

# Damaliscus lunatus lunatus – Tsessebe



Cliff and Suretha Dorse

<b>Regional Red List status (2016)</b>	<b>Vulnerable D1*†</b>
National Red List status (2004)	Endangered A2ac+C2a(i)
Reasons for change	Genuine change: Population increase
Global Red List status (2008)	Least Concern
TOPS listing (NEMBA) (2007)	Endangered
CITES listing	None
Endemic	No

\*Watch-list Threat †Conservation Dependent

Although this species declined by over two thirds in Kruger National Park between 1986 and 1999 (Grant & van der Walt 2000), primarily due to drought conditions (Dunham et al. 2004), the population is currently stable and increasing in many parts of the country.

## Taxonomy

*Damaliscus lunatus lunatus* (Burchell 1824)

ANIMALIA - CHORDATA - MAMMALIA -  
CETARTIODACTYLA - BOVIDAE - *Damaliscus* - *lunatus* -  
*lunatus*

**Common names:** Tsessebe (English), Basterhartbees (Afrikaans), Inkolome, Inkomozane (Ndebele), Tshêntshêbê (Sepedi), Kabolê (Setswana), Mzanxi, Inyamatanane (Swati), Ndzandzi (Xitsonga)

**Taxonomic status:** Subspecies

**Taxonomic notes:** Five subspecies are usually recognized: Korrigum (*D. lunatus korrigum*), Tiang (*D. l. tiang*), Coastal Topi (*D. l. topi*), Topi (*D. l. jimela*) and Tsessebe (*D. l. lunatus*). The last named form exhibits obvious differences from the other subspecies, with the result that this species is sometimes split into two, most recently by Grubb (2005). Cotterill (2003) recognised Tsessebés in the southern Bangweulu Flats of northeastern Zambia as a new species, *Damaliscus*

*superstes* based on differences in cranial morphology and pelage, and proposed considering animals from south-central Africa (south of, and including, Angola, Zambia and southern Democratic Republic of the Congo) as *D. lunatus* (with the exception of *D. superstes*), and all other populations from East Africa and the remainder of the range provisionally as *D. korrigum* (followed by Grubb 2005).

## Assessment Rationale

While there was a historical population reduction of c. 77% in Kruger National Park (KNP) between 1986 and 1999, the population has since stabilised. Using a sample of formally protected areas (N = 12) with adequate long-term data across the natural range of the subspecies, it is suggested that the national population on protected areas has exhibited a net increase over the past three generations (1996–2014). However, five protected areas in Limpopo and North West provinces are still experiencing significant declines and/or local extinctions (estimated to be 21% reduction over three generations). The causes of such declines should be investigated and mitigated and further long-term data, especially from the private sector, are needed to more accurately estimate national population trends over three generations.

As there is no net continuing decline, and the historical reduction is outside the three-generation window, the only criterion applicable is D. Currently (2013–2015), the formally protected population inside the natural distribution range is 1,642 individuals in 15 reserves (985–1,149 mature individuals, assuming a 60–70% mature population structure). Additionally, a preliminary analysis of 23 wildlife ranches containing Tsessebe subpopulations from around the country indicate that 46–87% of privately owned individuals can be considered wild and free-roaming, which brings the total minimum mature population size to 1,353–1,962 individuals. The mature population size in 2009 (five years ago) was at least 542–633 on formally protected areas, although this is an underestimate as not all long-term data are available (for both formally and privately protected subpopulations). However, given the possibility that the population has been eligible for Near Threatened D1 for at least five years, and that there is an estimated continuing decline in several protected areas across its range, we list this species as Vulnerable D1. This is a genuine down-listing and, given the current positive growth trend and tendency for the private sector to stock wild and free-roaming subpopulations, we predict that the species can be downlisted further in the next revision. However, the intensifying threat of poaching around protected area edges, and the potential emerging threat of increased drought frequency from climate change should be monitored as it may counteract the positive trends reported in this assessment. Key interventions include the establishment of a metapopulation plan to guide future translocations and reintroductions and protected area management for landscape heterogeneity and connectivity.

