Graphiurus ocularis – Spectacled Dormouse

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Regional Red List status (2016)	**Near Threatened A2bc*†**
National Red List status (2004)	Least Concern
Reasons for change	Genuine change: Declining population
Global Red List status (2016)	Least Concern
TOPS listing (NEMBA) (2007)	None
CITES listing	None
Endemic	Yes

*Watch-list Data †Watch-list Threat

The Spectacled Dormouse is so named in English for its characteristic black mask which resembles spectacles, whilst the Afrikaans name of "Gemsbokmuis" refers to the facial pattern that is superficially similar to that of the Gemsbok (*Oryx gazella*) antelope.

Assessment Rationale

The Spectacled Dormouse is endemic to southwestern South Africa. While it is widely dispersed, habitat loss through agricultural expansion is suspected to have reduced area of occupancy and increased fragmentation of the population, as is evidenced by available post-2000 records occurring predominantly in protected areas. In the Western Cape alone, between 2006 and 2011, 536 km^2 of land was converted to agriculture where 31% of losses occurred in Critical Biodiversity Areas. While we assume that the rocky habitats of this species are unlikely to be transformed on a large scale, the effects of climate change may make higher-elevation habitats more suitable for agriculture. Thus, the emerging threat of regional agricultural activities such as rooibos tea farming and vineyards will need to be monitored for their encroachment on Spectacled Dormouse habitat.

The species is considered rare. While the reporting frequency has been stable over the 10 years (1.2 ± 0.4 records / year) since 2005, it is 53% lower on average (2.5 ± 1.9 records / year) than the 10-year reporting frequency for the previous national assessment (1994–2004). There are also no available records at all since 2011. While it may be spurious to infer population decline based on data records because observer effort is variable, a genuine decline in the population cannot be ruled out. Thus, we list as Near Threatened A2bc given suspected population reduction over three generations due to the ongoing and emerging threats from agricultural transformation. However, we urge that further monitoring and field surveys are needed to confirm this by more accurately estimating population trends and area of occupancy. This is a precautionary listing, which should be revised as more data become available. We view this as a genuine change in status until evidence suggests otherwise.

Taxonomy

Graphiurus ocularis (Smith 1829)

ANIMALIA - CHORDATA - MAMMALIA - RODENTIA - GLIRIDAE - *Graphiurus* - *ocularis*

Common names: Spectacled Dormouse, Black-and-white Dormouse, Cape Dormouse, Namtap (English), Gemsbokmuis (Afrikaans), Sepêpê (Setswana)

Taxonomic status: Species

Taxonomic notes: *Graphiurus ocularis* is thought to be closely related to *G. platyops* (Montgelard et al. 2003), but *G. rupicola*, *G. monardi* and *G. nagtglasii* were not included in the latter study. Currently, no subspecies of this dormouse have been identified, and a comprehensive overview of the molecular phylogeny of this genus is necessary (Monadjem et al. 2015).

Distribution

This species is endemic to South Africa, where it occurs widely in the Northern Cape, Eastern Cape, and Western Cape provinces (Figure 1). It was first described from a locality near Plettenberg Bay, Western Cape, in 1829. There are a number of questionable records of this species (Holden 2005). For example, there is a single record from the North West Province (Skinner & Chimimba 2005), but Power (2014) cannot locate this record and it is uncertain whether the species does occur in the province. Similarly, its occurrence in KwaZulu-Natal, due to a single skin collected in 1915, some 400 km from its known range, is doubtful (Taylor et al. 1994). Its distribution range needs to be confirmed in the northern parts of the Northern Cape, and is yet to be recorded as far north as Tswalu Kalahari Reserve (D. MacFadyen unpubl. data). However, Avery and Avery (2011) reported a more recent record from a Barn Owl (*Tyto alba*) pellet from Lovers Leap, 26 km north of Van Zylsrus on the Molopo River, as well as a Holocene record from the Dikbosch 1 archaeological site, 81 km west of Kimberley. Thus, the

