# *Nesotragus moschatus zuluensis* – Suni


Megan Loftie-Eaton

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|---|---|
| **Regional Red List status (2016)** | **Endangered A2b+B2ab(ii,iii,v) +C2a(i)** |
| National Red List status (2004) | Vulnerable B1ab(ii,iii,iv,v) |
| Reasons for change | Genuine change: Population decline |
| Global Red List status (2016) | Least Concern |
| TOPS listing (NEMBA) | Vulnerable |
| CITES listing | None |
| Endemic | Edge of range |

The Zulu word for Suni, "Nhlegane", means "why is it beautiful?".

## Taxonomy

*Nesotragus moschatus zuluensis* (Thomas 1898)

ANIMALIA - CHORDATA - MAMMALIA - CETARTIODACTYLA - BOVIDAE - *Nesotragus – moschatus - zuluensis*

**Synonyms:** *Neotragus moschatus* (von Dueben 1846)

**Common names:** Suni (English), Soenie (Afrikaans), Nhlengane (Swati, Tsonga, Zulu)

**Taxonomic status:** Subspecies

**Taxonomic notes:** There are two subspecies of the Suni within southern Africa (Meester et al. 1986); *Neotragus moschatus livingstonianus* (Kirk 1865) from northeastern Zimbabwe northward, and *Neotragus moschatus zuluensis* (Thomas 1898) from northern KwaZulu-Natal Province (KZN) South Africa, southern Mozambique and south-eastern Zimbabwe. Although subpopulations from different regions are phenotypically indistinguishable, cytogenetic differences between *N. m. akeleyi* (from Kenya) and *N. m. zuluensis* indicate that they should be recognised as distinct management units (Kingswood et al. 1998). Globally, five subspecies have been described but the boundaries between forms are not clearly delineated (IUCN SSC Antelope Specialist Group 2016).

## Assessment Rationale

The Suni is a woodland and thicket dwelling (especially sand forest) species on the edge of its range within the assessment region, occurring within northern KZN. Although anecdotal reports suggest Suni presence in northeastern Kruger National Park, no recent records confirm this. Current extent of occurrence is estimated to be 10,778 km$^2$ and area of occupancy (AOO), using all remaining natural forest patches as a proxy, is estimated to be 489 km$^2$. This is likely to be an overestimate as not all forest patches, especially in the matrix between protected areas, will be occupied due to poaching pressure and human disturbance. Natural habitat in KZN was lost at a rate estimated to be 1.2% per annum between 1994 and 2011. Similarly, we suspect an ongoing loss of mature individuals from illegal poaching for bushmeat and sport hunting with dogs, especially around protected area edges and in private or communal lands. Between 2000 and 2013, there was a 5.6% and 1.1% rate of urban and rural expansion in KZN, respectively, which we view as a proxy for the latter threats. A major threat to this species is increasing Nyala (*Tragelaphus angasii*), African Elephant (*Loxodonta africana*), and other sympatric browser density that denudes the shrub layer necessary for Suni survival.

Population size is difficult to determine due to the Suni's shy nature and patchy occurrence, but is estimated to range between 440–4,890 individuals (220–2,445 mature individuals using a 50% mature population structure). The largest subpopulation (based on forest fragments) is estimated to range between 62–750 mature individuals. There has been a genuine decline in the largest historical subpopulation, Tembe Elephant Park: scat-based abundance in 1984 was 3.58 middens / 100 m but only 0.54 middens / 100 m in 2013, which corresponds to a > 50% population decline in the formerly largest subpopulation in the assessment region over more than three generations (14 years). Thus, we list Suni as Endangered A2b, based on an estimated decline in the protected stronghold of the species; B2ab(ii,iii,v) due to its restricted AOO and ongoing loss of suitable habitat, loss of mature individuals from poaching and loss of habitat quality from increased browser densities; and C2a(i) using the lower end of population and subpopulation size ranges. However, we caution that further subpopulation surveys are necessary to corroborate this listing by quantifying overall population size and trends more accurately. Key interventions for this species include: better management of African Elephant and Nyala populations which includes: de-stocking Nyala on private land; management of predator numbers; reintroduction or supplementation from captive-stock into the suitable habitat patches; protected area expansion, either formally or through biodiversity stewardship schemes; and

