Syncerus caffer caffer – Southern Savannah Buffalo

Regional Red List status (2016)	**Least Concern**
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2008)	Least Concern
TOPS listing (NEMBA)	None
CITES listing	None
Endemic	No

African Buffalo are known for their remarkable strength and determination; and will often assist fellow herd members when in distress, particularly when under attack from large predators.

Taxonomy

Syncerus caffer caffer (Sparrman 1779)

ANIMALIA - CHORDATA - MAMMALIA - CETARTIODACTYLA - BOVIDAE - *Syncerus* - *caffer*

Common names: Southern Savannah Buffalo, Cape Buffalo, African Buffalo, Buffalo (English), Buffel, Afrika-buffel (Afrikaans), Inyathi (Ndebele, Xhosa, Zulu), Nare (Sepedi, Sesotho, Setswana), Inyatsi (Swati), Nari (Venda), Nyarhi (Tsonga)

Taxonomic status: Subspecies

Taxonomic notes: The African Buffalo (*Syncerus caffer*) exhibits substantial morphological variability (Skinner & Chimimba 2005), resulting in controversies regarding the recognition of the various subspecies (Smitz et al. 2013). Recent evidence supports the separation of two distinct groups, corresponding to a West and Central African group and an East and Southern African group (Smitz et al. 2013). The East and Southern African group is comprised of a single subspecies (*Syncerus caffer caffer*), which is found in the assessment region. The West and Central African group is assigned to two or three subspecies (*S. c. nanus*, *S. c. brachyceros* and *S. c. aequinoctialis*), although the latter two of these subspecies are not recognised by all authorities (Le Roex et al. 2012; Smitz et al. 2013).

The West African Savannah Buffalo, *S. c. brachyceros* (from Senegal to Cameroon) and the Central African Savannah Buffalo, *S. c. aequinoctialis* (from Central Africa to Sudan) are morphologically intermediate between *S. c. caffer* (Southern Savannah Buffalo) and *S. c. nanus* (Forest Buffalo) (Skinner & Chimimba 2005). Forest Buffalo are adapted to forest life, having a smaller size, unobtrusive swept back horns and a red to reddish-brown colouration, and are restricted to West Africa (Skinner & Chimimba 2005). Southern Savannah Buffalo are about twice the size of Forest Buffalo, with large downward curved horns and a brownish to black colouration (Smitz et al. 2013). The taxonomic uncertainty in these four subspecies is corroborated by the observation of interbreeding and intermediate phenotypes in contact zones between all four subspecies (Prins 1996), and at least one reported cross between *S. c. caffer* and *S. c. nanus* (Smitz et al. 2013). Based on recent genetic results, *S. c. brachyceros* and *S. c. aequinoctialis* would be included in *S. c. nanus* following standard nomenclature rules (Smitz et al. 2013). Evidence suggests that buffalo populations in Uganda and the Central African Republic display the highest genetic diversity of all African Buffalo populations and this could be the region where the most overlap exists between the two main groups (*S. c. nanus* and *S. c. caffer*) (Smitz et al. 2013). Analysis of 766 mtDNA sequences from 43 localities indicates that S. c. caffer is found in Uganda, Kenya, Tanzania, Zimbabwe, Botswana, South Africa and Namibia (Smitz et al. 2013).

Assessment Rationale

This subspecies is widespread and abundant within the assessment region, with subpopulations being reintroduced across the country on private lands both within and outside their original range (which should be regulated). The total mature population size in 2013 is estimated to have been 50,231 animals in 70 formally protected areas (35,162 mature animals), while the private sector is estimated to have added at least 19,561 further animals, raising the total population size to at least 69,882 animals (48,917 mature). However, many of these private subpopulations are intensively managed and thus not eligible for Red List assessment. Future assessments should determine the true wild and free-roaming population size. The national population is estimated have significantly increased over three generations (1982–2015) and threats that could cause local subpopulation declines (such as disease, drought and poaching) are mitigated by the game ranching industry that has stimulated increasing numbers of reintroductions and introductions onto private properties. However, the increasing intensive and selective breeding of private subpopulations may be lowering genetic diversity and this should be monitored. Overall, while local declines must be monitored and managed, and genetic diversity should be sustained through a translocation policy, this subspecies should continue to thrive within the assessment region. Thus, the Least Concern listing remains.

