected reserves and 20 satellite reserves with no reproductive contribution. While satellite populations are projected to be non-viable without improved connectivity, the core population showed an extinction probability of <0.001 over 100 years. Recruitment rates indicated that a sustainable annual harvest of 65 cheetahs is possible for 2024/25, with recommended quotas of 22 females and 43 males, aligned with natural sex-biased dispersal. Most legal harvest occurs on private land, with lower levels on protected areas. Confidence in monitoring legal removals is high, though illegal harvest remains poorly monitored.

Between 2002 and 2023, 91% (1,270 animals) of cheetah exports were live individuals, the majority captive-bred and exported to zoos or breeding facilities. Main importers included China, UAE, USA, India, Great Britain, Australia, and Japan. Despite the difficulty in breeding cheetahs in captivity, an average of 80 live cheetahs were exported annually between 2002 and 2012. A 2014 audit of 13 breeding facilities highlighted weak controls, raising the risk of wild cheetahs entering captive facilities. In 2015, the Scientific Authority introduced stricter measures, including DNA verification and CITES registration requirements. These reduced exports from unregistered facilities, with South Africa's two CITES-registered breeding facilities subsequently dominating commercial exports. Offtakes, including DCAs and translocations, are recorded under provincial permit systems, though reporting on outcomes is inconsistent. All CITES exports are recorded nationally, and metapopulation removals are tracked by the Endangered Wildlife Trust. Illegal removals remain difficult to quantify.

Although removals from free-ranging populations once facilitated reintroductions, sufficient founder stock is now available from the metapopulation. Sustainable hunting of surplus adult males may offer future management benefits, though its effect on landowner tolerance remains unclear. Current harvest practices provide limited conservation incentives for landowners. Approximately 44.5% of the species' natural range (55,654 km²) lies within formally protected areas, where harvest is prohibited. Protection is assessed as moderately effective, with large protected areas such as KNP and KTP serving as key refuges despite occasional incursions. Harvest for export is restricted to surplus animals within the metapopulation and demonstrated sustainable levels, as shown by growth from 314 individuals in 2017 to 455 in 2023 despite 81 exports in that period. Provincial resource constraints, however, hamper effective enforcement of regulations.

In conclusion, the evidence considered in this NDF for *Acinonyx jubatus* (cheetah) demonstrates that the export of cheetah sourced from the metapopulation (CITES source code W) for reintroduction purposes poses a low risk to this species in South Africa and will not have a detrimental impact provided not more than 30 males and 15 females are removed per annum, thereby maintaining the average annual growth rate of the metapopulation at 0.135 (as established by a population viability analysis (PVA)). Surplus males can also be exported as hunting trophies provided the export threshold of 30 is not exceeded. Harvest from the free-ranging cheetah population will likely be detrimental, and therefore a zero-export quota for wild specimens sourced from the free-ranging population is recommended. The export of captive-bred specimens will not have a detrimental impact on the wild population, provided that all specimens are verified as captive-bred (as defined in Resolution Conf. 10.16 (Rev. CoP19)) prior

to export through DNA parentage analyses. All cheetah breeding facilities exporting internationally must be registered with the provincial Management Authority in compliance with the TOPS and CITES Regulations and must also meet the criteria developed by SANBI for cheetah breeding facilities. Adherence to these criteria will also ensure that the wellbeing (welfare) of cheetah in captive facilities is not compromised.

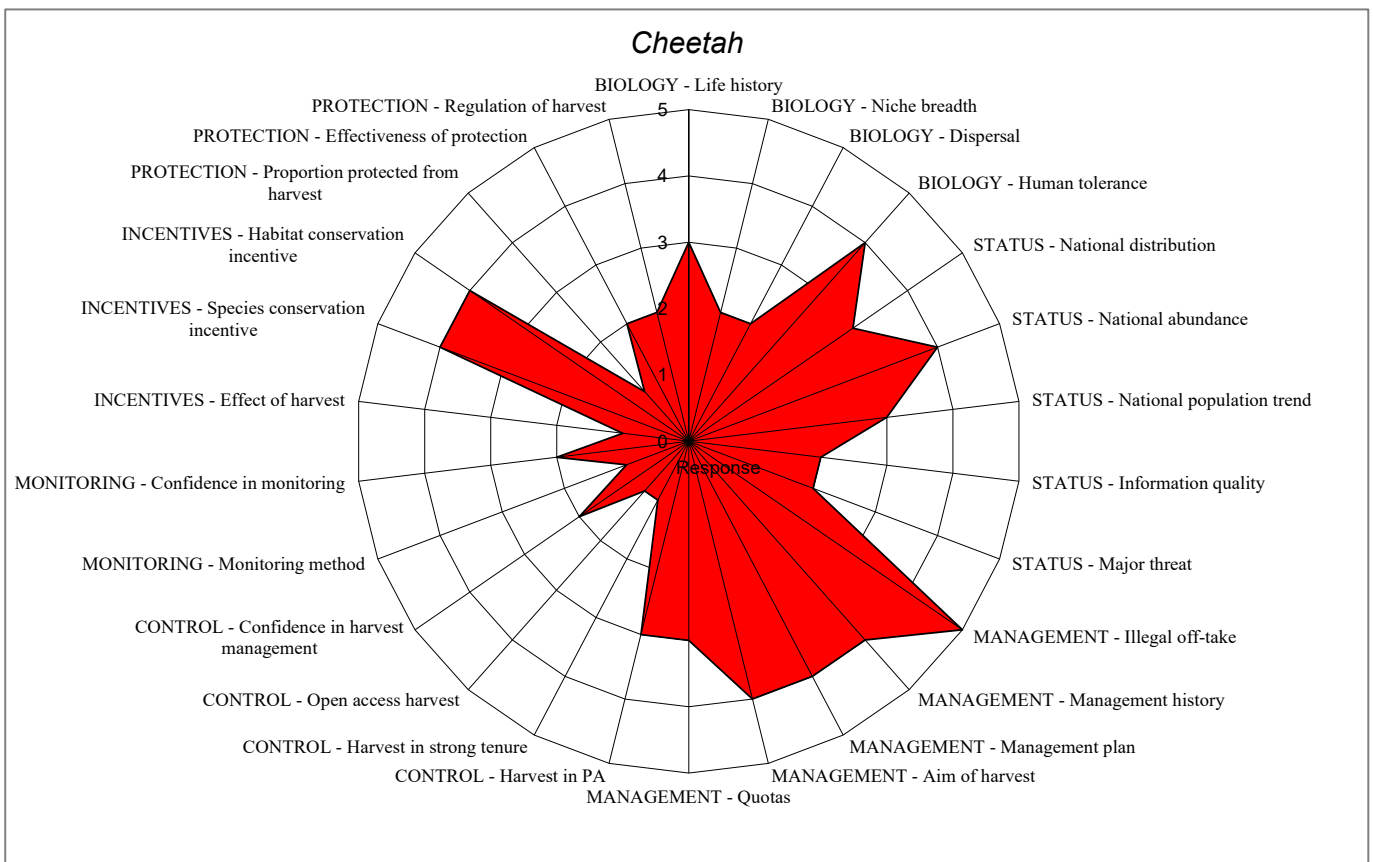


Figure 1: Radar chart summarizing the non-detriment finding (NDF) assessment undertaken for *Acinonyx jubatus* (cheetah) in South Africa in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The limited area shaded in the radar chart demonstrates an overall low risk to the species.

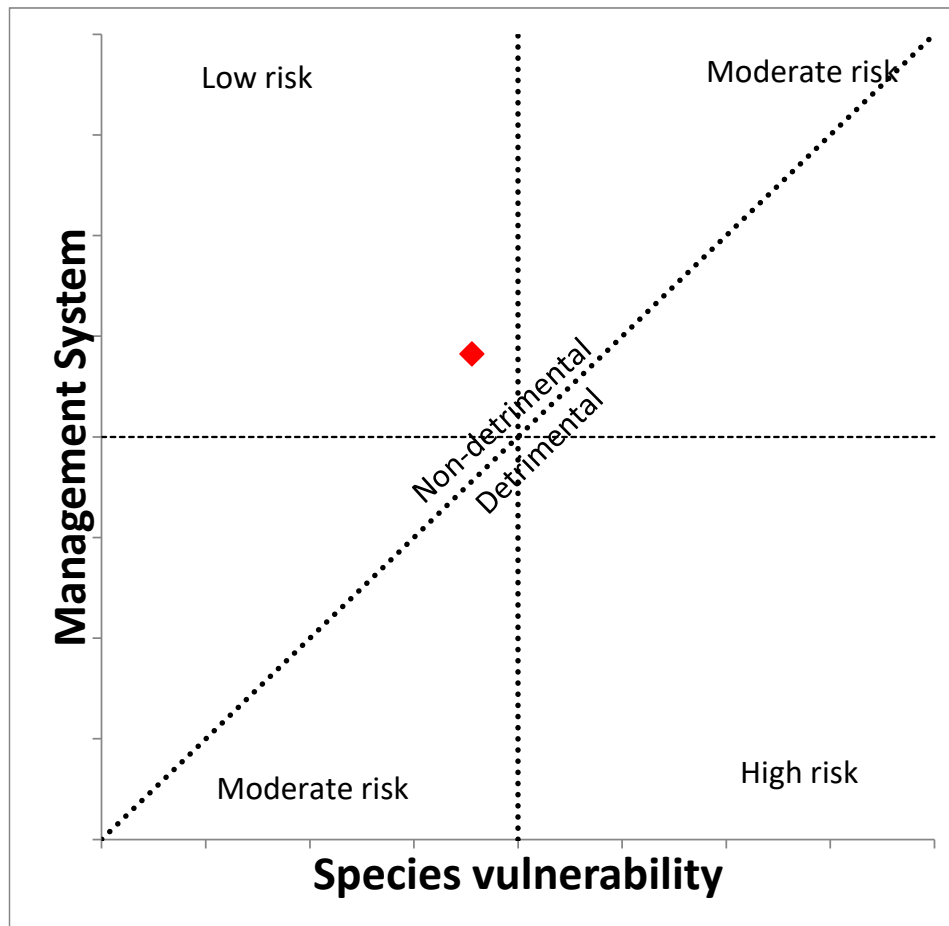


Figure 2: The level of risk of trading in *Acinonyx jubatus* (cheetah) by South Africa, as represented by the relationship between species vulnerability (biology and status) and the strength of the management system to which the species is subjected (harvest management, control, monitoring, incentives and protection). The figure demonstrates that the species is assessed as at a low risk, and that the current export from the captive-bred population and metapopulation (conservation purposes only) is not detrimental to the survival of the species in the wild.

