

Brown Hyaena *Parahyaena brunnea*



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Namibian conservation status	Near Threatened
Global IUCN status	Near Threatened since 2000
Namibian range	~685,600 km ²
Global range	~2,450,000 km ² (IUCN 2015)
Population estimate	Global: <10,000 mature individuals Namibia: <3,000 mature individuals
Population trend	Stable. Resettling or increasing in some parts of Namibia
Habitat	Desert, semi-desert, grassland, open shrub and woodland savanna with average annual rainfall up to 700 mm
Threats	<ul style="list-style-type: none">▶ Human-carnivore conflict outside protected areas▶ Non-selective persecution/control programmes (poisons, gin traps, snares)▶ Habitat fragmentation through predator-proof fencing▶ Traditional muti markets and illegal international commercial markets▶ Road mortalities▶ Trophy hunting, or any disruption to the social organisation (e.g. through removal of a breeding female); clan recovery can take many years

IDENTIFYING FEATURES

Brown hyaenas have the typical sloping body shape of hyaenas, with a strong, muscular neck, shoulders and front legs and less well developed hindlegs. Their body hair is dark to reddish brown and long. They have a brighter, yellowish to off-white mane and the legs are striped, which aids identification of individuals. The ears are pointed, as opposed to the round ears of spotted hyaenas. There is no pronounced sexual dimorphism.

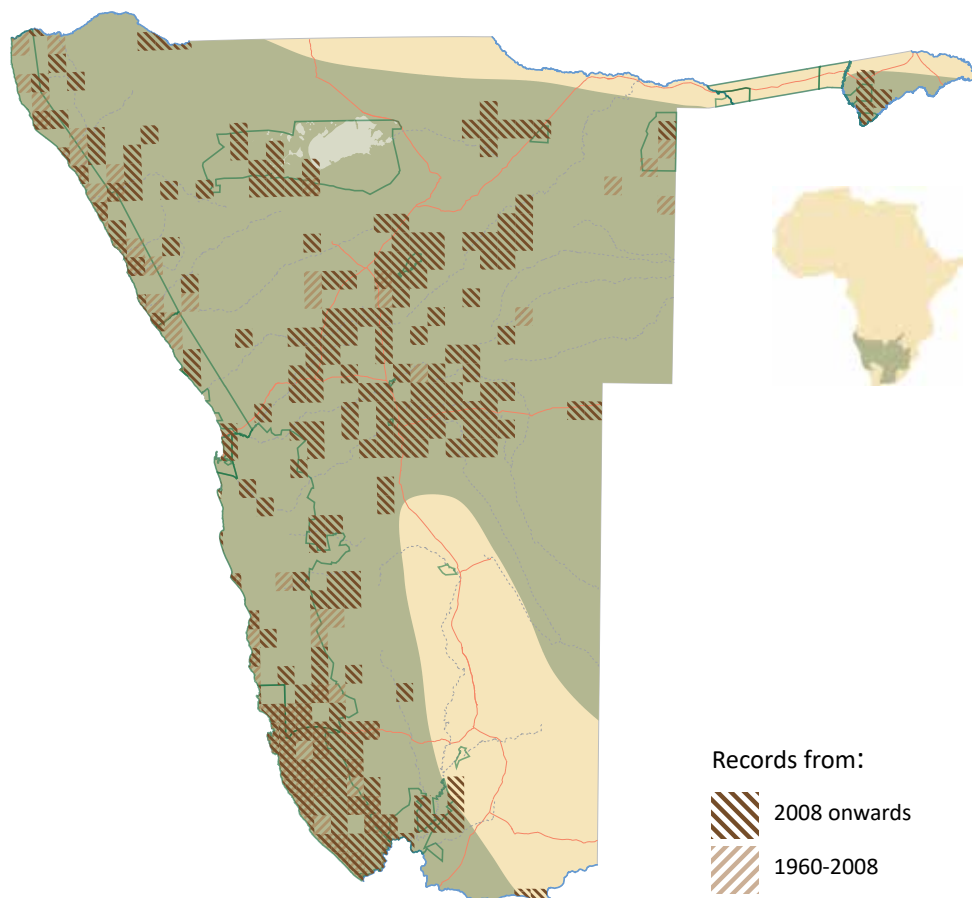
DISTRIBUTION

Brown hyaenas occur in the southern African subregion with a small, recently confirmed extension into the arid south-western parts of Angola (L Hanssen pers. comm.). They are widespread throughout Botswana (Winterbach *et al.* 2017) and most of Namibia (Wiesel 2015a). Historic distribution data show that they were absent or very rare in the eastern Zambezi Region and rare in areas of the south-eastern ||Kharas Region, where game densities were low (Shortridge 1934, Gaerdes 1977). The current distribution is similar

