

Non-detriment finding for *Damaliscus pygargus pygargus* (bontebok)

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Summary of findings

Damaliscus pygargus pygargus (bontebok) is included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Bontebok are currently hunted for trophies in South Africa, with 84% (a total of 1 844 specimens) of international exports between 2010 and 2021 reported as trophies. 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. Bontebok is also currently listed as Vulnerable in terms of section 56 of the National Environmental Management: Biodiversity Act (NEMBA) No. 10 of 2004; as Vulnerable on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Radloff *et al.* 2016). A non-detriment finding (NDF) for this subspecies is therefore required. This NDF for *Damaliscus pygargus pygargus* (bontebok) was compiled through a review of the relevant literature and deliberations held at an NDF workshop convened by the South African National Biodiversity Institute on 3 February 2022 (workshop participants and references included at the end of this document), and amended through various further consultations. The information presented is current as of February 2024.

The bontebok is endemic to the southern parts of the Western Cape in South Africa with its natural distribution range limited to a narrow band along the coastal plains of the Overberg region. Of the vegetation types within the bontebok's natural and extended natural distribution range, more than 50% are listed as critically endangered, with a further 26% listed as either endangered or vulnerable, in terms of section 52 of NEMBA. The status and limited availability of habitat for bontebok within the natural distribution range thus necessitated Cape Nature to adopt a policy that would enable the extension of the bontebok range through translocation. The keeping of this subspecies by private land owners outside of the natural distribution was therefore allowed by Cape Nature and a buffer population was created from which populations within the natural distribution range could be augmented within a meta-population management approach. Bontebok has also been translocated extensively outside of its extended natural distribution range to the rest of the Western Cape, as well as to the Eastern Cape, Free State, Limpopo, Northern Cape, and North West provinces. The total population is estimated between 9 819 and 11 069 animals of which approximately 2 480 animals currently occur within the natural and extended natural distribution range within the Western Cape. The minimum number of bontebok outside of its natural distribution range is thus estimated at 7 339 animals (75%). The national population is fragmented with the majority of the populations on private land consisting of less than 50 animals. Within the natural and extended natural distribution range bontebok numbers appear to be stable, but nationally the numbers are increasing. It appears that the bontebok population size within the natural and extended distribution range has stabilised at approximately 2480 individuals providing few options to improve the status of the species within its natural and extended natural distribution range. This is large due to the very restricted natural distribution range, the fact that bontebok are competing with domestic stock and other competing land uses within its native range, that income generation through bontebok trophy hunting is made difficult through the import restrictions, and disease and parasites prevent the species co-inhabiting with sheep. This is based on good local knowledge of population sizes and trends.

The bontebok is long-lived with animals recorded to live up to 15 years in captivity. Their reproductive rate is low due to the long gestation period of approximately 240 days and the production of a single lamb in spring. It is considered a medium-ability disperser (its dispersal abilities considered to be neither good nor poor) within a localised range and at present dispersal is severely limited by fences. Bontebok are almost exclusively grazers, with a preference for short grass and recently burnt veld. The subspecies is tolerant of human activities and bontebok appear to do well on old cultivated fields where short grasses proliferate. They have adapted well in

areas outside of their natural and extended natural distribution range where suitable habitats occur such as in the Free State.

The current, predominant threat to the bontebok both within and outside of its natural and extended natural distribution range is the large number of highly fragmented and small subpopulations in the absence of meta-population management. However within the natural and extended natural distribution range, an additional major threat is loss of habitat which is severe and in some cases irreversible. Further concerns relate to the low levels of genetic diversity within bontebok, a result of the genetic bottleneck the subspecies underwent with being hunted to near extinction in the 1930's, and more recently hybridisation with blesbok (*Damaliscus pygargus phillipsi*). Van Wyk *et al.*, (2017) investigated the hybridisation rates in animals sampled across South Africa and found that approximately 25% of the samples were hybrids, but more importantly also found that approximately 67% of the localities sampled, had hybrids. Hybridisation occurred due to human-mediated mixing of bontebok and blesbok (*Damaliscus pygargus phillipsi*). An additional key threat is the lack of economic incentives or sustainable funding models for private landowners to contribute to conservation objectives. International blanket trophy hunting bans (imposed by other CITES countries) constrain current incentives and impacts negatively on the conservation of the species and its habitat. In addition, where imports are allowed, the slow processing of permit applications are negatively impacting the ability of wildlife custodians to fund their conservation efforts through international trade. Improving economic incentives will assist with the implementation of a meta-population management plan which in turn will reduce concerns related to low genetic diversity and hybridisation.

Even though bontebok are currently exported as hunting trophies, there is no national quota in place. However, within the Eastern Cape, which manages approximately a third of the population, offtake quotas for bontebok from private landowners are submitted to the provincial conservation authority on an annual basis. The quotas are reviewed and approved by the provincial conservation authority in accordance with the Biodiversity Management Plan (BMP) for bontebok. Hunting of the subspecies on private land where land owners have been awarded exemption in terms of provincial conservation legislation is not regulated or monitored. Hunting is allowed in some provincial protected areas throughout its range while harvesting by live off-takes occurs on provincial nature reserves as well as National Parks. The overall aim of harvesting at present is mostly population management/control to facilitate the growth of the national population and to generate income to fund conservation efforts. Hunting of bontebok, for international export, is monitored through reporting of CITES exports, while translocation is monitored through a permit system on a case by case basis, but the effects of harvesting (on heterozygosity and fitness for example) are not currently monitored. Due to budgetary and capacity constraints, there is a medium confidence in the national monitoring of exports and the monitoring of the effects of harvest. A Biodiversity Management Plan for bontebok that addresses the main threats and meta-population management of the species has been developed, and gazetted for implementation in December 2019. In addition, to address the threat of hybridisation provincial and industry protocols have been developed and implemented. These protocols encourage or enforce hybridisation testing of bontebok populations as well as the testing and microchipping of all animals offered for sale or for trophy hunting. The protocols further prohibit the export of bontebok hybrid trophies. All test results are stored in a central database at the South African National Biodiversity Institute (SANBI).

At present, hunting of bontebok does not occur in any National Parks nor within some of the provincial protected areas. Approximately 7% of the subspecies total population is afforded strict protection in protected areas within its natural and extended natural distribution range. Budgetary and capacity constraints have lowered the confidence in the effectiveness of measures taken to afford strict protection. No restrictions on harvesting to prevent overuse are currently in place. The current conservation value accrued for the subspecies through harvesting is considered medium due to existing blanket trophy hunting bans, slow processing and constraints with the import of trophies to the USA that reduces the value proposition the species holds for private sector as part of a sustainable wildlife-based land-use model. The results of a questionnaire survey conducted by the SANBI in May 2016 support these findings and indicated that more than 30% of private game owners have bontebok because of its potential to subsidise conservation costs through income generated from trophy hunting. Of these 77% rely solely on international hunters and an additional 16% on a combination of local and international hunters for sustainable income streams. The survey confirms that 75% of the private game owners use the income generated through trophy hunting to secure bontebok habitat and manage their properties ecologically. A recent survey conducted in the Eastern Cape (137 surveys equating to 758 015 ha) evaluating the contribution of working lands to ecosystem processes and rewilding of landscapes highlighted that almost all wildlife ranchers practise sustainable land

management which can be seen as private investment into a public good through the provision of ecosystem services through natural capital restoration (Child, 2021, Unpublished data). Trophy hunting is the biggest financial contributor to revenue with positive outcomes in ecosystem restoration through land-use change from cultivated fields towards near natural habitats (Child, 2021, Unpublished data). Incentives for wildlife custodians to restore bontebok habitat within the species' natural and extended distribution range is low and competition with other land uses is very high. This is exacerbated by allowing bontebok introductions outside of its natural and extended range. Bontebok could however be used as a flagship species for the protection of critically endangered habitats within its natural distribution range.

In conclusion, this non-detriment finding undertaken for bontebok as summarised in the analysis of the key considerations above, demonstrates that legal local and international trade in live animals and the export of hunting trophies at present poses a low risk to the survival of this subspecies in South Africa (Fig. 1 and 2). International restrictions on the import of hunting trophies remains a constraint for improved conservation outcomes since the limited economic value of bontebok undermines incentives for landowners to conserve the subspecies and its habitat.

