

Myomyscus verreauxii – Verreaux’s Mouse



other *Myomyscus* species based on its distribution. No subspecies have been described.

Assessment Rationale

This endemic species remains listed as Least Concern in view of its wide (albeit fragmented) distribution within the Western and Eastern Cape, and because its habitat is largely inaccessible and unlikely to be extensively transformed. The estimated extent of occurrence is 150,917 km². There are no major threats expected to cause range-wide population decline. However, although around 76% of the Western Cape is still considered natural or near-natural, information from the Western Cape Nature Conservation Board indicates that there is a continuing decline in natural habitat from agricultural expansion, especially on lower- to mid-slope areas (below 1,000 m) from planted pastures and rooibos, wine and fruit cultivation, which may impact the species in the future as climate change makes higher elevation habitats more suitable for agriculture. Additionally, there may be localised losses of habitat quality due to the spread of invasive alien species, inappropriate fire regimes, and edge effects associated with agricultural and residential land-uses (for example, use of pesticides and predation from domestic pets). Although the species remains widespread and regularly encountered, proactive mitigation measures, including protected area expansion and habitat restoration, should be continued to counteract habitat loss. Protected area expansion to connect fragmented subpopulations, especially in the low-lying fynbos areas, would especially benefit this endemic species.

Regional Red List status (2016)	Least Concern*
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (2016)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing	None
Endemic	Yes

*Watch-list Threat

The endemic Verreaux’s Mouse, *Myomyscus verreauxii*, is largely restricted to the Fynbos Biome of the Western Cape Province (Mugo et al. 1995), only marginally extending into the Northern (Avery & Avery 2011) and Eastern Cape provinces.

Taxonomy

Myomyscus verreauxii (Smith 1834)

ANIMALIA - CHORDATA - MAMMALIA - RODENTIA - MURIDAE - *Myomyscus* - *verreauxii*

Synonyms: *Myomys verreauxii* (Smith 1834)

Common names: Verreaux’s Mouse, Verreaux’s White-footed Rat (English), Verreaux se muis (Afrikaans)

Taxonomic status: Species

Taxonomic notes: The genus *Myomyscus* is currently represented by three African species, which can be distinguished from the similar *Mastomys* species based on their longer tail relative to head and body length, whiter ventral colour, and number of nipples (Monadjem et al. 2015), as well as molecular data (Lecompte et al. 2005). Musser and Carleton (1993) suggest that the *Myomyscus* should be restricted to the type species (*M. verreauxii*), and a new genus should be described for the remaining taxa (Monadjem et al. 2015). However, further analyses are required before this hypothesis can be confirmed. Verreaux’s Mouse can be easily distinguished from the

Distribution

This species is endemic to southwestern South Africa, largely restricted to the Fynbos Biome in the Western Cape Province (Mugo et al. 1995), and partially extending into the Northern and Eastern Cape provinces (Avery & Avery 2011) (Figure 1). Their range may extend from the Olifants River in the west to the Knysna district and Plettenberg Bay in the east. They occur in a variety of habitats, including grasslands, fynbos and forests (Monadjem et al. 2010). The estimated extent of occurrence using all records is 150,917 km². Further field surveys are necessary to confirm current occupancy within its range.

Population

Although this species has a naturally fragmented distribution and is uncommon, it is regularly recorded and can be locally abundant (Happold 2013). For example, it comprised 50% of small mammals trapped in the forested valleys of the Cederberg, Western Cape (Rautenbach & Nel 1980). No population estimates are currently available.

