

# *Gerbilliscus leucogaster* – Bushveld Gerbil



<b>Regional Red List status (2016)</b>	<b>Least Concern</b>
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) (2007)	None
CITES listing	None
Endemic	No

So named because of its affinity for savannah, grassland and woodland habitats (Skinner & Chimimba 2005), the Bushveld Gerbil typically avoids semi-arid and arid areas, except in the presence of drainage lines and rivers (Monadjem et al. 2015).

## Taxonomy

*Gerbilliscus leucogaster* (Peters 1852)

ANIMALIA - CHORDATA - MAMMALIA - RODENTIA - MURIDAE - *Gerbilliscus* - *leucogaster*

**Synonyms:** *Tatera leucogaster* (Peters 1852); see Dempster (2013) for full list.

**Common names:** Bushveld Gerbil (English), Bosveldse Nagmuis (Afrikaans)

**Taxonomic status:** Species

**Taxonomic notes:** Previously classified as *Tatera leucogaster* with at least 17 described subspecies in southern Africa (Skinner & Chimimba 2005), this species was later recognised as *Gerbilliscus leucogaster* by Musser and Carleton (2005). The Bushveld Gerbil can be distinguished in its range from other *Gerbilliscus* species by its long tail and the black dorsal line, which runs along the tail length (Monadjem et al. 2015).

## Assessment Rationale

Listed as Least Concern in view of its wide distribution within the assessment region, abundant population, ability to live in a wide range of habitats, including agricultural landscapes, and because there are no major threats that could cause population decline. It may become an agricultural pest on grain-growing lands during some periods where populations can rapidly increase under optimal food conditions, which could result in local persecutions. Selective chemical control or biocontrol of population explosions through the use of Barn Owls (*Tyto alba*) are potentially effective and target-specific methods that are currently available and should be encouraged as techniques for holistic management.

**Regional population effects:** Rescue effect is possible through dispersal from Namibia, Botswana, Zimbabwe and Mozambique. Immigration is unlikely to decrease.

## Distribution

Endemic to Africa, the global distribution for this species ranges from Tanzania in the north to South Africa and from eastern Namibia and Angola to western and northern Mozambique. It is widely distributed in the Zambezi Woodland biotic zone and in parts of the South-West Arid and Highveld biotic zones (Dempster 2013). It occurs widely from the equator to about 30°S, including the lowveld of Swaziland and northeastern KwaZulu-Natal (Dempster 2013). It occurs in the northern and central parts of Namibia, throughout Botswana and Zimbabwe and in Mozambique south of the Zambezi River (Skinner & Chimimba 2005).

In the assessment area, it occurs in South Africa throughout the North West and Limpopo provinces (Skinner & Chimimba 2005; Power 2014), in most of Mpumalanga (except the south-central parts; Skinner & Chimimba 2005) and in the southern and western parts of the Free State (Lynch 1983; Skinner & Chimimba 2005). In the Northern Cape, most records are restricted to a strip to the north of the Orange River (Skinner & Chimimba 2005) although Avery and Avery (2011) have listed records spanning further westwards. It is generally restricted to the northeastern parts of KwaZulu-Natal (Skinner & Chimimba 2005), with Avery et al. (2002) reporting a slight range expansion for these species to the south, but these records are still to be verified (see Monadjem et al. 2015). It occurs in the northern half of Swaziland (Monadjem 1997a; Skinner & Chimimba 2005) and is currently considered to be absent from Lesotho (Lynch 1994; Ambrose 2006). In the Free State Province, this species has been recorded from Tussen-die-Riviere Nature Reserve (Ferreira & Avenant 2003).