Distribution records of brown hyaena, and present estimated area of distribution in Namibia.

Inset: African distribution of brown hyaena according to IUCN (Wiesel 2015b).

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



except that they also seem to be absent north of the Etosha National Park. This area is densely populated, which may contribute to their absence; however, brown hyaenas are known to survive well in urban areas (Kuhn 2014). Hyaena sightings have been reported from communal conservancies in the Omusati, Oshana, Ohangwena and Oshikoto Regions, but no distinctions have been made between hyaena species in the conservancy records (NACSO 2016), so it is impossible to ascribe these records to either spotted or brown hyaenas. The brown hyaena's occurrence in the eastern parts of Hardap Region and south-eastern areas of Omaheke Regions is uncertain. No recent records exist, but they occur across the border in the Kgalagadi and Ghanzi Districts of Botswana (Winterbach *et al.* 2017), which makes it likely they will also be found on the Namibian side. Small-stock farming, which is the predominant land use in eastern ||Kharas Region, may be the reason for the current absence of brown hyaenas there, due to increased conflict and less tolerance towards carnivores (Lindsey *et al.* 2013c).

POPULATION ESTIMATE AND TREND

According to the latest IUCN red data assessment, the global population estimate of brown hyaenas is less than 10,000 mature individuals (Wiesel 2015a). More recent estimates from Botswana show that it has the largest and probably the

least fragmented brown hyaena population with an estimate of 3,133–5,933 animals (Winterbach *et al.* 2017), followed by Namibia with an estimated 1,662–2,870 animals (Wiesel 2015b). No recent estimates are available for South Africa, but population sizes (900–2,200 estimated by Hofer & Mills 1998a) have possibly been underestimated in the past (Yarnell *et al.* 2016).

Historic data to assess population trends for Namibian brown hyaenas are sparse and contradictory. Shortridge (1934) describes the brown hyaena as being an abundant large carnivore in the north-western regions, Omaheke Region and the eastern Otjozondjupa Region, as well as being the common hyaena species north of and around the Etosha Pan area. Contrary to this assessment, Gaerdes (1977) describes the brown hyaena as rare in his review of historic observation records. However, much of this information originates from farm questionnaire surveys, done by the Department of Nature Conservation in 1972 and 1982. Although brown hyaenas were not included in the questionnaire, the Namibian population was estimated as 50 individuals, classifying them as endangered (Joubert & Mostert 1975). Furthermore, brown hyaenas only seemed to occur on 7.3% of farms (Joubert *et al.* 1982). In general, brown hyaenas were described as being more common on farmland and in coastal areas of the Namib than spotted

hyaenas (Stuart 1975, Gaerdes 1977, Skinner & van Aarde 1981).

The past exclusion of brown hyaenas from surveys possibly contributed to its Red Data status classification of insufficiently known (possibly vulnerable) and peripheral (Griffin 2003). Fortunately, through advances in monitoring technologies, especially camera traps that enable citizens to monitor wildlife more easily, more detailed data are available today. The importance of non-protected areas for brown hyaena conservation has been established for Botswana, South Africa and north-central Namibia (Kaufman *et al.* 2007, Stein *et al.* 2008, Thorn *et al.* 2011, Kent & Hill 2013, Lindsey *et al.* 2013c). However, densities vary depending on land use. Brown hyaena density is higher on freehold rangelands than on more densely populated communal rangelands (Kaufman *et al.* 2007). In Botswana, densities on livestock farms are sometimes higher than on game farms (Kent & Hill 2013), and densities on agricultural land in South Africa are lower than in protected areas (Thorn *et al.* 2011).

