Raphicerus campestris – Steenbok

**Taxonomy**

*Raphicerus campestris* (Thunberg 1811)

**Synonyms:** Antilope campestris (Thunberg 1811), acuticornis, bourqui, capensis, capricornis, cunenensis, fulvorubescens, grayi, hoamibensis, horstockii, ibex, kelleni, natalensis, neumanni, pallida, pediotragus, rupestris, steinhardtii, stigmatus, subulata, tragulus, ugabensis, zukowskyi, zuluensis

**Common names:** Steenbok (English, Afrikaans), Steinbuck (English), Ingina, Iqina (Ndebele), Iqchina (Ndebele, Zulu), Pudubudu (Sepedi), Phudufudu (Sepedi, Setswana), Thiane (Sesotho), Phuduhudu (Setswana), Mhene (Shona), Lingcina (Swati), Phuluvhulu (Venda), Xipene (Tsonga), Itshabanqa (Xhosa)

**Taxonomic status:** Species

**Taxonomic notes:** Although various subspecies have been suggested, for example Ansell (1972) recorded eight and Meester et al. (1986) listed five subspecies south of the Sahara Desert, the validity of these subspecies remains questionable. Two commonly accepted subspecies include *Raphicerus campestris campestris* from southern Africa and *R. c. neumanni* from East Africa (Kingdon 1997; du Toit 2013). Taxonomic revision of this species is necessary (Skinner & Chimimba 2005).

**Assessment Rationale**

Listed as Least Concern as the Steenbok is widely distributed (and continues to be well represented in protected areas according to 2012–2013 game counts), considered to be relatively common (for example, 3.78 animals / km² on two small-livestock farms in the Northern Cape and Free State provinces) and no major threats have been identified within the assessment region. Although local and regional declines are suspected due to bushmeat hunting and competition with livestock outside of protected areas, especially where human densities are high, the population trend is generally stable. The effects of the conversion to wildlife ranching on this species should be monitored across the various bioregions, as Steenbok in arid and fynbos habitats may be vulnerable to increasing competition with introduced extralimital herbivores, and which may represent an emerging threat given the expansion of the wildlife ranching industry. Key interventions include the formation of conservancies and the promotion of permeable fences.

**Regional population effects:** There is dispersal across regions through transfrontier spaces along the northern border of South Africa (including the Kgalagadi and Greater Limpopo Transfrontier Parks). Rescue effects are considered possible.

**Distribution**

In Africa, this species occurs in two disjunct areas, one in East Africa, including northern and central Tanzania and into southern Kenya, and the other in southern Africa, intruding marginally into southern Angola and western Zambia (Skinner & Chimimba 2005; du Toit 2013). These regions are separated by the tall, dense Miombo woodlands of central Zambia, northern Mozambique and Malawi (du Toit 2013), and are approximately 1,000 km apart (Skinner & Chimimba 2005). Steenbok are generally absent from forested and thick woodland areas (Skinner & Chimimba 2005). In East Africa, their distribution has declined somewhat as they previously occurred in Uganda, but much of their appropriate habitat has been transformed due to agriculture (East 1999).

The southern African distribution extends through suitable habitats southwards from southern Angola and western Zambia, across most of Namibia (with the exception of the extreme arid, coastal regions), throughout Botswana, into central and southern Zimbabwe, southern Mozambique and across most of South Africa (IUCN SSC Antelope Specialist Group 2016). Its distribution is continuous and widespread throughout South Africa with lower densities in areas without suitable cover. Within the assessment region this species is present in all provinces, throughout a number of habitat types, including grassland, savannah, shrublands and semi-desert, absent only from the southeastern forested regions of the Western Cape, Eastern Cape and KwaZulu-Natal provinces (du Toit 2013). It is likely that Steenbok once occurred in the lowlands of Lesotho, as they occur along the Caledon River in the eastern Free State (N. Avenant pers. comm. 2016), but were not recorded by Lynch (1994) and subsequent field surveys have failed to detect the species (Ambrose & Talukdar 2000; N. Avenant unpubl. data). Locals in the area have positively identified the species from memory (Sesotho name for Steenbok is Thiane), suggesting it was once present (N. Avenant pers. comm. 2016), but is probably regionally extinct due to overhunting (sensu Lynch 1994).

