

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/316156853>

Focus on the Leopard (*Panthera pardus*)

Article · July 2010

CITATIONS

0

READS

2,525

1 author:



[Deon Furstenburg](#)

Afri Wild Services (Private)

157 PUBLICATIONS 260 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Rhino Captive Breeding Conservation Analysis [View project](#)



Wildlife Risk Management [View project](#)



GEO WILD CONSULT (Pty) Ltd.
Expert support to the wildlife industry

Deon Furstenburg

Leopard

Panthera pardus (Linnaeus, 1758)

Afrikaans
 German
 French
 Swahili
 isiNdebele
 isiZulu
 isiXhosa
 seSotho
 seTswana
 Shona
 Shangaan
 Nama/Damara
 Herero/Ovambo

Luiperd
 Leopard
 Léopard
 Chui
 Ingwe
 Ingwe
 Ingwe
 Nkwe
 Nkwê
 Ingwé
 Ingwe
 Garub
 Ngwi

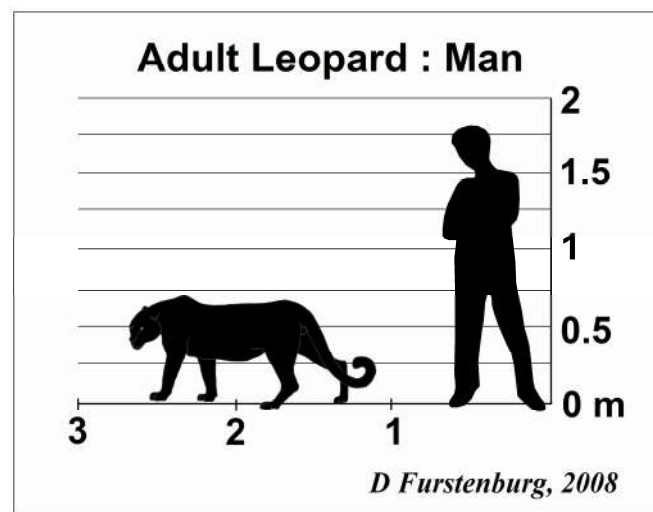


Photo: Alan Minnaar, adult

IUCN Conservation Status:

Lower Risk, least concern (LR/lc).

Leopards have the greatest geographic distribution of the world's cats and are found throughout the continents of Africa, Asia and in the Far East. The leopard is a symbol of power among many African tribes and its skin is often used for the cloaks worn by their kings. Besides the Cape buffalo *Syncerus afer*, the leopard is regarded as the second most dangerous animal in Africa. Its name is derived from the Greek word *leopardos* after *leo* for lion and *pardus* for panther.

Taxonomy	Kingdom:	ANIMALIA
	Phylum:	CORDATA
	Class:	MAMMALIA
	Supercohort:	LAURASIATHERIA
	Cohort:	FERUNGULATA
	Superorder:	FERAE
	Order:	CARNIVORA
	Suborder:	FELIFORMIA
	Family:	Felidae
	Subfamily:	Pantherinae
	Genus:	<i>Panthera</i>
	Species:	<i>pardus</i>