Table 1: Detailed non-detriment finding (NDF) assessment for *Acinonyx jubatus* (cheetah) in South Africa, undertaken in accordance with the CITES NDF checklist. Scores assigned to each question are indicated (bold text in shaded blocks) along with detailed explanations/justifications where relevant. Higher scores are indicative of higher risks to the species.

Biological characteristics		
1. Life history: What is the species' life history?	High reproductive rate, long-lived	1
	High reproductive rate, short-lived	2
	Low reproductive rate, long-lived	3
	Low reproductive rate, short-lived	4
	Uncertain	5
Cheetahs are deemed to have a low reproductive rate due to the time it takes for cubs to mature, though they have the potential to display higher reproductive rates under certain conditions, including in small fenced reserves with ample prey populations, and particularly where competing predators are absent. Estimates from the Serengeti suggest that cheetahs commence breeding at the age of 29-36 months for males and 29 months for females (Laurenson, <i>et al.</i>, 1992; Kelly, <i>et al.</i>, 1998; Durant, <i>et al.</i>, 2004). However, estimates from Kgalagadi Transfrontier Park (KTP) suggest that cheetahs only commence breeding at an average age of 37.2±3.42 months, while in fenced reserves cheetah start breeding as early as 27.4 months (Bisset and Bernard, 2011; Mills & Mills, 2017). Litter size ranges from 1-6 cubs, but data from Kruger National Park (KNP) show a 50% mortality rate within the first 12 months (Broomhall, 2001). Studies in KTP found a mean litter size (on emergence) of 3.1±1.1, while within fenced reserves in South Africa the mean litter size was 4.0 (Bisset and Bernard, 2011; Mills & Mills, 2017). Females mate again within three weeks of losing a litter and conceive again within 18.7 (adult females) to 67.4 (young females) days (Laurenson, <i>et al.</i>, 1992). In the event of successfully rearing a litter, females often conceive again before the cubs have left, but don't give birth before the family splits (Laurenson, <i>et al.</i>, 1992; Laurenson, <i>et al.</i>, 1995). The birth interval between successfully reared litters is 15-24 months (Berry, <i>et al.</i>, 2002), with 23.4±3.91 months being the average for cheetahs in the southern Kalahari and 17.8 the average for cheetahs in fenced reserves (Bisset and Bernard, 2011). Cheetahs reach senescence by the age of 12 years, though reproduction generally ceases by 10-11 years (Berry, <i>et al.</i>, 2002). In the Serengeti, most males die or disperse before the age of seven, whereas females can live up to 13 years or more (Kelly, <i>et al.</i>, 1998). Similarly, Durant, <i>et al.</i>, (2004), stressed that male survival was much lower than that of females (7.8 years for males, c.f. 11.8 for females), though in this study dispersal and mortality could not be separated, and thus it is likely that male mortality was overestimated. In the South African cheetah metapopulation, survival rate to 18 months in reserves with lions and high densities of leopards and spotted hyenas has been recorded at 45.1%, versus 62.5% in reserves without lions and with lower densities of other predators. Birth frequencies tend to be higher in reserves with high predator density, but this only partially compensates for higher mortality. Life expectancy has been observed to be significantly lower in reserves with lions and high densities of leopards and spotted hyenas (36.3±2.7 months versus 58.7±5.5 months), though there was no significant difference observed in life expectancy between the sexes (Buk, 2019).		
2. Ecological adaptability: To what extent is the species adaptable (habitat, diet, environmental tolerance etc.)?	Extreme generalist	1
	Generalist	2
	Specialist	3
	Extreme specialist	4
	Uncertain	5
Historically cheetahs occurred widely in sub-Saharan Africa in most habitats, excluding true desert and rainforests (Estes 1991). In South Africa, cheetahs occur primarily in savannahs, a biome that covers approximately one third of the country (Low & Rebelo, 1998 in Marnewick <i>et al.</i>, 2007) and can exploit grasslands, woodlands and even the fringes of deserts (Skinner & Smithers, 1990). Research on reintroduced cheetahs in the Eastern Cape highlights the ability of cheetahs to hunt successfully in dense thicket vegetation (Bisset & Bernard, 2007), though they do prefer open habitat to hunt – data from KNP show that cheetah tend to select open habitats (Broomhall <i>et al.</i>, 2003). Increased bush encroachment thus may limit the hunting success of cheetah. From a trophic niche perspective, cheetahs can be considered a specialist in that they are hyper-carnivorous (i.e. they only eat prey that they can catch). The species is however considered a habitat and prey generalist. They are generally not limited by a particular habitat type for survival and are actually rather flexible in terms of their diet. Ninety percent of the cheetah's diet consists of small to medium-sized antelope species that are generally relatively abundant in fairly natural and protected areas. The recovery of the cheetah within the metapopulation has shown that once anthropogenic pressures are removed, the species has the ability to recover relatively quickly. In addition, Annear <i>et al.</i>, (2025) showed that cheetah reproduction in seasonal environments is driven by the availability of neonate and juvenile prey, with conception and cub independence aligning with peaks in easy-to-catch neonates, while lactation coincides with the availability of larger juveniles. Although cheetahs are often viewed as specialized predators with limited ability		

to adapt to local environmental conditions, their findings suggest that cheetah can adjust reproductive patterns in response to prey availability (Annear <i>et al.</i> , 2025).		
3. Dispersal efficiency: How efficient is the species' dispersal mechanism at key life stages?	Very good	1
	Good	2
	Medium	3
	Poor	4
	Uncertain	5
Cheetahs use extremely large home ranges, indicating that their ability to disperse is reasonably good. In KNP, males range between 126 km ² and 191 km ² , while the average female home range is 171 km ² (Broomhall <i>et al.</i> , 2003). On South African game ranches, male home ranges (95% utilisation distribution) range from 122 km ² to 607 km ² , while female home ranges range from 15 km ² to 703 km ² (Marnewick & Somers, 2015). There are however few examples of cheetahs successfully re-colonizing areas that they have been extirpated from. The increase in predator-proof fencing across the cheetah range in South Africa may restrict their dispersal.		
4. Interaction with humans: Is the species tolerant to human activity other than harvest?	No interaction	1
	Pest / Commensal	2
	Tolerant	3
	Sensitive	4
	Uncertain	5
Cheetahs are sensitive to human disturbance and are generally absent from areas with significant human activity such as predator-proof fencing, changing land-use and road networks. They are seldom seen around communal land settlements. The current distribution of cheetahs in South Africa is much smaller than the historic range and is smaller than the ranges of more versatile and/or smaller predator species such as black-backed jackals (<i>Canis mesomelas</i>), caracals (<i>Caracal caracal</i>) and leopards (<i>Panthera pardus</i>). However, cheetahs have managed to persist in the northern parts of the country despite intensive persecution, and their distribution is wider than larger and/or more sensitive predator species such as spotted hyaenas (<i>Crocuta crocuta</i>), lions (<i>Panthera leo</i>) and African wild dogs (<i>Lycaon pictus</i>) (Friedmann & Daly, 2004).		
National status		
5. National distribution: How is the species distributed nationally?	Widespread, contiguous in country	1
	Widespread, fragmented in country	2
	Restricted and fragmented	3
	Localized	4
	Uncertain	5
In South Africa, cheetahs (<i>Acinonyx jubatus</i>) were historically widely distributed throughout the country in all suitable habitats (Marnewick <i>et al.</i> , 2007) but have been extirpated from over c. 90% of their former distribution range and currently occur only along the northern and western borders of the country and in several isolated protected areas and game reserves. An assessment by Marnewick (2015) concluded that only 90,470 km ² of land in South Africa was suitable cheetah habitat (the percentage of that habitat represented within State protected areas was not determined) (Fig. 3). While the KNP protects a large portion of suitable cheetah habitat in South Africa, the most suitable habitat is in the Limpopo Province, (an area of 51,289 km ² or approximately 56% of all suitable cheetah habitat; Marnewick, 2015) (Fig. 3). In these areas, however various source-sink dynamics are playing out. Lowveld and KwaZulu-Natal reserves are mostly sink reserves due to high predator densities, while the Kalahari and Southern Cape act as source reserves. The Waterberg cluster contains both sink and source reserves, with populations balancing and shifting between the two (Buk <i>et al.</i> , 2018). In the west, along the aridity gradient, the KTP protects an important trans-national cheetah population (Mills and Mills, 2017), while there are free roamers on farmlands that follow the northern border of South Africa (Marnewick <i>et al.</i> , 2007). Small fenced reserves across all nine provinces provide habitat for a managed metapopulation, with a total area size of between 11,721 km ² and 13,000 km ² (Wiese <i>et al.</i> , 2017).		
Cheetahs in South Africa live across a continuum of captive to completely free-ranging conditions, small confined to large expansive areas, inclusive of communal, private, and state land. Historically, the population was regarded as three groups assigned by differences in management intensity and land uses:		
1. Free-roaming animals (population size estimated with low confidence at 400 individuals) roaming landscapes outside fenced protected areas, mostly on ranch land, where they encounter livestock which they may at times predate leading to retaliation killing by land- or livestock owners and/or live removals (hereafter "free-roamers"). Weise <i>et al.</i> , (2017) estimated that free-roaming cheetahs occur across 94,764 km ² or 7% of South Africa and is a shared population with Botswana, Namibia and Zimbabwe;		

2. Wild cheetahs frequenting large protected areas of the KNP (population size assessed with high confidence at 116 mature individuals (Fouche *et al.*, in prep) and KTP (population size estimated with medium confidence at 80 individuals) where they primarily feed on wildlife, but do occasionally encounter threats such as snaring (hereafter 'wild'); and
3. Free-ranging animals occurring in a network of fenced reserves into which cheetahs have been reintroduced and where they encounter restrictions on dispersal and competition with other predators while feeding on wildlife (hereafter 'manage wild'). Management of these reserves as a single metapopulation seek to overcome challenges faced such as restrictions on dispersal and risks of managing small populations in isolation. Assisted dispersals seek to overcome movement constraints (Buk *et al.*, 2018). At the end of 2023, there was 264 known adults, 51 subadults, and 140 dependent cubs in this population residing on 67 reserves across all nine provinces within South Africa providing habitat with a total area of approximately 15,114 km². Competing predators account for 53.2% of cheetah mortalities in these reserves, whilst anthropogenic threats account for 26.6% of mortality (Buk *et al.*, 2018).

Cheetahs in South Africa thus occur in a fragmented landscape under a range of conditions from free-ranging unconstrained conditions to those that have been reintroduced into small and medium-sized fenced reserves to a large captive population (van der Merwe *et al.*, 2016; Buk *et al.*, 2018). Cheetah populations in fenced reserves have been managed as a metapopulation since 2011 (Buk *et al.*, 2018). The main goal of reintroducing cheetahs into fenced reserves was to support photographic tourism (Marnewick *et al.*, 2007).

