Crocidura cyanea – Reddish-grey Musk Shrew


Cliff & Suretha Dorse

Regional Red List status (2016)	**Least Concern**
National Red List status (2004)	Data Deficient
Reasons for change	Non-genuine change: New information
Global Red List status (2016)	Least Concern
TOPS listing (NEMBA)	None
CITES listing	None
Endemic	No

Although individuals from the western parts of its range, from which it was originally described (Citrusdal, Western Cape Province), have a reddish tinge, there is, unfortunately for its name, considerable variation in colour throughout the rest of its range (Skinner & Chimimba 2005).

Taxonomy

Crocidura cyanea (Duvernoy 1838)

ANIMALIA - CHORDATA - MAMMALIA - EULIPOTYPHLA - SORICIDAE - *Crocidura* - *cyanea*

Common names: Reddish-grey Musk Shrew (English), Rooigrysskeerbek (Afrikaans)

Taxonomic status: Species complex

Taxonomic notes: There are nine subspecies recognised (Heim de Balsac & Meester 1977), of which two occur within the assessment region: *C. c. cyanea* from northern Namibia to the Western Cape and Free State provinces and Lesotho, and *C. c. infumata* from parts of the Western and Eastern Cape provinces northwards to KwaZulu-Natal, North West, Gauteng, Limpopo, Mpumalanga provinces, as well as Zimbabwe, northern Botswana and Mozambique. Further research is needed to resolve the taxonomy of this species complex.

Assessment Rationale

This species is widely distributed within the assessment region and occurs in many protected areas, and can survive in multiple habitat types, including agricultural landscapes and gardens. Although commonly encountered, it occurs at naturally low densities. As there are no major threats identified, there is no reason to suspect a net population decline, but local declines are likely in areas that are overgrazed or where pesticides are used. Thus, the species is evaluated as Least Concern. Further surveys and research should focus on vetting existing museum records, as many have been misidentified as *C. silacea* and vice versa, leading to inaccuracies in the distribution map. Key interventions include protected area expansion of moist grassland habitats, as well as incentivising landowners to sustain natural vegetation around wetlands and keep livestock or wildlife at ecological carrying capacity.

Regional population effects: No significant rescue effects are possible as this species is too small to disperse over long distances, even though habitats are presumably connected across regions.

Distribution

This species has a wide distribution within the assessment region and southern Africa, occurring in Namibia (but not on the coast), north-eastern Botswana, Zimbabwe and parts of Mozambique (Skinner & Chimimba 2005). Within the assessment region, it is widespread throughout all provinces (Figure 1). Although previously it was not recorded as occurring in the middle and northern regions of the Northern Cape Province (Friedmann & Daly 2004), new data from Barn Owl (*Tyto alba*) pellets extends the distribution of the species to areas such as Benfontein Game Farm, Doornkloof Nature Reserve, Driekoppen and Wildflower Reserve (Avery & Avery 2011). In Swaziland, they are common in the highveld, middleveld and Lubombo regions (Monadjem 1998), and also occur in Lesotho around the Mahlanapeng and Sehonghong regions (Lynch 1994).

Existing museum records, for all *Crocidura* species, and for this species and *C. silacea* in particular, need to be exhaustively vetted, as *C. cyanea* and *C. silacea* are difficult to distinguish (Taylor & Contrafatto 1996) and this may have led to errors in both distribution maps. Similarly, the most recent confirmed museum record from North West Province was collected from Vaalkop in 1989 but many existing specimens may belong to this species (Power 2014).