**Population**

A global estimated population size of 600,000 individuals was recorded by East (1999), however, this is considered an underestimate due to the constraints associated with aerial surveys. In areas where Steenbok are common, ground surveys provided density estimates of 0.3–1.0 individuals / km² (East 1999) and distance sampling methods produced estimates of 3.78 animals / km² on Benfontein Game Farm and two small-livestock farms in the eastern Northern Cape and western Free State provinces (Stenkewitz et al. 2010). Similarly, recent field surveys in the North West Province confirmed an abundant population in the Kalahari vegetation types (Power 2014). However, lower densities are expected in areas without suitable vegetation cover and reliable estimates of population density are currently unavailable across most of its range, due to the cryptic nature of this species (du Toit 2013). Within the assessment region, habitat for this species is fairly continuous and widespread, thus there is suspected to be only one major subpopulation throughout the region. The population may only be declining in certain areas due to hunting by local settlements and farmers. Overall, the population is suspected to be stable.
Habitats and Ecology

Steenbok are well adapted to a range of habitat types, from semi-desert regions to mesic mountainous moorlands, including high altitude areas, such as Mt. Kenya (3,500 m asl) (du Toit 2013). They are generally absent from forests and thick woodland areas (Skinner & Chimimba 2005). Occurring commonly in the drier grasslands, shrublands and savannahs of southern Africa, this species often favours heavily grazed regions with a high concentration of forbs. These areas frequently form around water sources, although they are largely water-independent (IUCN SSC Antelope Specialist Group 2016). However, in Botswana, Steenbok are known to dig up roots, rhizomes and succulent bulbs in order to meet their water requirements in dry conditions (Haim & Skinner 1991). Well adapted to dry habitats, this species exhibits low metabolic rates and high overall minimal thermal conductance, allowing it to conserve water when exposed to high temperatures and extreme environmental conditions (Haim & Skinner 1991). Being one of the smallest ruminant browsers, and thus having high mass-specific metabolic needs, Steenbok are reliant on the year-round availability of high-quality forage resources, including geophytes, berries, flowers, green browse material, and indesiccant pods when green foliage is scarce during the dry season (du Toit 2013). In the Kruger National Park (KNP), they depend heavily on the pods of Acacia tortilis in dry conditions (du Toit 1993) and so their key vegetation types include thorn thickets where they find both food and shelter from predators.

Steenbok of both sexes remain within stable home ranges throughout the year. Territories in the Kuise valley of the Kruger National Park (KNP), they depend heavily on the pods of Acacia tortilis in dry conditions (du Toit 1993) and so their key vegetation types include thorn thickets where they find both food and shelter from predators.

Table 2. Use and trade summary for the Steenbok (Raphicerus campestris)

<table>
<thead>
<tr>
<th>Category</th>
<th>Applicable?</th>
<th>Rationale</th>
<th>Proportion of total harvest</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsistence use</td>
<td>Yes</td>
<td>Illegal bushmeat hunting.</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Commercial use</td>
<td>Yes</td>
<td>Trophy hunting, bitlont and live sales.</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Harvest from wild population</td>
<td>Yes</td>
<td>Trophy hunting, illegal bushmeat hunting and live sales.</td>
<td>Unknown</td>
<td>Stable</td>
</tr>
<tr>
<td>Harvest from ranched population</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Harvest from captive population</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 3. Possible net effects of wildlife ranching on the Steenbok (Raphicerus campestris) and subsequent management recommendations