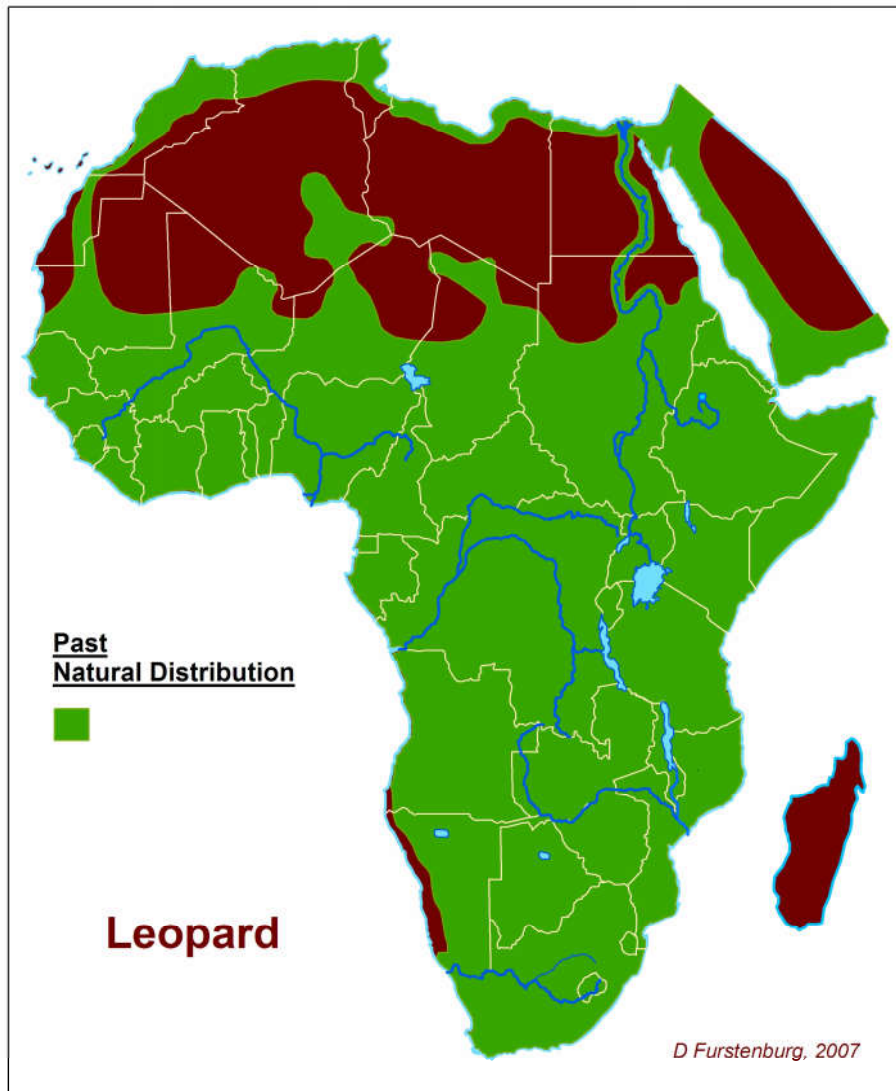
The leopard was first described as *Felis pardus* by Linnaeus in 1758. In 1930 it was renamed *Panthera pardus* by R. I. Pocock, distinguishing it from the non-roaring cats. Initially some 27 subspecies were named of which 13 occurred in Africa. More recently this number was reduced to eight but serious controversy led to the suggestion in 1995, of classing all African leopard into a single subspecies *Panthera pardus pardus*. This proposal has yet to be accepted internationally.

Distribution

Leopards are found across the entire African continent except in the Namibian and Saharan deserts. They have a high level of adaptability and live in a wide variety of habitats ranging from altitudes of sea level to over 5 000 m and higher. It is one of few of the larger mammal species remaining in the immediate surroundings of human development as evinced by the high numbers present in the environs of cities such as Cape Town and Nairobi. Most humans are unaware of their close proximity as they are shy and not often seen.

Black leopards are well known in the wet tropical forests of Asia and especially in India. They are not a different cat species but rather hybrids with a colour that gives them enhanced survival and stalking abilities in dark, forest environments. In Africa, the presence of black leopards has been reported in the forests of Mount Kenya and Mount

Ruwenzori. It is said that large numbers of black leopards once inhabited parts of Ethiopia and some were found to have black stripes along the back instead of rosette spots, very similar to those of the king-cheetah *Acinonyx jubatus*.