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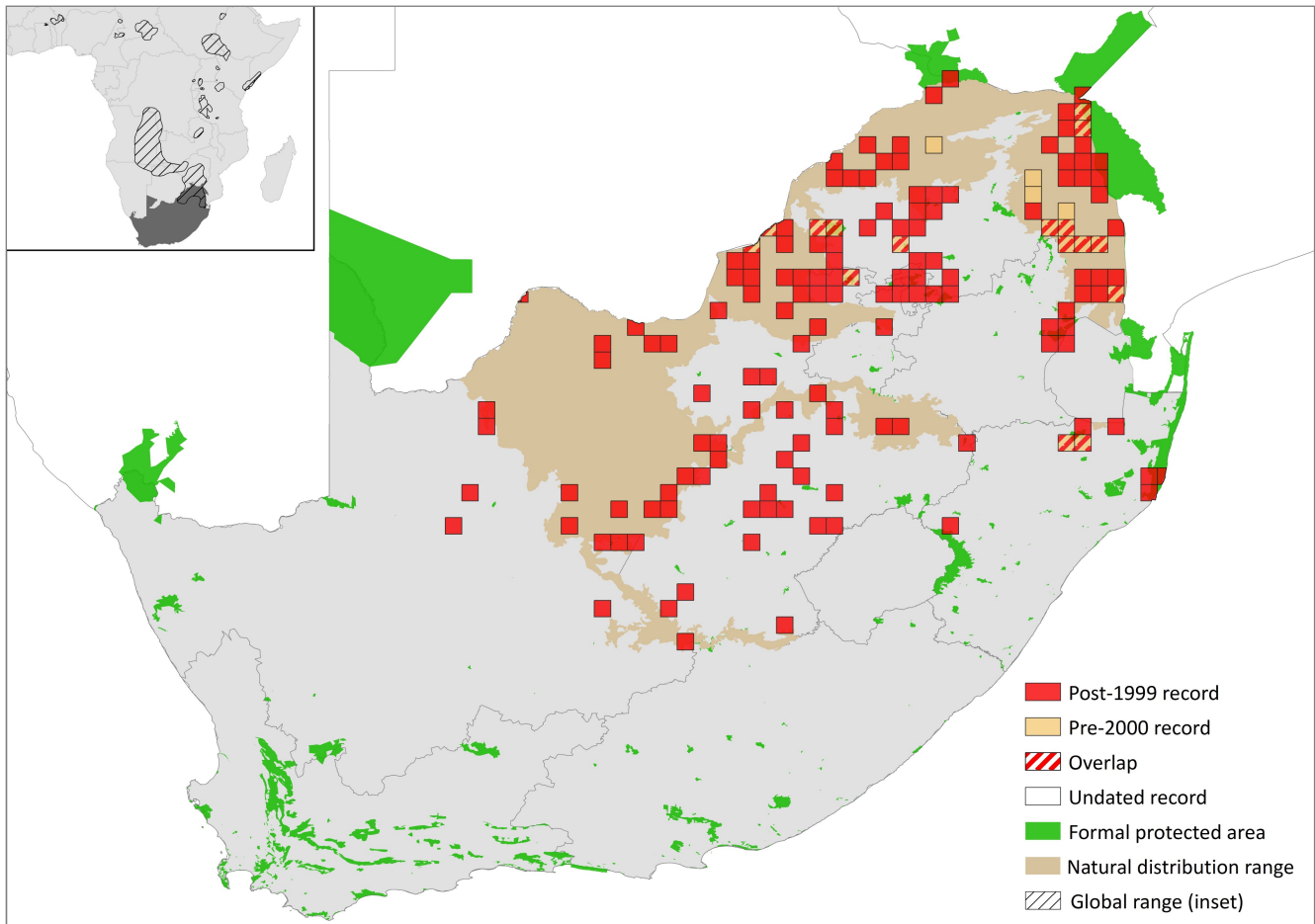