Current population trend: Stable

Continuing decline in mature individuals: Unknown

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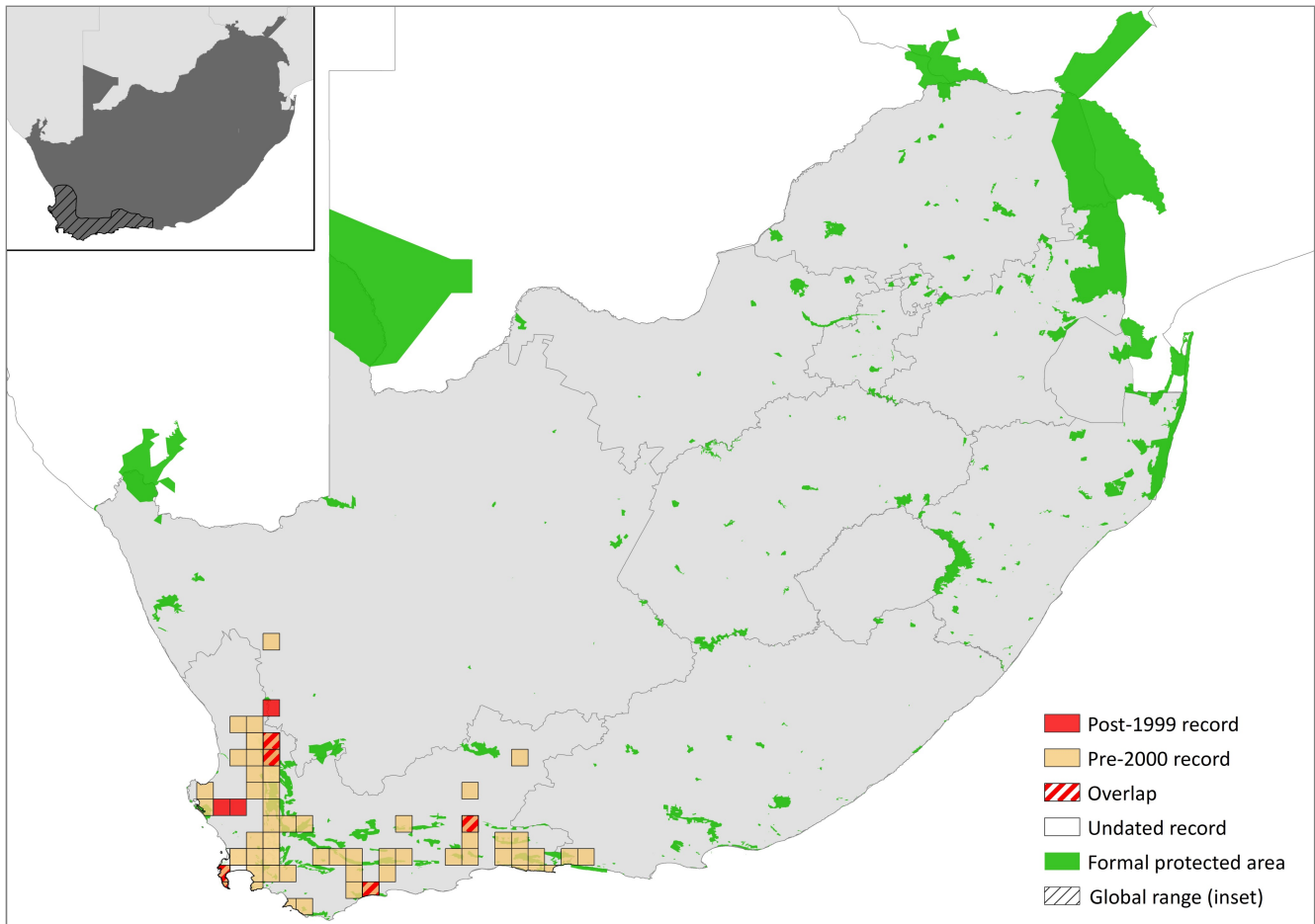


Figure 1. Distribution records for Verreaux's Mouse (*Myomyscus verreauxii*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Unknown

Severely fragmented: Yes, naturally fragmented by mountain ranges.

Habitats and Ecology

This nocturnal species is located within both lowland and montane fynbos vegetation. They have been recorded as fairly abundant in riverine forests, living in scrub on grassy slopes and the edges of forests (Rautenbach & Nel 1980). For example, in the Cederberg region, they are found in forested valleys. In the Knysna area, this species occurs in damp grasslands and vleis, seeking shelter under fallen trees (De Graaff 1981). Happold (2013) describes them as

inhabiting meadow banks near the coast, and near fallen trees or in grassy vleis in forests. It is unknown whether disturbed or modified regions form viable habitats for this species, but it has not been recorded from pine plantations (Armstrong et al. 1996).

David (1978) and Breytenbach (1982) found that Verreaux's Mouse depends largely on Proteaceae seeds, for example *Leucodendron album*. Additionally, Rautenbach and Nel (1980) reported that insects may also form a substantial part of their diet.

Ecosystem and cultural services: This species has been recognised as a valuable, and often essential, pollinator for ground *Protea* species (David 1978).

Use and Trade

This species is not known to be traded or utilised in any form.

Threats

The lower-lying areas of this species' range are threatened by habitat loss and fragmentation as a result of urban and agricultural expansion (Pence 2014a), while the inaccessible montane portions of its range are unlikely to be extensively transformed. However, climate change may make higher elevations more suitable for agricultural expansion (see below) and thus represents an emerging threat.

The effects of global climate change on the endemic Fynbos Biome of South Africa, and its interaction with land

Table 2. Threats to the Verreaux's Mouse (*Myomyscus verreauxii*) 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	2.2.2 <i>Agro-industry Plantations</i> : loss of habitat quantity and quality through agricultural expansion.	Pence 2014	Indirect (remote sensing)	Regional	There is a continuing decrease in habitat (107 km ² / year between 2006–2011).
2	11.1 <i>Habitat Shifting & Alteration</i> : habitat contraction and altered fire regime as a result of global climate change; climate change enabling viticulture on higher elevations.	Midgley et al. 2003	Indirect	Regional	Increasing: varied effects on native vegetation, including altered abundance and composition, which affects the seed dispersal functions of native plants. 14% increase in potential habitat loss from Cape winelands by 2050.
		Richardson & van Wilgen 2004	Indirect	Regional	
		Hannah et al. 2013	Simulation	Global	
3	8.1 <i>Invasive Non-Native/Alien Species/Diseases</i> : habitat degradation from invasive alien plants reducing natural food resources and altering fuel loads.	van Wilgen et al. 2012	Indirect (extent of invasion based on aerial surveys)	National	Increasing (see specific rate)
4	7.1.1 <i>Increase in Fire Frequency/Intensity</i> : habitat degradation from decreased fire intervals (caused by climate change interacting with elevated fuel loads from invasive alien plants) reducing food resources.	-	Anecdotal	-	-
5	2.2.2 <i>Wood & Pulp Plantations</i> : habitat loss from pine plantations.	Armstrong et al. 1996	Empirical	Regional	Stable

