Procavia capensis – Rock Hyrax

Regional Red List status (2016)	**Least Concern**
National Red List status (2004)	Least Concern
Reasons for change	No change
Global Red List status (20015)	Least Concern
TOPS listing (NEMBA)	None
CITES listing	None
Endemic	No

Rock Hyraxes are colloquially referred to as "dassies", which is derived from 'das' (or badger), as Cape Dutch settlers referred to them (Skinner & Chimimba 2005).

Taxonomy

Procavia capensis (Pallas 1766)

ANIMALIA - CHORDATA - MAMMALIA - HYRACOIDEA - PROCAVIIDAE - *Procavia* - *capensis*

Synonyms: *Cavia capensis* (Pallas 1766); *Heterohyrax antineae* (Heim de Balsac & Bégouen 1932)

Common names: Rock Hyrax, Rock Dassie (English), Klipdas, Klipdassie (Afrikaans), Imbila (Ndebele, Swati, Xhosa, Zulu), Pela, Thobela, Thewbela (Sepedi), Pela (Sesotho, Setswana), Mbila (Xitsonga, Tshivenda)

Taxonomic status: Species

Taxonomic notes: While as many as 17 subspecies have been described across its range by Hoeck and Bloomer (2013), only one (*P. c. capensis*), is recognised from the assessment region (Meester et al. 1986). However, Prinsloo and Robinson (1992) discovered a genetic break between the north-western and south-central populations in South Africa, indicating a possible species complex. Similarly, Visser (2013) found a genetic break across the Knersvlakte region; however this was only evident in the mitochondrial DNA (mtDNA, for females). Thus, separation across this barrier has not been long enough to warrant a taxonomic revision of the two lineages flanking it. We treat Rock Hyrax from South Africa as monotypic.

Assessment Rationale

Listed as Least Concern in view of its wide distribution within the assessment region, the wide range of habitats it occurs in, its occurrence in many protected areas and generally high abundance. Additionally, the rocky habitats in which it occurs are unlikely to be transformed, it adapts readily to urban areas and there are no threats that could cause widespread population decline. Thus, no direct conservation interventions are necessary. However, local declines are possible due to bushmeat consumption. This is an important forage species for a number of predators and subpopulations should be sustained for ecosystem functioning. Indiscriminate reintroductions should be discouraged pending the outcome of more detailed phylogeographic research.

Regional population effects: Continuous distribution with the rest of the African range so rescue effects are possible. Molecular research within the assessment region suggests secondary contact and gene flow between the north-eastern and south-central parts of South Africa (A. Maswanganye and P. Bloomer unpubl. data).

Distribution

Rock Hyraxes are widely distributed across the continent and parts of the Middle East, excluding the Congo Basin forests (Olds & Shoshani 1982; Hoeck & Bloomer 2013). Within the assessment region, they occur across the inland escarpment and adjacent rocky areas wherever there is suitable habitat (Skinner & Chimimba 2005). They occur in all provinces, as well as Swaziland (Skinner & Chimimba 2005), and have been sighted across Lesotho (Lynch 1994). In the North West Province at least, they are most abundant in the Norite Koppies and Pilanesberg Mountain Bushveld types and appear to have expanded their their range, as they recorded at Wolwespruit Nature Reserve for the first time in 2013 (Power 2014), but were previously absent from this region (Newbery 1995). Figure 1 is an under-representation of their distribution as, for example, they have been observed on isolated koppies along the Molopo and in the calcrete hills of the Kalahari (P. Bloomer pers. obs.).