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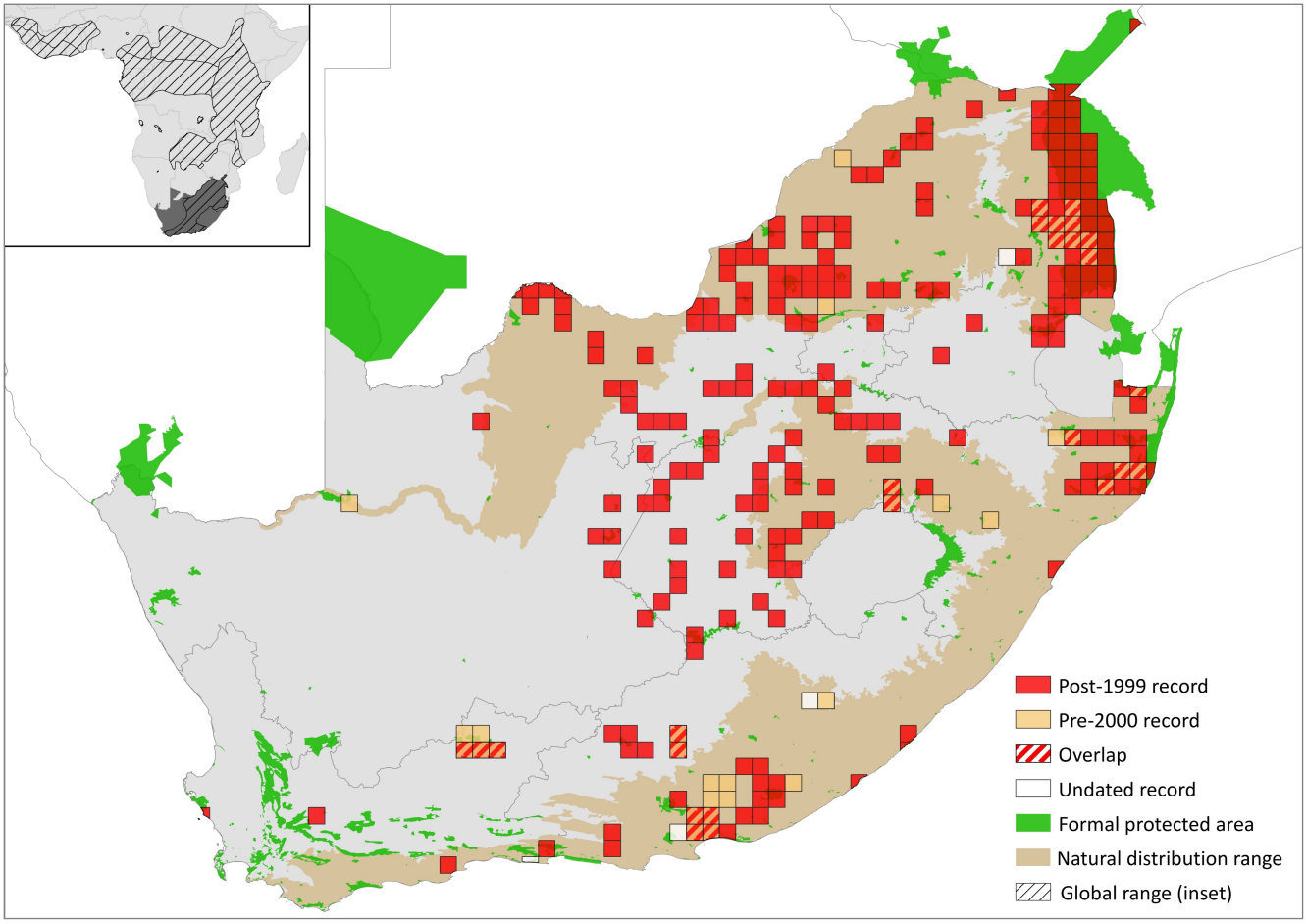