transformation has been assessed by Midgely et al. (2003), who predict the potential range contraction and elimination of certain Proteaceae species. Climate change was predicted to have more of an impact on Proteaceae species than land transformation; as land transformation was considerably less prevalent in regions of higher altitude (Midgley et al. 2003). Additionally, altered fire regimes due to climate change and the expansion of invasive alien plant species may lead to habitat degradation and fragmentation, thus affecting the availability of shelter and forage resources for this species. The fynbos habitat is impacted in parts by invasive alien plants which, despite control efforts, are expanding (van Wilgen et al. 2012). Replacement of natural vegetation by non-indigenous species may reduce food resources and lead to altered fire regimes, which may become a threat if the fire return interval becomes so short that seeds preferred by the Verreaux's Mouse cannot be produced.

Current habitat trend: Declining, in the lowland fynbos habitats. However, as 76% of the province remains natural or near-natural and the protected area network continues to expand (Pence 2014b), we suspect that habitat loss from agricultural expansion will only impact the species if higher-elevation areas are increasingly converted to crops, which may become likely as climate change makes such areas suitable. For example, climate change is projected to increase the suitability of upslope habitats for viticulture, increasing the footprint of winelands by 14% by 2050 (Hannah et al. 2013). Such trends in transformation of mid- and upper-slopes should be monitored.

Conservation

This species is present within a number of protected areas of the assessment region, such as the West Coast National Park, De Hoop Nature Reserve and Vrolijkheid Nature Reserve. Although no specific conservation interventions are necessary, this species would benefit

from protected area expansion, thus connecting lowland fynbos areas to patches of inaccessible montane habitat. Progress is being made in protected area expansion in the Western Cape, especially in Critical Biodiversity Areas (CBAs) (Pence 2014b). Stewardship on private lands may be particularly promising. For example, the Biodiversity Stewardship Programme has added over 490 km² to the Western Cape's formal protected area network since its launch in 2003, by entering into biodiversity agreements with private landowners (Maree et al. 2015). Such agreements should be enhanced through best practice management techniques for both viticulture and biodiversity, a new field dubbed vinecology, which is actively implemented in South Africa (reviewed in Viers et al. 2013).

Recommendations for land managers and practitioners:

- It is critical that the fight to eradicate invasive alien plant species from our protected areas continues and that every effort be made to maintain the "natural" fire regime within the Fynbos Biome. Landowners should be incentivised to employ the Working for Water Programme (Department of Environmental Affairs) to restore habitats.

Research priorities:

- Rate of future habitat loss in the Western Cape, especially in higher altitude areas due to climate change and viticultural expansion.
- Estimating population size through density estimates and total natural habitat available. This would enable a threshold of habitat loss to be calculated below which the population is expected to be fewer than 10,000 mature individuals.
- Effectiveness of invasive alien plant removal in increasing small mammal occurrence and abundance.

Table 3. Conservation interventions for the Verreaux's Mouse (*Myomyscus verreauxii*) 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	<i>1.1 Site/Area Protection:</i> landscape-level approach to species management; and protected area expansion to include lowland fynbos areas, in light of climate change predictions.	Pence 2014	Indirect (remote sending)	Regional	775 km ² added to the conservation estate from 2010–2013, 282 km ² of which in CBAs.	Western Cape Biodiversity Framework, CapeNature
2	<i>1.2 Resource & Habitat Protection:</i> biodiversity stewardship agreements for fynbos habitats.	Maree et al. 2015	Indirect (collation of agreement data)	Regional	490 km ² of natural vegetation protected since 2003.	WWF South Africa Biodiversity and Wine Initiative (c. 1,400 km ² land conserved since 2004); Conservation Stewardship Programme, CapeNature (est. 2003)

- Effectiveness of implementing vinecology management on small mammals should be monitored and evaluated.
- Research into how this species responds to fire frequency and the extent of dependence on nut-fruited plants and mammal-pollinated plants.

Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- The consistent clearance of invasive alien plant species across areas of the Cape Floristic Region reduces habitat degradation and water loss for native biodiversity.
- Plant indigenous vegetation in gardens and ensure corridors of natural vegetation remain to allow local movements.

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Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Verreaux's Mouse (*Myomyscus verreauxii*) assessment

Data sources	Museum records, field study (unpublished)
Data quality (max)	Inferred
Data quality (min)	Suspected
Uncertainty resolution	Expert consensus
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*.