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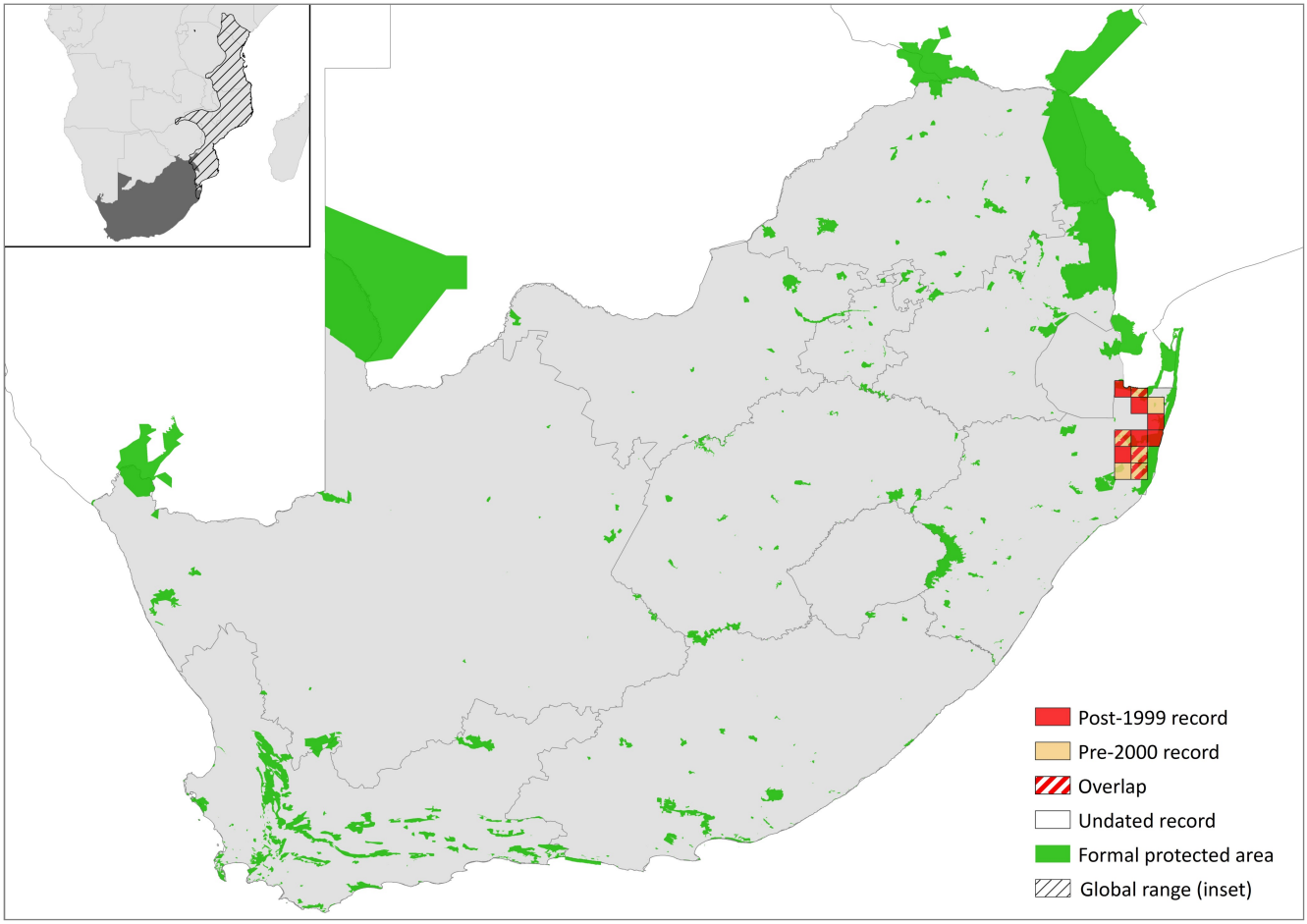