Figure 1. Distribution records for Southern Savannah Buffalo (*Syncerus caffer caffer*) within the assessment region

Table 1. Countries of occurrence within southern Africa

Country	Presence	Origin
Botswana	Extant	Native
Lesotho	Absent	-
Mozambique	Extant	Native
Namibia	Extant	Native
South Africa	Extant	Native
Swaziland	Extant	Reintroduced
Zimbabwe	Extant	Native

Regional population effects: Although there will be some movement of buffalo between the Kruger National Park (KNP), Mozambique and Zimbabwe, it is likely that the KNP subpopulation will be providing a source for the Zimbabwe (possibly) and Mozambique sections of the Tranfrontier Park. Fence barriers are negotiated with relative ease, particularly across rivers. A 2010 census of Limpopo National Park in Mozambique revealed that most buffalo sightings were in the southwestern sections and close to the KNP (Wildlife Management Services – Parque Nacionale do Limpopo 2010), suggesting movement from the KNP into Limpopo National Park.

Distribution

Before the influence of European settlers, the African Buffalo's former range stretched over most of southern Africa and Angola, through central and east Africa to the southern borders of Sudan and Ethiopia (Sinclair 1977). The Southern Savannah Buffalo subspecies is distributed through the eastern and southern portions of the overall range, predominantly in Uganda, Kenya, Tanzania, Zimbabwe, Botswana and South Africa (Smitz et al. 2013); and is also still present in Namibia and Mozambique (Winterbach 1998). They are now generally confined to protected areas (fenced and unfenced), within which they are well represented.

The largest subpopulations of buffalo are in the savannah areas of the Limpopo Province, Mpumalanga and KwaZulu-Natal (KZN) (Winterbach 1998), and to a lesser degree the Eastern Cape. They have been reintroduced to areas from which they were formerly extirpated (for example, in North West Province; Power 2014). Similarly, they were reintroduced in Swaziland, where the indigenous population was extirpated. There are fewer populations in the Western and Northern Cape provinces (Winterbach 1998; Venter 2006). Buffalo distribution in South Africa is expanding rapidly with Buffalo ranching and breeding operations becoming more popular (Venter 2006).

Population

It has been estimated that 670,000 Southern Savannah Buffalo exist across the continental distribution range (IUCN SSC Antelope Specialist Group 2008). In many parts of its range, the numbers of African Buffalo are thought to be declining because of bushmeat hunting and continuing loss of habitat (IUCN SSC Antelope Specialist Group 2008). Winterbach (1998) estimated that a

population of 111,900 buffalo inhabit southern Africa (excluding Mozambique).

Within the assessment region, there were an estimated 50,231 animals in 70 formally protected areas (2013 counts), which yields a mature protected population of 35,162 animals (assuming a 70% mature population structure). There were at least an additional 19,561 animals on 110 private properties across the country (2013 counts). This yields a total population size of 69,882 animals (48,917 mature) in 2013. However, many private buffalo subpopulations are intensively managed (Taylor et al. 2015) and do not qualify for inclusion in the Red List assessment. Further work is thus required to determine the wild and free roaming population size. The largest subpopulation exists in KNP, estimated at over 27,000 (Michel et al. 2006) and, more recently, 37,322 animals (Ferreira et al. 2013). The KNP subpopulation fluctuates in response to rainfall and drought, with population crashes observed during droughts in the 1980s and 1990s (Funston & Mills 2006). Additionally, the KNP population has been infected with Bovine Tuberculosis since 1990 (de Vos et al. 2001), along with foot and mouth disease, corridor disease and brucellosis. The subpopulation in Hluhluwe-iMfolozi Park in KZN is estimated at 5,468 animals (Clinning 2012) and iSimangaliso Wetland Park contains around 200 animals (van Rooyen 2004). The largest subpopulations in the Eastern Cape are estimated to be 399 in Addo Elephant National Park (Ferreira et al. 2013) and 318 in Great Fish River Nature Reserve (Peinke & Gibisela 2014) (2013 counts). The Doornkloof Nature Reserve in the Northern Cape has a population of *c*. 100 animals (2013 count).