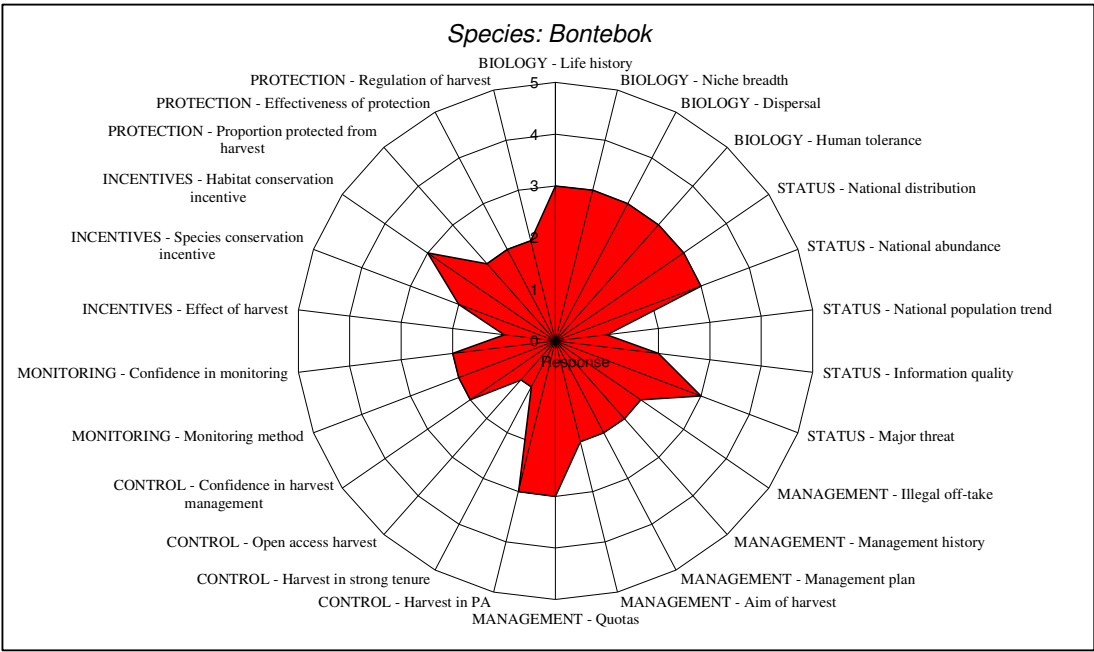


Figure 1: Radar chart summarising the non-detriment finding evaluation for *Damaliscus pygargus pygargus* (bontebok) undertaken in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The limited shaded area in the radar chart demonstrates an overall low risk to the subspecies.

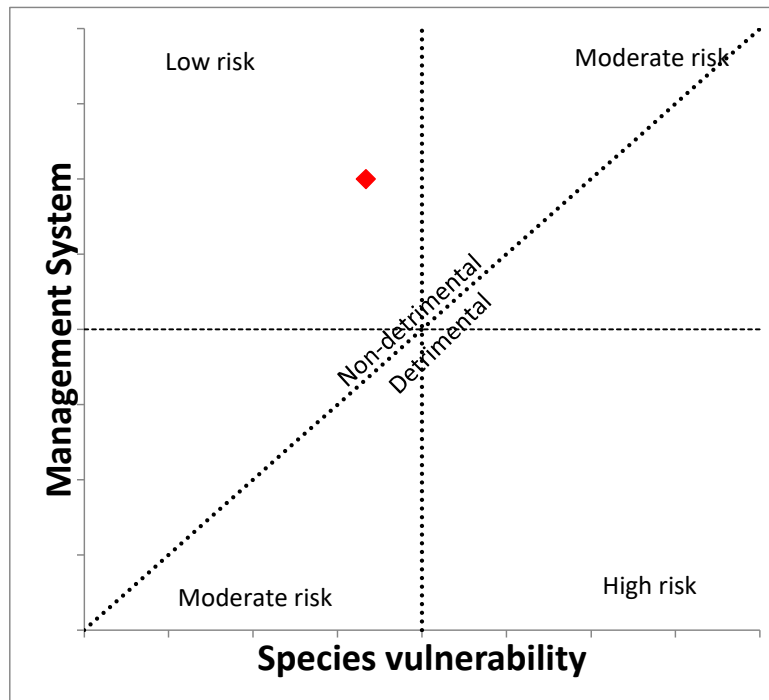


Figure 2: The risk of trading in *Damaliscus pygargus pygargus* (bontebok), as represented by the relationship between species vulnerability (biology and status) and the management system to which the species is subjected (management, control, monitoring, incentives and protection). The figure demonstrates that the subspecies is at a low risk, and that trade is not detrimental.

Table 1: Detailed NDF assessment for *Damaliscus pygargus pygargus* (bontebok) 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
In captivity bontebok have been known to live for up to 15 years. Bontebok are seasonal breeders, mating in early autumn in the Bontebok National Park where the rut takes place between the months of January to mid-March, with some activity continuing until April. Conception rate is influenced by rainfall prior to the breeding season, as well as food availability (Novellie, 1986). Females lamb on average every year after a gestation period of approximately 240 days. A single lamb is born in spring. Females are sexually mature after 2 years and have their first lambs at around 3 years old. Males are sexually mature at about 5 years of age. The bontebok's social organisation consists of territorial males, female herds and bachelor groups. The territorial males establish and maintain a mosaic of territories varying in size from 4 to 28 ha, within which they defend a smaller activity centre from other males. Males establish territories when they are 3 – 5 years old. Female herds consist of a small number of adult females (approximately 8) with their young (Skinner & Chimimba, 2005). Female herds are non-territorial and wander at will over the home ranges of the territorial males. Bachelor groups consist mainly of males of all ages but can include a small number of females.		
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
Bontebok are exclusive short grass grazers (Beukes, 1984, Beukes, 1987, Novellie, 1987, Kraaij & Novellie, 2010) and thus has a preference for the more grassy micro-habitat patches in the fynbos areas of the Overberg region, but have been observed to eat small shrubs (<i>Helichrysum orbiculare</i>), sedges (<i>Ficinia anceps</i> and <i>F. argyropa</i>) and restios (<i>Restio quinquefarus</i>). They seldom frequent tall woody vegetation with low visibility and steep slopes but prefer open areas with low shrubs (Novellie, 1987). Research conducted in the Bontebok National Park and the Cape of Good Hope Section of Table Mountain National Park found that bontebok have a preference for recently burnt veld and fire breaks (Watson <i>et al.</i>, 2011). They show disinterest in burnt vegetation four to five years post fire and rather utilise grazing lawns of <i>Cynodon dactylon</i> and bunch grasses. Suitable natural habitat for bontebok is thus limited to the remaining patches of Renosterveld and grassy micro-habitat patches in fynbos. Renosterveld is dominated by shrubs predominantly from the Asteraceae family as well as various C3 and C4 grasses. It is also far richer in forbs and annuals than fynbos. There is considerable debate over whether Renosterveld should be considered a 'grassy shrubland' or 'shrubby grassland' and some authors believe that Renosterveld was formerly a grassland before overgrazing by the early colonists transformed it to become a shrub-dominated habitat. Bontebok appear to adapt well to grasslands in the Eastern Cape and Free State, as well as old cultivated fields where short grasses proliferate. They have done exceptionally well in areas thought to be outside of their natural and extended natural distribution range (Fig. 3), probably due to the high abundance and diversity of grass species. Recent research (Furstenberg and Currie, 2019), suggests that they may have had a natural distribution range that extended into the grasslands of the Eastern Cape before arrival of Europeans in the early 1600s. This subspecies is highly dependent on the availability of drinking water and they drink regularly in the dry, hot summer months (van Zyl, 1978; Beukes, 1984; Luyt, 2005).		
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
According to Estes (1992) bontebok are sedentary-dispersers and populations segregate into female and bachelor groups within permanent territorial networks. At present the dispersal of the bontebok is restricted by fences and animals are dependent on translocation for dispersal. Historic documentation provides no record of their dispersal ability or historical		

movements. The availability of sufficient suitable habitat (i.e. Renosterveld) has in the past and is currently limiting the dispersal ability of bontebok. In addition, competition with other large grazers is likely to further limit their dispersal. However with sufficient suitable habitat, the dispersal efficiency of bontebok may be described as medium.

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

The bontebok is tolerant to human activities. They adapt to changes in the landscape and readily utilise short grass areas and old cultivated fields where short grasses proliferate. Disturbed grassland that is fallow, even temporarily, can be utilised by this species, thus they are able to utilise the degraded spectrum along the succession continuum, as long as sufficient grass species are present.

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
	Localised	4
	Uncertain	5

In terms of climate, vegetation and the fauna, the coastal lowlands of the Cape Floristic Region (CFR) can be divided into two distinct sub regions: the Southern Coastal Plain (SCP) and the Western Coastal Plain (WCP). The combination of year-round rainfall and greater availability of grass allows the SCP to support several large grazers that have been absent from the WCP. The SCP and WCP are isolated from each other and from the South African interior by the rugged Cape Fold Belt.