Density estimates are available for a variety of different habitats, inside and outside of protected areas, using a variety of different methods. Density estimates on commercial farmland in western Botswana from camera trap surveys were 2.3 animals/100 km² (Kent & Hill 2013) and between 0 and 2.94 animals/100 km² from spoor and camera trap surveys across the entire country (Winterbach *et al.* 2017). The population size at Ongava Game Reserve in Namibia is estimated at between 7 and 10 animals (K Stratford pers. comm.), hence a density of 2.33–3.3 individuals/100 km². However, brown hyaenas are not confined to the reserve and regularly cross over from the Etosha National Park to forage. Acquah (2012) estimated a density of 4–10 animals/100 km² on Okomitundu, but true home range size was unknown and it can be assumed that these hyaenas were also not restricted to the farm. However, very high densities have been observed in Kwandwe Private Game Reserve in South Africa, where Welch & Parker (2016) estimated 14–19 individuals/100 km², and Edwards *et al.* (2019) estimate density at Okonjima at 24 animals/100 km². A full electric fence prevents free movement there. Most fences do not pose a barrier to brown hyaenas though, and therefore density estimates from single farms and some private reserves have to be interpreted with caution. For the southern coastal Namib Desert, long-term home range and population size estimates are available. Here, coastal densities are estimated as 0.43–0.8 animals/100 km² (I Wiesel unpublished data).

The current population trend is stable. However, there are numerous researchers and farmers that report a perceived increase in brown hyaena numbers, especially in the Khomas Hochland area. It is not entirely clear whether this is just a result of this cryptic species becoming more visible through the use of camera traps as a monitoring tool, highlighting



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the importance of detailed monitoring studies necessary in these areas.

A recent genetic study has shown that there are potentially four subpopulations, one in South Africa, one in Botswana and two in Namibia (Westbury *et al.* 2018). In Namibia, there are indications of a northern and a southern subpopulation, possibly due to limited migration through the Namib Sand Sea and the eastern boundary of the Namib-Naukluft Park, where spotted hyaena density is higher (I Wiesel pers. obs., Stuart 1975).

ECOLOGY

Brown hyaenas are found in desert and semi-desert habitats with an annual average rainfall of less than 100 mm. They are also common in grassland, open shrub and open woodland savannas with rainfall up to 700 mm (Wiesel 2015a), and are known to survive close to urban areas (Kuhn 2014). In Namibia they occur along the entire Namib Desert coast and in high densities in the Khomas Hochland and central areas north of Windhoek (Wiesel 2015b). They are seldom recorded in wetlands, floodplains and densely forested areas.

Brown hyaenas live in mixed sex clans (Mills 1982) of what appear to be related females and males, and sometimes immigrant males. Clan sizes of up to 10 adult and subadult clan members have been recorded (Mills 1990b). In coastal areas of the southern Namib, clans consist on average of 2–3 adults and 1–2 subadult animals (I Wiesel unpublished data). Clans along the Skeleton Coast, also consisting of adult and subadult individuals, are on average 3–6 animals

(E Verwey pers. comm.). Subadult emigration is the main determinant of group size (Mills 1990b), with 33% of males becoming nomadic and forming an important component of the population (Mills 1982). After approximately 97 days of gestation (Shoemaker 1978), brown hyaenas give birth to a litter of 1–4 cubs (Mills 1983; average of 1.55 cubs coastal Namib, I Wiesel unpublished data; average of 2 cubs Skeleton Coast, E Verwey pers. comm.) in a natal den. The cubs are carried to the communal den when they are approximately 2 months old. These communal dens are the social meeting point of brown hyaenas. All clan members carry solid food back to the den to supplement the cubs' diet until they are completely weaned within 12–15 months (Mills 1990b, average of 11–12 months coastal Namib, Wiesel *et al.* 2019). Inter-litter intervals are irregular and range from 12–41 months in the southern Kalahari (Mills 1982) and 7–16 months in the southern coastal Namib (Wiesel *et al.* 2019).