Generation length for this species has been estimated as 11 years (Pacifici et al. 2013), yielding a 33 three–generation window (1982–2015). Using 11 formally protected areas, with adequate long-term data over this time, we estimate a population increase of 398% over three generations (1,888 to 9,401 animals on the sampled protected areas), with only two sampled subpopulations experiencing declines over this period. Thus, the population in the assessment region is currently increasing whereas they may be declining elsewhere in Africa (IUCN SSC Antelope Specialist Group 2008; Craigie et al. 2010). While there are local fluctuations (such as in the KNP subpopulation) related to climatic variability (droughts), buffalo have proven to recover rapidly to former levels after such events.

Current population trend: Increasing

Continuing decline in mature individuals: No

Number of mature individuals in population: 35,162–48,917

Number of mature individuals in largest subpopulation: 26,125

Number of subpopulations: 70 (formally protected areas)

Severely fragmented: Yes, populations are largely restricted to national parks and private lands, and dispersal is limited by fences.

Habitats and Ecology

Buffalo occupy a broad range of habitats, including forest (to elevations well over 4,000 m asl), moist lowland rainforests, coastal savannahs, montane grasslands, semi-arid bushland, *Acacia* woodland, and Miombo


Andre Botha

Brachystegia woodland. They do not inhabit deserts and sub-deserts, for example the Namib and the Saharan/ Sahelian transition zone (Prins & Sinclair 2013). Funston et al. (1994) found that the four factors that appeared to influence habitat selection of buffalo were forage availability, cover for protection against predators, proximity to water and the mobility of the herd. They drink water regularly and usually graze or take shelter in thick riverine vegetation (Skinner & Chimimba 2005). They require abundant grass, shade and water, and the absence of these requirements probably prevented their occupation of the Karoo or open grassland plains of the Highveld. Although abundant grass is required, large open floodplains or grasslands are avoided as they require the shade of trees to rest under during the hottest hours of the day. The digestive system of the buffalo is typical of bulk and roughage grazers, and is not suitable for a diet exclusively of browse material (Hofmann 1989), but they do occasionally take browse (Novellie et al. 1991; Venter & Watson 2008). They are prone to be selective of grass species and grass parts (Sinclair 1974; Hunter 1996; Prins 1996).

Buffalo are gregarious and occur in mixed herds numbering up to 3,000 individuals. In the KNP, herd numbers average 300–500 individuals (Whyte 2004) and larger herds are often associated with a higher proportion of juveniles (Tambling et al. 2013). Herds often inhabit home ranges that overlap very little with neighbouring herds and these home ranges vary in size, depending on season and the amount of available water and forage. Old and young bulls will leave the herd and form smaller bachelor herds that tend to occupy considerably smaller ranges than the larger female-dominated herds. These smaller bachelor herds are prone to greater levels of predation as they have smaller average group sizes and tend to inhabit riskier environments (Tambling et al. 2013). Herds will normally move towards water early in the morning and again early in the evening. They are most active while feeding early in the morning and late afternoon and are characterised by considerable feeding bouts at night. Buffalo employ this activity pattern both in the presence and absence of predators; however, under high predation risk, buffalo may increase midday movement with a corresponding decrease in early morning movement (Tambling et al. 2015).

In the KNP, Pienaar (1969) recorded that calves are typically born between January and April, with a peak in January/February, coinciding with a peak in grass growth and protein content (Skinner & Chimimba 2005).