Description

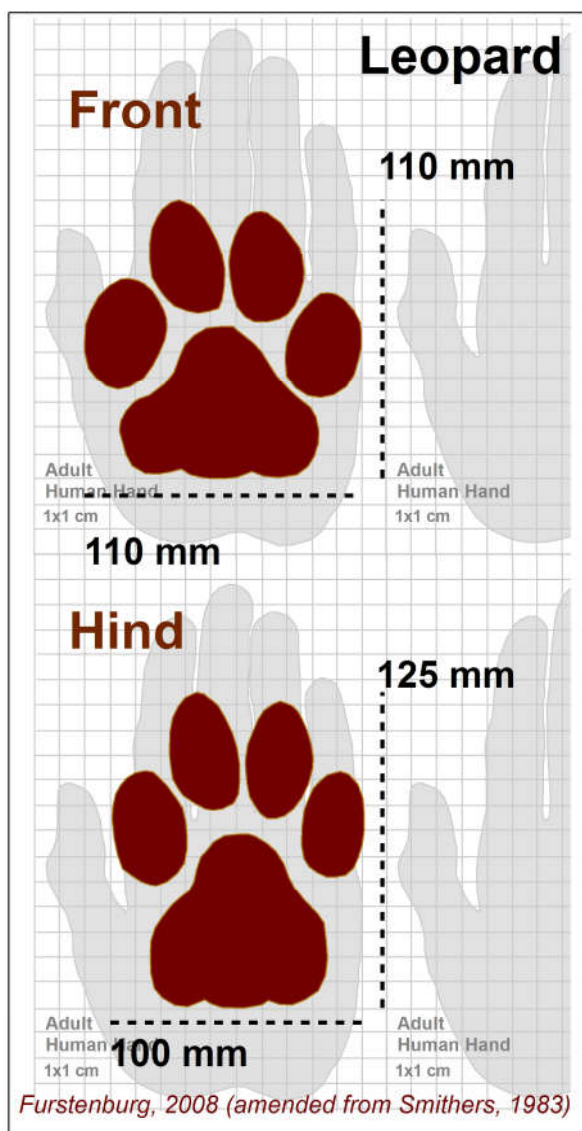
The leopard has a typically cat-like profile with a powerful muscular body, relatively short legs and a very long tail. The pelage is covered with a series of distinctive, black rosette spots that differ from the round, solid spots of the cheetah. The background colour, which is a light tan to golden-yellow, varies depending on the habitat. This has led to considerable taxonomic confusion and debate. Adult leopard males have a mean live body mass of 60 kg with a maximum of 90 kg and females, a mean of 32 kg. The mean shoulder height of adult males is 70 cm and females, 60 cm. A male can reach a total

body length, from the nostril to the tip of the tail, of 290 cm.

Individual leopard can be identified by the pattern of the rosette spots, especially those around the neck. Game owners are advised to build a photographic database of individuals on their ranches in order to assess the leopard density. These records, together with those kept by neighbours, can be used to define the leopard's home range.

Spoor

In common with other cats, leopards have five toes on the front paw, of which only four are printed in the spoor, and four toes on the hind paw. The spoor of the front paw measures 110x110 mm and that of the hind paw 125x100 mm. Both prints lack claw marks as the powerful claws retract fully into the nail-beds. Claws are 25-30 mm long.



Information table

Leopard information table			
Characteristic		Male	Female
Adult body weight	kg	60	30
Adult shoulder height	cm	60 – 80	55 – 650
Total body length (snout to tail end)	cm	201 – 236	178 – 188
Sexual maturity age	months	18 – 24	24
Social maturity age (1st mating)	years	2,5 – 3	3
1st Litter born at age	years		3,5
Gestation period	days		90 – 106
Litter size	number		1 – 4
Litter interval	months		15 – 24
Rutting season		Year round	
Birth season			Year round
Weaning age	months	3 – 4	
Independent at age	months	12 – 18	
Gender ratio: entire population (natural)		1	1
Mating ratio: adults (natural)		1	2
Cubs birth ratio		1,2	1
Maximum lifespan	years	10	12
Social order		Solitary	Solitary
Home range (Bushveld)	km ²	25	14
(Kalahari)	km ²	2 100	500
Territory range	ha	Entire home range	Entire home range
Daily food consumption (adults)	kg	3,3	2,5
Maximum stocking load		Determined by prey animal abundance	
Minimum habitat size required	ha	3 000	
Annual population growth		8 – 15%	

Trophy

The trophy value is the combined measurement of the maximum width of the skull and the maximum length.