Population

They are widespread and common. In some areas, they are characterized by extreme local population fluctuations (Hoeck 1989; Barry & Mundy 1998; Hoeck & Bloomer 2013; Barry et al. 2015), which may follow rainfall patterns (drought) and possibly disease outbreaks. Gene-flow between populations is influenced by the polygynous social system of this species in addition to the landscape connectivity (amount of intervening suitable habitat) between isolates in a specific region (Visser 2013). As such, male-biased dispersal and female philopatry characterises population genetic structure with areas

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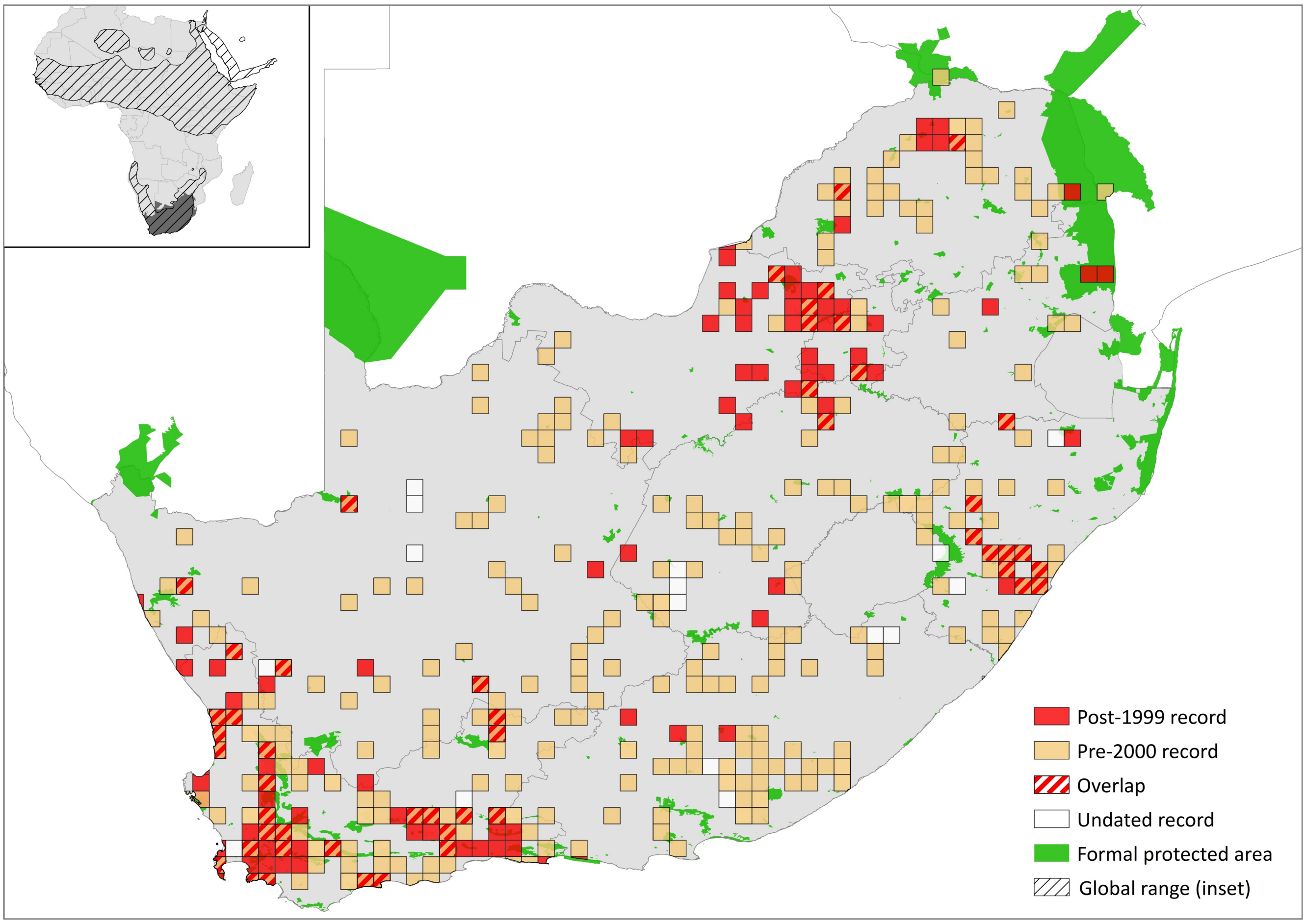

Figure 1. Distribution records for Rock Hyrax (*Procavia capensis*) within the assessment region

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

devoid of suitable rocky habitat acting to limit gene-flow between isolated populations. Across the Namaqualand and Western Fynbos regions populations are stable, with the Namaqualand region even showing a demographic population expansion (Visser 2013).