<table>
<thead>
<tr>
<th>Net effect</th>
<th>Data quality</th>
<th>Rationale</th>
<th>Management recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive, in parts of its range.</td>
<td>Anecdotal</td>
<td>Steenbok do not have a high commercial value in the wildlife ranching industry. They have not been widely introduced, due to their persistence in the landscape. Translocations are actively discouraged through conservation legislation.</td>
<td>Steenbok have small home ranges (&lt; 1 km²; du Toit 1993), are either solitary or in pairs, and do not require special considerations on wildlife ranches. They are considered to be density dependent and self-regulating. Steenbok population densities vary across the landscape, depending on the type and quality of habitat. However, persistence and population density should be monitored by landowners, particularly on ranches where this species is hunted. Additionally, the level of clinal variation should be determined at a landscape scale through genetic research.</td>
</tr>
</tbody>
</table>

Threats

No major threats have been identified for this species, however, Steenbok are locally susceptible to predation by domestic dogs (Canis familiaris) and subsistence hunters who frequently capture and kill juveniles in particular (when they are found lying alone in cover) for bushmeat (Lynch 1994; du Toit 2013; IUCN SSC Antelope Specialist Group 2016). Although these threats are not suspected to cause range-wide population declines, they can result in local declines or even local extinction (for example, Lesotho).

Habitat fragmentation through the erection of impermeable fences in the development of wildlife or livestock ranches may inhibit gene flow for this species, as well as other small antelopes and similar sized animals. Additionally, overstocking and mismanagement of livestock or wildlife ranches leading to overgrazing and declines in habitat and forage quality may threaten the success of this species. The development of wildlife ranches is likely to affect local Steenbok subpopulations disparately across different bioregions. Within arid regions and the Fynbos Biome, herbivores are historically less diverse and numerous, and ecological niches are narrow (compared to savannah regions); thus the introduction of extralimital herbivores into these regions is likely to increase competition for local Steenbok populations.

Current habitat trend: Stable, although continued human settlement and habitat conversion for agriculture has caused some local decline in habitat for this species. However, in parts of the Savannah Biome, the expansion of wildlife ranching may lead to an increase in suitable habitat.

Conservation

Steenbok are widespread, and occur extensively within protected areas and private ranch lands. Injudicious translocation of this species needs to be addressed: reintroductions and translocations need to source animals from the same ecotypic range (not more than 100 km away). Habitat connectivity across different vegetation types is essential to maintain gene-flow and clinal variation.

Table 4. Threats to the Steenbok (Raphicerus campestris) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Threat description</th>
<th>Evidence in the scientific literature</th>
<th>Data quality</th>
<th>Scale of study</th>
<th>Current trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.1.1 Hunting and Collecting Terrestrial Animals: local declines due to illegal bushmeat hunting, especially with dogs.</td>
<td>Lynch 1994</td>
<td>Indirect</td>
<td>Regional</td>
<td>Increasing with ongoing settlement expansion. Regional extinction in Lesotho.</td>
</tr>
<tr>
<td>2</td>
<td>2.3.2 Livestock Farming &amp; Ranching: decline in habitat quality and fragmentation due to overgrazing on both livestock and wildlife ranches. Current stresses 1.2 Ecosystem Degradation and 1.3 Indirect Ecosystem Effects: ecosystem degradation and fragmentation.</td>
<td>-</td>
<td>Anecdotal</td>
<td>-</td>
<td>Stable; the effect of habitat degradation varies according to the bioregion in which the livestock or wildlife ranch is situated, as well as the local land management practices.</td>
</tr>
<tr>
<td>3</td>
<td>8.1.2 Invasive Non-Native/Allien Species/ Diseases: introduction of extra-limital herbivores into arid and fynbos areas increases resource competition. Current stress 2.3.2 Interspecific Competition.</td>
<td>-</td>
<td>Anecdotal</td>
<td>-</td>
<td>Increasing with wildlife ranching expansion.</td>
</tr>
<tr>
<td>4</td>
<td>7.3 Other Ecosystem Modifications: erection of impervious fences leading to habitat fragmentation and reduced gene flow. Current stresses 1.3 Indirect Ecosystem Effects and 2.3.5 Inbreeding: habitat fragmentation and inbreeding.</td>
<td>-</td>
<td>Anecdotal</td>
<td>-</td>
<td>Increasing with wildlife ranching expansion.</td>
</tr>
</tbody>
</table>
within the species. Thus, the formation of conservancies and the promotion of permeable fences is required to ensure ecologically-resilient subpopulations of Steenbok.