The greater part of the South African cheetah population's distribution occurs outside of protected areas, the extent of which may have increased during the 1990s due to the shift from livestock to wildlife ranching and an increased tolerance to cheetahs among wildlife ranchers (van der Merwe *et al.*, 2016). Cheetah sightings are now a regular occurrence in the former Transvaal Province (notably in North West Province and Limpopo Province), where such sightings were rare during the 1960s and 1970s. Even so, cheetah range remains restricted to the far northern reaches of the country, and within that distribution, cheetah occurrence is likely to be patchy due to human habitation and habitat modification. The temporary shift in the game ranching industry to high-value species and colour morphs in 2018 may have decreased tolerance to cheetahs (and other carnivores) among pure game farmers and so increased the levels of retaliatory killing (Thorn, *et al.*, 2013; Pitman *et al.*, 2016). An increase in predator proof fencing, associated with the intensification of game farming, have likely negatively affected the movement and distribution of cheetah throughout their distribution range. However, more recently, data from the Eastern Cape, show a reversal in the trend of intensification of game ranches to again more extensive systems and the establishment of conservancies which is likely to benefit cheetah.

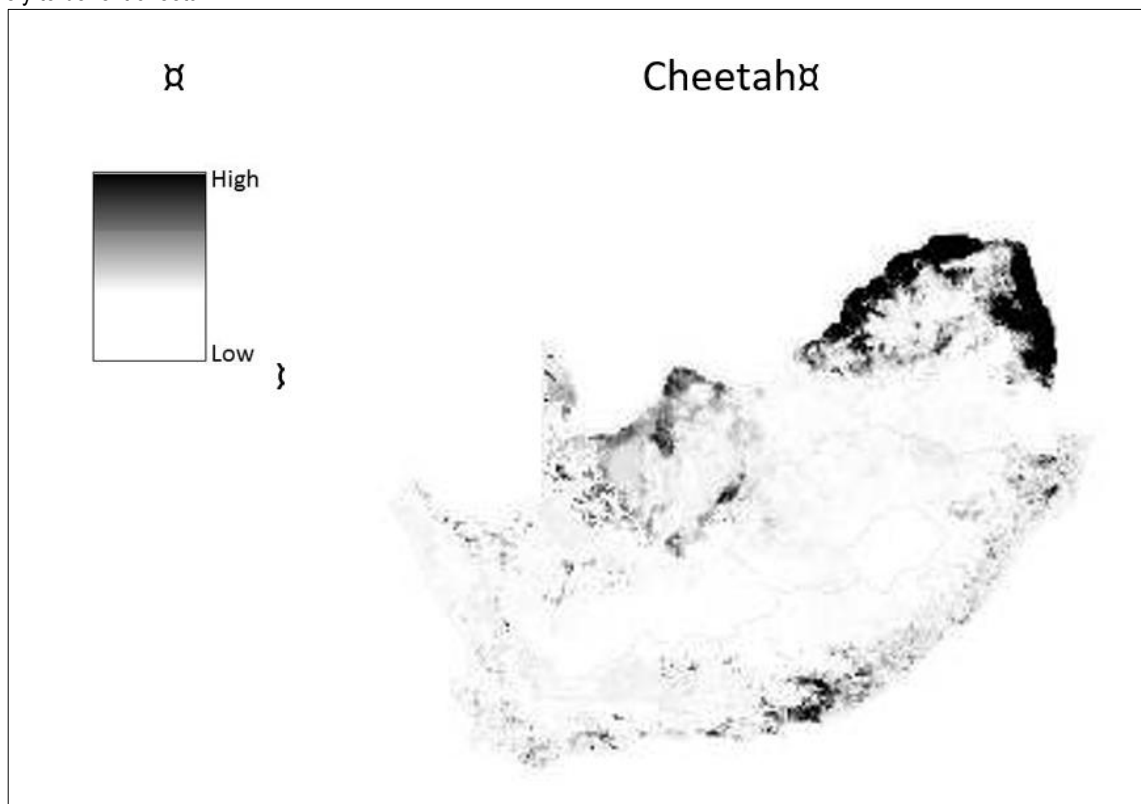


Figure 3: Habitat suitability maps produced from MaxEnt modelling for cheetahs in South Africa. Darker colours indicate more suitable habitat and lighter colours indicate less suitable habitat. (Source: Marnewick, 2015). Note, model parameters excluded data from reintroduced / metapopulation cheetahs.

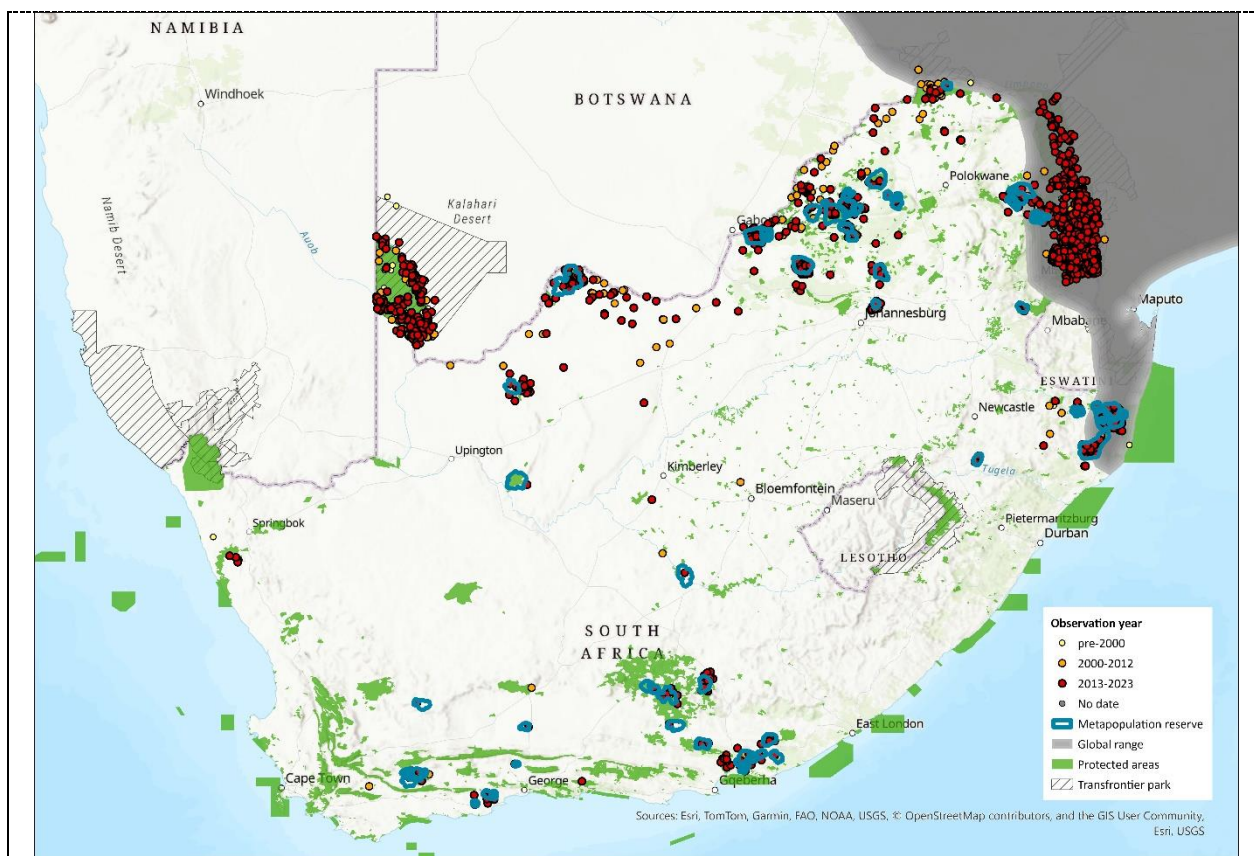


Figure 4: Distribution records for cheetah within South Africa, inclusive of reintroduced populations. Source: Van der Merwe, *et al.*, (2016).

6. National abundance: What is the abundance nationally?

Very abundant	1
Common	2
Uncommon	3
Rare	4
Uncertain	5

Currently, 61% (4,300 mature individuals) of the estimated global cheetah population of 7,100 adult cheetahs occurs in southern Africa, as opposed to approximately 2,300 adult cheetahs (32%) in eastern Africa (Durant, *et al.*, 2017).

Cheetahs are rare within South Africa. No reliable estimates are available for the free-ranging wild cheetah population, however Van der Merwe *et al.*, (2016) estimate the free-roaming population between 400 individuals. Using verifiable observations, Weise *et al.*, (2017) confirmed that free-roaming cheetahs occurred across approximately 28,900 km² in South Africa between 2010 and 2016, and likely across 94,100 km² of suitable free-range habitat. The free-roaming cheetah population occurs at medium to high densities of between 0.21 – 2.10 individuals/100km². Applying mean inferred densities from study sites across different southern African biomes to verified free-roaming cheetah occurrence in South Africa, the population may number approximately 196 adult individuals (excluding the Kruger National Park and Kgalagadi Transfrontier Park and the managed metapopulation), with an interpolated minimum of 132 animals and a maximum of 263 animals (Weise *et al.*, 2017). A free-roaming cheetah census is currently under way to obtain a more accurate population estimate (Cilliers, D., pers. comms.).

Several estimates of the number of cheetahs in KNP have been published, including 219 (Pienaar 1963), 172 (Bowland & Mills 1994), and 103 (Kemp & Mills 2005). In 2009, a photographic survey using mark-recapture models, estimated the KNP cheetah population at 412 animals (329 – 495; SE 41.95) (Marnewick *et al.*, 2014). Spatially Explicit Mark-Recapture analyses have been used for photographic data obtained from tourist photographic surveys in Kruger National Park with the use of African Wild Book artificial intelligence (AI) to identify cheetahs. These studies resulted in a population estimate of approximately 116 adult cheetahs in Kruger National Park (Fouche, In prep). This is 296 individuals less than the estimates of Marnewick *et al.* (2014) obtained without the use of AI and using Program MARK. This is not thought to represent a genuine decline in cheetah numbers, but rather more accurate identification through the use of African Wild Book AI (Fouche, In prep).

Capture-mark-recapture surveys between 2006 and 2012 estimate the cheetah density within the South African portion of the KTP at 0.90 individuals/100km². On average 46±4.5 adult cheetahs were identified each year between 2006 and 2014, slightly lower than an earlier estimate that used tourist photographs (Mills & Mills, 2017). A total of 54 individual adult cheetah were identified during this 1-year survey between June 1998 and July 1999 (Knight, 1999).