The physical barriers and environments that influence the large mammals in the CFR today were fundamentally altered during Pleistocene marine regressions (See Faith & Behrensmeyer, (2013) for a detailed explanation). Reduced sea levels exposed the shallow continental shelf of the SCP (the Agulhas Bank), creating a broad coastal plain, namely the Paleo-Agulhas plain, and increasing landmass by approximately 60 000 km². These marine regressions would have allowed large mammals to move between the SCP and WCP unimpeded. Likewise, movement between the exposed coastal plain to the east and the interior was facilitated by the expanded 40–60 km-wide coastal portal near Plettenberg Bay. Changes in paleogeography during marine regressions correspond to substantial environmental and vegetational shifts. Recent evidence indicates that the now submerged Paleo-Agulhas Plain formed a novel ecosystem that offered a C3/C4 mixed grassland habitat that was uncommon in the CFR, during periods when sea levels were low. This terrestrial landscape provided nutrient-rich forage and habitats to a variety of large herbivores and associated predators (Klein 1983; Klein & Cruz-Urbe 1987; Rector and Reed 2010; Faith 2011) and is in stark contrast to the faunal assemblage found in the present-day CFR, which is dominated by landscapes with nutrient-poor soils and unpalatable plants.

Fossil evidence indicates that the large mammal community that inhabited the exposed coastal plain was species rich and dominated by large grazing ungulates, including equids and alcelaphine antelopes (Klein 1983; Klein & Cruz-Urbe 1987; Rector and Reed 2010; Faith 2011). Grazing species may have migrated seasonally across the coastal platform, following the winter rains in the WCP and the summer rains along the eastern SCP. Rapidly rising sea levels during glacial terminations created a vicariance event by flooding the coastal plain and isolating the SCP from the WCP and the interior (Compton, 2011). Grassland species that once ranged across the continuous coastal plain were split into the two sub regions of the CFR. At the same time that ranges were being divided, altered rainfall regimes and rising atmospheric CO₂ concentrations contributed to a contraction of grasslands. As the sea level rose, the band of fynbos and other shrubby vegetation types moved northward across the formerly grassy coastal lowlands. This is consistent with fossil mammal sequences spanning the Pleistocene–Holocene transition, which show the replacement of open-habitat grazers by small browsers typical of CFR shrublands, with an essentially modern fauna in place by ~5 000 years ago (Klein 1983; Faith 2012).

The endemic South African antelope (*Damaliscus pygargus*, previously known as *D. dorcas*) belongs to the *Alcelaphini* tribe, which according to fossil records, originated in South Africa (Vrba, 1979). *D. pygargus* was historically distributed from the southwestern Cape to the southern boundary of Zimbabwe (Vrba, 1979). Fossil evidence suggests that *D. pygargus* first emerged in the South African interior around the early Pleistocene (± 1.4 Mya) (Vrba 1997, Sutton *et al.*, 2009) and later migrated into the CFR during the middle Pleistocene marine regression when reduced sea levels and expanded grasslands facilitated interchange between the CFR and the interior. In support, the earliest record of *D. pygargus* in the Cape Floristic

Region dates back to approximately 151 000 years ago (end of the middle Pleistocene). Faith and Behrensmeyer (2013) accordingly conclude that the subsequent isolation of faunal assemblages on the southern coastal plain during “interglacial highstands” allowed allopatric divergence at the subspecies level.

The rapidly rising sea levels during glacial terminations that flooded the coastal plain and isolated the SCP from the WCP and the interior probably led to the splitting of *D. pygargus* into two allopatric groups, blesbok (*Damaliscus pygargus phillipsi*) and bontebok (Faith & Behrensmeyer, 2013; Essop, *et al.*, 1991). However, there is currently some debate on whether the historic distribution range of the bontebok (in its current form and taxonomic status; *Damaliscus pygargus pygargus*) should include the western coastal plain and/or the grassland interior of the modern-day Eastern Cape Province (Furstenburg & Currie, 2019).

A number of studies have further shown that bontebok and blesbok are correctly classified as separate subspecies (Essop, *et al.*, 1991; Van der Walt, *et al.*, 2001). In addition to genetic differentiation, each sub-species also shows behavioural and morphological differences such as body markings and hide colours (Bigalke, 1955).

At present, the bontebok is considered endemic to the southern parts of the Western Cape and has a localised distribution along the coastal plains of the Overberg Region. It is a priority species for conservation in the Western Cape, based on its regional and evolutionary significance within the Fynbos Biome with a very limited natural distribution range on the low-lying, coastal plains between Botrivier and Riversdale, south of the Riviersonderend- and Langeberg mountain ranges. The status and limited availability of habitat for bontebok within the natural distribution range necessitated Cape Nature to adopt a policy that would enable the extension of the bontebok range through translocation. The keeping of this subspecies by private land owners outside of the natural distribution was therefore allowed by Cape Nature and a buffer population was created from which populations within the natural distribution range could be augmented as part of a meta-population management approach. Boundaries of the extended natural distribution range were designated to facilitate regulation and were based on magisterial district boundaries and geographic barriers (Fig. 3). The natural distribution range and extended natural distribution range of bontebok consist of more than 50% of vegetation types which are listed as critically endangered, with a further $\pm 26\%$ listed as either endangered or vulnerable (Fig. 3), in terms of section 52 of NEMBA.

Bontebok have been translocated extensively to various other provinces within South Africa, including the Eastern and Northern Cape, North West, Limpopo and the Free State, altogether totalling a minimum of 240 bontebok populations distributed throughout these provinces (Fig. 4). The majority of the bontebok population currently occurs outside of the Western Cape, where populations are fragmented into small subpopulations that are restricted by fences. Given the limited available habitat for the subspecies within the Western Cape and possible impacts of climate change on the current available habitat for the subspecies, well managed populations outside of the natural distribution range of the subspecies are considered of high conservation value.

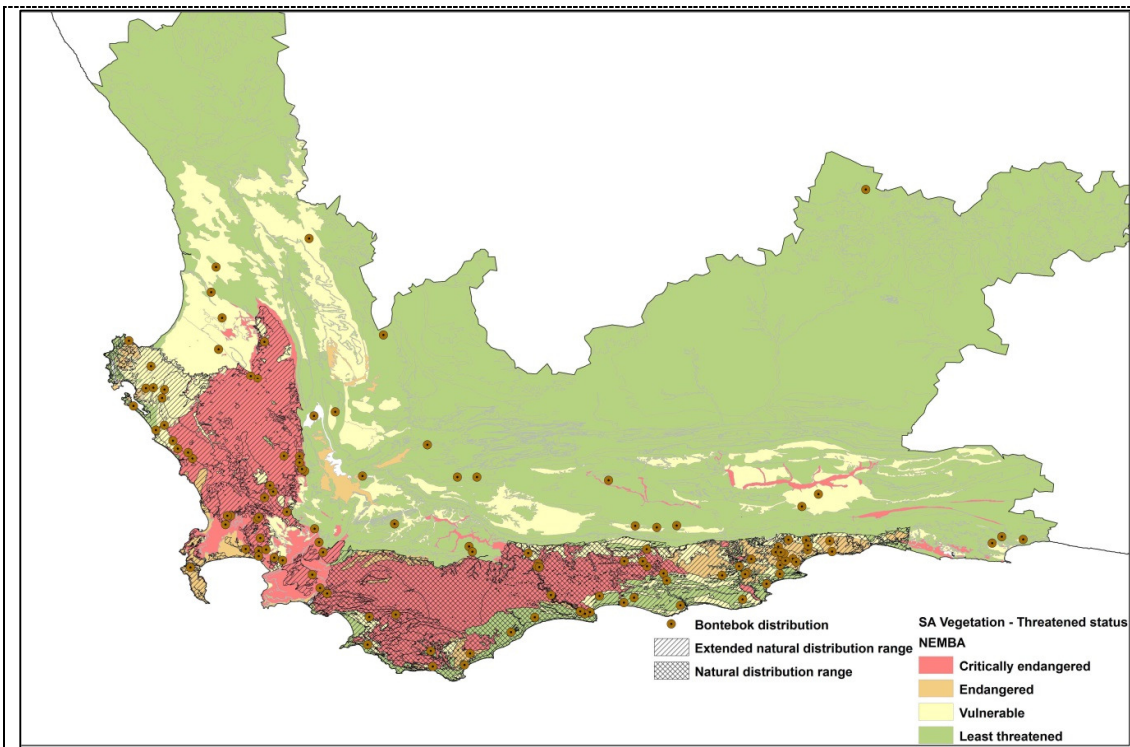


Figure 3: Bontebok natural distribution range, extended natural distribution range and distribution in relation to the threatened status of vegetation types in terms of section 52 of NEMBA. The natural distribution range is defined as the known or inferred distribution generated from historical (written or verbal) records, or physical evidence of the species' occurrence. Where direct evidence is inadequate to confirm previous occupancy, the existence of suitable habitat within ecologically appropriate proximity to proven range may be taken as adequate evidence of previous occupation. The extended natural distribution range is an aggregation of the west- and east potential bontebok compatible habitat extended to mitigate for the limited availability of untransformed habitat within the natural distribution range and is based on magisterial district boundaries and geographic barriers. Data courtesy of C. Birss, Cape Nature (2016).