Population

This species is widespread but exists at naturally low density, although it can be locally abundant. It is often trap shy (Jooste & Palmer 1982). It is uncommon but regularly recorded in fynbos. In Rolfontein Nature Reserve, Northern Cape Province, of all species caught in traps, it was the only shrew species sampled but occurred at low

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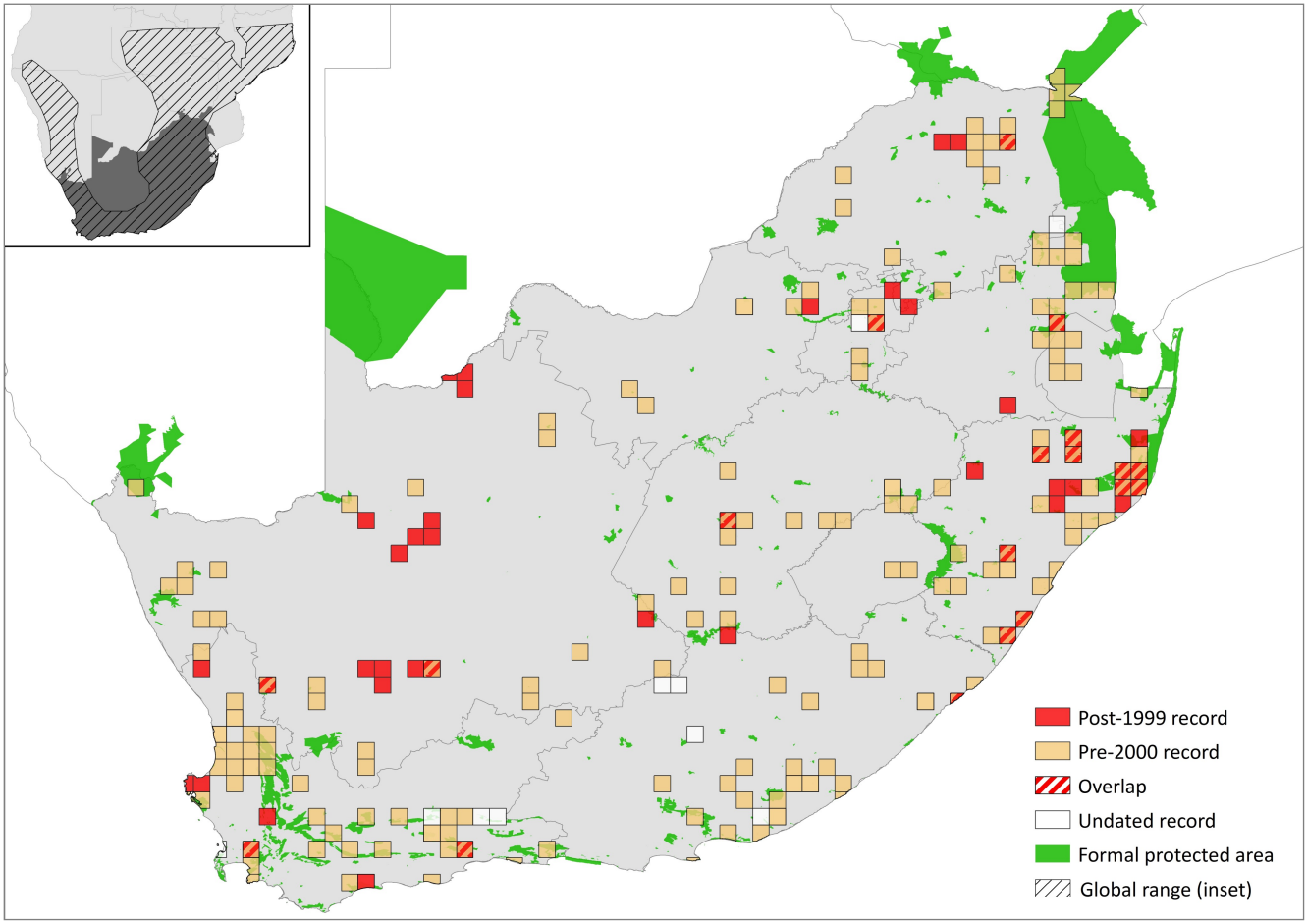

Figure 1. Distribution records for Reddish-grey Musk Shrew (*Crocidura cyanea*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

density: 27 individuals compared to 648 *Rhabdomys pumilio* (Jooste & Palmer 1982). It is one of the more commonly encountered shrews in Swaziland and parts of north-eastern Kwazulu-Natal (Monadjem 1998; J. Harvey unpubl. data). It can be very common in gardens and houses due to compost heaps.