Cheetahs have also been reintroduced into fenced reserves across South Africa including privately-owned reserves, provincial nature reserves and National Parks, comprising collectively 67 reserves over 15,114 km², supporting 264 adult cheetahs (Brown *et al.*, 2024a). While these cheetahs are fenced and managed at a reserve level in terms of demographics, they are not captive, as they hunt, breed and utilize habitat and face a range of natural threats that are dependent on the individual reserve. Genetic studies show that these cheetahs are genetically similar to the free-roaming population from where they mostly originated (Magliolo *et al.*, 2023). Under managed conditions, cheetah densities on small fenced reserves range from 0.11-15.0 individuals per 100 km² (Wiese *et al.*, 2017).

The total known cheetah population (including an estimate for the free-ranging population) is thus estimated at 1,409 (1,166 – 1,742) animals, of which approximately 553 (39%) individuals are strictly protected within four national parks and three provincial reserves (Table 2).

Table 2: Estimated population (mature individuals) numbers for cheetah (*Acinonyx jubatus*) in South Africa (end of 2023)

Geographic location	Area of location	Low estimate	High estimate	Best estimate	Source	Data quality
Free-roaming / outside protected areas	28,900 km ²	132	263	196	Weise <i>et al.</i> , 2017	Inferred
Kruger National Park	19,623 km ² (TFCA: 100 000 km ²)			116	Fouche, in prep	Photographic mark-recapture
Free-roaming / fenced reserves	15,114 km ²			455	Brown <i>et al.</i> , 2024	Individual monitoring
Kgalagadi Transfrontier Park (SA only)	12,600 km ² (TFCA: 38,000 km ²)			89	Van der Merwe <i>et al.</i> , 2016	Poor
TOTAL				856		

According to data obtained from provincial Management Authorities, there are currently 68 cheetah breeding facilities of which 47 are registered in accordance with the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) Threatened or Protected Species Regulations (TOPS Regulations) and only two (Hoedspruit Endangered Species Centre and De Wildt Cheetah Breeding Centre) are registered in accordance with Resolution Conf. 12.10 (Rev. CoP15) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Table 3). While the number of captive facilities with cheetah have remained the same since 2014, the number of facilities that trade and breed cheetah locally have almost doubled over the same time period (Table 3). The captive cheetah population in South Africa is estimated to number more than 600 cheetahs.

Table 3: A comparison of the number of cheetah breeding facilities within each of the provinces and the legal statuses of these facilities between 2014 and 2018. Data provided by the respective provincial Management Authorities.

	Eastern Cape		Free State		Gauteng		KwaZulu		Limpopo		Mpumalanga		North West		Northern Cape		Western Cape		Comparison	
	2014	2018	2014	2018	2014	2018	2014	2018	2014	2018	2014	2018	2014	2018	2014	2018	2014	2018	2014	2018
No of captive facilities with cheetahs	4	3	27	18	8	8	2	2	7	13	3	0	12	12	0		6	12	69	68
No of these facilities that breed & trade cheetahs locally	2	2	4	10	0	1	2	1	4	11	1	0	6	12	0		0	0	19	37
No of these facilities that breed & trade cheetahs internationally	0	0	2	2	8	0	0	0	3	9	0	0	6	4	0		0	0	19	15
No of ToPS registered cheetah breeding facilities	2	2	27	18	8	4	0	1	4	10	0	0	12	12	0		0	0	53	47
No of CITES registered cheetah breeding facilities	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0		0	0	2	2

Increasing

1

7. National population trend: What is the recent national population trend?	Stable	2
	Reduced, but stable	3
	Reduced and still decreasing	4
	Uncertain	5

While population trends of naturally occurring populations in large protected areas, such as KNP and KTP, are considered stable, the population trend for the free-ranging wild population is unknown. Anecdotal data suggest a likely decline in the free-ranging population, but the extent of the decline is unknown. A 20% reduction in the range of the free-ranging population has been suggested based on the fact that cheetah has disappeared from the Lowveld as well as parts of the Northern Cape (Van Zyl's Rus area). An increase in predator proof fencing, associated with the intensification of game farming, has further negatively affected the movement and distribution of cheetah throughout their distribution range.

Cheetah populations in fenced reserves initially increased due to successful reintroductions and breeding. However, between 2009 and 2012 the cheetah population in fenced reserves was in decline, mostly due to a cessation in the input of animals sourced from the free-ranging population, the killing of cheetahs in fenced areas by lions, or cheetahs being sold into captivity. Sourcing of free-ranging cheetah for the metapopulation ceased in 2009 mainly due to concerns that the 157 recorded removals in addition to reported killings of cheetahs in response to conflict, could affect the long-term survival of South Africa's free-ranging cheetah population, and create a sink on Botswana's cheetah population (Lindsey *et al.*, 2009). The cheetah metapopulation has since recovered after management of the metapopulation was improved and movements to captivity ceased, increasing from 217 individuals including dependent cubs in December 2012 to 328 in 2018 (Figure 5), and to 491 individuals at the end of 2021 (Figure 6). There is a high confidence in the latest estimates as they are obtained through intensive monitoring and counts. (In most small and medium sized reserves, all individual animals are known.)

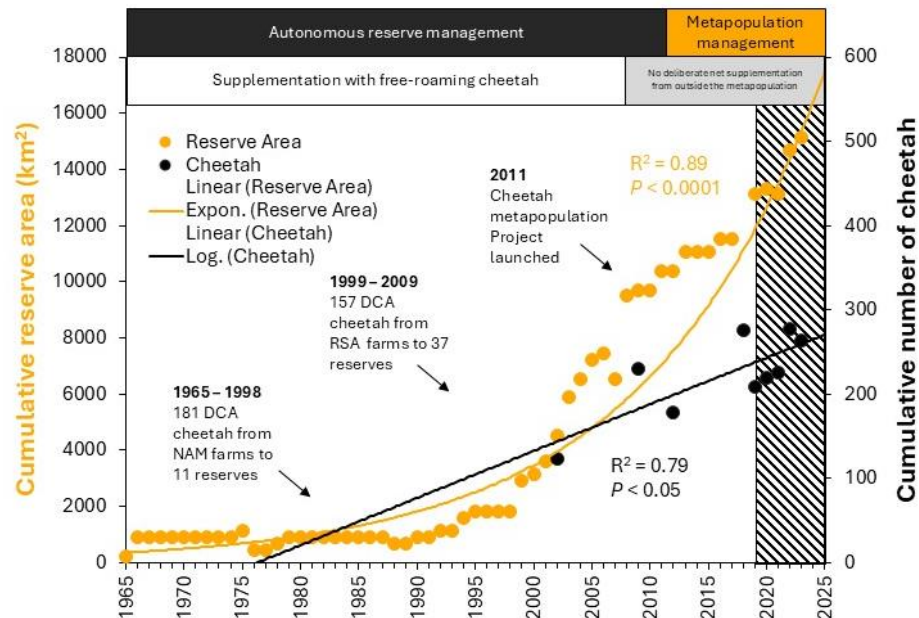


Figure 5: Total number of cheetahs and cumulative reserve area in South Africa's fenced reserves and the concurrent cheetah management regimes from 1965 to 2025. Figure obtained from Brown *et al.*, (2024a).

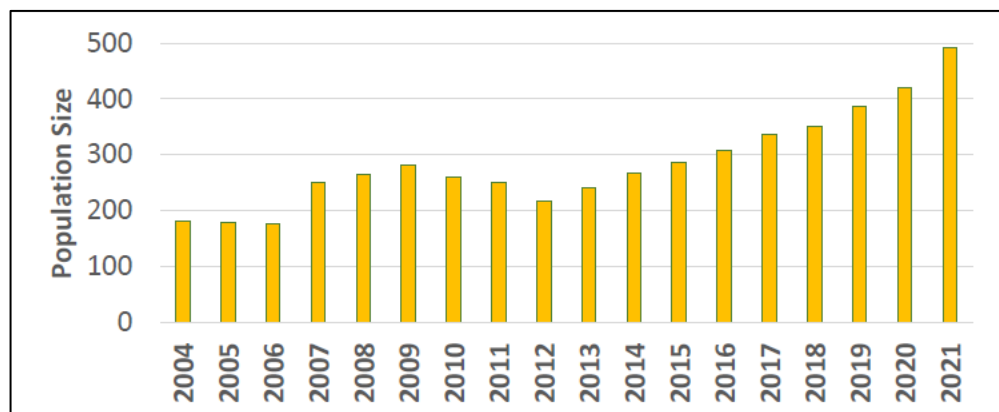


Figure 6: Trends in the cheetah metapopulation within game reserves in South Africa from 2004 to 2021 (van der Merwe, Buk & Naude, 2022).

8. Quality of information: What type of information is available to describe abundance and trend in the national population?	Quantitative data, recent	1
	Good local knowledge	2
	Quantitative data, outdated	3
	Anecdotal information	4
	None	5
Population estimates for KNP and KTP are considered accurate as they are based on detailed photographic surveys. All individuals in the small and medium-sized reserves are known and regularly monitored where possible by reserve staff and overarching by EWT, Ashia Cheetah Conservation and TMI. Since 2024, SANBI collates data from provincial conservation authorities and NGOs on an annual basis and maintains a database of all cheetah populations within South Africa. In addition, SANBI is currently in the process of developing a national online species population database to improve on the collation and accessibility of data. Outside of protected areas, a reasonable estimation of cheetah distribution has been obtained through questionnaire surveys, and the collation of sighting reports and damage causing animal (DCA) permit applications (Marnewick <i>et al.</i> , 2007). However, confidence in the estimates of the number of free-ranging wild cheetahs (and of trends in numbers) outside of protected areas is low.		
9. Major threats: What major threat is the species facing (underline following: overuse/ habitat loss and alteration/ invasive species/ other:) and how severe is it?	None	1
	Limited/Reversible	2
	Substantial	3
	Severe/Irreversible	4
	Uncertain	5
Major threats to cheetah in South Africa include conflict-related persecution, snaring and road mortalities (Marnewick <i>et al.</i> , 2025). However, data on the scale of these threats are sparse. Persecution is among the leading world-wide threats to large predators (Treves & Karanth, 2003; Graham <i>et al.</i> , 2005; Inskip & Zimmermann, 2009). Surveys undertaken in Limpopo indicated that African wild dogs are the least tolerated predators followed by cheetahs, although these species were only blamed for 6% and 3% of reported kills respectively (Thorn <i>et al.</i> , 2013). Thorn, <i>et al.</i> , (2012) found that farmers in North West Province killed 0.3 cheetahs/100 km ² per year, resulting in estimated annual provincial removals of 137 cheetahs, approximately 34% of the estimated free-ranging cheetahs outside of protected areas (Lindsey <i>et al.</i> , 2009). From 2003 to 2009, four out of seven collared cheetahs were illegally killed by farmers within Limpopo (Marnewick & Somers, 2015). Data reported from provinces are however inconsistent with these findings and show that for the period 2002 – 2018 only six illegal killings of cheetahs were reported or investigated (Table 4). This is however to be expected as illegal activities are difficult to monitor. No data were available for several years for two of the four provinces in which the free-ranging cheetah population occurs. The free-ranging cheetah population occurs mainly on private land and it is very difficult to detect illegal activities on these properties, especially in under-resourced provinces. In addition, the recent shift in the game ranching industry to high-value species and colour morphs has likely decreased tolerance to cheetahs (and other carnivores) among pure game farmers, resulting in increased levels of retaliatory killing (Thorn, <i>et al.</i> , 2013; Pitman <i>et al.</i> , 2016). However, the collapse of the colour variant market and data from the Eastern Cape, show a reversal in the trend of intensification of game ranches to again more extensive systems and the establishment of conservancies which is likely to benefit cheetah. In a recent survey of the free-roaming cheetah population (FRCC study) 11 collared cheetahs were killed between 2023 and 2025. Given the low estimates for the population this may be considered a substantial threat to the population.		
Table 4: Number of cheetahs legally killed as damage causing animals (DCAs) in the respective provinces (A) and the number of illegal killings of cheetah reported or investigated (B) from 2002 – 2018. Data provided by the respective provincial Management Authorities. ND = No data. Provincial Key: EC = Eastern Cape; FS = Free State; GP = Gauteng; KZN = KwaZulu-Natal; LIM = Limpopo; MP = Mpumalanga; NW = North West Province; NC = Northern Cape and WC = Western Cape.		