Leopard trophy records					
Rowland Ward (XXVII edition 2006)					
Minimum qualifying value = 15 ³ / ₈ " (39,05 cm)				Measuring method 17	
Rank	Inch	cm	Locality	Year	Source
1 st	19"	48.26	Tanzania	1957	V. Neamand
2 nd	18 ¹³ / ₁₆ "	47.78	Chad	1958	E.T. Gates
3 rd	18 ³ / ₄ "	47.63	Kenya	1964	G. Munn
4 th	18 ³ / ₄ "	47.63	Lowveld, Zimbabwe	1988	Count X. De Montbel
5 th	18 ⁵ / ₈ "	47.31	Masailand, Tanzania	1983	Stanley Benz
Safari Club International S.C.I.					
Minimum qualifying value = 14" (35.56 cm)				Measuring method 11	
1 st	19 ¹ / ₈ "	48.58		1993	D.R. Holt

Confederation of Hunters Associations of South Africa CHASA					
Minimum qualifying value = 15" (38.10 cm)				Measuring method (F)	
1 st	17 ³ / ₄ "	45.09	Chewore, Zimbabwe	1997	L.J. Visser

Habitat requirement

Habitats are almost unlimited, ranging from wet tropical forest to bushveld, thickets, savannah, grassland, highveld, marshland, fynbos, Karoo shrubland and Kalahari and semi-arid deserts. Leopards are found on plains, on mountains into the snowline and on beaches. The only habitat totally avoided is sandy desert. The suitability of a habitat is not determined by its topographic characteristics but by the availability and abundance of prey and the accessibility of terrain suitable for stalking and hunting it. Camouflage such as tall grass, bushes and rocks are needed for successful kills. Open, short grass plains are less suitable and are defined as marginal habitat. Leopards tend to favour rocky koppies and hills, kloofs and riverine areas. They occur at an annual rainfall of less than 100 mm to over 2 000 mm, are independent of surface drinking water and can survive in arid environments.

Behaviour

Leopards are primarily nocturnal and most kills take place at night. They hunt alone; even a female with sub-adult young abandons them when hunting. The prey is stalked by crawling close to a distance of between 4-7 m. The cat then leaps forward onto the animal with lightning speed, aiming for the neck area but usually landing on the shoulders. The momentum of the leap generally knocks the prey off its feet and the cat rolls over it quickly and attempts to rip out its throat. Smaller antelope are often killed by a bite through the back of the skull. Leopards do not chase prey and only 20% of stalking attempts are successful. Once killed, the carcass is protected from scavengers and other predators by dragging it into thicket, or by hoisting it high into a tree to a split in the trunk; a carcass up to twice the cat's mass can be lifted. A leopard will return repeatedly to the hidden carcass until all the remains are eaten. Hunting success relies mainly on an extremely well developed sense of sight and hearing while scent is of little importance.

During hot daylight hours leopards rest in dense cover, between rocks, in caves, old aardvark burrows or high up on the branch of a large tree. In early mornings they tend to lie and view their surroundings from sunny spots on rocks or river banks. On overcast, cool days leopards may move around in daylight. They are excellent swimmers and do not hesitate to enter water. One leopard was seen crossing 900 m of open water between islands on Lake Kariba.

In bushveld terrain, leopards rarely move more than 5 km per night. Stander measured a daily travelling distance of 0.8-17.8 km in the dry savannah of Namibia with an average of 12.2 km for males and 8.4 km for females. Bothma and LeRiche recorded moves of

up to 29 km per day in the Kalahari. Movement is not continuous but consists of a series of short distances of up to 200 m.

Leopards are vicious when aggravated, short tempered and constantly ready for a fight. Attempts to follow a leopard on foot are very dangerous and the uttermost caution is essential. Once the cat realises a human is in pursuit, it often circles back on its tracks, selects an ambush site and waits for the intruder who is met by a sudden, fierce attack that is often fatal. When stumbling across a leopard unexpectedly, eye-to-eye contact and sudden movement should be avoided as these trigger an immediate attack. This is exactly opposite to the response that should be given to a disturbed lion, when eye-to-eye contact must be maintained at all cost. This establishes superiority and breaking the contact is interpreted as submissive behaviour that triggers an attack.