Current population trend: Stable

Continuing decline in mature individuals: Unknown

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Unknown

Severely fragmented: No. Can occur in multiple habitats, including gardens and transformed landscapes.

Habitats and Ecology

It often occurs in relatively dry terrain compared to other shrews, and has been collected from among rocks, dense scrub and grass, montane forest moist habitats, hedges around farmlands, degraded areas and gardens (Meester 1963; Rautenbach 1982; Taylor 1998). In KwaZulu-Natal Province, it has been found in moist grassy habitats bordering reedbeds, drier bushveld, open grassland, coastal forest (J Harvey pers. obs. 2015) and gardens (Taylor 1998). In the western parts of the country, it has been collected from scrub on Kalahari sand and reedbeds around waterholes (Skinner & Chimimba 2005), and it occurs on karroid scrub and fynbos in rocky areas. In Rolfontein Nature Reserve, Northern Cape Province, it occurred in seven of the eleven vegetation communities, but was most abundant in the Mountain Bristle Grass (*Setaria lindenbergiana*) community (Jooste & Palmer 1982). This species thus has a wide habitat tolerance, although prefers areas with deep leaf litter, moist soil and ground level vegetation (Dickman 1995). Similarly, in Swaziland, it has a wide habitat tolerance but is mainly associated with grasslands overlaying rocky terrain (Monadjem 1997). Interestingly, in Namibia, a population has been found inhabiting a cave, where they feed on cave invertebrates and possibly dead bats (Marais & Irish 1990). They are sporadically active throughout the day and night and are insectivorous, with a high proportion of Isoptera in their diet (Dickman 1995).

This species is almost undiscernible from its sibling species *C. silacea*, differing only in cranial and dental characters (Meester et al. 1986; Taylor et al. 1994; Taylor & Contrafatto 1996).

Table 2. Threats to the Reddish-grey Musk Shrew (*Crocidura cyanea*) 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	*2.3.2 Small-holder Grazing, Ranching or Farming*: wetland and grassland degradation through overgrazing (removal of ground cover).	Bowland & Perrin 1989	Empirical	Local	Possibly increasing with human settlement expansion and intensification of wildlife farming.
		Driver et al. 2012	Indirect	National	45% of remaining wetland area exists in a heavily modified condition.
2	*9.3.3 Herbicides & Pesticides*: shrews are vulnerable to biomagnification of toxins.	-	Anecdotal	-	Stable as agricultural expansion is decelerating.
3	*7.2 Dams & Water Management/Use*: wetland loss through drainage/water abstraction during agricultural, industrial and urban expansion.	Driver et al. 2012	Indirect (land cover change from remote sensing)	National	Increasing with settlement expansion and 65% of wetland ecosystem types threatened already.
4	*7.1.2 Suppression in Fire Frequency/ Intensity*: human expansion around forests has decreased natural fire frequency. Current stress *1.2 Ecosystem Degradation*: altered fire regime leading to bush encroachment (including alien vegetation invasion) and thus loss of moist grasslands.	-	Anecdotal	-	-
5	*11.1 Habitat Shifting & Alteration*: moist microhabitats lost in westerly reaches of range.	Taylor et al. 2016	Projected	National	Contraction of grassland and fynbos habitats by 2050.

Ecosystem and cultural services: An important prey species for owls (for example, Perrin 1982).

Use and Trade

There is no known subsistence or commercial use of this species.

Threats

No severe threats are currently known to affect this species specifically, the main threat to shrews in general is the loss or degradation of moist, productive areas, such as wetlands and rank grasslands within suitable habitat. The two main drivers behind this are abstraction of surface water and draining of wetlands through industrial and residential expansion, and overgrazing of moist grasslands, which leads to the loss of ground cover (de-structures habitat) and decreases small mammal diversity and abundance (Bowland & Perrin 1989, 1993). Overgrazing is particularly threatening for this species, as it relies on medium to tall grass cover. Suppression of natural ecosystem processes, such as fire, can also lead to habitat degradation through bush encroachment or loss of plant diversity through alien invasives, and is suspected to be increasing with human settlement expansion. As this species does occur in agricultural landscapes, the use of pesticides is a threat as it is vulnerable to biomagnification due to its predominantly insectivorous diet. There are also clear overlaps and synergistic effects between these threats. We infer a continuing population decline based on loss of natural habitat.