Monitoring numbers of Steenbok is important for the development of management strategies, investigating population dynamics, and understanding the relationships between predators and prey (Stenkewitz et al. 2010). Due to its cryptic and solitary nature, this species is not suitable for harvesting in any feasible meat-production system, and should not be promoted as a viable species in the wildlife-based rural economy as a source protein. It is likely that Steenbok harvesting would exhibit low financial feasibility and would cause counter-productive disturbance to local Steenbok subpopulations.

Recommendations for land managers and practitioners:

- Promote this species as a natural forage species for indigenous predators as part of the "holistic approach" to the management of damage-causing animals. Apply genetic conservation principles in the management of this ecotypic species.
- Where feasible and practical, ensure that fences are permeable particularly on conservancies/stewardship sites.
- Monitor persistence through the collection of sighting records.
- Monitor population density in areas where this species is hunted.
- Determine the level of clinal variation at a landscape scale through genetic research: collect and bank genetic samples to support genetic research.

Research priorities:

- Effects of wildlife ranching on this species across various bioregions.
- Extent of habitat loss due to expanding agriculture and human settlement.
- Functional properties of Steenbok in seed dispersal.
- Investigations into the relationship between this species and other forage species and damage causing animals, relating specifically to the "holistic approach" to DCA management.
- Map the genetic composition of the southern African population in order to ensure the development of effective and informed decisions relating to reintroductions and translocations of this species.

The collection of distribution information to monitor the persistence of this species in the landscape across the Western Cape, as well as ad hoc information is currently being collected and stored by CapeNature. This information is used for bioregional planning and to determine data gaps in the Western Cape.

Encouraged citizen actions:

- Report sightings and roadkills on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- Landowners should ensure that disturbance of this species and its young is kept to a minimum, particularly with regards to domestic dogs.
- Create conservancies to broaden habitat available for the species.
- Install permeable fences.
- Understand and support the concept of genetic conservation with particular regard to ecotypic species and their management.
- Report illegal hunting to provincial conservation authorities.
- Submit hunting returns (to enable higher confidences in calculating impacts of hunting and evaluating bag limit size).

<table>
<thead>
<tr>
<th>Rank</th>
<th>Intervention description</th>
<th>Evidence in the scientific literature</th>
<th>Data quality</th>
<th>Scale of evidence</th>
<th>Demonstrated impact</th>
<th>Current conservation projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1 Site/Area Protection: conservancy formation to expand protected areas.</td>
<td>-</td>
<td>Anecdotal</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>2.1 Site/Area Management: install permeable fences on ranchlands to allow dispersal.</td>
<td>-</td>
<td>Anecdotal</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>5.3 Private Sector Standards &amp; Codes: translocation regulation to prevent ecotype mixing.</td>
<td>-</td>
<td>Anecdotal</td>
<td>National</td>
<td>-</td>
<td>CapeNature’s Translocation and Utilization Policy</td>
</tr>
<tr>
<td>4</td>
<td>5.1.3 Law &amp; Policy: establish provincial hunting proclamations and bag limits.</td>
<td>-</td>
<td>Anecdotal</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Data Sources and Quality

<table>
<thead>
<tr>
<th>Data sources</th>
<th>Field study (literature, unpublished), indirect information (expert knowledge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data quality (max)</td>
<td>Inferred</td>
</tr>
<tr>
<td>Data quality (min)</td>
<td>Suspected</td>
</tr>
<tr>
<td>Uncertainty resolution</td>
<td>Expert consensus</td>
</tr>
<tr>
<td>Risk tolerance</td>
<td>Evidentiary</td>
</tr>
</tbody>
</table>

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Manual, Part 2. 15. Smithsonian Institution Press, Washington, DC, USA.


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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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