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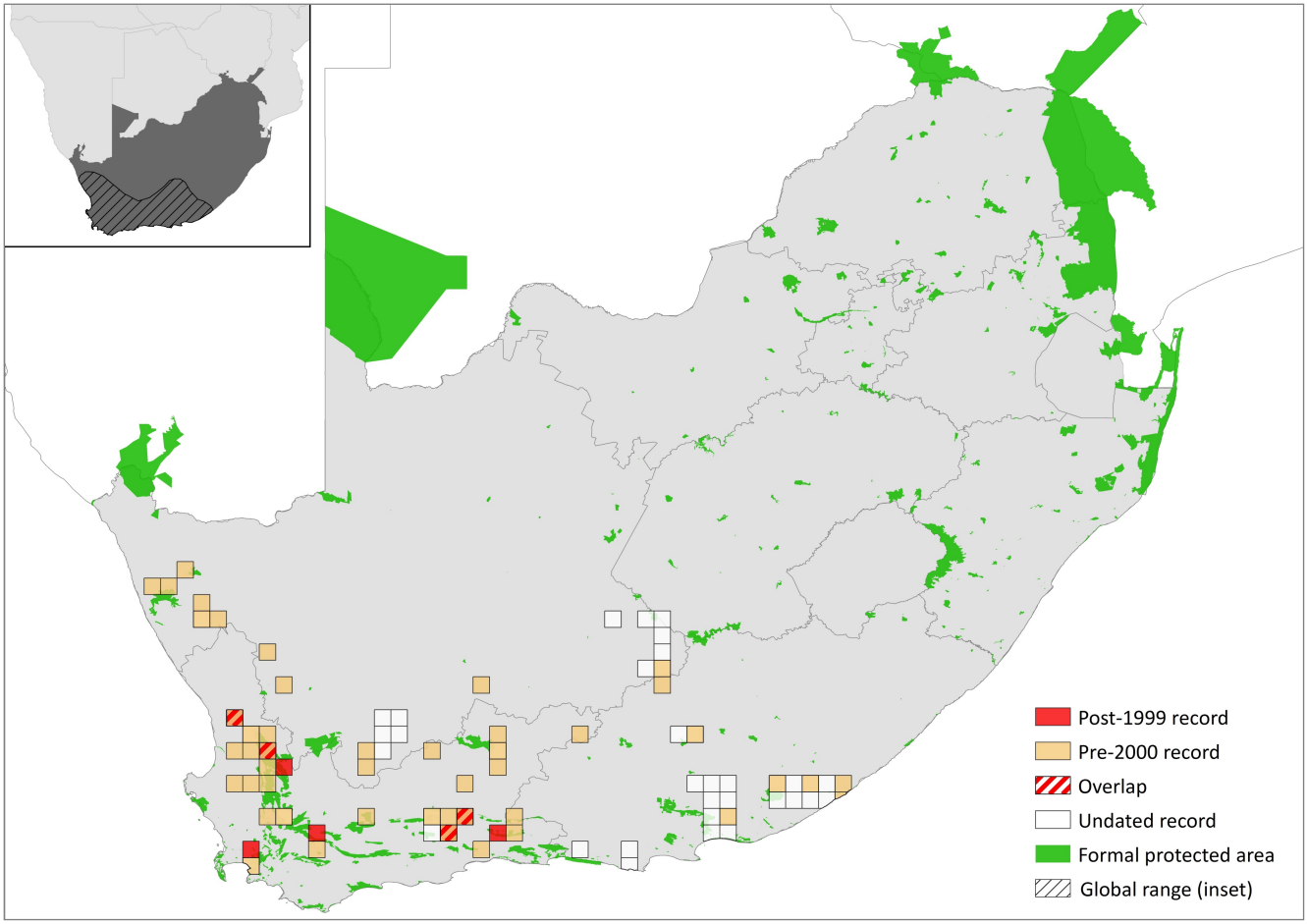

Figure 1. Distribution records for Spectacled Dormouse (*Graphiurus ocularis*) within the assessment region

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	-

possibility that the historical range extended further north than the current range needs to be considered. It is absent from the Highveld grasslands of Gauteng and Mpumalanga (MacFadyen 2014). As in Monadjem et al. (2015), two records from north of the Gariep River (de Graaff 1981) could not be traced and are not plotted in Figure 1.