Feeding & Nutrition

Leopards are opportunistic and will eat any food source available. The natural diet depends largely upon the composition of the prey in the area. In some areas hyrax and rodents such as mice and porcupine are readily hunted but in others are totally neglected. The size of prey varies from the 200 gm of mice to the 120 kg of a sub-adult gemsbuck. In the Kalahari a 240 kg gemsbuck bull was reported to have been killed by a 60 kg male leopard. However, prey of between 15 and 65 kg are preferred. Studies in the Kruger National Park and the adjacent Timbavati Nature Reserve showed that up to 31 prey species were taken by leopard of which impala *Aepyceros melampus* contributed 78-88%. In contrast, studies in Zimbabwe revealed that hyrax, hare and klipspringer *Oreotragus oreotragus* contributed >50% of the diet. Fish, ground birds and small birds such as pigeons form an important part of the diet. Leopards do not fear humans and have been reported to become man-eaters, a phenomenon especially common in India. In East Africa, a leopard male was reported to have attacked and killed an adult eland bull. They also attack and kill other predators such as the aardwolf, the bat-eared fox and the black-backed jackal and have a distinct preference for members of the canine family. Feral dogs are high on the list and often lure leopard into residential areas. Baboons and monkeys are also favoured but a troop of baboon males is capable of attacking and killing a leopard.

After the prey is killed, the belly is ripped open and the intestine jerked out. The remains of the carcass are then concealed in thick undergrowth or hoisted up into a tree. The buttocks are usually eaten first. The majority of the wool and feathers of prey such as rodents and fowl are plucked out with the incisors. A bolus is then formed in the mouth and discarded before the leopard eats the flesh of the carcass. Leopards return to feed on the carcass of large prey for up to six consecutive days. This behaviour may be used to trap leopards in cage traps for management purposes.

A leopard does not scavenge or take bait that it has not killed. If the opportunity arises,

a leopard kills more than it can consume and will break into a chicken pen or a boma with confined antelope and kill all the animals before feeding on one alone.

Leopards do not depend on drinking water as they obtain moisture from their prey and also produce water as a by-product of their metabolism. In the desert, succulent fruit such as gemsbok cucumber and stammas are readily eaten for their moisture content. However, they will drink from surface water if it is available.

The volume of meat consumed differs according to the size of the cat, the type of prey and the surrounding environment. As much as 12 kg of meat can be consumed in a single meal. On average, adult bushveld leopard males in a habitat with large antelope consume an average of 3.3 kg meat per day and females, an average of 2.5 kg per day. The frequency of kills for females varies from 1 in 12 days in the Sabi Sand Game Reserve, to 1 in 7 days in the Kruger National Park and 1 in 1.5 days in the Kalahari. Males kill every three days in the Kalahari. This computes to an annual meat consumption of 31 impala per adult leopard.

Territory & Home range

The home range of a leopard is also its territory due to its solitary nature. Both males and females have their own individual home ranges that are defended against intruders of both sexes. A female will only tolerate the presence of a male in her territory during the mating period. Studies indicate that adjacent home ranges overlap by up to 46%, but that individuals keep a spatial distance between each other and avoid entering the overlap simultaneously. The size of the home range varies in relation to the habitat type, the environment and the composition of prey. The size is not static but changes in relation to changes in climate and the related change of potential food resources. Home ranges vary from 1 400 ha for females and 2 500 ha for males in bushveld and savannah areas, to 49 000 ha in the mountains of the Western Cape and 290 000 ha in the Kalahari desert. The home range of a male may overlap those of 2-4 females. A leopard passes through its entire home range approximately once every six days.