Figure 1. Distribution records for Tsessebe (*Damaliscus lunatus lunatus*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

**Regional population effects:** Populations in neighbouring countries have been declining (Dunham et al. 2003), and hence we assume no rescue effects are possible. Additionally, most subpopulations within the assessment region are isolated by fencing. The only dispersal routes that might exist are between the KNP, Zimbabwe and Mozambique (the Great Limpopo Transfrontier Park). However, based on the small remaining subpopulation in KNP, immigration appears to be negligible and there is no confirmation that it actually takes place.

## Distribution

This species formerly occurred widely on floodplains and other grasslands in sub-Saharan Africa. It was one of the most numerous large antelope species in Africa, but has been eliminated from much of its former range (IUCN SSC

Antelope Specialist Group 2008). Five subspecies occur throughout sub-Saharan Africa: Korrigum, Tiang, Coastal Topi, Topi, Bangweulu Tsessebe and Common Tsessebe (hereafter, Tsessebe). Tsessebe remain present in a number of populations in southern Africa, but became extinct in Mozambique around the late 1970s or early 1980s (IUCN SSC Antelope Specialist Group 2008). Similarly, they have been reintroduced in Swaziland, after the indigenous population was hunted to extinction by the 1930s (Monadjem 1998). The current distribution of Tsessebe comprises South Africa, the eastern sector of Botswana, northeastern parts of Namibia (limited mainly to the Caprivi), northwestern and central parts of Zimbabwe and into western Zambia.

Within the assessment region, its natural distribution extends to western and eastern Limpopo, northwestern and eastern Mpumalanga, northern and western North West Province, eastern Northern Cape, western Free State and the extreme north of KwaZulu-Natal. It has been widely reintroduced across this range, especially on private land. Additionally, it has been widely introduced into areas of KwaZulu-Natal, Free State, Mpumalanga and Northern Cape provinces (Figure 1).

## Population

In KNP, Tsessebe declined from 1,163 individuals in 1986 to 419 in 1993 and declined again by 62% until 1999 (Grant & van der Walt 2000). However, the subpopulation has since stabilised at c. 200–250 individuals (Ferreira et al. 2013). Generation length for this species has been estimated at six years (Pacifiçi et al. 2013), making the three generation period approximately 18 years (1996–

**Table 2. Summary of population size estimates for Tsessebe (*Damaliscus lunatus lunatus*)**

Province	Type	Inside natural distribution range	No of reserves/ properties	Subpopulation total (2013–2015)
Free State	Formally protected	Yes	1	286
Free State	Formally protected	No	1	27
Free State	Wildlife ranches	No	35	531
Gauteng	Formally protected	Yes	1	45
Limpopo	Formally protected	Yes	9	750
Limpopo	Wildlife ranches	Yes	13	298
North West	Formally protected	Yes	1	58
North West	Wildlife ranches	Yes	33	614
Northern Cape	Formally protected	Yes	1	250
Northern Cape	Private	Yes	2	253
Northern Cape	Wildlife ranches	Yes	8	422
KwaZulu-Natal	Formally protected	No	2	55
KwaZulu-Natal	Private	No	1	48
Mpumalanga	Formally protected	No	1	66
<b>Grand total</b>	<b>All</b>	<b>Both</b>	<b>109</b>	<b>3,703</b>
Total	Formally protected	Both	17	1,537
Total inside natural range	Formally protected	Yes	13	1,389
Total inside natural range	Formally protected + Private	Yes	15	1,642
Total inside natural range	Wildlife ranches	Yes	54	1,334
Total inside natural range	Wildlife ranches (adjusted)	Yes	54	1,001–1,161
<b>Grand total eligible</b>	<b>All</b>	<b>Yes</b>	<b>69</b>	<b>2,256–2,803</b>