Certain areas in the Western Cape are relatively well connected and secure, and, with the advance of climate change, may well prove to be an important stronghold for the species. Within the Eastern Cape, it was only recently recorded at one of three sampling sites within the Sneeuberg Mountain Complex (Asante Sana Nature Reserve; Kok et al. 2012). The extent of occurrence is estimated as 344,268 km^2 for all records and 42,095 km^2 using just the post-2000 records. This species may qualify for a threatened listing under the B2 criterion should future research calculate area of occupancy more accurately.

Population

It is uncommon, with densities ranging between 1.8 and 3.1 animals / ha on a 7.75 ha study plot with seasonal variation in density (Channing 1984; Holden 2013). The overall population size of this species is not currently known, but it is considered uncommon to rare (Smithers 1986; Holden 2013) and population densities vary according to the suitability of the habitat. This is a relatively large animal which occurs in territories and thus is relatively easy to trap. Sampling in suitable habitats often does not reveal presence of the species. For example, trapping conducted in 2011 in Mountain Zebra National Park did not detect any individuals (Z.J.K. Madikiza & E. Do Linh San unpubl. data). Reporting rate has also declined in the Western Cape over the past 10 years (C. Birss unpubl. data), which may be confounded by decreased observer effort. Thus, there is a priority to identify long-term monitoring sites to guide field surveys, quantify population trends and occupancy patterns, as well as to determine the effects of habitat fragmentation, which may be the cause for population discontinuity in the Cape Fold Mountains. Holden (2013) suggests a change in listing to Near Threatened or Data Deficient based on its discontinuous distribution and poor representation in museum collections. Generation length is calculated as 2.4 years (Pacifici et al. 2013), which yields a 7.2 year three-generation period.

Current population trend: Declining

Continuing decline in mature individuals: Unknown

Number of mature individuals in population: Unknown

Table 2. Threats to the Spectacled Dormouse (*Graphiurus ocularis*) 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	*2.1.2 Annual & Perennial Non-timber Crops*: habitat loss from agricultural expansion. Current stress *2.3 Indirect Species Effects*: reduced gene flow between subpopulations.	Pence 2014	Indirect	Regional	Ongoing
2	*11.1 Habitat Shifting & Alteration*: global climate change increasing area suitable for agriculture. Current stress *1.2 Habitat Degradation.*	Hannah et al. 2013	Simulation	National	Increasing

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Unknown

Severely fragmented: Yes

Habitats and Ecology

The largest of the regional Dormouse species, this squirrel-like Dormouse with its bushy tail has a characteristic black and white face mask making it easily identifiable. It occurs within the sandstone formations of the Cape, where cracks and crevices in the rock create ideal shelters in which to nest and rest (Channing 1984), but it has also been known to use stone kraals and buildings. It is associated with rock piles, outcrops, crevices and stone kraals (Holden 2013). In Rolfontein Nature Reserve, Northern Cape Province, three specimens were caught in *Setaria lindenbergiana* grassland community, which is wetter than the surrounding area and covered with large boulders (Jooste & Palmer 1982). Their flattened skull allows animals to move through narrow rock crevices and they will actively choose routes along rocks over those at ground level even though they may be considerably shorter (Holden 2013). Although this species is largely terrestrial, it is occasionally arboreal, with the type specimen (A. Smith 1829) having being captured in a tree. They are vocal and will demonstrate aggression when disturbed. In the Cederberg, they were found to occur in sympatry with Namaqua Rock Mice (*Micaelamys namaquensis*) and Cape Rock Sengis (*Elephantulus edwardii*) (Channing 1984). Similar to other species of dormouse, this species is largely an insectivore, feeding on a variety of invertebrates, but also includes birds, lizards, millipedes, spiders, scorpions and honeybees in its diet (Channing 1984).

