

## Black-footed Cat *Felis nigripes*

2

FELIDAE



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Namibian conservation status	Vulnerable
Global IUCN status	Vulnerable
Namibian range	538,000 km <sup>2</sup> ; but area of occupancy estimated at 366,700 km <sup>2</sup>
Global range	2,214,300 km <sup>2</sup>
Population estimate	Global: 9,700 mature individuals Namibia: 2,600 mature individuals
Population trend	Regional population decline
Habitat	Dry, open grassy regions of southern Africa, specifically in the Nama Karoo, grassland and savanna biomes. Endemic to southern Africa
Threats	<ul style="list-style-type: none"> <li>▶ Habitat loss and degradation through overgrazing, which negatively affects prey populations</li> <li>▶ Unintentional mortality through predator control measures (e.g. shot and killed during night hunts; killed by hunting dogs; injury and mortality by gin traps and cage traps)</li> <li>▶ Lack of legislative protection</li> <li>▶ High natural mortality (predation and disease) of wild populations</li> <li>▶ Possible decline in populations of springhare, aardvark or other animals that create shelter and dens for black-footed cats</li> </ul>

### IDENTIFYING FEATURES

The black-footed cat is the smallest wild cat species in Africa (Nowell & Jackson 1996c). This species is frequently confused with the similar southern African wild cat *Felis lybica cafra* or small-spotted genet *Genetta genetta*, but it is much smaller than the latter and has a shorter tail. The back of the ears is plain-coloured (not rusty as in southern African wild cat); the head is broad with prominent ears, and the body is boldly patterned with black spots and bands on a tawny or rusty-brown undercoat.

Black-footed cats have bright, reflective eyes and a characteristic blue eye-shine close to the ground at night. Important behaviours to help identification are that they are nocturnal, usually solitary, shy, move low to the ground (creeping gait) and rarely climb trees.

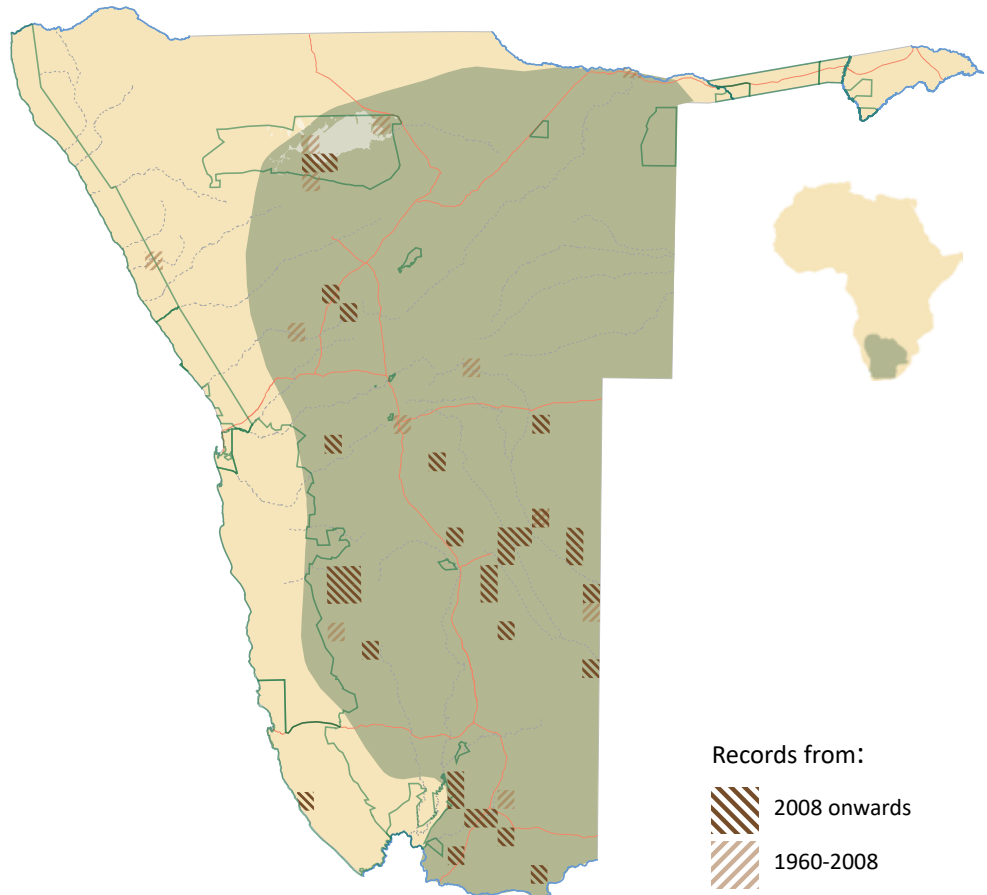
### DISTRIBUTION AND ABUNDANCE

The black-footed cat is endemic to southern Africa. It occurs primarily in South Africa, Botswana and Namibia, and might marginally extend into southern Angola and Zimbabwe

Distribution records of black-footed cat, and present estimated area of distribution in Namibia.