Brown hyaenas are solitary, opportunistic foragers and most food is obtained through scavenging. Vertebrate remains are the most important food source, but reptiles and invertebrates are also consumed. Brown hyaenas on Namibian farmland predominately scavenge from leopard and cheetah kills (Stein *et al.* 2013), while coastal hyaenas' diets mainly comprises seals and seabirds (Avery *et al.* 1984, Siegfried 1984, Skinner *et al.* 1998, Kuhn *et al.* 2008). Hunting plays a minor role, although coastal brown hyaenas are successful hunters of Cape fur seal pups (Wiesel 2010). In urban areas refuse dumps can become major sources of food, and analysis of scat and stomach contents of road-killed hyaenas revealed non-food items such as tin foil, bottle tops, plastic and parts of shoes (I Wiesel pers. obs.). Brown hyaenas seem to be independent of permanent fresh water availability within their home range (e.g. Skinner &

van Aarde 1981), and may complement their water intake by eating fruit, such as melons, when necessary (Mills 1978), or travel outside their territory to visit permanent water sources (I Wiesel unpublished data).

During the day, brown hyaenas seek shelter under bushes, holes or in mountainous areas under rocks. They are predominately nocturnal and cover average distances of 18 km/day in coastal areas and 42 km/day in inland areas of the Namib (I Wiesel unpublished data). Territories are marked at the boundaries and inside through defecating in latrines and pasting on vegetation and other landmarks (Mills & Mills 1980, Mills 1990b). Home ranges of adult male clan members are larger than those of adult females and often overlap with the home ranges of neighbouring clans. In the Southern Kalahari and Makgadikgadi in Botswana home ranges of 235–481 km² (100% Minimum Convex Polygon: MCP) and 135–221 km² (95% MCP) respectively have been recorded (Mills 1990b, Maude 2005). In Namibia home range sizes vary greatly, dependent on habitat type and distribution of food sources (Table 3.1). Nomads in the southern Namib Desert covered up to 11,690 km² over a period of one year and maximum dispersal distance was 240 km (I Wiesel unpublished data).

Brown hyaenas can be sympatric with spotted hyaenas but are sometimes displaced by them (Mills 1990b). Along the Namib Desert coast, black-backed jackals are considerable competitors for the coastal food resources and brown hyaenas may lose prey to jackals when outnumbered (I Wiesel unpublished data). Brown hyaenas scavenge carcasses from lions where they co-occur (Owens & Owens 1978, Mills 1990b, Yarnell *et al.* 2013) and they are dominant to cheetahs and sometimes leopard (Mills 1990b).



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THREATS

Brown hyaenas are widespread across Namibia and a large proportion of the population lives outside of protected areas, where they may come into conflict with humans. They are often persecuted directly on farms, where they are shot or captured alive and subsequently killed or translocated. They are also indirect victims of predator control measures, such as snaring and poisoning, which may become a major threat for many carnivore species. Because of their scavenging nature, they are sometimes unfairly blamed for livestock losses; however, they can kill small-stock and incidents of calf attacks have increased in some parts of Namibia (I Wiesel pers. comm.). It is often suggested that “problem animals” are old animals that have problems of finding food elsewhere, or young subadults that start foraging on their own. When this is the case lethal or non-lethal removal of such animals mostly resolves the problem. In central Namibia, for instance, a subadult male that had injured several calves, was relocated, assimilated into the resident hyaena clan, and did not cause further conflict (Weise *et al.* 2015c). In dry southern Namibia, brown hyaenas also cause damage by gnawing on water pipes, resulting in losses of an important and limited resource on farms.

The tolerance of farmers towards carnivores in general, and the perceived predation risk posed by various carnivores, is a cause for concern. In Namibia a high proportion of farmers kill carnivores, and tolerance to large carnivores is often low. However, among the carnivore guild, brown hyaenas are mostly tolerated, especially among conservancy members (Schumann *et al.* 2008). Still, hyaenas in the central areas

north of Windhoek are perceived to predominately prey on cattle and donkeys (Schumann *et al.* 2012) and 3.8% of land managers in Namibia reported significant livestock losses to brown hyaenas (Weise *et al.* 2015c). Studies in Botswana, however, show, that brown hyaenas do not hunt livestock (Maude & Mills 2005).