**Figure 1. Distribution records for Suni (*Nesotragus moschatus zuluensis*) within the assessment region**

**Table 1. Countries of occurrence within southern Africa**

| Country | Presence | Origin |
|---|---|---|
| Botswana | Absent | - |
| Lesotho | Absent | - |
| Mozambique | Extant | Native |
| Namibia | Absent | - |
| South Africa | Extant | Native |
| Swaziland | Possibly extant | Native |
| Zimbabwe | Extant | Native |

increased training of protected area managers and subsequent prosecution of protected area transgressors.

**Regional population effects**: Although there are potential dispersal corridors between northern KZN and southern Mozambique through the Lubombo Transfrontier Conservation Area, especially through Tembe Elephant Park and Ndumo Game Reserve to Maputo Special Reserve, high poaching pressure in the matrix between protected areas is suspected to repress the establishment of dispersers, especially around the Kosi Bay area. Furthermore, anecdotal evidence suggests that poaching pressure may be so severe in southern Mozambique that rates of dispersal into South Africa may decrease. Until research has demonstrated otherwise, we do not apply the regional criterion as no significant rescue effects are suspected.

# Distribution

Globally, Suni occur along the eastern part of the African continent in thickets and coastal regions from Kenya to KZN, with their southerly limit being around Lake St. Lucia (IUCN SSC Antelope Specialist Group 2016). They are associated with evergreen vegetation consisting of closed-canopy woodland with shrub cover and thickets in coastal regions and associated hinterlands, stretching from Kenya to KZN, where their southerly limit is around Lake St. Lucia in northeastern KZN (*c.* 28°S) (Skinner & Chimimba 2005).

Within the assessment region, which is the southern edge of its global range, Suni occur in woodlands, thickets and forests, especially sand forests in Maputaland (van Eeden 2006; Belton et al. 2008), in the northeastern parts of KZN (Figure 1). Sand forests and the thicket habitats have been lost to agricultural, urban and rural sprawl and thus these habitat types are highly fragmented, which makes the Suni population subject to edge effects and isolation. They occur in protected areas, such as Tembe Elephant Park and Ndumo Game Reserve, and in coastal areas such as sections of the iSimangaliso World Heritage Site including False Bay Park and Mkhuze Game Reserve, as well as private lands. Although recent records in Kosi Bay are confirmed (*c.* 10 individuals), poaching pressure continues to cause decline in the area (S. Kyle pers. comm. 2015). There are reports that they occur in northeastern parts of Kruger National Park in Mpumalanga Province and in Pongola Nature Reserve in KZN (Skinner & Chimimba 2005), but no recent records confirm this. They are also likely to occur in Swaziland, such as in the east-facing slopes of the Lubombo Mountains or in Milwane Wildlife Sanctuary, although their occurrence is

not confirmed (Monadjem 1998). There are suspected to be very few Suni left in southern Mozambique due to high poaching pressure (S. Kyle pers. comm. 2015), so immigration into South Africa is increasingly unlikely. There have, however, been sightings of Suni in Maputo Special Reserve over the past few years, although these remain infrequent (C. Hanekom pers. comm. 2015).

The estimated extent of occurrence (EOO), including northeastern Kruger National Park, of this species is estimated at 10,778 km$^2$. If we calculate EOO based on confirmed records only, it is 6,568 km$^2$. Using all forest patches as a proxy for AOO yields 556 km$^2$, of which only 489 km$^2$ is estimated to remain natural using recent (2013) landcover satellite imagery (GeoTerraImage 2015). Of 433 forest patches within the EOO, the average size is 1.1 ± 6.8 km$^2$, with a maximum size of 136.5 km$^2$ (Northern Coastal Forest) and a minimum of 0.05 km$^2$ (Sand Forest). The largest protected area in which Suni occurs is Tembe Elephant Park (*c*. 300 km$^2$), of which an estimated 65% (195 km$^2$) comprises suitable thicket woodland habitat (W. Matthews & C. Hanekom unpubl. data).