Inset: African distribution of black-footed cat according to IUCN (Sliwa *et al.* 2016a).

The Namibian distribution in the main map is more up to date and does not necessarily agree with the distribution shown in the inset.



(Skinner & Smithers 1990, Sliwa *et al.* 2016a).

In Namibia, black-footed cats occur in the south from the Orange River around Noordoewer along the Great Escarpment and into areas of the Pro-Namib near Helmeringhausen and Maltahöhe (Küsters 2014). An isolated camera trap photo of *Felis nigripes*, taken 8.5 km east of the coastline in the Tsau||Khaeb National Park (Brown Hyena Research Project pers. comm. 2022) indicates they occur there (sporadically or resident) in suitable habitat. They are probably absent from the true Namib Desert. Camera trap records from Neuhof Reserve (Environmental Information Service 2021) and sightings on farms in the NamibRand area (Küsters 2013) extend the known range into the eastern fringes of the Namib.

Records suggest that farms around Grünau, Karasburg, Mariental and Stampriet may have viable populations of black-footed cats (Küsters 2014, Sliwa *et al.* 2019). The Nossob and Auob Rivers may be important corridors for linking subpopulations locally and into southern Botswana (D Joubert pers. comm. 2013, Küsters 2014). The species probably only occurs irregularly in the Khomas Hochland due to unfavourable habitat and mountainous terrain. Further north, its distribution ranges from Wilhelmstal towards Outjo and into the central and eastern parts of Etosha

National Park. The short, dwarf scrubland habitat south of the pan is ideal habitat for black-footed cats. No records are documented from the Skeleton Coast National Park, except for an unverified sighting at Springbokwasser, near Möwe Bay (Environmental Information Service 2021) and one possible sighting in the Hoanib River (P Stander pers. comm. 2018).

Population densities are probably very low in the northern parts of Namibia (i.e. north of Etosha and eastwards) and subpopulations may be irregular in occurrence and isolated, such as the record of a road-kill on the B8 near Rundu (M Paxton pers. comm. 2018). Abundance and occurrence in the arid western parts of Namibia may present isolated populations or sporadic distribution along corridors of suitable habitat, i.e. along drainage lines or rivers.

Considering the records described above, the estimated extent of occurrence in Namibia (i.e. encompassing all confirmed location records within the country) is 538,047 km<sup>2</sup>. However, the species probably does not occur continuously throughout this area as not all of it is suitable habitat. The area of occupancy, defined as the area within its total range with suitable habitat and resident populations, is estimated as only 366,691 km<sup>2</sup>. This area excludes the extreme outlier records, such as the records near Rundu, in

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the Tsau||Khaeb National Park and Springbokwasser in the Skeleton Coast National Park (Environmental Information Service 2021).

Joubert *et al.* (1982) documented that the black-footed cat occurred on 304 farms throughout Namibia and that the species was more common in the northern districts of Tsumeb and Outjo and absent from the southern districts of Karasburg and Bethanie. The data collected during this survey should however be viewed with caution as the species can occur undetected or may be misidentified as the similar but larger southern African wild cat or small-spotted genet. Shortridge (1934) reported that the species was well known from the Gobabis District, became more numerous towards the Botswana border and was more associated with typical Kalahari sand-plain habitats. There are few location records from this area (Küsters 2014) and further east into Botswana (Wilson 2015, Sliwa *et al.* 2016a).

Although the distribution of *Felis nigripes* overlaps with seven formally protected areas in Namibia (Wilson 2015, Sliwa *et al.* 2016a), its presence has only been confirmed in the Etosha National Park (Stander 1991b, Küsters 2013). Overall, the distribution records are scarce and patchy, reflecting its status as a rare and under-reported species. The patterns of historic and recent distribution should not be regarded as range extensions but rather a reflection of insufficient confirmed records of black-footed cats in Namibia.

## POPULATION ESTIMATE AND TREND

Due to their shy nature, nocturnal habits and small size, black-footed cats are rarely seen and hence less reported than larger wild felines. They are considered uncommon and rare throughout their range (Skinner & Smithers 1990, Nowell & Jackson 1996c). This makes population densities difficult to determine (Olbricht & Sliwa 1997, Sliwa 2013).