## Population

This species is relatively common, exhibiting expected cyclic fluctuations of population abundance (Avenant 2011; Dempster 2013). It is often the most common small

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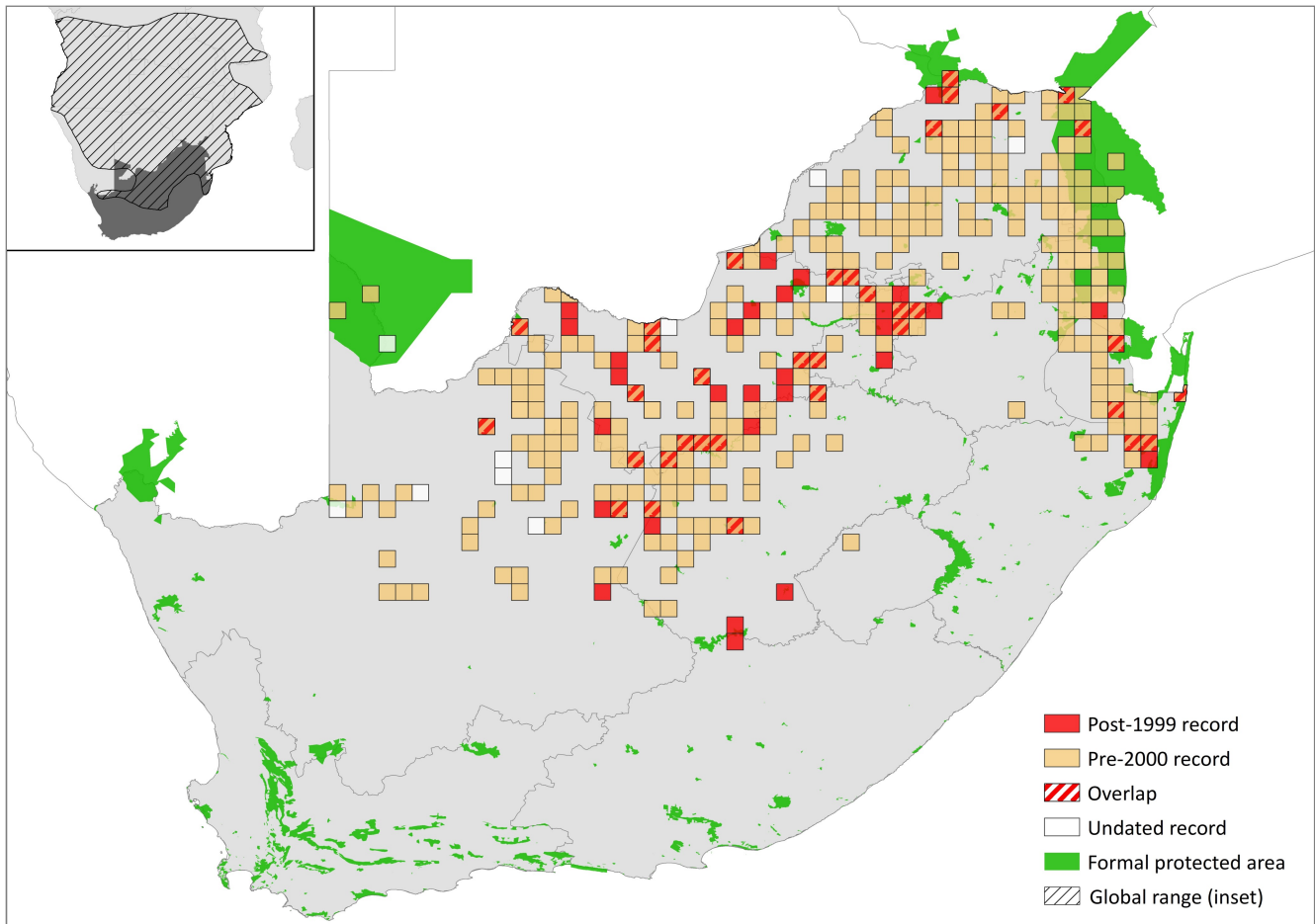


Figure 1. Distribution records for Bushveld Gerbil (*Gerbilliscus leucogaster*) within the assessment region