Table 2. Use and trade summary for the Southern Savannah Buffalo (*Syncerus caffer caffer*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Bushmeat	Minority	Increasing
Commercial use	Yes	Bushmeat, biltong hunting, trophy hunting, live game sales	Majority	Increasing
Harvest from wild population	Yes	Bushmeat	< 10%	Increasing
Harvest from ranched population	Yes	Trophy hunting, biltong hunting, live game sales	> 10%	Increasing
Harvest from captive population	Yes	Trophy hunting, biltong hunting, live game sales	> 30%	Increasing

Ovulation in females and spermatogenesis in males was found to commence after about 3.2 years (Sinclair 1977; Taylor 1985), and 2.5 years of age, respectively (Taylor 1985). Generally, females may give birth to their first calf when they are 4–5 years old (Carmichael et al. 1977; Taylor 1985; Mizutani 1987). Although males may reach sexual maturity between the ages of 3.5 and 5.5 years, dominant bulls typically prevent younger bulls from breeding until they are 7–8 years old (Skinner & Chimimba 2005). Over an age of 10 years, males are no longer found in breeding herds (Skinner & Chimimba 2005). A single calf is born, weighing approximately 31.1 kg for males, and 31.2 kg for females, following a mean gestation period of 340 days (Vidler et al. 1963). Calves suckle for about 9 months, and may remain with its mother for up to two years (Skinner & Chimimba 2005)

Ecosystem and cultural services: Buffalo, as bulk grazers, are important ecosystem engineers who facilitate the presence of more selective, smaller grazers (Venter et al. 2014). They are an important food source for the larger predators like African Lion (*Panthera leo*) (Hayward & Kerley 2005). Buffalo and lions (which prey on them) are both part of the "Big Five", and are important species for tourism in Africa (Okello et al. 2008). As part of the "Big Five", they are sought after as hunting trophies. The tourism and hunting industries are of major socio-economic importance in South Africa.

Use and Trade

Since disease became a major threat to buffalo populations, the breeding of disease-free buffalo in South Africa has become a highly lucrative industry. Auction sales prices of buffalo have increased significantly over the years (Power 2014). Current average prices for live buffalo are between R180,000 and R450,000 per animal. There is also an increasing trend to sell animals as "stud" breeding stock when they have large, trophy quality horns. Prices of up to R44 million have been recently paid for some of these "stud" bulls. Cows are traded in a similar way and also reach high prices at game auctions in South Africa. There is considerable trophy hunting taking place of both diseased and disease-free buffalo. The current trophy hunting value is between R80,000 and R350,000 depending on the client and trophy quality. Live animals have been sold on auction from the smaller Addo Elephant National Park (Addo) for more than 10 years and, based on recent estimates, this trade is unlikely to have any impact on the Addo subpopulation (C. Tambling unpubl. data). Similarly, buffalo are auctioned from provincial reserves in the Eastern Cape and the North West (Nel 2015), as well as from current breeding operations. Overall this trade is unlikely to affect the population in the assessment region. Buffalos are also used for bushmeat (Lindsey et al. 2012), however, the bushmeat trade, in many cases, has reached a commercial level in Africa and may not be considered subsistence-use anymore.

Wildlife ranching and the private sector have generally had a positive effect on this species as it has been widely reintroduced onto private properties within its natural distribution and introduced on those outside of its distribution. Private landowners have also bred numerous disease-free herds that can be reintroduced into protected areas. There is an increasing trend to breed buffalo under intensive conditions due to the high value and demand attached to the species. However, the selective breeding of buffalo for "stud" purposes could pose a significant threat to the population's genetic integrity. Inbreeding and selective breeding could cause reduced genetic diversity with subsequent negative effects on the population. More species-specific research is needed to confirm or refute this. These captive subpopulations may not be suitable for re-integration with wild stock. However, there is no current need for reintroductions, as the wild stock is healthy. Reintroducing buffalo onto reserves with lions would be counterproductive, as the few management interventions that have combined naïve buffalo with lions have resulted in high initial levels of lion predation. If the buffalo population is not large enough to absorb the initial predation the reintroduced population may not persist.