In South Africa, Wilson (2015) estimated population

densities from long-term data collected by the Black-footed Cat Working Group (2004–2015) of between 1 to 3 cats/100 km<sup>2</sup>, ranging from low to high density areas. High density areas were identified in the central Upper Karoo region, towards the north-western parts of the Eastern Cape and north-eastern parts of the Western Cape. The total population size of mature, adult black-footed cats in the sub-region is estimated at 9,707 (Wilson 2015, Wilson *et al.* 2016). Moreover, no subpopulations are suspected to have more than 1,000 adult individuals (Sliwa *et al.* 2016a). Total population size in Namibia is estimated at not more than 2,566 adult individuals, calculated as 70% of the population in suitable habitat (i.e. the area of occupancy) at a density of 0.01 cats/km<sup>2</sup> (Sliwa *et al.* 2016a). Estimating population size from the area of occupancy reflects a conservative estimate.

The species is considered rare in Namibia (Shortridge 1934, Joubert *et al.* 1982; Griffin 1998) and although its predicted range extends over large parts of central and southern Namibia, only a few confirmed locality records are documented (Küsters 2013, 2014, Wilson 2015). Reports suggest that some populations may have declined within the last 10 years or possibly no longer exist in other areas (Küsters unpublished data). Unfortunately, many records collected were of dead black-footed cats, i.e. shot, killed by hunting dogs or fatally trapped during predator control activities (Küsters 2013, 2014, unpublished 2017). Often farmers are not aware of the species occurring in their area until one is killed by hunting dogs, shot or trapped. Unpublished reports of kittens found in termite mounds or in agriculture fields being taken from the wild to be kept as pets (Küsters unpublished) could potentially affect reproductive success and recruitment if this occurs repeatedly. A decline throughout the regional population is suspected (Sliwa 2008, Wilson 2015, Sliwa *et al.* 2016a), especially when local populations are exposed to recurring persecution or have a high prevalence of disease (i.e. amyloidosis: Olbricht & Sliwa 1997, Terio *et al.* 2008).

## ECOLOGY

They are strictly crepuscular and nocturnal and are active throughout the night, even in low temperatures (Olbricht & Sliwa 1997, Sliwa 2004). During the day they rest underground in dens or in hollow termite mounds. They do not dig their own dens, but depend on burrows dug by other species, such as springhare, yellow mongoose, ground squirrel, aardwolf and armadillo, for shelter and as a refuge for kittens, especially in habitat lacking termite mounds (Wilson 2015).

They occur in arid to semi-arid, grassy habitat with sparse cover in the form of trees and shrubs (Skinner & Smithers 1990, Nowell & Jackson 1996c), with average annual rainfall of between 100–500mm (Sliwa 2008). Although they can be described as habitat specialists, some reports suggest

that they may use modified land such as agricultural fields (Küsters 2013, Wilson 2015). A farmer from the Hardap Region reports black-footed cats occasionally foraging in tomato plantations, most likely hunting seasonally abundant rodents (K Bassingthwaight pers. comm. 2013). Another sighting was from a kitten found in a maize field in South Africa (Anonymous pers. comm., Wilson 2015).

Although black-footed cats are opportunistic hunters taking a large variety of prey, small vertebrates are their main prey, with average prey size of  $24.1 \pm 47.4$  g (Sliwa *et al.* 2010). Small mammals, such as the large-eared mouse and ground-roosting larks, constitute the most important prey classes (Sliwa 1994, 2006).

Sliwa (2004) studied the movements of 17 radio-collared black-footed cats in the Northern Cape and reports that annual home range sizes of adult female cats ( $n=7$ ) were significantly smaller at  $10 \text{ km}^2$  compared to adult male ranges at  $20.7 \text{ km}^2$ . The density on the  $60 \text{ km}^2$  reserve was estimated at  $0.17$  adult black-footed cats/ $\text{km}^2$  in the summer of 1998 (Sliwa 2004). The density of the same population had declined to  $0.08$  cats/ $\text{km}^2$  in the years 2005–2015, estimated from long-term research in the area (Wilson *et al.* 2016). In more arid areas of the Upper Karoo, home ranges of female and male cats are larger (Sliwa *et al.* 2016a, 2017, Küsters *in prep.*) and population density of cats is lower (Sliwa *et al.* 2016b, Wilson *et al.* 2016, Küsters *in prep.*). Preliminary home range analysis of the first research on the species in Namibia suggests that the home range size of adult females is much larger (estimate ranges of  $20\text{--}53 \text{ km}^2$ ,  $n=6$ , Küsters 2021) than those recorded on Benfontein Nature Reserve ( $10 \text{ km}^2$ , Sliwa 2004) and on farmland near De Aar in South Africa (Sliwa *et al.* 2017; Küsters *in prep.*). In addition, there is high variation in home range size and shape between individuals and some females exhibit

dramatic shifts in home range use (Küsters 2020; 2021).