It is nocturnal in habits, although crepuscular at times, especially on overcast days. It remains active throughout the year, but if the temperature drops sufficiently or if there is a scarcity of food, it can enter a state of torpor for up to a month (Holden 2013). In captivity it is unable to tolerate temperatures greater than 35˚C (Perrin & Ridgard 1999), and this may be a limiting factor with regards to range extensions northwards. Females are thought to produce two litters per year, 6–8 weeks apart (Channing 1984). There is some evidence that Spectacled Dormice might be territorial as pairs will occupy the same area for extended periods of time. Adults will occupy the most favourable habitats with their current off-spring with less favourable habitats allocated to dispersing youngsters. Channing (1984) estimated the average life-span to be at least 4 years.

Ecosystem and cultural services: Similar to other small mammals, this species is preyed upon by predators such as the Barn Owl (Avery et al. 2005). Additionally, this species could be used as a flagship species in the Cederberg area where it is “notorious” amongst campers for its nocturnal raiding.

Use and Trade

While there is insufficient data available to quantify severity, there is an emerging interest in the exotic pet industry for dormice despite their complicated requirements. The Spectacled Dormouse may be of particular interest due to its larger size and attractive facial features.

Threats

This species is confined to rocky outcrops and its habitat is mostly well protected. However, ongoing habitat loss (see below) and habitat fragmentation, as a result of plantations (such as Rooibos tea plantations) and vineyards, may impact immigration and gene flow between isolated habitats. Global climate change may further shrink its range southwards as is evidenced already by archaeological records which show they occurred significantly further north in the Holocene period (Avery & Avery 2011). Additionally, climate change is increasing the spread of alien invasive plants, which may increase the fuel load and thus the regularity and severity of wild fires (Richardson & van Wilgen 2004). This may cause habitat degradation for this species.

Current habitat trend: Possibly declining. While it occurs in rocky habitat unsuitable for agriculture, climate change may be making such higher-elevation areas more suitable for agriculture. 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. Ongoing agricultural expansion is also likely to further fragment the population. In the Western Cape, Pence (2014) calculated that between 2006 and 2011, 536 km^2 of land was converted to agriculture (107 km^2 per year), of which 31% of habitat losses occurred in Critical Biodiversity Areas. Overall, a total of approximately 2,120 km^2 of natural habitat has been lost between 2000 and 2013 (G. Pence unpubl. data).

Conservation

The species occurs in several protected areas. The Cederberg Wilderness Area is particularly well known for this species, where it would appear to be at its highest density. There have also been recent records from the Jonkershoek Nature Reserve in the Boland Mountain Complex, which were, in fact, the first in 45 years. Protected area expansion to connect isolated habitats,

Table 3. Conservation interventions for the Spectacled Dormouse (*Graphiurus ocularis*) 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 rocky habitats through corridors.	-	Anecdotal	-	-	Cape Nature Protected Areas Expansion Strategy

such as the rocky sandstone habitats of the Western Cape, will presumably benefit this species. Long-term monitoring should be established to measure the effects of corridor creation.

Recommendations for land managers and practitioners:

- Ensure corridors of natural vegetation between areas of suitable habitat are protected to allow for gene flow and dispersal. This is being addressed through the Cape Nature Protected Areas Expansion Strategy that is being finalised currently.

Research priorities:

- Investigate the distributional range of this species, especially, but not only, in outlier areas with suitable habitat.
- Determine population densities across this species range.
- Determine long-term population and occupancy trends inside and outside of protected areas.

Encouraged citizen actions:

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

Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Spectacled Dormouse (*Graphiurus ocularis*) assessment

Data sources	Field study (literature, unpublished), indirect information (literature, unpublished) museum records
Data quality (max)	Inferred
Data quality (min)	Suspected
Uncertainty resolution	Expert consensus
Risk tolerance	Precautionary

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