A. No of cheetah killed as DCA																		
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
EC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP	0	ND	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KZN	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
LIM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MP	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
NW	ND	ND	ND	ND	ND	0	0	0	0	0	0	0	0	0	0	0	0	0
NC	ND	ND	ND	ND	ND	ND	0	0	0	0	0	0	0	0	0	0	0	0
WC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
B. No of illegal killings of cheetah reported/investigated																		
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
EC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP	0	ND	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KZN	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	3
LIM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
MP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	ND	ND	ND	ND	ND	0	0	0	1	0	0	0	0	0	0	0	0	1
NC	ND	ND	ND	ND	ND	ND	0	0	0	0	0	0	0	0	0	0	0	0
WC	0	0	0	0	0	0	ND	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	1	0	6

Habitat destruction due to the development of urban areas and infrastructure, and the increasing prevalence of predator-proof fencing around ranches in some areas also constitute a significant threat to cheetahs by fragmenting available habitat (Thorn *et al.*, 2011).

Cheetahs are also vulnerable to being caught in snares, either purposefully set to kill cheetah for body parts or use as religious regalia or as bycatch of snares set for other species (Ray *et al.*, 2005). Increased incidences of snaring have been reported in several provinces including KwaZulu-Natal and Mpumalanga. In the Soutpansberg (Limpopo), the leading causes of leopard mortality have been found to be snaring, shooting and poisoning, either in response to the perceived risk of livestock predation or for bushmeat or animal parts (Williams, *et al.*, 2017). There is no reason to suspect that it would be any different for cheetah.

Data from an audit of cheetah breeding facilities conducted in 2014 by the South African National Biodiversity Institute (SANBI) showed that the potential for the movement of wild cheetahs into captive facilities was high and was facilitated by weak management measures. For example, cheetahs within captive facilities were seldom individually identifiable, with permits issued for the number of cheetahs within a facility and not for individual animals. Several facilities did not have containment areas or crushes in which an animal could be scanned for microchips during inspections, which meant that microchip numbers could only be checked when animals were exported. It was thus possible that once a cheetah in the facility died, it could easily be replaced by a wild cheetah. The implementation of strict management measures in 2015 appears to have significantly reduced this threat to the South African cheetah population, though some of the recommended measures have not yet been fully implemented (See Table 5). Owing to the stricter measures, especially with respect to facilities participating in international trade, the export of laundered wild cheetah from South Africa is now unlikely.

While the number of captive facilities with cheetah have remained the same since 2014, the number of facilities that trade and breed cheetah locally have almost doubled over the same time period (Table 3). The lack of full implementation of the recommended measures may thus allow for the laundering of free-ranging wild cheetah through captive facilities within South Africa, especially through those facilities that are not participating in the international trade.

Table 5: Management measures recommended by the Scientific Authority in 2015 and level of implementation.

Management measures	Fully implemented (Yes / No)
All captive-bred cheetah must be recorded in a studbook that keeps records of dates of births and deaths, translocations and sales (with blood or tissue samples taken from dead animals for DNA fingerprinting);	No. Only implemented for international trade
All cheetah in captivity must be individually identifiable through identification photographs and micro-chips and DNA fingerprints;	No. Only implemented for international trade
All specimens to be exported internationally must first be verified as offspring of captive-bred parents through DNA analyses;	Yes
Any facility exporting internationally must be registered with the Management Authority in compliance with the TOPS and CITES regulations;	Yes

Criteria for registered cheetah breeding facilities must be developed.		Completed
The biggest threat to the metapopulation is the deaths of individual animals through their capture and translocation. Braud <i>et al.</i>, (2019) suggested that free-ranging, rather than habituated captive cheetahs, are particularly at risk of dying during immobilization and transport. Since the inception of the cheetah metapopulation project in 2011, 23 capture-related deaths have been reported out of a total of 114 (20%) cheetahs that were immobilized. Although some mortalities are inevitable during the chemical capture and anaesthesia of wildlife species, rates exceeding 2% should be considered unacceptable in any large mammalian species (Arnemo <i>et al.</i>, 2006). Hyperthermia, likely to be associated with capture stress, was considered the primary complication observed during anaesthesia. Capture-associated hyperthermia is a common sequel of the capture of wild ungulates and has been shown to largely be a stress response rather than being associated with high environmental temperatures or physical exertion (Meyer <i>et al.</i>, 2008). Even though the threat of persecution to the free-ranging population may be high, the threats facing the cheetah metapopulation are limited and reversible. In addition, management measures implemented with respect to cheetah breeding facilities have effectively reduced the laundering of wild cheetahs into captivity. The overall level of threat to the wild population is thus considered limited and reversible.		
Harvest management		
10. Illegal off-take or trade: How significant is the national problem of illegal or unmanaged off-take or trade?	None	1
	Small	2
	Medium	3
	Large	4
	Uncertain	5
The unregulated/illegal off-take of cheetahs due to perceived or real losses of domestic stock or wildlife is likely severe for the free-ranging wild cheetah population. It is likely that persecution within the Bray area, North West Province, South Africa is negatively affecting one of the biggest transboundary cheetah populations between Botswana, Namibia and South Africa. However, the extent of such off-takes is not known with any certainty. Based on surveys undertaken in Limpopo, the African wild dog is the least tolerated predator followed by the cheetah, although these species were only blamed for 6% and 3% of the reported kills respectively (Thorn <i>et al.</i>, 2013). Thorn <i>et al.</i>, (2012) found that farmers in North West Province killed 0.3 cheetahs/100 km² per year, resulting in estimated annual provincial removals of 137 cheetahs, about 34% of estimated free-ranging cheetahs outside of protected areas (Lindsey <i>et al.</i>, 2009). From 2003 to 2009, four out of seven collared cheetahs were illegally killed by farmers within Limpopo alone (Marnewick & Somers, 2015). Data reported from provinces are inconsistent with these findings and show that for the period 2002 – 2018 only six illegal killings of cheetahs were reported or investigated (Table 4). This is however to be expected as illegal activities are difficult to monitor. No data were available for several years for two of the four provinces in which the free-ranging cheetah population occurs (Table 4). The free-ranging cheetah population occurs mainly on private land and it is very difficult to detect illegal activities on these properties, especially in under-resourced provinces. KwaZulu-Natal, Limpopo, Mpumalanga and the Northern Cape allow for the lethal removal of problem cheetah under permit. Provincial data show that only three cheetahs have been legally killed as DCAs from 2002 to 2018 (Table 4). During the recent survey of the free-roaming cheetah population (FRCC study) 11 collared cheetahs were killed between 2023 and 2025. Localized snaring within some protected areas can be considered a threat to the metapopulation as well as the KNP cheetah population. Between January 2019 and December 2023, six cheetah mortalities within the metapopulation were attributed to such offtakes. According to the Ezemvelo KZN compliance database five cheetah incidences were recorded since April 2009. Three of these were for the possession of cheetah skins and two were animals snared in Mkhuze Game Reserve. Poisoning of cheetah, leopard and other big cats is a recent threat recorded within KNP. Recently there has also been an increase in subsistence snaring specifically aimed at obtaining bushmeat. Snaring is non-specific and often carnivores such as wild dog and sometimes cheetah are affected. Small pieces of meat are poisoned and placed along game paths and around waterholes. Recently there has also been an incident where a cheetah was skinned and the pelt and body parts removed. A similar incident was recorded by the EWT where a cheetah was killed along a fence line and the entire skeleton expertly removed. Cheetah parts (whole skins, or parts thereof) are periodically (but rarely) observed in markets (muthi and traditional garment makers) and being worn by traditional leaders. In addition, there is also DNA evidence that skin fragments sold as 'cheetah' are more likely to be from smaller spotted carnivores, such as serval and genets (Williams <i>et al.</i>, unpublished research). Cheetahs are frequently used interchangeably (or as substitutes for) leopard skins for garments for traditional leaders, but their 'share' of this market for traditional attire is notably lower compared to leopard. The skins of large spotted carnivores are used to convey strength, dignity to the wearers. Evidence for this is from personal observation, publications (Williams <i>et al.</i>, 2025), newspapers, and videos from traditional ceremonies (Williams, V. pers. comms.).		

There have been some allegations of illegal cross border trade of cheetahs from Botswana and Namibia into South Africa, but the extent of this trade seems to be small.

11. Management history: What is the history of harvest?	Managed harvest: ongoing with adaptive framework	1
	Managed harvest: ongoing but informal	2
	Managed harvest: new	3
	Unmanaged harvest: ongoing or new	4
	Uncertain	5

Illegal killing of free-ranging cheetahs, often in response to perceived or actual livestock and wildlife losses, currently represents the largest unregulated off-take from the national population. Historically, cheetahs were extirpated from approximately 85% of South Africa. Beginning in 1965, individuals sourced from Namibian and South African ranches were reintroduced into fenced reserves. Between 1965 and 2009, 343 cheetahs were reintroduced, yet by 2009 only 289 individuals remained. Following the cessation of translocations of free-ranging cheetahs, numbers within fenced reserves declined further to 217 individuals across 40 reserves by 2012.