2014). Based on data from 12 protected areas across the country, the national population is estimated to have increased on net over three generations by 47–71%. However, further long-term data from both formally and privately protected areas are needed to more accurately estimate the national population trend as these estimates may be inflated due to the extrapolation of available data to cover the three generation period. Worryingly, however, many protected subpopulations, especially in North West and Limpopo provinces, continue to decline (estimated 21% population reduction in six such subpopulations), and they have become locally extinct at Madikwe Nature Reserve, as well as Borakalalo Nature Reserve, as none were recorded in the 2015 count (Nel 2015). Overall, five out of 12 sampled subpopulations are declining or locally extinct within the natural distribution. Similarly, in KwaZulu-Natal Province (which is not included in this assessment as it falls significantly outside the natural distribution), there has been a significant subpopulation crash at Ithala Nature Reserve from 160 in 2000 to 60 in 2010 and 19 in 2013 (Barichiev 2013). The cause of the decline is unknown, but is correlated to an accumulative deficit in rainfall. Furthermore, the reintroduced population at Phongolo Nature Reserve has, due to natural causes, gone extinct and must now be considered a failed translocation and establishment attempt (P. Goodman unpubl. data). Conversely, the subpopulation on Loskop Dam Nature Reserve, Mpumalanga Province (which is also precluded for falling outside the natural distribution range) has significantly increased from 18 individuals in 2005 to 66 in 2013 (J. Eksteen unpubl. data).

The national total current (2013–2015) population size is estimated to be at least 3,700 (Table 2) in the assessment

region, compared to an estimated 1,100 in 2004 (Friedmann & Daly 2004). This is an underestimate as not all data from privately protected subpopulations were available at the time of the assessment. Of these, the minimum population size of formally and privately protected areas occurring within the natural distribution range (IUCN Standards and Petitions Subcommittee 2014) is 1,642 individuals and 1,334 broadly occurring on wildlife ranches (a more detailed spatial analysis is required to determine exactly which ranches fall within the natural range). A preliminary analysis of 23 wildlife ranches containing Tsessebe subpopulations from around the country (A. Taylor unpubl. data) indicate that 46–87% of animals on wildlife ranches can be considered wild and free-roaming (not intensively managed; IUCN Standards and Petitions Subcommittee 2014). This brings the total number of estimated eligible individuals to 2,256–2,803 individuals, of which the total minimum mature population size is 1,353–1,962 individuals, assuming a 60–70% mature population structure (Table 2). Further data collection from the private sector is needed to more accurately estimate national population size.

At least two subpopulations outside of KNP (Mokala National Park and Sandveld Nature Reserve) are larger than 250 individuals (compared to none in 2004). This is based on information from ecologists/park managers from all the formal conservation agencies within the assessment region. A subpopulation of approximately 280 individuals also exists on a South African National Defence Force (SANDF) property (Roodewal) in Limpopo Province (P. Nel unpubl. data; 2016 estimate).

The reproductive rate for Tsessebe can be high in good quality habitat and in the absence of predators. For example, Mokala (SANParks), Sandveld (Free State) and Roodewal Bombing Range (SANDF – Limpopo) reported subpopulation growth rates in excess of 20% over the past decade. In poor quality habitats however, both adult and calf survival is very poor, which can be exacerbated during below average rainfall cycles. Inter-species competition also appears to influence subpopulation performance.

**Current population trend:** Increasing overall.

**Continuing decline in mature individuals:** Yes, in some areas due to poaching, declining habitat quality and interspecific competition.

**Number of mature individuals in population:** 1,353–1,962

**Number of mature individuals in largest subpopulation:** 172–200 individuals in Sandveld Nature Reserve.

**Number of subpopulations:** At least 69 in total, existing on formal conservation areas and wildlife ranches. There are 13 formally protected subpopulations inside the natural distribution.

**Severely fragmented:** Found on isolated and fenced protected areas and private land. Its habitat is also fragmented within KNP (Dunham et al. 2004).