Current population trend: Stable

Continuing decline in mature individuals: No. Although in some areas utilised for bushmeat.

Number of mature individuals in population: Unknown

Number of mature individuals in largest subpopulation: Unknown

Number of subpopulations: Seven clusters were retrieved in the microsatellite data and two clusters in the mtDNA data across the Namaqualand/western Fynbos regions (Visser 2013). The number of subpopulations would therefore be at least seven across this region. However, the rest of the assessment region requires investigation.

Severely fragmented: No. When overpopulated or during food shortages, they are capable of traversing great distances between suitable rocky habitats, at least 20 km away (Skinner & Chimimba 2005).

Habitats and Ecology

This species occupies a wide range of habitats, but is typically associated with rocky outcrops, cliffs, or piles of boulders with bushes (Skinner & Chimimba 2005; Hoeck & Bloomer 2013), also occurring in fynbos and karroid habitats. Granite formations with boulders and dolomite intrusions in the Karoo are especially favoured (Skinner & Chimimba 2005). This species occurs in modified or disturbed habitats, such as erosion gullies in the Karoo, culverts under roads and holes in stone walls (Olds & Shoshani 1982; Rübsamen et al. 1982; Skinner & Chimimba 2005). Some land uses may actually create habitat for hyrax, which also adapt well to human areas, leading to overpopulation and often becoming pests (Wimberger et al. 2009). This could be from easily accessible food resources in urban gardens and increased habitat availability in the form of houses or garden rockeries (especially in Pietermaritzburg and Ladysmith in the KwaZulu-Natal Province). It appears to be more adaptable than the Yellow-spotted Rock Hyrax (*Heterohyrax brucei*), with which it is sympatric in the northern areas of the assessment region (Skinner & Chimimba 2005).

Table 2. Use and trade summary for the Rock Hyrax (*Procavia capensis*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Bushmeat use.	Unknown	Stable
Commercial use	Yes	Local trade in skins.	Unknown	Stable
Harvest from wild population	Yes	No ranched or domesticated populations.	All	Stable, possibly increasing locally with settlement expansion.
Harvest from ranched population	No	-	-	-
Harvest from captive population	No	-	-	-

They are predominantly diurnal and gregarious, living in colonies that vary in size according to food availability, and consisting of a dominant male with a harem of 3–17 females (Fourie & Perrin 1987). Males are forced to disperse when mature whereas females disperse voluntarily. Males, especially juveniles, are therefore highly vulnerable to predation when dispersing (Hoeck 1982). They are generalist herbivores and their diet comprises a variety of grasses, forbs and shrubs, with a predilection for new shoots, buds, fruits and berries (Hoeck & Bloomer 2013). They consume a wide variety of plant species (Fourie & Perrin 1989).

Shelters are used to hide from predators but also play an important role in the regulation of hyrax body temperature (Brown & Downs 2006). Hyrax use the shelters in summer to lower their body temperature relative to the high ambient temperatures as well as to prevent excessive water loss. However, body temperatures were found to be lower in winter than in summer, with lower ambient temperatures, such that they spend more of their time outside their shelter to increase their body temperatures by sunbathing (Brown & Downs 2006). Body temperatures during winter nights were low but constant, presumably by individuals huddling within the shelter (Brown & Downs 2006), but there was no evidence to support this theory (Downs et al. 2013).

This species, although known previously, was first described in 1766 by Pallas, who first saw one in a tavern in Cape Town where it was kept as a pet (Skinner & Chimimba 2005).