In response, a metapopulation project was initiated (Buk et al., 2018). Interviews and records revealed key conservation challenges: breeding cheetahs were absent from 35% of reserves, breeding occurred in only 13% of reserves, fence quality was inconsistent, approximately 3% of cheetahs were being sold into captivity annually, and 28% of mortalities were linked to anthropogenic causes. Predation by lions accounted for 31% of mortalities, exacerbated by lion-naïve cheetahs and high lion densities. These challenges were addressed through improved management and translocations among reserves in line with metapopulation principles. Despite small reserve sizes (median = 125 km², typically four cheetahs per reserve) and 80% of reserves being privately owned, the metapopulation increased by 51% over six years, reaching 328 individuals across 51 reserves by January 2018, while maintaining genetic diversity (Buk et al., 2018). Nevertheless, the number of adult females remains a limiting factor for population growth, viability, and expansion.

Parallel to these conservation efforts, cheetah trade has raised management concerns. Analysis of CITES trade data (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK) indicated that between 2002–2023, live exports comprised 91% (1270 animals) of total exports, with 71 trophies reported (includes re-exports from Namibia and Zimbabwe) (Fig. 7). No provincial hunting permits were issued. From 2002–2012, live exports accounted for 91% (878 animals), with over 80% of captive-bred cheetahs destined for zoos and breeding facilities. Despite the fact that cheetahs are purportedly difficult to breed in captivity, an average of 80 live cheetahs were exported annually, raising suspicions of wild cheetahs being laundered into captivity—supported by EWT data showing 3% of metapopulation cheetahs entering captivity annually (Buk et al., 2018). A 2014 SANBI audit highlighted weak management controls, including the lack of individual identification, inadequate containment facilities, and poor permit tracking, which enabled substitution of wild cheetahs for captive individuals.

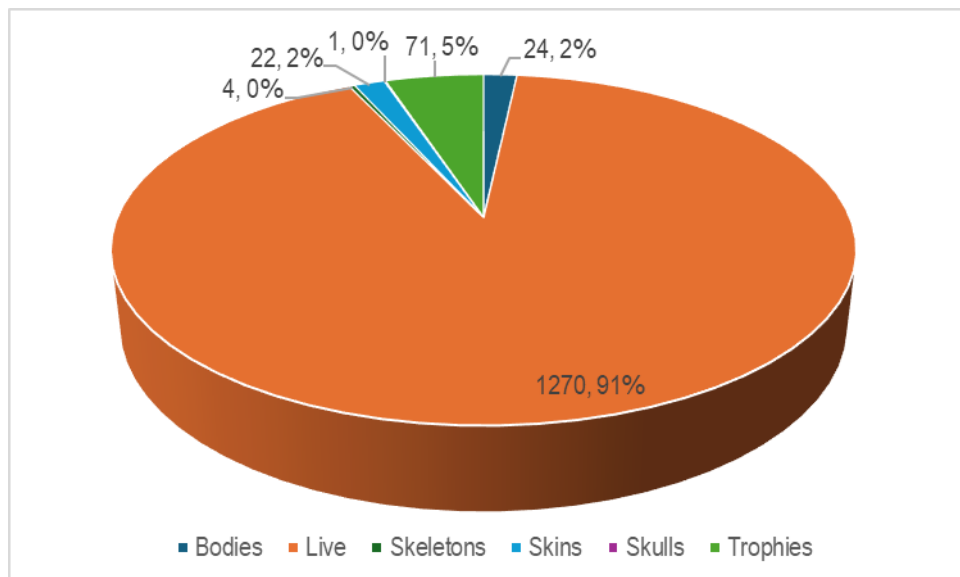


Figure 7: The number of cheetahs exported from South Africa between 2002 and 2023, using the trade terms bodies, skeletons, skins, skulls, live and trophies under all purpose codes. Numbers exported as well as percentages per trade term are indicated. Note: trophies exported include re-exports from Namibia and Zimbabwe.

Captive breeding success remained low: in the year preceding the audit, only 36 cubs were produced across six of 13 facilities, despite 76 breeding females. Internationally, only 33 of 250 institutions bred cheetahs successfully in 2012 (Marker & Cunningham, 2013). Provincial records showed 19 wild cheetahs were legally translocated into captivity between 2002–2013, and in one instance, a standing permit authorized continuous capture of wild cheetahs (A standing permit is a permit issued to authorize the continuous carrying out of a restricted activity, or a combination of restricted activities, involving one or more specimens of one or more listed threatened or protected species (Regulation 7 of the Threatened or Protected Species (TOPS) Regulations (2007))). High levels of interprovincial movements were also recorded (646 exports and 794 imports between 2002–2018), though these data did not align with CITES records (Table 6).

Table 6: The number of cheetahs imported into provinces (A) from 2002 to 2018 and the number of cheetahs exported from provinces for the same time period (B). Data were obtained from the respective provincial Management Authorities. (ND = No Data). Provincial key: EC = Eastern Cape; FS = Free State; GP = Gauteng; KZN = KwaZulu-Natal; LIM = Limpopo; MP = Mpumalanga; NW = North West Province; NC = Northern Cape and WC = Western Cape

A. No of cheetah imported into provinces from other provinces																			
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total	
EC	0	0	5	1	0	3	2	0	1	0	0	3	1	1	6	1	3	27	
FS	0	0	0	0	0	0	0	4	23	4	ND	0	4	0	7	1	0	43	
GP	0	ND	ND	11	10	7	15	17	22	8	4	3	0	0	0	0	11	108	
KZN	7	5	13	17	12	7	8	23	3	6	6	42	5	6	3	15	5	183	
LIM	0	0	0	0	0	0	0	2	3	4	10	16	6	14	32	19	17	123	
MP	?	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	1	7	
NW	0	0	0	0	0	0	0	0	0	0	6	0	2	1	0	3	2	14	
NC	ND	ND	ND	ND	ND	ND	0	0	0	0	2	3	4	0	1	0	0	10	
WC	ND	ND	14	17	18	10	19	38	15	19	24	6	27	14	9	37	12	279	
Total	7	5	32	46	40	27	44	84	69	43	54	73	49	36	58	76	51	794	
B. No of cheetah exported from province																			
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total	
EC	0	0	2	1	4	7	ND	ND	2	17	5	2	6	5	4	12	13	80	
FS	0	0	0	2	18	14	8	6	7	5	5	3	14	4	6	0	2	94	
GP	1	ND	ND	3	3	7	1	20	16	14	7	17	0	0	0	0	6	95	
KZN	4	3	5	11	2	25	9	9	8	0	5	3	6	8	8	13	10	129	
LIM	0	0	0	0	0	0	0	2	2	2	3	5	7	8	7	12	10	58	
MP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NW	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	5	
NC	ND	ND	ND	ND	ND	ND	0	0	0	0	1	0	2	0	0	0	0	3	
WC	ND	ND	13	2	10	10	2	8	14	23	16	9	27	18	16	3	11	182	
Total	5	3	20	19	37	63	21	45	49	61	42	39	62	43	41	40	56	646	

From 2002–2023, 1,270 live cheetahs were exported, 85% classified as captive-bred (source codes C and D) (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK) (Fig. 8). Of the 68 wild individuals exported, 94% were for reintroduction. All live cheetahs born in captivity (source code F) were exported prior to stricter national measures in 2015. Exports for commercial purposes under source code C decreased since 2015, averaging approximately two live individuals per year. Commercial trade in live cheetah has primarily been replaced by animals from the two CITES-registered breeding facilities (source code D). From 2015, new regulations required DNA verification of captive-bred parentage, and facilities exporting internationally had to be registered with the Management Authority. These measures reduced unverified captive-bred exports, though since 2018, exports under source code C have risen again, mainly for non-commercial purposes (Fig. 8), highlighting the importance of implementing DNA passports for both non-commercial and commercial exports from South Africa. The spike in 2023 in the export of captive bred cheetahs for non-commercial purposes from South Africa is primarily due to two major exports to India of approximately 70 cheetahs collectively (Fig. 8).

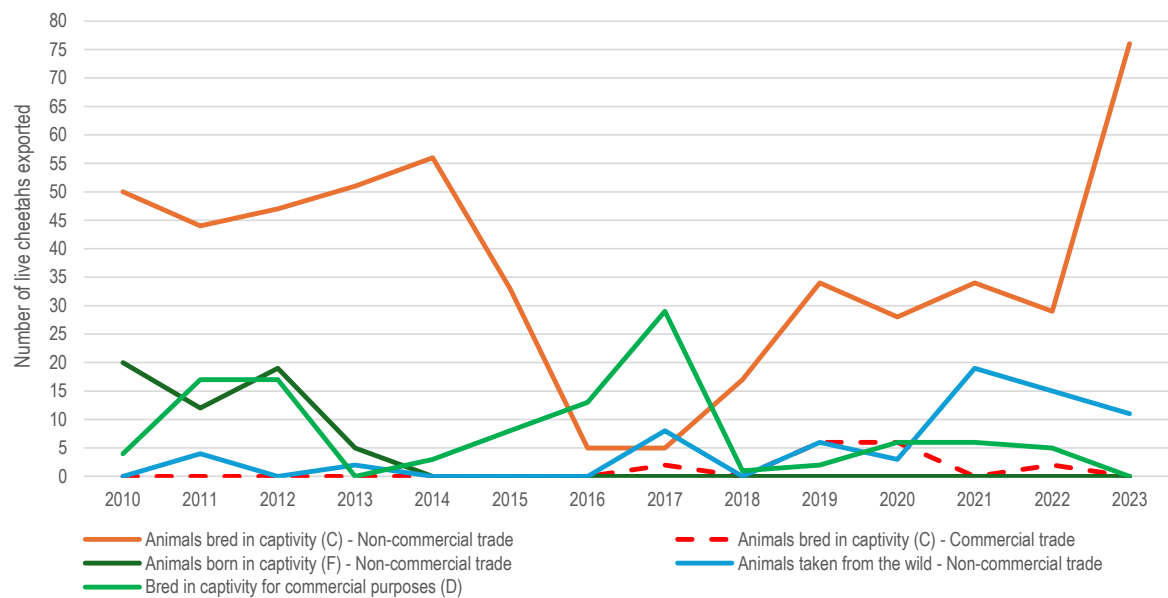


Figure 8: The number of live cheetahs exported from South Africa annually under the various source codes between 2002 and 2023 as reported by South Africa (Exporter quantity) (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK).