## Habitats and Ecology

Generally an inhabitant of floodplains and other grasslands in sub-Saharan Africa (IUCN SSC Antelope Specialist Group 2008). In South Africa, the Tsessebe formerly occurred in the bushveld and lowveld, often at the ecotone between grassland and woodland. Their preferred habitats are Kimberley Thornveld and Mopane Bushveld. They do not occur in forests, arid or montane habitats (above 1,500 m) (Duncan 2013). Currently, the Tsessebe occurs mainly on the basalt plains of northern KNP because they feed in broad, grass-covered drainage lines within *Colophospermum mopane* shrubland on basaltic soils (Dunham et al. 2004). In Borakalalo Nature Reserve (North West) Tsessebe preferred less dense woody areas and areas that had medium height grass species, and home ranges for Tsessebe herds averaged approximately 248±49 hectares (Göpper 2012). Nearly exclusively grazers, they can go for months without drinking in the dry season if they are feeding on growing grass (Duncan 2013). They are averse to using artificial water points unless they resemble natural pools (Skinner & Chimimba 2005).

## Use and Trade

This species is hunted for food and sport. Within the assessment region, Tsessebe are also sold live at auctions. They are managed for their tourist value, as well as trophy hunting, although their value as trophy animals is unknown. Private ranching and intensive breeding is increasing for this species, along with its commercial value.

Wildlife ranching has the potential to contribute positively to the conservation of the species if the reintroduction of Tsessebe into suitable areas is promoted. Habitat quality and conservative stocking rates are key factors for success with regards to keeping and breeding Tsessebe and it is unlikely that they will perform well in captive breeding systems. Wildlife ranchers should be made aware of the risk of hybridisation with Red Hartebeest (*Alcelaphus buselaphus caama*) and this threat should be monitored and regulated.

## Threats

Within the assessment region, the main threats are deteriorating habitat quality, unnaturally high competition from other grazers due to high stocking rates, and increasing poaching in some areas. Deliberate or unintentional hybridisation with other Tsessebe subspecies and/or Red Hartebeest (*Alcelaphus buselaphus caama*) on wildlife ranches may be an increasing threat as hybrids are fertile (Schulze 2016). There are indications that they are a finicky herbivore species, that can be affected by competition from other grazers (Skinner & Chimimba 2005, Power 2014). The provision of artificial water points, specifically in KNP, is suspected to have resulted in increased grazing competition and predation pressure and thus a decline in Tsessebe numbers (Grant et al. 2002). Drought conditions are thought to exacerbate the more proximal threats, as Dunham et al. (2004) showed that the decline in KNP was likely precipitated by declining adult survival during a period of below-average dry season rainfall. The implication is that climate change, which is projected to decrease rainfall along the east–west aridity gradient in South Africa (Erasmus et al. 2002), will make habitat less suitable in the western parts of the country in the future. Similarly, drought and competition with livestock have been identified as major causes for population decline in Zimbabwe (Dunham et al. 2003). The Marakele National Park subpopulation has been fluctuating at low levels since 2009 and it is speculated that they are impacted by

**Table 3. Use and trade summary for the Tsessebe (*Damaliscus lunatus lunatus*)**

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	They are poached for bushmeat.	Minority	Possibly increasing
Commercial use	Yes	Sold at game auctions and hunted.	Majority	Possibly increasing
Harvest from wild population	Yes	Bushmeat poaching in protected areas.	Minority	Possibly increasing along protected area edges.
Harvest from ranched population	Yes	Trophy hunting and live animal sales.	Majority	Increasing with commercial value.
Harvest from captive population	Yes	Trophy hunting and live animal sales.	Minority	Increasing with commercial value.



Photo 1. Red Hartebeest x Tsessebe hybrids (Erika Schulze)

high predator densities. Similarly, the subpopulation at Madikwe Game Reserve declined due to declining habitat quality, interspecific competition and high predator densities (P. Nel unpubl. data).