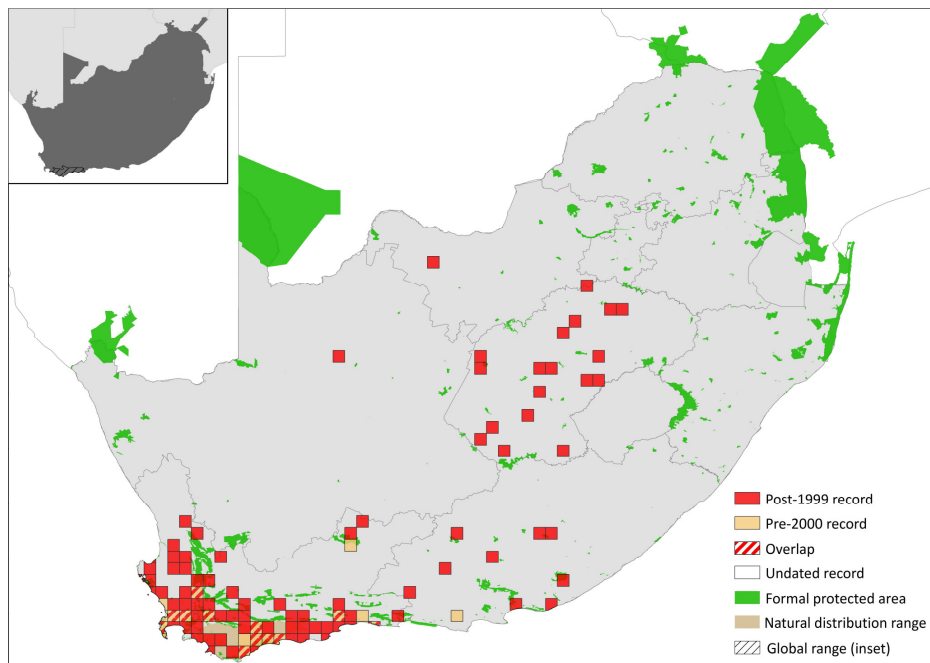


Figure 4: Current occurrence of bontebok within South Africa (Figure taken from Radloff *et al.*, 2016).

6. National abundance: What is the abundance nationally?	Very abundant	1
	Common	2
	Uncommon	3
	Rare	4
	Uncertain	5

The bontebok population is fragmented into small subpopulations (Fig. 3) that are restricted by fences. The total national population is estimated between 9 819 and 11 069 animals (Table 2). The total population estimate for the natural and extended natural distribution range is 2 480 animals. Of the 2 480 animals within the natural distribution range and the extended natural distribution range 676 ($\pm 21\%$) occur within protected areas. Of these, 314 occur in three of the South African National Parks' (SANParks) namely Bontebok, Table Mountain and West Coast National Parks. Approximately 715 bontebok are extra-limital in the Western Cape. Bontebok have been translocated extensively to various other provinces within South Africa, including the Eastern and Northern Cape and the Free State and to a much more limited degree to Limpopo and North West. Current estimates for bontebok on private land outside of the Western Cape are 4 001 animals on 71 properties in the Eastern Cape, 1 339 animals on 50 properties in the Free State, between 1 250 and 2 500 animals on 115 properties in the Northern Cape, 30 animals in North-West on three properties and four animals on one property in Limpopo Province (Table 2). Approximately 96 bontebok occur on Tsoelwana Nature Reserve in the Eastern Cape, while 3 905 bontebok occur on a minimum of 70 private farms within the Eastern Cape. This estimate is regarded as a conservative estimate of bontebok numbers outside of its natural and extended natural distribution range as not all properties that keep bontebok have been accounted for. More than 70% (between 75 and 77%) of the total bontebok population resides outside of both its natural and extended natural distribution range (7 339-8 589) compared to within (2 480). Population sizes on individual private properties are small, with the majority of the properties (80%) having less than 50 animals. Within the natural distribution range the likelihood of expanding the area for bontebok is low due to competing land uses and high land costs.

The Bontebok Breeders Association did surveys of bontebok numbers on private properties in 2016, 2017 and 2020. From a database of 206 farmers the Association received 166 replies in 2016 reporting 5 933 adult animals, 150 replies in 2017 reporting 5 797 adult animals and 102 replies in 2020 reporting 4 468 adult animals. In 2016, the average number of bontebok per property was 36 individuals, 39 individuals in 2017 and 44 individuals in 2020. According to the Bontebok Breeders Association there has been an average growth of 3.95% between 2016 and 2017 and an average growth of 4.24% between 2017 and 2020. The average growth observed is considered conservative as it excludes animals that were harvested or animals that were sold and translocated to other properties.

A study conducted by Child, *et al.*, (In prep), using the wildness framework (Child, *et al.*, 2019) show that approximately 87% of the total sampled bontebok (4 230 individuals) could be classified in one of the three wild categories (Simulated natural, Near natural and Self-sustaining) and should thus be included in red listings of the subspecies. However, only 53% of all bontebok populations could be considered wild, meaning that the overall wildness of bontebok in private land is skewed towards fewer but larger bontebok populations.

Table 2: Estimated number of bontebok occurring within each of the provinces on state and private land as per provincial records at the end of 2021. The natural distribution range (NDR) is defined as an aggregation of the indigenous distribution range(s) based on magisterial district boundaries and geographic barriers and the extended natural distribution range as an aggregation of the west- and east potential bontebok compatible habitat extended to mitigate for the limited availability of untransformed habitat for bontebok within its natural distribution range.

	Western Cape	Eastern Cape	Northern Cape	Free State	North West	Limpopo	Total
Total number of bontebok	3195	4001	1250 - 2500	1339	30	4	9819 - 11069
Provincial Parks	362	96	0	0	0	0	458
National Parks	314	0	0	0	0	0	314
Private land within NDR & extended NDR	1804	0	0	0	0	0	1804
Private land outside NDR & extended NDR	715	3905	1250 - 2500	1339	30	4	7243 - 8493
Number of private properties	153	70	115	50	3	1	392
Total no. of farms	159	71	115	50	3	1	399

	Increasing	1
	Stable	2

7. National population trend: What is the recent national population trend?	Reduced, but stable	3
	Reduced and still decreasing	4
	Uncertain	5
Due to its narrow habitat range, land use change and overhunting, the population size of bontebok reached a critical low in the 1930's with only ± 17 animals remaining. In 1931 a National Park to protect the species was proclaimed in the Bredasdorp district (Barnard & Van der Walt, 1961). Subsequent population growth levelled off at around 100 animals. It was then discovered that the species suffered from a copper deficiency and high parasite infestations, specifically the lungworm (<i>Protostrongylus</i> spp.). The Park was also very small (676 ha) and 80% of the area was covered by the unpalatable Renosterbos (<i>Elytropappus rhinocerotis</i>) (Barnard & Van der Walt, 1961). In 1960, the present site of Bontebok National Park was proclaimed in the Swellendam area and 84 bontebok were translocated, with 61 surviving the translocation (Penzhorn, 1971). In the new area, numbers peaked at over 400 animals in the 1980's. The current population size in the Bontebok National Park is estimated at 221, with a further 93 estimated in other national parks. The populations in protected areas within the Western Cape and Eastern Cape as well as in National Parks are stable. Determining a population trend for De Hoop and Denel Overberg Test Range (OTR) is difficult because census methods and timing have differed between years and between properties. However, the available information indicates that numbers increased rapidly between 1992 and 1994 and were then more or less stable until 2002, after which they experienced fluctuations thought to be at least partly related to rainfall patterns and occurrence of veld fires (de Villiers & Shaw, 2020). An aerial census in 2019 indicated a combined population of 549 bontebok (de Villiers & Shaw, 2020). Within the natural and extended natural distribution range, space limitations/carrying capacity are limiting population growth but overall populations appear to be stable. Population sizes on private land, especially extra-limital populations, have been increasing. It appears that the bontebok population size within the natural and extended distribution range has stabilised at less than 2 500 individuals giving it an Endangered status according to the IUCN Red list criteria and providing few options to improve the status of the species within its natural and extended natural distribution range. This is largely due to the very restricted natural distribution range, the fact that bontebok are competing with domestic stock and other competing land uses within its native range, that income generation through bontebok trophy hunting is made difficult through the import restrictions, and disease and parasites prevent the species co-inhabiting with sheep.		
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
The most recent conservation assessment for bontebok was conducted in 2015 as part of the national Red List assessment (Radloff <i>et al.</i>, 2016). Game counts are conducted for large mammals, including bontebok, annually or biannually in most national parks and provincial reserves. Private landowners in general also conduct regular counts of economically important mammal species such as bontebok. In addition, landowners applying for Certificates of Adequate Enclosure (CAE or Game Farm Permit in Northern Cape) must include the species and population sizes on their permit applications. However, data obtained from private landowners are not always comprehensive and up to date. There is thus good knowledge of individual populations at the local level, but these data need to be collated and centralised. SANBI, in collaboration with national and international experts, implemented a genetic tool to detect hybrid bontebok. A national genetic database with more than 12 400 DNA profiles is maintained to monitor hybridisation. Continued research on the genetic diversity of individual populations is generating new knowledge. There are currently two processes underway to improve on the collation and accessibility of data. SANBI is currently in the process of developing a national online species population database. Wildlife Ranching South Africa has also started with the development of an online system for their members to submit species population data.		
9. Major threats: What major threat is the species facing (underline following: overuse/ habitat loss and alteration/ invasive species/ other: Small fragmented populations & no coordinated management plan) and how severe is it?	None	1
	Limited/Reversible	2
	Substantial	3
	Severe/Irreversible	4
	Uncertain	5

The main threats to the future conservation of the subspecies are 1) limited optimal natural habitat within its natural distribution range; 2) Small, fragmented populations in the absence of a coordinated meta-population management plan; 3) preliminary genetic analyses show low genetic variation within the natural distribution range population, consistent with the fact that this subspecies was hunted to near extinction in the 1930's; and 4) The risk of hybridisation with the closely related blesbok (*Damaliscus pygargus phillipsi*). Within the natural and extended natural distribution range the fragmented populations occur primarily on sub-optimal habitat and are currently managed as sources for distribution of bontebok to properties outside the natural range, while comparatively little effort is being afforded towards habitat rehabilitation and restoration to secure the future of bontebok within its natural distribution range.