# Population

Globally, the Suni population is estimated at *c*. 365,000 animals (IUCN SSC Antelope Specialist Group 2016). Within the assessment region, it occurs in fragmented and low-density subpopulations. While it occurs in higher densities throughout the rest of its African range, such as 13–17 individuals / km$^2$ in Zanzibar Island (Tanzania) and Lengwe National Park (Malawi) (IUCN SSC Antelope Specialist Group 2016), densities in South Africa are typically lower. For example, 0.9 individuals / km$^2$ in Mkhuze Game Reserve (East 1999). Very few individuals are suspected to occur between Kosi Bay and Lake St. Lucia (S. Kyle pers. comm. 2015).

Estimating population size is difficult because of their secretive and shy nature. During 2013/2014, 641 individuals were estimated to occur in four Ezemvelo-KZN Wildlife (EKZNW) nature reserves (I. Rushworth unpubl. data.): 393 in Mkhuze Game Reserve, 80 in Makhasa Nature Reserve, 158 in False Bay Park, and 10 in Coastal Forest Reserve. Hunnicutt et al. (unpubl. data) estimate total population numbers at < 3,000 individuals based on changes in scat counts and available habitat. Considering social groups consist of two adults and one or two juveniles, we assume a 50% mature population structure, which yields *c*. 1,500 mature individuals. Similarly, by extrapolating a density range of 0.9–10 individuals / km$^2$ across the AOO (489 km$^2$), population size is estimated to be 440–4,890 individuals (220–2,445 mature individuals). If we use forest patches as a proxy for subpopulations, the largest fragment is 137 km$^2$, which yields a range of 62–685 mature individuals. Historically, the largest protected subpopulation was Tembe Elephant Park in KZN, which was estimated at 3,000 individuals in the late 1980s (Lawson 1986). However, recent research indicates a significant decline in this subpopulation and the total subpopulation is likely to be fewer than 1,500 individuals (750 mature individuals) (A. Hunnicutt unpubl. data), and could be even more severe a decline based on anecdotal encounter rates (W. Matthews pers. obs. 2015). Scat-based abundance in 1984 was 3.58 middens / 100 m in Tembe Elephant Park (Lawson 1986), but was only 0.54 middens / 100 m in 2013 (A. Hunnicutt unpubl. data). Generation length has been calculated as 4.8 years (Pacifici et al. 2013), which yields a 14-year three-generation period (1999–2013). Thus, there has been an estimated > 50% population decline in Tembe Elephant Park over more than three generations. Similarly, game counts at Mkhuze Game Reserve show an estimated decline from 550 Suni in 2008 to 393 in 2014 (A. Hunnicutt unpubl. data). The current subpopulation size at Phinda Private Game Reserve is low as it was found to have an abundance rating of 0.22 middens / 100 m (A. Hunnicutt unpubl. data). More positively, numbers in False Bay Park have been stable over three generations (1999: 126 animals; 2014: 159 animals; C. Mulqueeny unpubl. data). In Ndumo Game Reserve, numbers may have started to increase over the past six years with vegetation recovery following the reduction in abundance of game species such as Nyala (C. Hanekom unpubl. data).

The decline in Tembe Elephant Park is likely a result of multiple factors: increasing African Elephant density (habitat alteration leading to a decline in the density of shrubs), increasing Nyala density (habitat alteration and resource competition), and predation from high Lion (*Panthera leo*) density and introduced Wild Dogs (*Lycaon pictus*), although whether Wild Dogs are a threat is debatable (C. Wright unpubl. data). However, in Mkhuze Game Reserve, with possibly the second largest Suni subpopulation in a protected area, a recent reintroduction of Wild Dogs and lion has added markedly to the predation pressure on Suni. These pressures are not unique to Tembe and Mkhuze and may exist in other reserves with Suni. More research is urgently needed to assess population trends in other protected areas.