Trade analysis further showed that between 2002–2023, 1202 live cheetahs were exported (Source codes F, C, D) to China (CN), United Arab Emirates (AE), USA (US) and Japan (50% of exports) (Fig. 9) (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). The UAE was identified as a key destination, where private ownership of cheetahs is popular; of 148 exports to the UAE between 2002–2015, most were destined for breeding facilities, zoos, or as personal effects, many listed as captive-bred. Other notable importers included Mexico (39) and Canada (38).

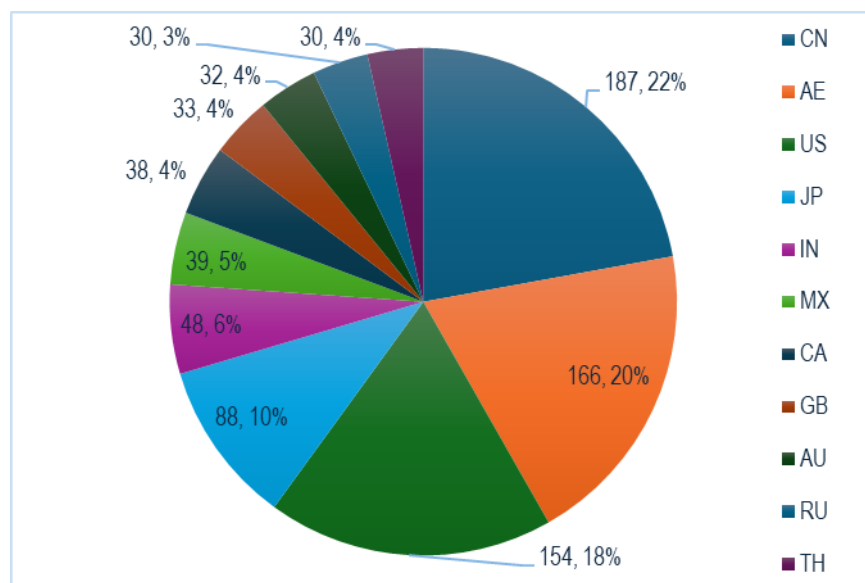


Figure 9: The percentage of total live cheetah exports (Source codes F, C, D) from South Africa (All purpose codes) for the top ten importing countries as determined by an analysis of CITES trade data for the period 2002 – 2023 (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). Country key: US = United States of America; CN = China; AE = United Arab Emirates; JP = Japan; MX = Mexico; CA = Canada; RU = Russian Federation; ES = Spain; TH = Thailand; AU = Australia.

By 2023, SANBI's cheetah DNA database contained 1,363 profiles from 65 facilities, with approximately 953 parentage passports issued, providing an important forensic tool to improve traceability. The national CITES online permitting system is now also operational and will further improve reporting on international exports.

12. Management plan or equivalent: Is there a management plan related to the harvest of the species?	Approved and co-ordinated local and national management plans	1
	Approved national/state/provincial management plan(s)	2
	Approved local management plan	3
	No approved plan: informal unplanned management	4
	Uncertain	5
In 2009, a National Conservation Action Plan was developed for cheetahs in South Africa (Lindsey <i>et al.</i>, 2009). A Cheetah Advisory Group, established in 2022, provides a collaborative platform for knowledge-sharing, and co-learning to strengthen the ethical, science-based management of Southern Africa's cheetah populations. By bringing together government representatives, reserve managers, and conservation experts, the group promotes coordinated approaches that support the regional metapopulation. A Biodiversity Management Plan (BMP) in terms of the National Environmental Management: Biodiversity Act (NEMBA) 2004 is currently being developed by the Cheetah Advisory Group (CAG). In addition, national guidelines for the management of the South African cheetah metapopulation has been developed and are currently within the Intergovernmental processes for implementation. While not fully implemented, elements i.e., dispersal have been implemented. In addition, all reserves with cheetah must have an approved management plan for the species. A protocol for the reintroduction of cheetah to reserves that form part of the metapopulation has also been developed by EWT (Cilliers & van der Merwe, 2016). Any new reintroduction is informed by a predator management plan that is submitted to the relevant provincial Management Authority. In addition, a genetic management plan and code of ethics around the appropriate and responsible management of the cheetah population is signed by the reserves that constitute the cheetah metapopulation. While reintroductions have historically been considered unmanaged and opportunistic, without set targets for numbers, areas, demographics etc., a recently developed framework offers guidance to ensure translocations serve both individual duty of care and species-level conservation (Neethling <i>et al.</i>, 2025). South Africa's managed cheetah metapopulation meets several criteria for a successful reintroduction programme, as proposed by Seddon (1999) and Hayward <i>et al.</i>, (2007). Breeding by the first wild born generation was achieved already early on, a self-sustaining population has been accomplished through metapopulation management, and a 3-year breeding population with a natural growth rate has been passed twice during the 2012–2018 period. A wild population of ≥ 500 individuals before 2030 is a realistic target (Buk <i>et al.</i>, 2018). Currently the managed wild metapopulation is approaching 5% of the global cheetah population and may thus prevent a Red List up-listing from Vulnerable to Endangered (Buk <i>et al.</i>, 2018). Due to habitat fragmentation, the metapopulation will continue to require management in accordance with metapopulation principles (Buk <i>et al.</i>, 2018). The management of genetic diversity in South Africa's cheetah metapopulation has advanced through the identification of inbred individuals using historical reproduction records, with the aim of preventing further inbreeding (Buk <i>et al.</i>, 2018). However, ensuring long-term genetic viability requires more than retrospective analysis. Magliolo <i>et al.</i> (2022) demonstrated through forward-time genetic simulations that, without intervention, the metapopulation is projected to lose up to 54% of its genetic diversity over 25 generations due to drift. Their study found that limited gene flow from free-roaming cheetahs was insufficient to prevent this decline. Instead, the authors emphasize the necessity of a coordinated supplementation strategy involving genetically diverse, unrelated individuals from select captive facilities. This approach maintains heterozygosity and prevents an increase in closely related individuals within the metapopulation. Therefore, alongside the continued use of a centralized, standardized digital studbook to guide translocations, proactive genetic supplementation should be integrated into metapopulation management. Encouragingly, current genetic diversity remains comparable between the metapopulation, free-roamers, and some captive groups, offering a strong foundation for such strategies (Magliolo <i>et al.</i>, 2022).		
13. Aim of harvest regime in management planning: What is harvest aiming to achieve?	Generate conservation benefit	1
	Population management/control	2
	Maximize economic yield	3
	Opportunistic, unselective harvest, or none	4
	Uncertain	5
Legal DCA cheetah control is typically conducted to reduce predation and human-predator conflict. The aim of metapopulation harvest is to generate conservation benefit for the species and to manage surplus animals within the metapopulation. However, the largest part of the harvest is illegal which is considered opportunistic and unselective.		
14. Quotas: Is the harvest based on a system of quotas?	Ongoing national quota: based on biologically derived local quotas	1
	Ongoing quotas: "cautious" national or local	2

	Untried quota: recent and based on biologically derived local quotas	3
	Market-driven quota(s), arbitrary quota(s), or no quotas	4
	Uncertain	5
Buk (2019) undertook a population viability analysis (PVA) to model the viability of the managed cheetah metapopulation. His model showed that the South African cheetah metapopulation should maintain 96% of its genetic diversity and predicted a growth from 314 animals to a metapopulation size of over 500 cheetahs in 20 years, and to over 1000 cheetahs in 100 years if an annual increase in carrying capacity of 0.7% is realised (equivalent to one average sized reserve added every second year, which is entirely realistic as during the past 20 years two reserves were added each year on average) (Buk, <i>et al.</i>, 2018). The PVA further showed that up to 30% of males could be removed annually without any adverse effects on metapopulation viability, provided that only males are removed, whereas only 5% of females could be sustainably removed annually if only females are removed (Buk, 2019). If both sexes were to be removed in any one year, no more than 10% of the male population and 4% of the female population could be removed. These animals could be used for expanding the metapopulation by adding new breeding subpopulations or for restocking small non-breeding reserves with males only. Hunting of the male adults could even be considered, if there were no better options (Buk, 2019). Based on the outcome of this PVA, the Scientific Authority recommended an annual export quota of 13 cheetahs from the metapopulation (3 females and 10 males) for the sole purpose of reintroducing cheetah to other range States as part of the expanded metapopulation. As a result of the growth in the metapopulation the initial PVA was revised (van der Merwe, Buk & Naude, 2022). The updated population viability analysis (PVA) that considered data from 2004 to 2021 on the managed metapopulation of cheetah held in several game reserves of South Africa to determine trends, and number of cheetah that can be sustainably removed from the population without detriment to the population as a whole as well as any of the regional clusters found that a conservative removal of 41 cheetah per year could be sustained when the South Africa metapopulation is considered as a single population. The PVA further showed that, based on several scenarios of differing carrying capacities and dispersal rates, 19 male and 14 adult female cheetah could be removed per annum with no detrimental impact on any of the population clusters (extinction probability < 1%). Based on the outcomes of the PVA, the Scientific Authority of South Africa recommended an increase in the annual export quota to 29 cheetahs from the metapopulation (12 females and 17 males). Most recently, a 2024/2025 PVA and Annual Harvest Model (AHM) were conducted using demographic data collected between 2019 and 2023. The analysis confirmed that the managed South African cheetah metapopulation remains viable, with a <0.001 extinction probability over 100 years, even under high harvest scenarios. Network analysis identified a single core population of 49 effectively connected reserves, alongside 20 satellite reserves that showed no evidence of reproductive contribution during the study period. The satellite subpopulations are unlikely to persist without improved connectivity. Simulations showed that the core population could sustain an annual harvest of up to 65 individuals (based on net subadult recruitment), with a recommended 1 female:2 male sex ratio to reflect natural male-biased dispersal. Scenario testing (ranging from 0 to 25 females and 50 males removed per year) showed that even the highest modelled harvest (Scenario 25: 25 females, 50 males annually) maintained both population viability and genetic diversity (>99%) over 100 years. Based on these findings, the Scientific Authority recommended an export quota 30 males and 15 females per annum for reintroduction purposes, thereby maintaining the average annual growth rate of the metapopulation at 0.135 (as established by a population viability analysis (PVA)). This AHM approach ensures continued demographic stability and supports both national metapopulation growth and international reintroduction programmes, while emphasizing that satellite populations are not suitable sources for harvest until effective connectivity is established. This is still considered to be a small managed harvest that has only recently been implemented. Whereas translocation of cheetahs between reserves within the metapopulation is not considered to be a harvest, translocation to other range countries for reintroduction purposes is considered to be a harvest.		
Control of harvest		
15. Harvesting in Protected Areas: What percentage of the legal national harvest occurs in State-controlled Protected Areas?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5
Most cheetahs are harvested outside of protected areas. Some animals living primarily in protected areas may be subjected to persecution killings or captured when ranging beyond the borders of protected areas, however most protected areas are fenced, which limits such movements. There is the potential in future to sustainably harvest individuals from populations that have been reintroduced into small to medium-sized fenced reserves, in cases where management is required to reduce cheetah densities. Cheetahs translocated for reintroduction into other range countries may be removed from protected areas that form part of metapopulation. For example, cheetahs for a recent reintroduction to Malawi were sourced from Mountain Zebra National Park.		
	High	1