Table 3. Possible net effects of wildlife ranching on the Southern Savannah Buffalo (*Syncerus caffer caffer*) and subsequent management recommendations

Net effect	Positive, but potentially negative
Data quality	Expert consensus
Rationale	Wildlife ranching has translocated this species widely across the country, both within and outside of its native range. However, the effects of genetic manipulation threaten to impact wild populations.
Management recommendation	Research is needed on potential negative effects of stud breeding, and the introduction of these individuals into wild populations.

Table 4. Threats to the Southern Savannah Buffalo (*Syncerus caffer caffer*) 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	*8.2.1 Problematic Native Species/Diseases*: vulnerability to Bovine tuberculosis.	de Vos et al. 2001	Empirical	Local	Stable
		Michel et al. 2006	Indirect	National	
		Cross et al. 2009	Empirical	Local	
2	*5.1.1 Hunting & Collecting Terrestrial Animals*: bushmeat hunting.	Lindsey et al. 2012	Indirect	International	Increasing
		Nel 2015	Empirical	Local	
3	*11.2 Droughts*: increased frequency of droughts caused by climate change.	Nel 2015	Empirical	Local	Increasing
4	*2.3.2 Livestock Farming & Ranching*: Current stress *2.3.5 Inbreeding:* including selective breeding causing reduced genetic diversity.	-	Anecdotal	-	Increasing
5	*7.2.9 Dams & Water Management/Use*: excessive artificial water point provision.	-	Anecdotal	-	Increasing

Threats

Historically, buffalo subpopulations suffered most severely in the 1890s, due to the great rinderpest epidemic, which was associated with pleuro-pneumonia and resulted in mortalities of up to 95% among wild ungulates and livestock (Winterbach 1998). Rinderpest, anthrax and other diseases persisted, causing localised declines and extinctions of subpopulations throughout the 20th century, as rinderpest spread from cattle to wildlife. However, the World Organisation for Animal Health declared rinderpest completely eradicated worldwide in May and June 2011 (World Organisation for Animal Health, accessed August 2014). Within the assessment region, the strict controls in regulating buffalo movement have resulted from the risk that buffalo pose to cattle and vice versa through disease transmission. Bovine tuberculosis is of primary concern, particularly in the KNP and KZN. Tuberculosis was first diagnosed in buffalo in KNP in 1990 (Michel et al. 2006), although the growth rate and demographics of the subpopulation are unchanged (Cross et al. 2009). Over the past years, the disease has spread northwards (Michel et al. 2006). Potential negative long-term effects include the threat to the survival of threatened species that come into contact with infected buffalo, the risk of spill-over to neighbouring communal cattle, which could affect human health, and negative economic impacts caused by national and international trade restrictions (Michel et al. 2006). The population at Addo Elephant National Park is still completely disease-free (no confirmed cases of diseases of economic concern) and buffalo are sold at auction each year. The majority of populations within formally protected areas outside of the veterinary red line (the hypothetical line separating diseased buffalo populations from disease-free populations) originated from this Addo population. The KNP population is also infected with foot and mouth disease, corridor disease and brucellosis, and is behind the veterinary red line. Additionally, a major population in Hluhluwe-iMfolozi Park is infected with tuberculosis and corridor disease.

Buffalo are a preferred target-species for meat hunters and poachers. Snaring may affect local subpopulations within the assessment region (for example, Nel 2015). Poaching for bushmeat has become a major threat across the continent, and is one of the important causes of population declines in large ungulates in protected areas in other parts of Africa (Craigie et al. 2010; Lindsey et al. 2012), such as the Serengeti National Park in Tanzania, Comoé in Cote d'Ivoire, and Garamba in the Democratic Republic of the Congo. The increase in poaching is caused by an increase in the demand for bushmeat in both rural and urban areas, human encroachment into wildlife areas, lack of enforcement, lack of alternative livelihoods and food sources, lack of clear land rights, political instability and demand for traditional medicine (Lindsey et al. 2012). A significant increase in mineral and gas mining and exploration, with associated influx of people into uninhabited or low human density areas, are also considered to be a major factor causing increased poaching activity (Thibault & Blaney 2003). Additionally, encroachment by humans and their domestic animals on the borders of protected areas causes edge effects and subsequently could have a negative influence on buffalo habitat.