Due to their small home range size and low dispersal rates, the species is subject to considerable fragmentation with limited gene flow between patches. Habitat in the region is becoming increasingly fragmented as residential and industrial development disconnects forest patches (Jewitt et al. 2015).

**Current population trend:** Declining. Based on scat-based abundance in Tembe Elephant Park and game counts in Mkhuze Game Reserve.

**Continuing decline in mature individuals**: Yes. Suspected from snaring, especially on the edge of protected areas. There is also habitat transformation within and outside protected areas where Suni occur.

**Number of mature individuals in population**: 220–2,445

**Number of mature individuals in largest subpopulation**: 62–750

**Number of subpopulations**: *c.* 5

**Severely fragmented:** Yes. Forest habitat is fragmented and isolated.

# Habitats and Ecology

Within the assessment region, Suni prefer vegetation types with high undergrowth stem density for both predation evasion and access to foodstuffs (Lawson 1986; Belton et al. 2008). In northern KZN, they occur in dry woodland, bushveld and thickets on sand or clay soils (Rowe-Rowe 1994). They display highest densities in sand forest (van Eeden 2006), but also occur in sandveld woodland thickets and riparian woodlands. In some areas within their range they may benefit from the expansion of secondary thicket habitat associated with human activities (IUCN SSC Antelope Specialist Group 2016).

**Table 2. Use and trade summary for the Suni (*Nesotragus moschatus zuluensis*)**

| Category | Applicable? | Rationale | Proportion of total harvest | Trend |
|---|---|---|---|---|
| Subsistence use | Yes | Anecdotal observations of poaching, also compliance incidents recorded by EKZNW staff. | Majority | Increasing |
| Commercial use | Yes | Anecdotal reports of trophy hunting on private lands. | Minority | Unknown |
| Harvest from wild population | Yes | Most Suni are wild and free-roaming. | Majority | Increasing |
| Harvest from ranched population | Yes | Suspected | Minority | Increasing |
| Harvest from captive population | Yes | Suspected | Minority | Unknown |

They occur as solitary adults (77%), in pairs (12%) or in families consisting of a male, female and offspring (Lawson 1986). They are shy and, if disturbed, they freeze, before jumping away into the nearest thicket (Skinner & Chimimba 2005). They have small territories: Lawson (1986) recorded male territories as 0.005–0.011 km$^2$, with little overlap, and females as 0.009–0.046 km$^2$, almost entirely overlapping within male territories. Males reach maturity at eight months; females at 12 months. Inter-calving interval is approximately seven months and the generation length is four years.

Suni cannot digest cellulose properly, and feed primarily on leaves, with a preference for freshly fallen leaves, but also eat wild fruits, flowers and tips of shoots (Lawson 1986). They have also been observed to feed on mushrooms (Heinichen 1972).

**Ecosystem and cultural services:** Suni are a flagship species for northern KZN's threatened sand forests. They are also an important food source for Crowned Eagles (*Stephanoaetus coronatus*), Martial Eagles (*Polemaetus bellicosus*) and African Pythons (*Python sebae*).

"Nhlegane" is the Zulu name for the Suni and means "why is it beautiful?". According to Northern Maputaland folklore this came from King Shaka declaring the Suni the most beautiful animal in his forest.

# Use and Trade

This species is used on a subsistence level as bushmeat, which may lead to localised declines. Trophy hunting is also seen in parts of its range including South Africa, but no information is available on numbers hunted or impact on the population. More research should be undertaken to determine possible sustainable offtake rates. Small subpopulations exist on private game farms and conservancies, but are likely fragmented in that they seldom experience gene flow with each other or larger protected subpopulations.