The main threat within the natural and extended natural distribution range is habitat loss, with consequential other threats emanating from habitat loss. Within the natural distribution range this threat is severe and in some cases irreversible. At present more than 80% of the optimal habitat for bontebok within the Western Cape has been modified to agricultural lands mainly of monocultures such as wheat or canola. However suitable habitat exists outside the species' natural distribution range as evidenced by reportedly healthy and growing populations in the Free State and other provinces. Nationally the threat to the bontebok is small fragmented populations mostly managed in isolation in the absence of a meta-population management plan and hybridisation with the closely-related blesbok. These threats are discussed in more detail below.

1) Small fragmented populations that are managed mostly in isolation

The lack of action to ensure that populations remain viable and optimally reproducing in suitable habitats, the introduction of alien and extra-limital species, increased competition for natural resources due to competing land uses and modification of habitat are all current threats to the population. A large number of subpopulations on private land are small (<15 animals) and have sex ratios of 1:3 to 1:7, (males: females) (Cowell & Birss, 2016). The effective implementation of a coordinated meta-population strategy that aims to conserve allelic diversity and maintain genetic diversity within and between the relevant sub-populations should be a priority. There are currently no formal meta-population management plan, but elements of a meta-population management plan are currently implemented by the provinces and the private sector.

2) Limited optimal habitat leads to low reproductive success within the natural and extended natural distribution range

Although the population size of bontebok has increased over time within its natural and extended natural distribution range, it has remained relatively small compared to other antelope (Broders, *et al.*, 1999). Slow recovery and growth of the bontebok populations may be attributed to environmental factors, unstable sex ratios and/or low reproductive success.

3) Loss of genetic diversity

In the 1930's the 17 known bontebok that survived overhunting were introduced into the original Bontebok National Park. In 1960 a total number of 61 animals were successfully translocated from this site to the then newly established Bontebok National Park (Barnard & van der Walt, 1961). According to van Wyk *et al.*, (2013) a restricted number of original breeding animals (17), in combination with the population's isolation may have contributed to low levels of genetic diversity. Measures of genetic diversity in reference bontebok were found to be lower than that of reference blesbok populations. The lower level of molecular diversity observed within the pure reference bontebok is however expected given its demographic history. The bontebok does not have the buffering effect of a large genetic reservoir and inbreeding may be detrimental to the bontebok population (van Wyk *et al.*, 2013). In the long-term, low genetic variation in combination with population isolation may result in an increased risk of extinction (van Wyk *et al.*, 2013). In addition, selective breeding for characteristics such as coat colour and pattern, and horn length threatens genetic diversity (Selier *et al.*, 2018).

4) Risk of hybridisation

Hybridisation between the bontebok and blesbok is of specific concern to the conservation of bontebok (van Wyk *et al.*, 2013; van Wyk *et al.*, 2017). Hybridisation occurred due to human-mediated mixing of the two subspecies (Lloyd & David, 2008 in van Wyk *et al.*, 2013). Blesbok occurs widely throughout South Africa outside of the Western Cape. A concern was raised that private landowners may be translocating bontebok to properties where hybrids are already present or to properties that neighbour blesbok populations. Inadequate fencing on nature reserves and private properties may result in escapes and in some cases, hybrid offspring were the consequence. These hybrids are fertile. A study to determine a hybridisation threshold for bontebok for management purposes concluded that 0.90 was optimal. This has since been implemented in formal policy by Cape Nature. It was found that more than two-thirds of localities had at least some hybrid individuals, with populations varying in the degree of introgression. This threshold ensures that the least non-admixed bontebok individuals will be misclassified as hybrids and that 94% of hybrid animals will be removed from the national population. The study also found that hybrids were predominantly a result of hybridisation between hybrids and either bontebok or blesbok with no first generation hybrids detected (Van Wyk *et al.*, 2017). Negative consequences associated with hybridisation include reduction of fitness, alteration in the genetic structure of populations and the interference of locally co-adapted gene complexes (Allendorf *et al.*, 2001). Research on bontebok and blesbok hybridisation should be expanded to include all regions in South Africa where bontebok populations may potentially be under threat. This threat is being

addressed through the development and implementation of provincial and industry protocols. Protocols include: Bontebok Protocol developed by Wildlife Ranching South Africa's (WRSA) Bontebok Breeders Association; Bontebok Conservation, Translocation and Utilisation Policy of Cape Nature (BCTUP, 2016), Norms and Standards for the keeping and management of bontebok (*Damaliscus pygargus pygargus*) in the Free State and the Eastern Cape Bontebok Protocol: Operational Policy Guideline of the Chief Directorate: Environmental Affairs. These protocols all require an individual DNA profile using a verified microsatellite marker set for any animal to be translocated or exported as a hunting trophy. The animal must further be microchipped for individual identification. All DNA profiles and metadata are stored in a national database at SANBI. No CITES export permits will be issued for bontebok X blesbok or bontebok X tsessebe hunting trophies. Identified hybrids must be kept in isolation, they may not be translocated alive, and must be culled. In addition the BCTUP (2016) describes a collection protocol based on a forensic sampling procedure to ensure chain of custody. Several private bontebok breeders are participating in this process and have already tested their herds.

- 5) Lack of economic incentives/ sustainable financing models for private landowners to contribute to conservation objectives.

Conservation within South Africa occurs within a fragmented human-dominated landscape where biodiversity land uses have to compete with other often more lucrative land uses that are seldom conservation compatible. Bontebok populations throughout South Africa in general is small and fragmented requiring a meta-population management approach. The development of protected areas has been used as a key strategy to reduce the loss of biodiversity and to conserve species globally (DeFries *et al.* 2007). This strategy, however, has had limited success in the developing world, where most of the world's biodiversity is located (Montesino Pouzols *et al.* 2014). Human populations in the developing world and particularly Africa, continue to grow rapidly (United Nations 2013). As a result, these countries often find it difficult to maintain their biodiversity due to increasing land use conflicts and insufficient funds for conservation (Krug 2001; Leader-Williams 2005). For this reason, the inclusion of private and communal lands within conservation plans, are integral to the persistence of species (Cousins *et al.*, 2008, Child *et al.*, 2012). Privately-owned land can play an important role in the protection of threatened species including the bontebok, black (*Diceros bicornis*) and white rhino (*Ceratotherium simum*), since these properties have much higher budgets and are more flexible and efficient in managing complex systems and reducing cost (Di Minin *et al.*, 2013b, Packer *et al.*, 2013, Di Minin *et al.*, 2015). While there is little scope for the expansion of state-owned parks, the privately protected estate is growing (Gallo *et al.*, 2009). These areas have been highly profitable (60%–80% over operational costs) and have been direct contributors to community wealth (Norton-Griffiths 2007, Naidoo *et al.*, 2011, Packer *et al.*, 2013). Beside the economic benefits accruing to landowners, private reserves and game ranches provide the public good 'biodiversity' at no cost to the tax-payer (Krug, 2001). Thus, incorporating land uses and management practices which are compatible with biodiversity conservation not only helps protecting critical habitats for a variety of species (Gardner *et al.*, 2007), but also contributes to maintaining landscape connectivity (DeFries *et al.*, 2007).

However, to effectively implement and incentivize landowners within the private sector to participate in a meta-population management plan requires sustainable financial models. In addition, both the hybridization and low genetic variation within the subspecies can be addressed through this approach. Trophy hunting plays a critical role in generating income to subsidise the conservation of bontebok as part of a sustainable funding model for wildlife-based land uses on private land that are conservation compatible. Blanket trophy hunting bans and strenuous administrative requirements impact negatively on this sustainable funding model for conservation by reducing the value proposition the subspecies holds for private wildlife custodians. The administrative and management burden increase locally and internationally to ensure conservation outcomes, including the implementation of a meta-population management plan, whilst the ability to realize financial incentives are becoming increasingly difficult. This threat is considered substantial as it increases the risks of disinvestment in bontebok conservation by private sector with concomitant reduction in the current conservation successes.