Ecosystem and cultural services: The Rock Hyrax may be seen as a keystone species as they are a source of food for many of the larger predators such as the Verreaux's (Black) Eagle (*Aquila verreauxii*) (for example, constituting 74% of its diet in the Karoo, Davies 1989), Martial Eagle (*Polemaetus bellicosus*), Crowned Eagle (*Stephanoaetus coronatus*) (Boshoff et al. 1994), Leopard (*Panthera pardus*), Caracal (*Caracal caracal*) (for example, comprising 22–55% of its diet, Grobler 1981; Palmer & Fairall 1988), jackals (*Canis* spp.*)*, African Wild Cat (*Felis silvestris*) and various snakes (Olds & Shoshani 1982; Davies 1989, 1994, 1999; Barry & Barry 1996; Kotler et al. 1999; Druce et al. 2006; Chiweshe 2007; Kruger 2010). The importance of Rock Hyrax as a forage species has been demonstrated by Fourie (1983) who estimated that 11% and 4% of the mature population (N = 24,553 individuals) in an area were eaten by Caracal and Verreaux's Eagle respectively in one year (see also Davies 1989).

Rock Hyraxes may also cause ecosystem damage, especially if predators have been removed and colonies are overpopulated: Heavy grazing around colonies can cause a preponderance of unpalatable plants (such as *Hermannia burkei*), can compete with livestock exceeding the recommended stocking rate by a factor of 15 (Skinner & Chimimba 2005), and may also reduce the regeneration of trees. Furthermore, their latrines can cause a health risk when they occupy spaces below houses (for example, in Pietermaritzburg) and in roofs of hospitals (for example, Ladysmith, KwaZulu-Natal Province). Thus, sustaining predators in landscapes is a sound management tool, as well as preventing access to buildings.

Use and Trade

The Rock Hyrax is snared for skins and meat. This is not expected to impact on the population overall. However, local declines or extinction may occur. For example, in Lesotho they are hunted with dogs (Lynch 1994), and in Pietermaritzburg with small snares (K. Wimberger pers. obs. 2007).

Threats

There are no major threats to this species. However, it is hunted locally for bushmeat which may lead to local subpopulation declines. Power (2014) notes that concerns over the species have been raised in the Magaliesberg by landowners who suspect that numbers have declined recently. However, this may be conflated with natural population fluctuation due to drought, disease and predator eradication. For example, entire subpopulations have become locally extinct due to drought (Barry & Mundy 1998) and sarcoptic mange may have caused local extinctions in the KwaZulu-Natal Province in the late 1990s (Wimberger et al. 2009).

Current habitat trend: Stable. They occupy rocky outcrops that are largely inaccessible and not under threat of extensive transformation. They also occur in modified habitats. Climate change may become an increasing threat, especially in the western areas of the assessment region as drought becomes more frequent (for example, Erasmus et al. 2002).

Conservation

The species occurs in many large, well-protected areas across much of its range within the assessment region. No specific conservation interventions are necessary at present. Visser (2013) found low genetic diversity in two

Table 3. Threats to the Rock Hyrax (*Procavia capensis*) 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	*5.1.1 Hunting & Collecting Terrestrial Animals*: local declines caused by bushmeat hunting.	-	Anecdotal	-	Possibly increasing with ongoing settlement expansion.
2	*11.2 Droughts*: increased aridity from climate change and thus decrease in habitat suitability.	Erasmus et al. 2002	Simulation	National	Range shifts from east to west following as western areas become increasingly dry.
3	*8.2 Problematic Native Species/Diseases*: sarcoptic mange may lead to local extinctions.	-	Anecdotal	-	-

conservation areas in the Western Cape (Table Mountain National Park and Boulders Penguin Colony), likely due to the poor habitat connectivity of this region in addition to an anthropogenically influenced landscape. Thus protected area expansion and possibly reintroduction/translocation (see below) will benefit this species, especially biodiversity stewardship programmes that connect suitable rocky outcrops.