Current habitat trend: Widely distributed and common in gardens. However, it may be part of a suite of species that will display a general decline with grassland and fynbos contraction due to climate change (Taylor et al. 2016). Similarly, the western population may suffer significant range contractions and shift to the east as conditions become increasingly arid (Erasmus et al. 2002).

Conservation

This species is found in several protected areas across its range. For example, it is widely recorded in protected areas in KwaZulu-Natal (Taylor 1998) and Ferreira and Avenant (2003) recorded it in Tussen-die-Riviere Nature Reserve in Free State Province. Although no direct conservation interventions are necessary, protecting and restoring suitable habitat, such as moist grassland and fynbos patches, will benefit this species. Biodiversity stewardship schemes should be promoted to conserve such patches. Protecting these habitats may create dispersal corridors between patches that will enable adaptation to climate change. At the local scale, landowners and managers should be educated, encouraged and incentivised to conserve the habitats on which shrews and other small mammals depend. Retaining ground cover is the most important management tool to increase small mammal diversity and abundance. This can be achieved through lowering grazing pressure (Bowland & Perrin 1989), or by maintaining buffer strips of natural vegetation around wetlands (Driver et al. 2012). Small mammal diversity and abundance is also higher in more complex or heterogeneous landscapes, where periodic burning is an important tool to achieve this (Bowland & Perrin 1993). Removing alien vegetation from watersheds, watercourses and wetlands is also an important intervention to improve flow and water quality, and thus habitat quality, for shrews. Education and awareness campaigns should be employed to teach landowners and local communities about the importance of conserving wetlands and moist

Table 3. Conservation interventions for the Reddish-grey Musk Shrew (*Crocidura cyanea*) 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	*1.2 Resource & Habitat Protection*: stewardship agreements with private landowners to conserve wetlands and grasslands.	-	Anecdotal	-	-	Multiple organisations
2	*2.2 Invasive/Problematic Species Control*: maintain stocking rates of livestock and wildlife at ecological carrying capacity.	Bowland & Perrin 1989	Empirical	Local	Small mammal diversity and abundance significantly higher after decrease in grazing pressure.	-
3	*2.1 Site/Area Management*: maintain/restore natural vegetation around wetlands.	-	Anecdotal	-	-	-
4	*2.2 Invasive/Problematic Species Control*: clear alien vegetation from watersheds and wetlands to restore habitat quality.	-	Anecdotal	-	-	Working for Water, Department of Environmental Affairs
5	*4.3 Awareness & Communications*: educating landowners in the importance of wetlands and grasslands.	-	Anecdotal	-	-	-

grasslands. Farmers should be encouraged to reduce their use of pesticides and use biological control instead.

Recommendations for land managers and practitioners:

- Landowners and communities should be incentivised to stock livestock or wildlife at ecological carrying capacity and to maintain a buffer of natural vegetation around wetlands.
- Enforce regulations on developments that potentially impact on the habitat integrity of grasslands and wetlands.

Research priorities:

- Additional field surveys are needed to clarify and confirm the taxonomy and the distribution of this species, The effects of climate change on its distribution and abundance should be specifically modelled.
- Museum records must be vetted to refine the distribution map.

Encouraged citizen actions:

- Citizens are requested to submit any shrews killed by cats or drowned in pools to a museum or a provincial conservation authority for identification, thereby enhancing our knowledge of shrew distribution (carcasses can be placed in a ziplock bag and frozen with the locality recorded).
- Practice indigenous gardening to sustain small mammals.

Data Sources and Quality

Table 4. Information and interpretation qualifiers for the Reddish-grey Musk Shrew (*Crocidura cyanea*) assessment

Data sources	Field study (literature, unpublished), Indirect information (expert knowledge), museum records
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.*