Table 1. Countries of occurrence within southern Africa

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

mammal species in an area (Linzey & Kesner 1997; Power 2014). Its population numbers and frequency of occurrence may vary with habitat or environmental conditions. It was the most common species in habitats that were frequently burned, compared to unburned habitat, in the Kruger National Park (Korn 1981) and Nysvley (Korn 1987). In the Okavango Delta, Plavsic (2014) found that numbers in an unburned site were marginally higher compared to numbers in a burned site for six months post-burning, thereafter the pattern was reversed. In small-holder agricultural systems of the Vhembe District, Limpopo Province, it reached higher abundances in the wetter areas (Vyeboom village, minimum number alive – 30 animals / ha), than the dryer areas (Ka-Ndengeza villages, minimum number alive – 11 animals / ha; L.H. Swanepoel, L.N. Nembudani & P.J. Taylor unpubl. data). In commercial agro-ecosystems of the Free State Province, populations can reach high

densities (minimum number alive – up to 150 animals / ha; L.H. Swanepoel & M. Keith, unpubl. data), while in natural grassland (Sandveld Nature Reserve) it can be the dominant species (minimum number alive – 25 animals / ha; L.H. Swanepoel & M. Keith, unpubl. data). On the Highveld grasslands it often surprisingly outnumbers the Highveld Gerbil (*G. brantsii*) (Power 2014). At Nylsvley, abundance varied from 6% (in old fields; least common of the five species sampled) to 61% (in burnt *Acacia* woodland; most common of the five species sampled) (Korn 1987).

**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

## Habitats and Ecology

It is generally associated with a wide variety of habitats, including bushveld and grasslands (Skinner & Chimimba 2005) and may even occur in highly transformed habitats (Power 2014), typically occurring in areas with mean annual rainfall above 250 mm (Dempster 2013). In the North West Province, it is found in over half of the province's vegetation types, and commonly colonises the bare understory of exotic stands of *Prosopis glandulosa* (Power 2014). Although it is predominantly associated

**Table 2. Threats to the Bushveld Gerbil (*Gerbilliscus leucogaster*) 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	5.2.3 <i>Persecution/Control</i> : anthropogenic persecution, as it can become an agricultural pest. Current stress 2.1 <i>Species Mortality</i> .	Makundi & Massawe 2011 Taylor et al. 2012	Indirect Indirect	Review Review	Stable

with light sandy soils or sandy alluvium, it may also occur on hard ground where it uses holes in termitaria and under tree roots (Skinner & Chimimba 2005; Dempster 2013). It is absent in areas of heavy red clay soils or soft sand (Dempster 2013). In agro-ecosystems dominated by sandveld, it seems to co-occur with *G. brantsii*, where it seems to outcompete them (L.H. Swanepoel and M. Keith unpubl. data). The frequency and timing of burning can have a significant effect on its abundance. Generally, the highest proportions of communities occur in habitats that have been burnt one or more times during the previous three years, compared to unburnt sites (Korn 1981). In KwaZulu-Natal, this species has been found in *Acacia nilotica/Hyphaene coriaca* pan systems, *H. coriaca* Palmveld, Sand forest, *Combretum molle* woodland and riverine woodland (Rautenbach et al. 2014; Delcros et al. 2015).

It has an omnivorous diet, which mainly consists of plant material and insects (Perrin & Swanepoel 1987; Monadjem 1997b). In some parts of South Africa, it may potentially cause significant damage in cropland when it forages on germinating seeds and newly emergent seedlings (Verdoorn 2010; von Maltitz et al. 2014). It is often the most abundant small mammal species in agricultural areas (L.H. Swanepoel & M. Keith unpubl. data), where it can reach excessively high numbers during population explosions (de Graaff 1981).