There is evidence that brown hyaenas are frequently killed by vehicles on tar roads. In southern Namibia, road mortalities on tarred roads have caused temporary local extinctions of clans (I Wiesel unpublished data). Upgrades from gravel to tar roads pose a real threat due to increased traffic volume, increased traffic after dark, and speeding. A conservatively calculated annual average of 1.5 brown hyaenas is killed on a 40 km stretch of tar road in southern Namibia (I Wiesel unpublished data).

Snares to poach birds and game pose a threat to brown hyaenas, especially around urban areas, settlements and refuse dumps, where hyaenas commonly forage. Evidence of snaring is often found at brown hyaena den sites, as clan members also carry snared animals, caught in snares, back to the den (I Wiesel pers. obs.). Brown hyaenas often get caught in bird snares and sometimes lose their feet trying to bite them off or when blood supply is disrupted. Some hyaenas caught in large snares have been able to escape from the capture site, but die of sepsis later (I Wiesel pers. obs.).

The impact of pathogens transmitted by domestic dogs is unknown, but several disease outbreaks, such as distemper and rabies, have been recorded in Namibia (Gowtage-Sequeira *et al.* 2009). Serologic screening shows that brown

Table 3.1: Home range sizes of Namibian brown hyaenas.

Area	Home range size (km ²)	Age category	Sex	Home range estimate method	Source
East-central Namibia	127	adult		MCP (95%)	R Portas, J Melzheimer unpublished data
	297	adult		MCP (95%)	R Portas, J Melzheimer unpublished data
	44	subadult		MCP (95%)	R Portas, J Melzheimer unpublished data
Central area north of Windhoek	96	adult		MCP (100%)	L Hanssen unpublished data
Central Namibia	103	subadult		MCP (100%)	Weise <i>et al.</i> 2015
	134	subadult		MCP (100%)	Weise <i>et al.</i> 2015
Skeleton Coast Park	1286	adult	female	MCP (100%)	E Verwey unpublished data
	2108	adult	male	MCP (100%)	E Verwey unpublished data
Southern Namib Desert- coastal	368*	adult	females	MCP (100%)	I Wiesel unpublished data
	678*	adult	males	MCP (100%)	I Wiesel unpublished data
	375*	subadult	female	MCP (100%)	I Wiesel unpublished data
	305*	subadult	male	MCP (100%)	I Wiesel unpublished data
Southern Namib Desert- inland	3584	adult	male	MCP (100%)	I Wiesel unpublished data
	4,865	adult	male	MCP (100%)	I Wiesel unpublished data

MCP= Minimum Convex Polygon; * = average

hyaenas are exposed to a variety of pathogens (Wiesel *et al.* 2018), but the impact on the population is still unknown.

Brown hyaenas are not a valuable trophy hunting species. However, there seems to be an increase in demand for trophies of less frequently hunted species, possibly among collectors. Import restrictions on brown hyaenas in for instance the U.S. (Endangered Species Act), may limit demand, but photos of trophy hunted animals seem to be a popular substitute for actual trophies. Uninformed trophy hunting on brown hyaenas can have severe consequences for the population, because the risk of eliminating breeding females is so high, and it is these individuals which maintain the social clan structure. It is difficult to distinguish between sexes due to the long fur and small external sexual organs, as well as the penile pads that may be confused with testes. This makes the trophy hunting of brown hyaenas ill-advised. Furthermore, the low trophy price of brown hyaenas does not justify the risks.

Reintroductions and relocations should similarly not be encouraged, and should only be done with proper research into the clan structures of the source and recipient groups. Disruption of the social organisation of resident clans may cause stress and may have negative impacts on their reproductive output.

Restriction of natural migration and local movements due to, for example, predator-proof fencing around small private and public game reserves and parks may pose a threat. This should be monitored and possibly managed to avoid inbreeding.

Influences on the reproduction of a brown hyaena clan can have long-lasting population impacts. They are slow breeders with irregular, sometimes long inter-breeding intervals and low litter sizes (1–4 cubs,) and thus the recovery of populations may take many years. In southern Namibia, a prime territory including a mainland seal colony as a food source, became vacant in 2006, when the breeding female died and two adult males were killed on the tar road. The clan adjoining the vacant territory to the north only moved into the vacant territory in 2009, where they started denning in 2010. It took another 8 years until reproduction was recorded in the territory that the northern clan left behind (I Wiesel pers. obs.).