16. Harvesting in areas with strong resource tenure or ownership: What percentage of the legal national harvest occurs outside Protected Areas, in areas with strong local control over resource use?	Medium	2
	Low	3
	None	4
	Uncertain	5
There is very little legal harvest of cheetahs, except for some DCA control (either lethally or through translocation). Such harvest occurs primarily on private land, where local control over resource use is high. According to provincial records, no permits have been issued for the trophy hunting of cheetah, and only three cheetahs have been legally killed as DCAs for the period 2002 – 2017 (Table 4). Whereas translocation of cheetahs between reserves within the metapopulation is not considered to be a harvest, translocation to other range countries for reintroduction purposes is considered to be a harvest. Cheetahs translocated for reintroduction into other range countries are mainly sourced from private land.		
17. Harvesting in areas with open access: What percentage of the legal national harvest occurs in areas where there is no strong local control, giving <i>de facto</i> or actual open access?	None	1
	Low	2
	Medium	3
	High	4
	Uncertain	5
The large majority of cheetahs occurring outside of protected areas occur on private land with strong local control over natural resource use.		
18. Confidence in harvest management: Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5
The current permitting system and stricter measures implemented in 2015 (Table 5) are believed to be effective in preventing the international export of wild cheetah laundered as captive-bred. There is thus a high confidence in management of captive populations to prevent/reduce the laundering of wild cheetah through captive facilities for international trade. However, the local trade in cheetahs is not as well managed. Confidence in the management of exports of live cheetah between provinces is thus low as not all the recommended measures have been effectively implemented and thus laundering of free-ranging cheetah through captive breeding facilities is still a possibility (Table 5).		
Capacity and resource constraints within provinces limit the effective implementation of management plans and harvest controls. National guidelines for the management of cheetah as a metapopulation has been developed and are currently implemented. A national Biodiversity management plan for cheetah is also being developed. However, none of the provinces likely have the capacity to effectively curb illegal off-take.		
There is a high confidence in the management of the metapopulation and harvest controls. The only harvest currently allowed from the metapopulation is for the export of live cheetahs for reintroduction purposes, restricted to excess cheetah within the metapopulation and limited to a maximum of 13 animals per annum.		
Monitoring of harvest		
19. Methods used to monitor the harvest: What is the principal method used to monitor the effects of the harvest?	Direct population estimates	1
	Quantitative indices	2
	Qualitative indices	3
	National monitoring of exports	4
	No monitoring or uncertain	5
Most of the legal harvest is from the cheetah metapopulation. All aspects of the metapopulation are monitored including illegal off-takes. Direct population estimates are available as all births and deaths (natural and anthropogenic) are recorded; translocations nationally and internationally are recorded and monitored.		
Cheetahs are currently listed as vulnerable in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), meaning that a permit is required if a person intends to carry out any restricted activity involving cheetahs such as keeping, hunting, catching, breeding, selling, conveying or exporting from the country. The permit system is regulated through the Threatened or Protected Species (TOPS) Regulations (2007), which have been promulgated in terms of NEMBA. Cheetahs are also protected under various provincial Ordinances / Acts. Records of permits issued provide useful data for monitoring. Some provinces record the numbers of DCA permits issued, but few actually note whether putative DCAs were successfully		

removed (translocated or killed). The Department of Environment, Forestry and Fisheries records the numbers of CITES export permits issued by each province.

The Scientific Authority has recommended that all cheetahs kept in captive breeding facilities must be individually identifiable through identification photographs, micro-chips and DNA fingerprints, and any live specimens to be exported internationally must first be verified as offspring of captive-bred parents through DNA analyses. A cheetah DNA database managed by SANBI currently stores 1,363 DNA profiles. A total of 65 facilities have sent samples, collected according to an approved forensic protocol, and approximately 953 passports confirming parentage have been issued. At present only some captive breeding facilities are maintaining a studbook. Though not yet fully implemented, these recommended measures provide a mechanism for monitoring the trade.

20. Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5

Confidence in the monitoring of harvest from the metapopulation is high, as all cheetahs are individually identifiable and harvest for international reintroductions is strictly regulated. In addition, all metapopulation reserves report annually on population numbers, off-takes and introductions.

Confidence in the monitoring of captive breeding facilities keeping cheetah has increased since the implementation of SANBI's cheetah DNA database, and the issuing of DNA passports for international cheetah exports. There is thus a high confidence in the monitoring of international exports of live cheetah.

Monitoring of illegal off-take of free-ranging wild cheetahs is poor. The free-ranging cheetah population occurs mainly on private land and it is difficult to detect illegal activities on these properties, especially in under-resourced provinces. From 2003 – 2009 four out of seven collared cheetahs were illegally killed by farmers within Limpopo (Marnewick & Somers, 2015). Yet data reported by provinces show that for the period 2002 – 2018 only six illegal killings of cheetahs were reported or investigated (Table 4). No data were available for several years for two of the four provinces in which the free-roaming cheetah population occurs. There is thus a low confidence in the monitoring of illegal off-takes from the free-ranging wild population.

Record keeping by provinces of permits issued for legal activities regulated through TOPS, though improved in recent years, has generally been poor. The implementation of the online CITES and TOPS permit application system is likely to improve recordkeeping.

Incentives and benefits from harvesting

21. Utilization compared to other threats: What is the effect of the harvest when taken together with the major threat that has been identified for this species?	Beneficial	1
	Neutral	2
	Harmful	3
	Highly negative	4
	Uncertain	5

Major threats to cheetah in South Africa include conflict-related persecution, snaring and road mortalities (Marnewick *et al.*, 2025). The capture and removal of live animals for the captive trade was highlighted as a major threat to cheetah (van der Merwe, *et al.*, 2016), but recent interventions and restrictions have mitigated this risk effectively. Initially, harvest of wild cheetahs for reintroductions into more secure small reserves may have been beneficial for the species. However, there are presently sufficient numbers of individuals within the metapopulation to provide founder individuals for future reintroductions, and so further harvest of cheetah from the free-ranging wild population is unlikely to yield conservation benefits for the species and would be detrimental to the source populations. At present the harvest of cheetah from the free-ranging population is not allowed as any harvest is likely to be detrimental.

Translocation of cheetah captured from the metapopulation to other range countries for conservation purposes is beneficial to the species. Harvest of wild cheetah for export purposes has been restricted to excess animals within the metapopulation and to only 45 cheetah (30 males and 15 females) per annum.

22. Incentives for species conservation: At the national level, how much conservation benefit to this species accrues from harvesting?	High	1
	Medium	2
	Low	3

	None	4
	Uncertain	5
The harvest of cheetahs as it currently occurs in South Africa is unlikely to incentivize the conservation of the species. Sustainable hunting of excess male adults could potentially benefit the management and conservation of the species in the future, though no data are available to show if or how utilisation affects tolerance of landowners towards the species. A PVA (Buk, 2019) has shown that up to 30% of males could be removed annually without any adverse effects on metapopulation viability, provided that only males are removed. A more recent PVA (Brown et al., 2024) indicated that the metapopulation could sustain an offtake of up to 31% of adult males based on the total recommended harvest quota, and up to 20% based on the quota recommended for export.		
23. Incentives for habitat conservation: At the national level, how much habitat conservation benefit is derived from harvesting?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5
The harvest of cheetahs as it currently occurs in South Africa is unlikely to incentivize the conservation of cheetah habitat, though no data are available to support such a supposition.		
Protection from harvest		
24. Proportion strictly protected: What percentage of the species' natural range or population is legally excluded from harvest?	>15%	1
	5-15%	2
	<5%	3
	None	4
	Uncertain	5
The extent of the distribution of cheetahs outside of protected areas is not known with confidence. Boitani <i>et al.</i> , (1999) estimated that there is ~125 150 km ² of suitable cheetah habitat in South Africa of which approximately 55,654 km ² is under formal protection, including state-owned and private nature reserves. Because protected areas are fenced, 55,654 km ² of the cheetah's distribution is effectively excluded from harvest. An estimated 277 cheetahs (42% of total population) occur within four national parks and three provincial reserves and are thus strictly protected. No trophy hunting or DCA control are allowed within any of the state-protected areas and these constitute approximately 44.5% of the suitable cheetah habitat within South Africa. However, cheetahs translocated for reintroduction into other range countries may be removed from protected areas that form part of metapopulation. For example, cheetahs for a recent reintroduction to Malawi were sourced from Mountain Zebra National Park in the Eastern Cape.		
25. Effectiveness of strict protection measures: Do budgetary and other factors give confidence in the effectiveness of measures taken to afford strict protection?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5
Even though cheetahs within some protected areas might be exposed to strong edge effects, the cores of larger protected areas such as the KNP and KTP likely constitute inviolate refuges for cheetahs. There is thus a medium confidence in the effectiveness of these strict protection measures.		
26. Regulation of harvest effort: How effective are any restrictions on harvesting (such as age or size, season or equipment) for preventing overuse?	Very effective	1
	Effective	2
	Ineffective	3
	None	4
	Uncertain	5
There is good legislation in place both on a national (TOPS Regulations) as well as a provincial level, where all use activities relating to cheetah are regulated. This legislation is being effectively implemented in South Africa. In addition, national guidelines for the metapopulation management of cheetah has been developed and are implemented. Harvest of wild cheetah for export purposes has been restricted to excess animals within the metapopulation and to only 45 cheetah (30 males and 15 females) per annum. These restrictions are considered to be effective. In order to prevent laundering of wild cheetah through captive breeding facilities, all cheetah exported internationally must i) be recorded in a studbook that keeps records of dates of births and deaths, translocations and sales (with blood or tissue samples taken from dead animals for DNA fingerprinting); ii) be individually identifiable through identification photographs and micro-chips and DNA fingerprints; and iii) be verified as offspring		

of captive-bred parents through DNA analyses; and any facility exporting internationally must be registered with the Management Authority in compliance with the TOPS and CITES regulations. Criteria for the registration of a captive breeding facility for cheetah has been developed and approved by the Scientific Authority of South Africa. However, not all the above recommendations have been fully implemented.

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