This species excavates small burrows, which are interconnected underground, and cleans its burrows every evening. As such, burrows in use can be recognised by fresh soil outside the burrow (Skinner & Chimimba 2005; Dempster 2013). Breeding is seasonal and associated with regular summer rainfall. The duration of the breeding season is variable, which is indicative of a temporally dynamic reproductive strategy. Litter size is large but variable and associated with a xeric environment (Perrin & Swanepoel 1987).

**Ecosystem and cultural services:** It has been recorded as a reservoir of the plague bacillus *Yersinia pestis* in South Africa, and is also susceptible to infection of African horse sickness and *Listeria monocytogenes* under laboratory conditions (Dempster 2013). With the exception of periods during which this species exhibits low population numbers, it is also a valuable food source for small carnivores and raptors, especially Barn Owls.

## Use and Trade

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

## Threats

There are no major threats to this species. During population explosions it may become an agricultural pest in some areas, which could result in persecution (Verdoorn 2010; von Maltitz et al. 2014). Pest control depends on the farming set-up, but mostly takes the form of rodenticides, chemical seed treatment or habitat modification. These control actions can have negative effects on other non-pest rodent species (Makundi & Massawe 2011), as well as the secondary predators feeding on rodents (Taylor et al. 2012). This species may be a reservoir for the bubonic plague (Dempster 2013), however, it is unlikely that it is persecuted for this, as it does not usually enter human establishments.

**Current habitat trend:** Stable

## Conservation

This species is present in many protected areas within the assessment region, for example, Mkhuzi Game Reserve, Phinda Private Game Reserve, Kruger National Park, and healthy populations are known to exist in the Sandveld Nature Reserve, Free State (L.H. Swanepoel & M. Keith, unpubl. data). While no specific interventions seem to be necessary for its conservation, careful attention should be paid to the secondary impact of pest management. It is suggested that management of pest Highveld Gerbils be done using ecologically-based rodent management principles (Taylor et al. 2012). These include responsible use of chemicals, rodenticides, natural predation (biocontrols), habitat modification and intensive communal trapping (Makundi & Massawe 2011). In a study conducted on *G. afra* in the Western Cape, Barn Owl control was found to be twice as effective for controlling the gerbil population, compared to the use of poison (Potter 2004). Barn Owls respond to prey explosions by increasing reproduction (Potter 2004; Makundi & Massawe 2011). This management intervention also saves farmers the cost of buying poison and prevents the mortality of non-target species, including domestic stock.

**Table 3. Conservation interventions for the Bushveld Gerbil (*Gerbilliscus leucogaster*) 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	3.1.1 <i>Limiting Population Growth</i> : biocontrol methods during population explosions, such as encouraging Barn Owls ( <i>Tyto alba</i> ) through nest boxes and hunting perches.	Potter 2004	Indirect	Regional	The use of owls to control rodents in wheat fields was twice as effective as using poison.	-

## Recommendations for land managers and practitioners:

- Although the likelihood of success should still be established for *G. leucogaster*, Barn Owls could potentially be used to control population explosions of this species in cropland. This should be encouraged as part of a holistic management intervention (Verdoorn 2010). To increase the potential utility of Barn Owls to manage *G. leucogaster*, perches should be erected in crop fields and nesting boxes in appropriate sites close to the fields.

## Research priorities:

- The practicalities and effectiveness of the use of Barn Owls as a population control method for this species.
- Taxonomic resolution of the *Gerbilliscus* genus.

## Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- Install Barn Owl nest boxes and perches in crop fields to encourage biocontrol during population explosions.

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## Data Sources and Quality

**Table 4. Information and interpretation qualifiers for the Bushveld Gerbil (*Gerbilliscus leucogaster*) assessment**

Data sources	Field study (literature, unpublished), indirect information (literature), museum records
Data quality (max)	Inferred
Data quality (min)	Inferred
Uncertainty resolution	Best estimate
Risk tolerance	Evidentiary

## Assessors and Reviewers

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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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