Although brown hyaena parts (glands, organs, hair, scats) are used in traditional medicine, collection is rather on an opportunistic basis from natural mortalities or road kills. In southern Namibia, many road kills disappear from the side of the road and of two recovered mortalities, one was skinned and the second had been hidden, presumably to be used for food (I Wiesel pers. comm.). However, emerging illegal commercial markets in Asia targeting teeth, bones and claws may become a serious threat in the future.

CONSERVATION STATUS

The brown hyaena is listed as Near Threatened in Namibia. It had previously been listed as insufficiently known due to paucity of data. The species' international conservation status has remained Near Threatened since 2008, after being uplisted in 2000 from Lower Risk/Least Concern to Lower Risk/Near Threatened (Wiesel 2015a). The lack of



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reliable density data together with the global population estimate of less than 10,000 mature individuals justifies this listing, despite the stable population trend assessments across its range. The brown hyaena was deleted from Appendix II of the CITES Appendices in 2000.

ACTIONS

Brown hyaenas, like many other large carnivores, are vulnerable to ecological and population stress due to their large area requirements, low reproductive rate and low densities (compare with Gittleman *et al.* 2001). Brown hyaena ecology is still widely misunderstood and misinterpreted by farmers. Several actions with regard to management recommendations, awareness programmes and research priorities are recommended for implementation in Namibia.

Management:

- ▶ Trophy hunting of brown hyaenas should be prohibited, due to the social clan structure and difficulties in differentiating between sexes.
- ▶ Uninformed reintroductions and relocations are not encouraged. The clan structure of both the source and recipient populations should first be studied, and decisions should be informed by the results and made after specialist consultations. Only subadult problem individuals may be relocated due to their submissive nature, that may enable assimilation into the recipient clan (e.g. Weise *et al.* 2015c). Such animals should be

whenever feasible fitted with GPS collars to monitor relocation success.

- ▶ Standard methodologies should be developed for farmers to identify the correct problem animal species in predation events.
- ▶ Event Book reporting and conservancy reports should distinguish between spotted and brown hyaena.
- ▶ Tared national roads that traverse through national parks should be closed from sunset to sunrise. This is especially relevant for newly upgraded roads, e.g. the Orange River road from Rosh Pinah to Oranjemund. There should be enforcement of speed restrictions, and penalties.
- ▶ **Awareness:**
 - ▶ Promote brown hyaenas for providing useful ecosystem services through their scavenging.
 - ▶ Promote citizen science participation in online reporting platforms, such as the EIS. This could target especially private camera trap owners and farmers (e.g. via NAU), and should explain the importance of such data in the national and global context. It is important to record all types of data, e.g. sightings, photos, human-carnivore-conflict, mortalities, carnivore signs (dens, latrines, marking posts).
 - ▶ Education with regard to brown hyaena sociality, foraging strategies and ecological needs.



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- ▶ Provide detailed and correct information about brown hyaena ecology and social behaviour through video clips and popular articles in magazines, especially farmers' magazines.
- ▶ Promote farmer-to-farmer guidance on farming harmoniously with brown hyaenas.

Research:

- ▶ Assessment of livestock hunting abilities of brown hyaenas, especially in high density areas, such as the Khomas Hochland.
- ▶ Assessment of economic impacts of brown hyaenas to farmers in comparison to other predators, overall livestock losses and their benefits through e.g. scavenging.
- ▶ Collection and analysis of scats to determine diet composition on farmland to assess the use of livestock. Genetic population structure studies in Namibia. This should include genetic studies of enclosed subpopulations in small reserves and parks to assess management options.
- ▶ Standardised distribution monitoring through national multi-species carnivore monitoring programmes using camera traps, complemented by questionnaires, citizen science participation and sign surveys.



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Assessors: Ingrid Wiesel and Lise Hanssen

Contributors: Emsie Verwey, Joerg Melzheimer and Rubén Portas

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