Axel Hunnicutt

The private sector may have generally had a positive effect on this species as it has been reintroduced onto private properties within its natural distribution. However, private landowners often overstock Nyala, which can reduce the shrub cover necessary for this species (Lawson 1986; Coates & Downs 2005; Belton et al. 2008; Lagendijk et al. 2012). With recent increases in Nyala prices, there is potential for ranches to increase their Nyala densities, which may have adverse effects on Suni overall.

# Threats

The greatest historical threat was loss of habitat from both agricultural expansion, human settlement expansion and large herbivore impacts, which has left Suni habitat fragmented and Suni subpopulations isolated. Although suitable habitats of northern KZN are currently well-protected, habitat loss continues, especially through human settlement expansion (see below). Currently, the major threats affecting Suni are:

1. **Bushmeat poaching:** anecdotal observations suggest high mortality rates from snares, even within protected areas. Bushmeat poaching may be increasing, especially along protected area edges where human densities tend to be highest (Wittemyer et al. 2008). Because they use pathways through dense underbrush, they are easily snared and poaching is suspected to lead to higher mortality than natural predation (Skinner & Chimimba 2005). Lawson (1986) observed that in northern KZN, Suni had disappeared outside protected areas from habitat loss and overhunting. On several farms, particularly in the Mkhuze area, new landowners have opened their land to bushmeat and traditional medicine hunting.
2. **Sport hunting:** illegal hunting with domestic dogs (*Canis familiaris*) for sport or gambling is similarly suspected to be causing high mortality rates (*sensu* Grey-Ross et al. 2010), especially on private or communal lands in the matrix between protected areas.
3. **Continuing loss of habitat:** current habitat loss, especially from urban and rural expansion (see

**Table 3. Threats to the Suni (*Nesotragus moschatus zuluensis*) 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 | *5.1.1 Hunting & Collecting Terrestrial Animals*: poaching for bushmeat use. | - | Anecdotal, EKZNW compliance data | - | Suspected to be increasing due to human settlement expansion, especially around protected area edges. |
| 2 | *5.1.2 Hunting & Collecting Terrestrial Animals*: illegal dog hunting sport. | Grey-Ross et al. 2010 | Indirect | Regional | Suspected to be increasing due to human settlement expansion, especially around private lands and communal areas. |
| 3 | *8.2.2 Problematic Native Species/ Diseases*: high densities of sympatric browsers, particularly African Elephant and Nyala, reduces the shrub cover critical to Suni survival. Current stresses *1.2 Ecosystem Degradation* and *2.3.2 Competition*: habitat degradation and increasing interspecific competition. | Lawson 1986 | Empirical | Regional | Increasing, based on game auction trends for Nyala. |
| | | Belton et al. 2008 | Empirical | Local | |
| | | Lagendijk et al. 2012 | Empirical | Local | |
| | | A. Hunnicutt unpubl. data | Empirical | Local | |
| 4 | *1.1 Housing & Urban Areas*: habitat loss through expanding human settlements. Current stresses *1.2 Ecosystem Degradation* and *1.3 Indirect Ecosystem Effects*: fragmentation and degradation of remaining habitat into small patches. | Jewitt et al. 2015 | Indirect (satellite imagery) | Regional | Average loss of natural habitat 1.2% / annum between 1994 and 2011. |
| | | GeoTerraImage 2015 | Indirect (satellite imagery) | National | Urban and rural expansion of 5.6 and 1.1% respectively between 2000 and 2013. |
| 5 | *2.1 Annual & Perennial Non-Timber Crops*: habitat loss of forest and thickets through agricultural expansion. *1.2 Ecosystem Degradation* and *1.3 Indirect Ecosystem Effects*: degradation and fragmentation of remaining habitat into small patches. | Jewitt et al. 2015 | Indirect (satellite imagery) | Regional | Average loss of natural habitat 1.2% / annum between 1994 and 2011. |
| 6 | *5.3.3 Logging & Wood Harvesting*: selective logging decreases food availability and may increase hunting pressure. | A. Hunnicutt unpubl. data | Empirical | Local | Suspected to be increasing based on settlement expansion. |
| 7 | *8.2.2 Problematic Native Species/ Diseases*: high reintroduced predator densities in protected areas. | - | Anecdotal | Local | Increasing in some protected areas. |

below), contributes to further fragment the population, lowering gene flow rates and thus reducing the resilience of the population to environmental changes.