## THREATS

Habitat degradation and subsequent negative effect on habitat, vegetation cover and rodent prey densities may be the most important threats to populations of black-footed cats and affect the species' persistence regionally. Emerging threats may affect its subpopulations in the long-term include infectious diseases, genetic isolation and climate change (Schipper *et al.* 2008, Wilson 2015).

Mortality through predator control (i.e. shooting, gin- and cage traps, hunting dogs) poses a considerable direct threat to localised populations in Namibia (Küsters 2013, 2014). Black-footed cats are generally not perceived as a threat to livestock or poultry (Küsters 2013, Wilson 2015), but are killed by predator control methods either directly through accidental shooting or indirectly through gin and other traps deployed on farms. During a farm survey in 1981, Joubert *et al.* (1982) reported that 32 black-footed cats were killed on farms in the Karasburg area, yet only three ( $n=3$ ) farms reported that the species caused any damage, illustrating the high mortality rate of non-selective control measures and indiscriminate eradication of all predators. Long-term persecution can lead to local extinction, especially in rare species that occur at low densities and have small litter sizes (Sliwa *et al.* 2010). Additionally, high rates (over 50%) of natural mortality (e.g. disease and predation) are recorded for radio-tracked black-footed cats in the wild (Sliwa *et al.* 2016b, Wilson *et al.* 2016).

Wilson (2015) suggests that declining springhare populations may negatively impact suitable habitat for black-footed cats by limiting the number of den sites for shelter. Also, the removal (i.e. the direct killing, trapping or poisoning)



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or decline in populations of other fossorial species such as aardvark, Cape ground squirrel and mongooses, may affect the availability of dens and hence influence the long-term occurrence and survival of black-footed cats regionally (Wilson *et al.* 2016). Aardvarks, through their feeding habits, create protected shelters and refuges in termite mounds, especially for black-footed cat females with kittens (M Küsters pers. obs.). Aardvarks are also very important habitat creators for many other smaller animals (Hausmann *et al.* 2018).

A few road mortalities are documented in Namibia (Küsters unpublished data) and the extent and effect on local populations is not known (Wilson 2015).

In areas with a high density of medium-sized predators, predation by black-backed jackal and caracal may negatively affect survival of juveniles and females (Sliwa *et al.* 2010, Wilson *et al.* 2016). Predation is one of the main causes of mortality in radio-tracked free-ranging black-footed cats (Sliwa *et al.* in review).

Evidence suggests that wild black-footed cats were caught on farms in the Gobabis and Mariental Districts in the late 1970s and sold to overseas zoological gardens and safari parks (Küsters unpublished data). The exact number and sex of these cats is unknown, but one farmer caught at least 10 cats during the 1980s for sale to European zoos through a local game capture operator (Anonymous pers. comm. 2012). This could have severely compromised healthy, stable populations and may have resulted in local extinction, or fragmentation or a reduction of the local population, especially if adult females were caught. Several reports suggest that young and adult cats are caught in the wild and kept as pets (Küsters 2013, 2014). Sadly, these cats rarely survive in captivity. Black-footed cats are not suitable pets, cannot be tamed and need specialised care and nutrition (Olbricht & Sliwa 1997).

Captive breeding of black-footed cats is affected by poor reproductive success, high rates of mortality among kittens (<1 year old) and young adults of breeding age, and biased sex ratios (Olbricht & Sliwa 1997, Terio *et al.* 2008). Black-footed cats show a high prevalence for systemic (AA) amyloidosis (Olbricht & Sliwa 1997, Terio *et al.* 2008), a disease in which insoluble fibrillar protein deposits cause kidney failure. Both wild (Sliwa *et al.* 2016a, M Küsters pers. obs.) and particularly captive black-footed cats have succumbed to kidney failure due to this condition (Sliwa 2013). Evidence suggests that the species has a predisposition for this disease and that susceptibility to amyloidosis may be familial, i.e. it occurs in genetically related individuals (Terio *et al.* 2008). High prevalence of amyloidosis is a concern for the long-term viability of populations, not only in captivity but also in the wild, especially if ongoing threats further isolate subpopulations.

Hybridisation with domestic cats has not been documented in the wild or elsewhere and is not identified as a threat to wild populations (Wilson 2015).