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

At present there has been negligible illegal offtake of bontebok in any of the National Parks and Western Cape Provincial Nature Reserves where they occur (Novellie, pers. comm.). Poaching of bontebok occurs at very low levels on other provincial and private properties. There has been no forensic cases recorded by SANBI over the past three years. At least one poaching incident has occurred in the Western Cape in the last three years.

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
The White Paper on the Conservation of the Sustainable Use of South Africa's Biodiversity was approved by Cabinet on 29 March 2023, and published under Government Notice No. 3537 in the Government Gazette, No. 48785, for implementation on 14 June 2023. The White Paper provides a foundation for conservation and sustainable use in terms of its four goals, namely: 1) Enhanced Biodiversity Conservation (All biological diversity and its components conserved); 2) Sustainable Use (The sustainable use of biodiversity enhances thriving living land- and seascapes and ecosystems, livelihoods, and human well-being, while a duty of care avoids, minimises, or remedies adverse impacts on biodiversity); 3) Equitable Access and Benefit Sharing (Benefits are derived and shared from the use and development of South Africa's genetic and biological resources, without compromising the national interests); and 4) Transformed Biodiversity Conservation and Sustainable Use (Effect is given to the environmental right as contained in Section 24 of the Constitution which facilitates redress, and promotes transformation). The White Paper, therefore, set out the vision: "An inclusive, transformed society living in harmony with nature, where biodiversity conservation and sustainable use ensure healthy ecosystems, with improved benefits that are fairly and equitably shared for present and future generations", with the Mission: "To conserve and manage South Africa's biodiversity, and ensure healthy ecosystems, ecological integrity and connectivity, with transformative socio-economic benefits to society for current and future generations through ecologically sustainable, and socially equitable use of what people value from nature." In South Africa bontebok are utilised for trophy hunting, local hunting, photographic tourism, live sales and recreation (e.g. captive populations) in accordance with the sustainable use policy environment prescribed by the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA). The subspecies is 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 bontebok 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. Various provincial ordinances and acts provide further legislative protection. The regulatory framework in place thus allows for sustainable offtakes. On a property level managers and/or landowners have an interest in ensuring the stability of their populations and manage their populations and offtakes accordingly. The harvest of bontebok is thus dually managed by both private landowners and government within an adaptive framework. In addition, all trophy hunts by international clients must be recorded in the Professional Hunter's Register. The professional hunter accompanying the international client is responsible for completing and submitting the register to the provincial conservation authority. The Department of Forestry, Fisheries and the Environment (DFFE) collate the provincial registers into a national register on an annual basis. The current Western Cape Provincial Conservation Ordinance lists bontebok as Protected. Private landowners can apply for CAE where hunting / offtake of bontebok is exempted from separate permit applications for hunting. This means that every harvest (hunt) is not regulated, but exempted from separate applications. Landowners however maintain their own records on hunting, but data are generally inaccessible. The decision to grant a CAE to a landowner remains a regulatory management decision taken by Cape Nature, the provincial conservation authority in the Western Cape, and based on good sound ecological knowledge. Historic off takes have not been recorded nationally and any data that have been generated have not been used to inform management decisions. Within all provinces all restricted activities relating to the bontebok are permitted and well managed in accordance with the Threatened and Protected Species Regulations. In the Northern Cape, only landowners with a Game Farm Permit are exempted from obtaining separate hunting permits if the species are hunted, moved, etc. on their property only. As soon as the species or any derivative thereof leaves the game farm property they need to obtain the relevant permits for the restricted activities, e.g. transport, export, etc. Between 2010 and 2022 approximately 1 909 bontebok were hunted by international clients (DFFE Professional Hunter's (PH) Register (Fig. 5). The number of bontebok hunted per year seem to be declining (though not significantly) from more than 300 per year (2011 and 2012) to approximately 100 individuals per year (2019), 5 in 2020 (though this may be due to the COVID restrictions worldwide) and 54 individuals in 2022 (DFFE PH Register data) (Fig. 5). According to the CITES trade database approximately 1 844 bontebok trophies and 35 live bontebok were exported between 2010 and 2021 (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). Approximately 56% of all trophy hunts occur in the Eastern Cape and less than 2% of all bontebok trophy hunts occur within the Western Cape.		

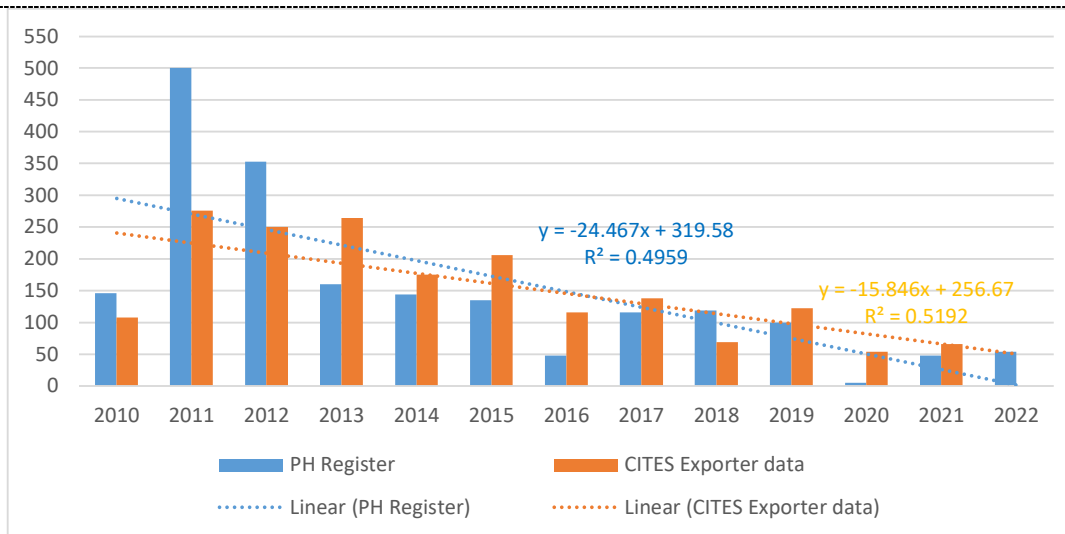


Figure 5: Number of bontebok hunted by international clients according to the Professional Hunter's Register and the CITES trade database (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK) between 2010 and 2022 (Data for 2022 only from PH Register).

Bontebok and blesbok hybridisation is currently being addressed through provincial and industry protocols. The following protocols have been developed and implemented: Bontebok Protocol developed by Wildlife Ranching South Africa's (WRSA) Bontebok Breeders Association; Bontebok Conservation, Translocation and Utilisation Policy of Cape Nature (BCTUP, 2016), Norms and Standards for the keeping and management of bontebok (*Damaliscus pygargus pygargus*) in the Free State, the Eastern Cape Bontebok Protocol: Operational Policy Guideline of the Chief Directorate: Environmental Affairs and in the Northern Cape through the NCNCA (No. 9 of 2009) and its subsequent Regulations. These protocols all require DNA profiling of any animal to be translocated or exported as a hunting trophy using a validated microsatellite marker set. The animal must further be microchipped for individual identification. All test results are stored in a national database at SANBI. Currently, the SANBI database contains 12 334 DNA profiles. No CITES export permits will be issued for bontebok X blesbok or bontebok X tsessebe hunting trophies. Identified hybrids must be kept in isolation, they may not be translocated alive, and must be culled.

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

SANParks and Cape Nature have developed a Biodiversity Management Plan (BMP) for bontebok in terms of the National Environmental Management: Biodiversity Act, 2004. The aim of the BMP is to ensure the long-term survival of the species in nature. The Biodiversity Management Plan for bontebok (BMP) has been gazetted for implementation in December 2019. At present there is no formal meta-population management plan for bontebok, however elements of a meta-population management plan is currently implemented. SANParks currently has no specific management strategy for this subspecies, and management follows the general policy for the management of large mammals in SANParks' National Parks. Bontebok National Park, which was established for the protection of bontebok antelope has the largest bontebok population of all SANParks properties, but can no longer expand in size. The Agulhas National Park has been identified as ideal habitat to establish a new population of bontebok thereby contributing to the meta-population. The park currently is unfenced but funding has been requested to erect fences prior to the introduction of any wildlife. None of the provinces have provincial management plans specifically for bontebok. Private landowners however may have general ecological management plans for their specific properties.

The policy/regulatory framework in place across all provinces for bontebok can further be considered as an approved and coordinated management plan for harvest. The regulatory framework is aimed at the long term sustainable use of the species. The subspecies is 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 bontebok such as keeping, hunting, catching, breeding, selling, conveying or exporting from the country. In addition, all policies / regulations are approved and subject to a public participation process.