Reintroduction as a management tool has had mixed success: Since 2004, this species has been bought from local conservation authorities (for example, Ezemvelo-KZN Wildlife) by private landowners and reintroduced into various areas. Similarly in Gauteng, Rock Hyraxes have been removed from overpopulated urban nature reserves and reintroduced into areas where they are thought to have declined, sometimes with the dual benefit of ensuring the survival of threatened species such as the Verreaux's Eagle subpopulation at Walter Sisulu National Botanical Gardens ("Hyrax Operation Project"). However, post-release observations suggest that only three of six reintroductions remain self-sustaining today, providing the eagles with much needed dassie sustenance (B. van der Lecq pers. comm. 2012; Wimberger et al. 2009). Indeed, reintroduction attempts have been met with only limited success (Crawford 1984). More recently, Wimberger et al. (2009) described an unsuccessful reintroduction attempt where captive individuals (N = 16) and wild individuals (N = 9) were released into Umgeni Valley Nature Reserve, KwaZulu-Natal Province. After three months captive individuals showed no site fidelity and could not be found while wild individuals were dead within 18 days, mostly due to predation (Wimberger et al. 2009). This failure is attributed mainly to predation and group disintegration. Hyraxes are vulnerable to predation when foraging away from cover (Druce et al. 2006) which is similarly true of the post-release period. Indeed, 78% of the released individuals were probably eaten by Caracal. Small group sizes thus hinders vigilance (Hoeck 1975) and a lack of social cohesion (poor group composition) may also contribute to failure.

To improve the success of future reintroduction attempts, Wimberger et al. (2009) recommend an estimation of predator density in the release site and active predator deterrent (if predator density is high) for a period after release, or the consideration of another release site. Also, the use of soft releases and post release monitoring with radio telemetry are recommended.

Recommendations for land managers and practitioners:

- No special land management is necessary to sustain populations, given that they inhabit rocky, untransformed habitats and can utilise human structures. The eradication of predators may however cause higher population densities in affected areas (Fairall & Hanekom 1987). In such areas (or areas of naturally high population density), the reintroduction of predators is recommended as an holistic management strategy (and even necessary to maintain the natural vegetation; see Fairall & Hanekom 1987).
- Monitoring of the genetic diversity of populations in conservation areas of poor habitat connectivity across South Africa may inform appropriate conservation interventions. Given the low genetic diversity in two conservation areas of the Western Cape (Visser 2013), animal numbers/genetic

Table 4. Conservation interventions for the Rock Hyrax (*Procavia capensis*) 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	*1.2 Resource & Habitat Protection*: biodiversity stewardship programmes to connect rocky habitats.	-	Anecdotal	-	-	Multiple organisations
2	*3.3.1 Species Reintroduction*: reintroduction to depopulated areas and to provide carnivores with forage species.	B. van der Lecq unpubl. data	Anecdotal	Local	Successful in that a colony was established after multiple reintroduction events.	Hyrax Operation Project, Endangered Wildlife Trust (ended 2012)
		Wimberger et al. 2009	Empirical	Local	Failed. No surviving individuals within 3 months.	

diversity may have to be augmented via translocation of genetically closely related animals from surrounding (wild or protected) areas to curb any future loss of genetic diversity through population fluctuations. Conservation planning should also redress the lower landscape connectivity of certain areas under formal protection (for example, in the Western Cape: Tankwa Karoo National Park, West Coast National Park, Table Mountain National Park, Silvermine National Park, Cape Peninsula National Park, Boulders Penguin Colony, Betties Bay penguin colony and the Kogelberg Nature Reserve) and consider strategies that would establish corridors.

- Finally, post-release monitoring of reintroduction attempts is necessary to build an evidence base on reintroduction techniques (Wimberger et al. 2009).

Research priorities:

- A phylogenetic study is necessary for the genus across its African distribution to identify lineages with separate evolutionary histories. This may also inform a taxonomic revision of the genus *Procavia*.
- Studies of diseases between populations close to human settlements versus populations further away may be valuable. Additionally, the consequences of disease on population cycles could be investigated.
- The extent of use as bushmeat should be examined. Finally, an examination into the use of translocation as a reintroduction tool may be required as it has proven to be ineffective in the past (Wimberger et al. 2009).

Encouraged citizen actions:

- Report sightings on virtual museum platforms (for example, iSpot and MammalMAP), especially outside protected areas.
- Avoid feeding or keeping as pets.

Data Sources and Quality

Table 5. Information and interpretation qualifiers for the Rock Hyrax (*Procavia capensis*) assessment

Data sources	Field study (literature)
Data quality (max)	Estimated
Data quality (min)	Suspected
Uncertainty resolution	Best estimate
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.*