Poaching is an increasing problem in some protected areas, especially as human settlements and density increase along protected area edges (Wittemyer et al. 2008). For example, only one individual is left on Borakalalo Nature Reserve, North West Province, from suspected high poaching rates (Nel 2015). It was also found that this subpopulation had low genetic diversity (Göpper 2012).

It has also been proven that Tsessebe can hybridise with Red Hartebeest and that the hybrid offspring are fertile. Although the F1 hybrid offspring are clearly distinguishable from both pure Tsessebe and pure Red Hartebeest, it is a concern that the hybrid offspring are fertile and it is not known at this stage what further generations of hybrids would look like. Recent data reveal that it is very difficult to distinguish between Red Hartebeest/Tsessebe hybrid offspring from pure offspring (Schulze 2016). The threat can at this stage be considered minor, but it has the potential of becoming a more serious threat as more Tsessebe are being kept in small camps or

in intensive breeding systems where Red Hartebeest also occur.

**Current habitat trend:** Stable in area but decreasing in quality, mainly due to overutilization (over-stocking) and bush encroachment. Subpopulations are mostly secure in fenced areas, and the area of occupancy may be expanding along with the expansion of privately protected areas and wildlife ranches.

## Conservation

Tsessebe are well represented in both protected areas and on private land within the assessment region, with strongholds in KNP (Limpopo), Pilanesberg National Park (North West), Mokala National Park (Northern Cape) and Sandveld Nature Reserve (Free State). Thus, although the decline of subpopulations on state land in North West, Limpopo and Mpumalanga provinces is concerning, all provinces have at least one protected area in which Tsessebe are flourishing and which could potentially restock other reserves when off-takes are necessary for subpopulation management. Similarly, captive breeding could possibly be undertaken inside the KNP in similar enclosures as has been undertaken with Roan Antelope (*Hippotragus equinus*) to stabilise the population declines. However, no *ex situ* breeding is recommended at this time. Translocation out of the KNP is problematic due to veterinary restrictions.

The most urgent intervention is habitat management to ensure excessive grazing competition and predation pressure is reduced by sustaining ecological stocking densities and closing water points to increase habitat heterogeneity (for example, Smit & Grant 2009; Macandza et al. 2012), thereby enabling the coexistence of rare antelopes, such as Tsessebe, on relatively protected areas and landscapes. Studies testing the effectiveness of this intervention should be initiated.

Reintroductions into new sites within the natural distribution should also be encouraged under a metapopulation framework. Tsessebe subpopulations are also performing very well in areas with good quality

**Table 4. Threats to the Tsessebe (*Damaliscus lunatus lunatus*) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)**

Rank	Threat description	Evidence in the scientific literature	Data quality	Scale of study	Current trend
1	7.2.9 Dams & Water Management/Use: increase in surface water availability. Current stresses 1.2 Ecosystem Degradation, 2.1 Species Mortality and 2.3.2 Competition: increase in grazing competition and predation pressure and decrease in grass cover.	Grant et al. 2002 Dunham et al. 2003	Indirect Indirect	Local Local	Stable in KNP but possibly increasing elsewhere.
2	5.1.1 Hunting & Collecting Terrestrial Animals: poaching and snaring along protected area edges.	Nel 2015	Empirical	Local	Possibly increasing with human settlement expansion.
3	11.2 Droughts: increased drought frequency reducing dry-season forage availability.	Erasmus et al. 2002 Dunham et al. 2004	Simulation Indirect	National Local	Arid conditions to increase in western areas.
4	2.3.2 Small-holder Grazing, Ranching or Farming: expansion of wildlife industry possibly increasing contact between exotic subspecies and/or Red Hartebeest. Current stress 2.3.1 Hybridisation.	Schulze 2016	Empirical	Local	Increasing