Bontebok and blesbok hybridisation is currently being addressed through provincial and industry protocols. The following protocols have been developed and implemented: Bontebok Protocol developed by Wildlife Ranching South Africa's (WRSA) Bontebok Breeders Association; Bontebok Conservation, Translocation and Utilisation Policy of Cape Nature (BCTUP, 2016), Norms and Standards for the keeping and management of bontebok (*Damaliscus pygargus pygargus*) in the Free State, the Eastern Cape Bontebok Protocol: Operational Policy Guideline of the Chief Directorate: Environmental Affairs and in the Northern Cape through the NCNCA (No. 9 of 2009) and its subsequent Regulations.

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

Although there are elements of generating conservation benefits, maximising economic yield and opportunistic harvesting within the harvest regime, harvest is predominantly for the purpose of population management/control through the translocation or hunting of animals. As part of its mandate to manage and conserve biodiversity, Cape Nature is required to manage species. Similarly SANParks' mandate includes population management and generating conservation benefits, while private landowners have both economic and population management objectives. Thus a common aim of individual plans across all role players is population management/control with some economic yield.

In the absence of large predators it is necessary to manage bontebok populations either through hunting or translocation to maintain an appropriate number, sex and age structure on the property. Landowners select suitable specimens for offtake based on age and reproductive performance as well as excess, i.e. too many males. The use of translocation, live sales and hunting is thus mainly for the purpose of population management rather than the income generated through the management action.

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

There is no national quota for bontebok harvest. In all provinces off-takes are managed on a local scale by the provincial Management Authorities through a permit system on a case-by-case basis, based on direct population estimates. Within the Eastern Cape, which manages approximately a third of the population, offtake quotas for bontebok from private landowners are submitted to the provincial conservation authority on an annual basis. The quotas are reviewed and approved by the provincial conservation authority in accordance with the BMP for bontebok.

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

Harvesting here is defined as hunting as well as the translocation of bontebok outside of its natural and extended natural range. Harvesting of bontebok from protected areas is limited and mainly in the form of live sales and translocation. No hunting of bontebok currently occurs in any of the National Parks. There are a small number of bontebok hunted on the provincial protected areas within the Western Cape, mainly to address skewed population sex and age structures.

16. Harvesting in areas with strong resource tenure or ownership: What percentage of the legal national harvest occurs outside Protected Areas, in areas	High	1
	Medium	2
	Low	3
	None	4

with strong local control over resource use?	Uncertain	5
A large portion of the bontebok population (72% of those in the natural and extended natural distribution ranges and 92% of all populations in South Africa) occurs on private land where most of the national harvest in the form of hunting and translocation occurs. Animals from protected areas are sold to private landowners and bontebok are also traded between private landowners. From 2017 to 2022, 261 bontebok permits were issued in the Western Cape Province. Of these, four were for exported from the province and 25 were for hunting. Hunting trophies constituted 84% (a total of 1 844 specimens) of all bontebok international exports reported for South Africa between 2010 and 2021 (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). During the same time period only 35 live bontebok were exported from South Africa for commercial purposes (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK).		
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
There are no bontebok occurring in open access areas.		
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
In all provinces that have bontebok, budgetary and human resource capacity required for the development and implementation of species management plans are limited. Budgetary constraints, lack of capacity, the lack of a national bontebok meta-population management plan and budget for monitoring indicates a medium confidence in harvest management of bontebok.		
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
At present harvesting, both translocation and hunting, is monitored through a permit system and CITES exports. The effects of harvesting are however not currently monitored and there is often a lack of knowledge of what happens on the ground. At a national level harvesting is monitored through the CITES exports. At a provincial level fine-scale data exist on which harvesting decisions are made. Bontebok populations on both state and private land are regularly counted and there is thus good knowledge of individual populations at the local level, but these data need to be collated and centralised limiting the provinces ability to monitor the effects of harvesting, which includes both translocation and hunting. Cape Nature compiles an annual bontebok monitoring report that provides information on bontebok population sizes, number of hybrids identified as well as permitted offtake data. There are currently two processes underway to improve on the collation and accessibility of data. SANBI is currently in the process of developing a national online species population database. Wildlife Ranching South Africa has also started with the development of an online system for their members to submit species population data.		
In addition, the policy and regulatory mechanisms require direct population estimates for any restricted activity. Through the permitting system, monitoring data on the annual offtakes of species per property are generated. Thus off-takes are managed on a local scale by the provincial Management Authorities through a permit system on a case-by-case basis, based on direct population estimates. In addition, all trophy hunts by international clients must be recorded in the Professional Hunter's Register. The professional hunter accompanying the client (a legal requirement) is responsible for completing and submitting the register to the provincial conservation authority. The DFFE collate the provincial registers into a national register on an annual basis allowing fine scale analyses of trends in trophy hunting offtakes and possible impacts on species subject to trophy hunting, such as bontebok.		

Within the Eastern Cape, offtake quotas for bontebok from private landowners are submitted to the provincial conservation authority on an annual basis. The quotas are reviewed and approved by the provincial conservation authority in accordance with the BMP for bontebok.

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

There is a medium confidence in the national monitoring of hunting exports, but low to medium confidence in the monitoring of the effects of harvest due to budgetary and capacity constraints within all provinces that host bontebok. At present data are not collated or centralised, limiting the provinces ability to monitor the effects of harvesting. There is also no capacity to analyse information received from private game farms. As most of the bontebok occur on private land at present, provinces are reliant on private sector to report accurately and timeously. Recently, the TOPS permitting system is moved online but not all provinces are currently making use of the online permitting system.

There are currently two processes underway to improve on the collation and accessibility of data. SANBI is currently in the process of developing a national online species population database. Wildlife Ranching South Africa has also started with the development of an online system for their members to submit species population data.

Incentives and benefits from harvesting

21. Utilisation 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

The main threat to the bontebok within its natural distribution range is habitat loss. Harvesting (both hunting and translocation) is beneficial to the species when taking the threat of habitat loss into consideration. As only non-hybrid animals can be harvested, the maintenance of hybrid free bontebok populations is incentivised, thus increasing the value of these animals. If a species is valuable, then it will be maintained along with its natural habitat. Harvesting to prevent over stocking/grazing can also assist in maintaining the habitat. There is also an opportunity to link bontebok with the conservation and rehabilitation of rare Renosterveld within its native range. As bontebok may be stocked outside of its natural distribution range, natural grassland within its range could be lost to other forms of land use. Exporting animals outside of the natural range could deplete the genetic pool within the Western Cape. Caution must thus be applied to ensure bontebok outside of its natural and extended natural range still contributes to the bontebok meta-population.

The major threats recorded for bontebok is habitat loss within its natural distribution range and small fragmented populations that are managed mostly in isolation across its distribution in South Africa. Trophy hunting creates economic incentives for conservation in areas that can be seen as unsuitable for alternative wildlife-based land uses (Child *et al.*, 2012; Lindsey, 2007) and provide the necessary revenue to implement other important management actions such as those required for the management of populations of a species as a meta-population.

Where wildlife has no or limited value outside protected areas, it dwindles and disappears due to active persecution, loss of habitat, competition with livestock, or overutilisation (Prins & Grootenhuys, 2000). The price–proprietorship hypothesis suggests that if wildlife is valuable, and if this value accrues to landholders, then there is a high probability that landholders will manage wildlife sustainably, just as they would manage livestock (Child, 2012). The sustainable use approach aims to maximise the benefits from wildlife to the people on whose land it lives. It involves four linked concepts: proprietorship, price, subsidiarity and collaborative adaptive management (Child, 2012). This is the approach South Africa followed by devolving rights to use wildlife to landholders (and more recently communities), encouraging multiple commercial uses of wildlife to drive up its value and reducing bureaucratic requirements, which act as a tax against wildlife. These policies are highly successful. Wildlife populations on private land in South Africa increased from half a million in the 1960s to several million now, creating a multibillion Rand sector (Carruthers, 2008; Child, 2012). Importantly, trophy hunters' spending benefits the local economies where the hunt takes place and supports more than 17 000 job opportunities mostly in the rural provinces of South Africa (Saayman *et al.*, 2018).

Non-harvest based use of wildlife is a powerful tool for the conservation of species and generation of economic benefits to local communities (Krüger, 2005) and private landowners. Yet, this is particularly so for areas that are easily accessible and where charismatic species are present (Di Minin *et al.*, 2013). Sustainable harvest base utilisation such as trophy hunting,

on the other hand, can be an important generator of revenue in remote areas unsuitable for alternative wildlife-based land uses, for example where charismatic species are absent or occur in very low densities or in areas where wildlife populations are recovering (Child *et al.*, 2012; Lindsey *et al.*, 2007). Sustainable utilisation of wildlife is thus a win-win strategy for retaining wildlife as a land-use strategy over large areas in Africa (Lindsey, 2008), for the expansion of the conservation estate, and for generating important economic benefits for local communities and private landowners (Lindsey, 2008; Selier & Di Minin, 2015). Child *et al.*, (2012) further argues that wildlife is an economically efficient use of the drylands in South Africa and is likely to be more profitable in low rainfall areas than traditional agriculture because it is easily diversified through hunting and tourism (Fig. 6).