The only confirmed hybrids were animals in captivity (Leyhausen 1979).

## CONSERVATION STATUS

Black-footed cats are endemic to southern Africa and have the most restricted distribution of all the African felid species (Nowell & Jackson 1996c).

The density of black-footed cats in areas of suitable habitat in Namibia is suspected to be low (i.e. 1 cat/100 km<sup>2</sup>) (Wilson 2015, Sliwa *et al.* 2016a, Sliwa *et al.* 2019) and subpopulations may be isolated and threatened by local extinction. Total population size over its entire range is estimated at less than 10,000 mature individuals, with subpopulations not expected to exceed 1,000 individuals, and the overall population is considered to be in decline (Sliwa *et al.* 2016a). Total population size in Namibia is estimated at not more than 3,666 individuals, of which only 2,566 are expected to be mature individuals of breeding age.

Therefore, the conservation status of black-footed cats in Namibia is Vulnerable due to its small population size, fragmented subpopulations and continuing decline of populations regionally, coupled with a suspected risk of local extinction in certain areas. This is a precautionary assessment given the paucity of distribution records and limited data on survival rates of adults and dispersing subadults, causes of mortality, disease prevalence and status of suitable habitats.

The black-footed cat is not legally protected in Namibia and is only scheduled as a “wild animal” (Nature Conservation Ordinance 4 of 1974). Lack of legislative protection and general poor awareness of the species in the hunting and farming community causes unintentional prosecution and indirect mortality. In South Africa, *Felis nigripes* is listed as Vulnerable in the Regional Red List and formally protected under the Threatened or Protected Species List (Wilson *et al.* 2016). Hunting of the species is prohibited in South Africa and Botswana (Nowell & Jackson 1996c).

The species is listed as Vulnerable in the IUCN Red List of Threatened Species and Endangered in the US Federal list. It is included in the American Association of Zoos and Aquariums Species Survival Plan (Black-footed Cat Species Survival Plan) and listed in Appendix I of the Convention on International Trade in Endangered Species (CITES) of wild fauna and flora (Sliwa *et al.* 2016a).

## ACTIONS

Species conservation efforts should be focused on farmland, as most of the black-footed cat's distribution range in Namibia falls on private or communal land outside formally protected areas. Arguably, this species should be seen as a flagship species for the conservation of biodiversity in central and southern Namibia. The Black-footed Cat Research Project Namibia, in partnership with the Black-footed Cat Working Group and the Namibian University of Science and Technology, is working on a study site to better understand the ecology and conservation status of this species in Namibia. The project aims to collect valuable data to assess the species' habitat requirements (e.g. home range sizes, social organisation), diet, health and diseases, causes of mortality, dispersal and survival in the arid south of Namibia.

## Research

- ▶ Continue collecting distribution records for black-footed cats in Namibia and start field surveys to confirm presence in areas for future study sites.
- ▶ Undertake ecological studies to assess basic space and habitat requirements (e.g. home range sizes, population densities), status and health of populations, causes of mortality, dispersal and survival in new study sites to assess ecology across the distribution range.
- ▶ Collate available genetic material from various sources and compare to populations in South Africa, between geographical areas and subpopulations.

## Management

- ▶ Collaborate with the Ministry of Environment, Forestry & Tourism on possible conservation action and declare the species as protected under the draft Protected Areas and Wildlife Management Bill.
- ▶ Investigate the extent of deliberate persecution and removal of black-footed cats from the wild and prosecute those people who illegally keep or trade in the species.
- ▶ Further develop the “black-footed cat custodian” programme in Namibia, similar to the programmes run by the Endangered Wildlife Trust in South Africa. Farmers who voluntarily strive and commit to conserve the black-

footed cat and its habitat; and who practice selective species-specific methods of predator control and do not use poison, will be recognised. This will promote overall biodiversity conservation and awareness within the farming community.

## Awareness

- ▶ Educational and awareness campaigns should be aimed at highlighting the arid ecosystem and animals of the Nama-Karoo biome, with special emphasis on the black-footed cat and its role in the natural environment. The campaigns should raise awareness about small carnivores and how they are beneficial at regulating rodent populations, which in turn has a positive impact in agricultural areas.
- ▶ Programmes need to be developed that promote biodiversity conservation and discourage farming methods and land uses which lead to habitat degradation and which impact negatively on biodiversity.
- ▶ Workshops and education are needed to encourage best practices in problem predator control. These should focus on species-specific control measures and should discourage the use of unselective methods such as poison and gin-traps (including ‘nekslaaners’ or home-made lethal traps).



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