4. **High African Elephant and Nyala densities:** high or artificially inflated African Elephant and Nyala abundance reduces the shrub cover needed by Suni and consequently has a negative relationship with Suni abundance (Lawson 1986; Belton et al. 2008; Lagendijk et al. 2012). In many areas, the increase in Nyala, particularly on private lands, has been suggested to contribute to local Suni extinctions, which has similarly been shown to impact Bushbuck (*Tragelaphus sylvaticus*) abundance (Coates & Downs 2005). Similarly, increased sand forest disturbance (likely by sympatric browsers), which affects forest structure, is shown to negatively affect Suni presence (Belton et al. 2008; Lagendijk et al. 2012; A. Hunnicutt unpubl. data).
5. **Loss of habitat quality from resource extraction:** firewood collection and charcoal production within forests are likely to decrease habitat quality for the species by removing shrub cover, and also decrease the effective AOO.

**Current habitat trend:** Declining. Habitat for this species has decreased in quality due to human habitation, slash and burn agricultural practices, and resource extraction from forests and woodlands (for example, removal of small stems and undergrowth for fuelwood and building materials). This is particularly the case in northern Maputaland. Within protected areas, transformation of habitat structure and quality is potentially increasing from high densities of African Elephant and Nyala.

Between 2000 and 2013, there was a 5.6% and 1.1% rate of urban and rural expansion in KZN respectively (GeoTerraImage 2015), which we infer to be increasing rates of habitat degradation. Recent satellite imagery data confirm an ongoing loss of forest habitat within the assessment region between 2000 and 2014 (A. Skowno unpubl. data). As Suni are at highest densities in sand forest (van Eeden 2006), the loss of this forest type will be especially detrimental on the population. Overall, there was a 20.4% loss of natural habitat in KZN from 1994 to 2011, with an average loss of 1.2% per annum (Jewitt et al. 2015). If this rate of loss continues into the future, there

will be an estimated 14.4% loss of habitat over the next three generations.

# Conservation

Important protected subpopulations in KZN occur in Tembe Elephant Park (largest subpopulation and a source for immigrants and/or dispersal), Mkhuze Game Reserve, Phinda Private Game Reserve (site of current subpopulation research), Ndumo Game Reserve, and False Bay Park, St. Lucia. They may marginally occur in Kruger National Park, but no recent records are available. The most important interventions are as follows:

1. **Protected area expansion:** to conserve and consolidate remaining sand forest patches and other suitable habitats into a connected metapopulation. For example, in Maputaland, a new transfrontier landscape is being proposed that will, amongst other species, presumably benefit Suni by extending the existing Lubombo Transfrontier Conservation Area to the south and east of Tembe Elephant Park and to the west of Ndumo Game Reserve (Smith et al. 2008).
2. **Biodiversity stewardship schemes:** to conserve suitable sand forest patches and other suitable habitat outside protected areas and prevent ongoing habitat loss or disturbance to such sites. Similarly, stewards and private landowners should be incentivised to manage their African Elephant and Nyala to support healthy Suni subpopulations.
3. **Training:** protected area managers and governmental agencies need further training and capacity development to monitor and enforce regulations on illegal development, timber harvesting and dog hunting. This will minimise mortality and disturbance to the species.
4. **Reintroduction:** reintroduction and augmentation of existing subpopulations from captive-bred stock could help to create demographically and ecological self-sustaining subpopulations and increase the overall AOO (this needs to be investigated further). Suni breed well in captivity and captive-bred individuals can be used as a source population. For example, a Suni breeding project (currently not active) was initiated in Punda Maria, Kruger National Park, in 1989, to gain information on the species in captivity (Pretorius et al. 1996). However, reintroduction methods and attempts need further research and documentation, as a previous attempt was unsuccessful: in 1995, 39 captive-bred individuals were reintroduced into northeastern Kruger National Park but no individuals could be found by 1998 (East 1999). Another translocation to Kruger National Park from Tembe Elephant Park yielded high mortality for the captured individuals, thus safer capture methods should be employed for future translocations. Furthermore, research shows that the subspecies *N. m. zuluensis* should be managed as a separate conservation unit (Kingswood et al. 1998), and thus introduction of extra-limital subspecies to augment existing subpopulations within the assessment region is discouraged. Suni have small home ranges, which may make them suitable for reintroduction into private conservancies.