Buffalo are also vulnerable to drought (Nel 2015), which historically resulted in significant population declines, especially when associated with diseases, such as rinderpest or anthrax; for example, during the 1990s, in Tsavo National Park (Kenya), the Serengeti/Mara (Tanzania), Gonarezhou National Park (Zimbabwe) and KNP (South Africa) (East 1999). Within the assessment region, drought is related to lack of forage availability after having been artificially provided (increasingly the case on private properties). The effects of climate change may exacerbate these problems, rendering many areas unsuitable for this subspecies.

Current habitat trend: Stable

Conservation

This species occurs widely across the assessment region, with the bulk of the population within protected areas, including the KNP, as well as Addo Elephant National Park and Great Fish River Nature Reserve. The latter populations contain the original Addo disease-free populations. Thus, the bulk of the population exists in well-managed formal protected areas. The economic value of

Table 5. Conservation interventions for the Southern Savannah Buffalo (*Syncerus caffer caffer*) 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	*5.2 Policies & Regulations:* create translocation plans that sustain genetic diversity and comply with disease mitigation legislation.	-	Anecdotal	-	-	-

this species has led to its reintroduction into a number of private properties across its natural distribution. The future status of this subspecies is closely linked to the future of protected areas, game ranches and well-managed hunting areas, since it is a frequent target of poachers. No immediate interventions are required. However, strategic translocations to sustain genetic diversity are necessary (Nel 2015).

Additionally, the success of this subspecies is tied to the control of diseases, especially where the transmission of disease from buffalo to cattle could occur. In terms of Regulation 20 published under the Animal Diseases Act, 1984 (Act No. 35 of 1984), no live cloven hoofed animals may be moved out of South Africa's foot and mouth disease infected zones. Veterinary regulations have led to the restriction of movement of buffalo beyond the red line in South Africa, as these diseases are easily transmitted to cattle. This limits opportunities to establish this species outside its current range in South Africa. There are programmes in place to breed disease-free animals from behind the red line. This should be continued, but land managers should ensure that genetic diversity is retained and that there is no threat of inbreeding through the use of well-coordinated translocation policies.

Recommendations for land managers and practitioners:

- Develop this species as a cornerstone of the sustainable, wildlife-based rural economy.
- Provide incentives for landowners to create conservancies where the benefits of this species are shared.
- Responsible management of buffalo herds and breeding is encouraged.

Research priorities:

- Methods of creating wildlife-based economies from this species through ranching, tourism and hunting.
- The effect of current stud breeding of buffalo on the species genetic diversity.
- Further continued research on disease risks (especially non-indigenous diseases like bovine tuberculosis).
- The scale, distribution and trends in buffalo bushmeat hunting, especially along the borders of protected areas; as well as the associated ecological, social and economic impacts.

Encouraged citizen actions:

- Landowners should create conservancies for this species and engage local stakeholders to create sustainable, wildlife-based rural economies.
- Lobby government to address lack of alternative livelihoods and food sources with innovative sustainable development solutions (e.g. encouraging smaller families, reducing reliance on natural resources, effective land-use planning, etc.).

Data Sources and Quality

Table 6. Information and interpretation qualifiers for the Southern Savannah Buffalo (*Syncerus caffer caffer*) 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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Assessors and Reviewers

Craig Tambling[1], Jan Venter[1,2], Jacobus du Toit[3], Matthew F. Child[4]

[1]Nelson Mandela Metropolitan University, [2]Eastern Cape Parks and Tourism Agency, [3]Private Wildlife Veterinarian, [4]Endangered Wildlife Trust

Contributors

Claire Relton[1], IUCN SSC Antelope Specialist Group

[1]Endangered Wildlife Trust

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