**Table 5. Conservation interventions for the Tsessebe (*Damaliscus lunatus lunatus*) ranked in order of effectiveness with corresponding evidence (based on IUCN action categories, with regional context)**

Rank	Intervention description	Evidence in the scientific literature	Data quality	Scale of evidence	Demonstrated impact	Current conservation projects
1	2.1 <i>Site/Area Management</i> : suitable habitat management, including de-stocking and water-point closure.	-	Anecdotal	-	-	SANParks
2	3.3.1 <i>Species Reintroduction</i> : reintroduction into suitable areas inside its natural distribution should be continued to increase national population.	-	Anecdotal	-	-	SANParks, provincial conservation agencies and private stakeholders.
3	6.2 <i>Livelihood, Economic &amp; Other Incentives</i> : developing sustainable game meat markets to decrease poaching rates.	-	Anecdotal	-	-	None
4	1.1 <i>Site/Area Protection</i> : protected area expansion to allow adaptation to climate change and increase habitat heterogeneity.	-	Anecdotal	-	-	-

habitat and free-roaming wild subpopulations of Tsessebe in these areas should be encouraged. Animals from growing subpopulations can be used to seed new subpopulations. For example, in the North West Province, reintroductions onto SA Lombard, Bloemhof Dam, Mafikeng and Botsalano Game Reserves are endorsed (Power 2014). Similarly, wildlife ranchers should be encouraged to continue establishing the native subspecies in areas of their natural range. However, due to the risk of hybridisation, Tsessebe subpopulations should preferably not be established on properties with Red Hartebeest and if Tsessebe are sourced from populations that occur with Red Hartebeest, genetic testing will have to be conducted to ensure that only genetically pure Tsessebe are translocated.

Protected area expansion, especially transfrontier expansion, should be encouraged, especially in the western parts of its range, to allow adaptation to climate change, dispersal and limit interaction with competing grazers and/or predators. To reduce poaching rates, the establishment of alternative livelihood schemes should be investigated, such as developing game meat markets from sustainable wildlife production areas, thereby also increasing the social and economic relevance of reserves in rural areas.

#### Recommendations for land managers and practitioners:

- A Biodiversity Management Plan is needed to inform a national translocation policy. All provinces have at least one protected area that is flourishing and which could potentially re-stock other reserves when off-takes are necessary for subpopulation management.
- A systematic monitoring scheme should be established as there is no coordinated monitoring at national or provincial scales.
- Landowners should be incentivised to maintain ecological stocking rates and create habitat heterogeneity through seasonal water-points or water-point closure to sustain the resources and prevent excessive grazing competition with Tsessebe.
- Landowners and protected area managers should also be encouraged to create conservancies and extensive areas for free-roaming Tsessebe herds.

#### Research priorities:

- Long term datasets for protected areas should be collated to more accurately estimate national population trends.
- Evidence for hybridisation with alien subspecies and/or with Red Hartebeest (*Alcelaphus buselaphus caama*) within the private sector or on formally protected areas should be collated to assess the extent and severity of this threat. This includes developing genetic markers for testing. Hybridisation potential with related species (Blesbok and Red Hartebeest) has been determined in a research project conducted on three provincial nature reserves in the Free State Province by the Free State Department of Small Business, Economic Development, Tourism and Environmental Affairs. The fertility of hybrid offspring as well as the physical characteristics of F2 hybrid offspring are currently being monitored.
- Investigating the causes of current subpopulation decline and testing potential interventions to reverse such declines.

#### Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially in KNP and on private lands outside protected areas.
- Private landowners can also drop fences to form conservancies and create the conditions to establish wild and free-roaming herds of Tsessebe.

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## Data Sources and Quality

**Table 6. Information and interpretation qualifiers for the Tsessebe (*Damaliscus lunatus lunatus*) assessment**

Data sources	Field study (unpublished)
Data quality (max)	Estimated
Data quality (min)	Estimated
Uncertainty resolution	Best estimate
Risk tolerance	Evidentiary

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