**Recommendations for land managers and practitioners:**

**Table 4. Conservation interventions for the Suni (*Nesotragus moschatus zuluensis*) 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 | *1.1 Site/Area Protection*: protected area expansion to connect large sand forest patches and suitable habitat to ensure viable subpopulations. | - | Anecdotal | - | - | Conservation planning to extend Lubombo Transfrontier Conservation Area. |
| 2 | *1.2 Resource & Habitat Protection*: habitat conservation and connectivity through biodiversity stewardship schemes. | - | Anecdotal | - | - | Currently the Tshanini/Bhekula CCA & Usuthu Gorge CCA |
| 3 | *2.1 Site/Area Management*: training forest managers to increase prosecution rates of people found with snares or Suni carcasses. | - | Anecdotal | - | | - |
| | *6.1 Linked Enterprises & Livelihood Alternatives*: development and implementation of sustainable resource extraction practices from forests for local communities, including Suni offtake. | - | Anecdotal | - | - | - |
| | *5.4 Compliance & Enforcement*: lobbying government agencies to enforce legislation restricting illegal development and timber harvesting. | - | Anecdotal | - | - | - |
| | *3.3.1 Species Reintroduction*: reintroduction and augmentation from captive-bred stock may help to sustain large subpopulations and increase area of occupancy. | East 1999 | Empirical | Local | Unsuccessful – no evidence for individuals in released areas. | - |

- Captive breeding projects can be used to supplement existing subpopulations or reintroduce subpopulations to areas within the natural range. However, captive subpopulations should not mix alien subspecies with *N. m. zuluensis*. Evidence from captive-bred individuals indicates higher perinatal mortality in subspecies hybrids (Kingswood et al. 1998). Recording the success or failure of any reintroduction event is crucial to create an evidence base.
- Stocking levels of Nyala and African Elephant may adversely affect Suni, thus both species should be kept at stocking densities. Similarly, monitoring the effects of African Elephant on habitats inhabited by Suni is required.
- Systematic subpopulation monitoring is required to better estimate population size and trends, as well as current AOO patterns.

**Research priorities:** An abundance index based on scat counts was started in 2013. The project plans to collect abundance data annually at Tembe Elephant Park and Phinda Private Game Reserve to compile an index for Suni. This project could increase its impact and effectiveness by sampling from more reserves where Suni are thought to be present. This monitoring project is being continued by Axel Hunnicutt in Phinda Private Game Reserve. Further research priorities include:

- Surveys of Suni subpopulations to generate accurate subpopulation size estimates.
- Studies investigating the rate of dispersal of individuals between South Africa and Mozambique.
- Studies generating information on ranching and commercial utilisation of this species, as well as the potential for reintroduction into small private reserves or conservancies.
- Studies to further understand diet and relationship with sympatric foragers, as well as the risk of predation by introduced carnivores.

**Encouraged citizen actions:**

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- Reduce Nyala on private properties to keep stocking rates low.

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# Data Sources and Quality

**Table 5. Information and interpretation qualifiers for the Suni (*Nesotragus moschatus zuluensis*) assessment**

| | |
|---|---|
| Data sources | Field study (unpublished), indirect information (literature, unpublished) |
| Data quality (max) | Estimated |
| Data quality (min) | Inferred |
| Uncertainty resolution | Maximum/minimum values |
| Risk tolerance | Evidentiary |

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


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