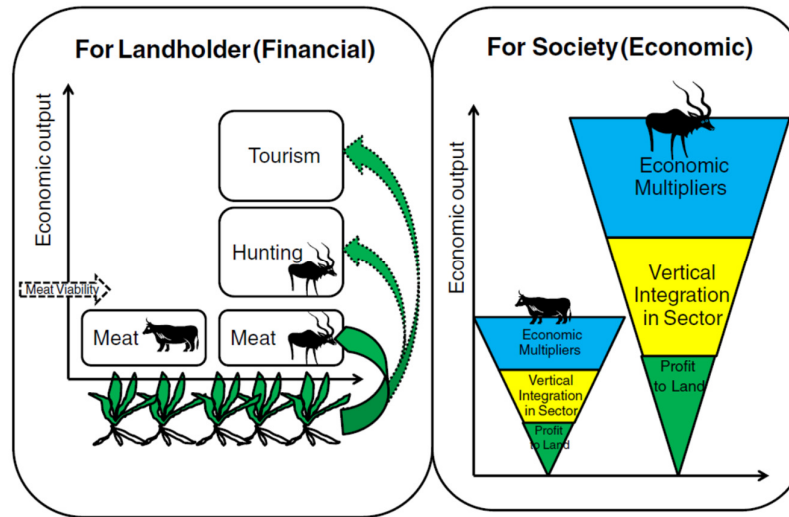


Figure 6: Conceptualising economic differences between the bio experience and commodity economy in drylands (Figure taken from Child *et al.*, 2012).

Given the major threats facing bontebok in South Africa, trophy hunting can be considered beneficial to both species conservation and habitat conservation. Trophy hunting in South Africa is well-regulated and offtakes are managed through an adaptive framework at a local level. The robust system in place in South Africa thus negates the risks associated with trophy hunting that have been observed in other parts of Africa such as the extirpation of hunted species where offtakes are excessive (Lindsey *et al.*, 2007) or the negative evolutionary consequences associated with selective harvesting (Balme, *et al.*, 2010; Crosmar, *et al.*, 2013; Selier, *et al.*, 2014).

A number of experts (Di Minin, Leader-Williams & Bradshaw, 2016; Dickman *et al.*, 2019; Parker *et al.*, 2020) have warned that blanket trophy hunting bans could exacerbate biodiversity loss due to the disinvestment of private landowners and communities in wildlife-based land uses, and at the same time risk disempowering and impoverishing rural communities. At present not all available hunting markets allow for the import of hunting trophies of certain threatened species such as black rhinoceros (*Diceros bicornis*), bontebok and Cape mountain zebra (*Equus zebra zebra*), for example the USA, an important hunting trophy market for South Africa, requires an enhancement finding for each trophy import of these species (since they are listed as Endangered on the Endangered Species Act). These international restrictions unfortunately hamper the conservation efforts for these species in South Africa.

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

At present 79% of bontebok in the natural and extended natural distribution ranges and 92% of all bontebok populations in South Africa occurs on private land. Genetic testing and an increased demand for bontebok nationally have increased the value of bontebok between 2010 and 2015. The high value of bontebok and the ability to harvest either through hunting or translocation is one of the main reasons why private game owners keep bontebok. The results of a questionnaire survey conducted by the SANBI in May 2016 support these findings (194 questionnaires received) and indicated that more than 30% of private game owners keep bontebok for the purpose of trophy hunting. Of these 77% rely solely on international hunters and an additional 16% on a combination of local and international hunters. More than 75% of the private game owners indicated that the income generated through trophy hunting is used for the ecological management of their

properties. A recent survey conducted in the Eastern Cape (137 surveys equating to 758 015 ha) evaluating the contribution of working lands to ecosystem processes and rewilding of landscapes highlighted that almost all wildlife ranchers conduct sustainable land management which can be seen as private investment into a public good through the provision of ecosystem services through natural capital restoration (Child, 2021, Unpublished data). Trophy hunting is the largest contributor to revenue and can lead to shifts towards near natural habitats from formerly cultivated fields (Child, 2021, Unpublished data).

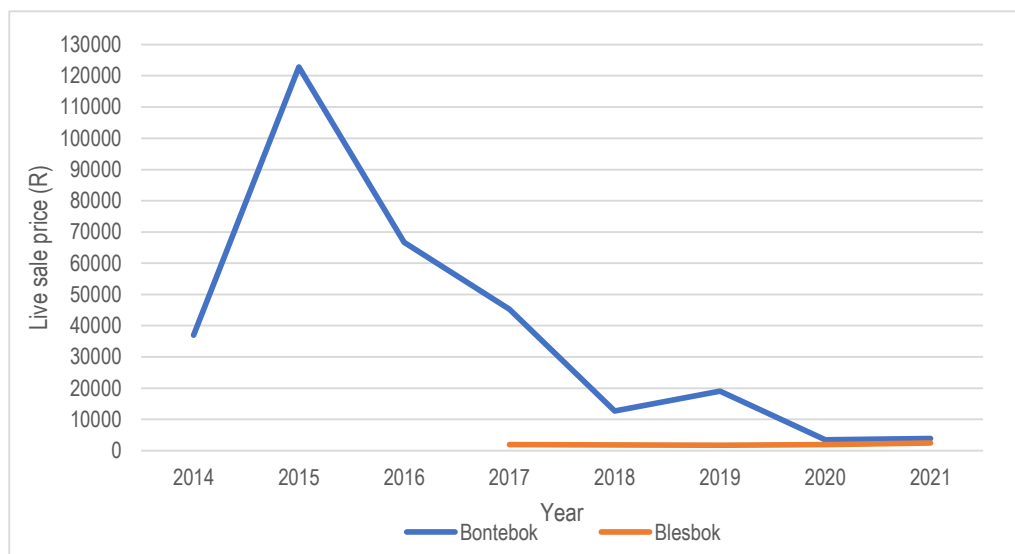


Figure 7: Average annual live sale prices for bontebok and blesbok between 2014 and 2021 (Data provided by Dr Flippie Cloete).

However, recent and continued restrictions on the importation of bontebok trophies to the USA, due to the subspecies listing on the USA Endangered Species Act (ESA) of 1973 (<https://ecos.fws.gov/ecp/report/species-listings-foreign?statusCategory=Listed>), is impacting negatively on the current demand for bontebok from USA trophy hunters (main trophy hunting market). This reduced demand is having a negative effect on the value of bontebok and incentives to keep and conserve the subspecies on private land, considering that the close relative to the bontebok, the blesbok, is not listed on any of the CITES appendices or the USA ESA (Fig. 7).

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

As bontebok may be stocked outside of its natural distribution range, there is a low incentive for habitat conservation and little additional habitat is accrued due to the protection of this subspecies. In addition, there is limited Renosterveld remaining in the Western Cape and limited opportunities to increase available habitat for bontebok within the NDR. There is often conflict between managing species and habitat even in protected areas. A recent survey conducted in the Eastern Cape (137 surveys equating to 758 015 ha) evaluating the contribution of working lands to ecosystem processes and rewilding of landscapes highlighted that almost all wildlife ranchers conduct sustainable land management which can be seen as private investment into a public good through the provision of ecosystem services through natural capital restoration (Child, 2021, Unpublished data). Trophy hunting is the largest contributor to revenue and can lead to shifts towards near natural habitats from formerly cultivated fields (Child, 2021, Unpublished data). Due to higher value of bontebok, compared to blesbok in the past, there was a perverse incentive in replacing blesbok in its indigenous range with bontebok.

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

Approximately 7% of the total bontebok population occurs on protected areas within the natural and extended natural distribution range. At present no permits are issued for the hunting of bontebok in any of the national or provincial parks within the Western Cape. Translocation outside of the species natural distribution range is included in the definition of harvest, however translocation of bontebok from protected areas is required for population control and it would not be beneficial for the species or its habitat to legally exclude this form of harvest.		
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
There is a medium confidence in the effectiveness of the protection measures as budget and resource capacity is limited. Patel <i>et al.</i> , 2023, found that many provincial reserves are not effectively managed due to various driving factors. The top three challenges identified in this report affecting management effectiveness were capacity, poor management skills and lack of budget. There is limited budget or capacity to enforce existing regulations. If stricter harvesting regulations are to be implemented these would not be enforced either due to lack of capacity or budget. There is currently limited budget to fence Agulhas National Park, which is the largest protected area with good habitat for bontebok. On a provincial level similar problems are experienced with De Hoop Nature Reserve not being able to maintain fences and as a result bontebok on occasion escapes from the property. In addition, there are financial limitations constraining the removal of excess game numbers (a necessary management action) on De Hoop Nature Reserve to improve the current habitat conditions.		
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
At present all offtakes in terms of bontebok are regulated through a system of permits. Regulatory mechanisms in place are effective as there are currently no evidence of overuse or harvest of bontebok. There are no additional restrictions required to manage the harvest of the subspecies.		

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