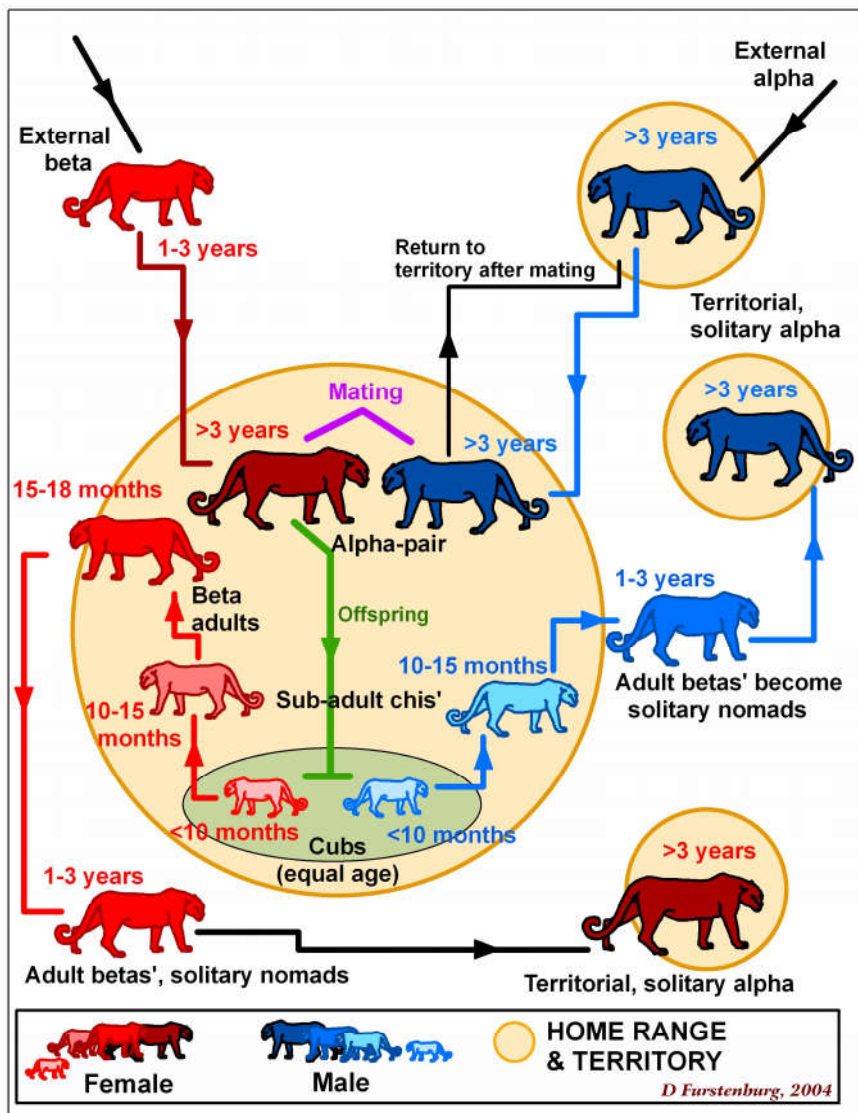
Leopards use different means to inform other members of their presence in a home range or to tell other males that a female is ready to mate. These include body displays and vocalization with different pitches of roaring and grunting. In addition, low hanging branches and tree stems are regularly marked with distinct claw scratches. The cat also scent-marks by spraying urine on under-story bushes and grass pods and then forcefully scratches the ground with a backwards action of the hind paws, often kicking dirt over the plant. These ground scratches are highly distinctive if tracking leopard on foot. The scent is a mixture of urine and secretions from the adrenal glands and the inter-digital glands on the hind paws. The smell of the scent is regulated to signal different messages. The most common vocal call heard from leopard is a low pitch, scraping cough, uttered to advertise its presence as it moves through its territory. Except in oestrus, when short

calls are frequently uttered, females generally vocalize less than males. Leopards also often purr, especially after feeding.

Social structure

Leopards are solitary animals except when they pair during mating or when a female is accompanied by her cubs. The mating pair splits soon after mating. The cubs leave the mother shortly before the birth of the next litter at an age of 12-18 months and become solitary. They generally become nomads for 6-12 months and then establish a home range. Males may wander a distance of up to 100 km before settling.

Due to their solitary nature, even an adult leopard is vulnerable to intimidation by gregarious or social predators such as lion *Panthera leo*, spotted hyaena *Crocuta crocuta*, African wild dog *Lycaon pictus*, wolves *Canis* spp and vultures.



Reproduction

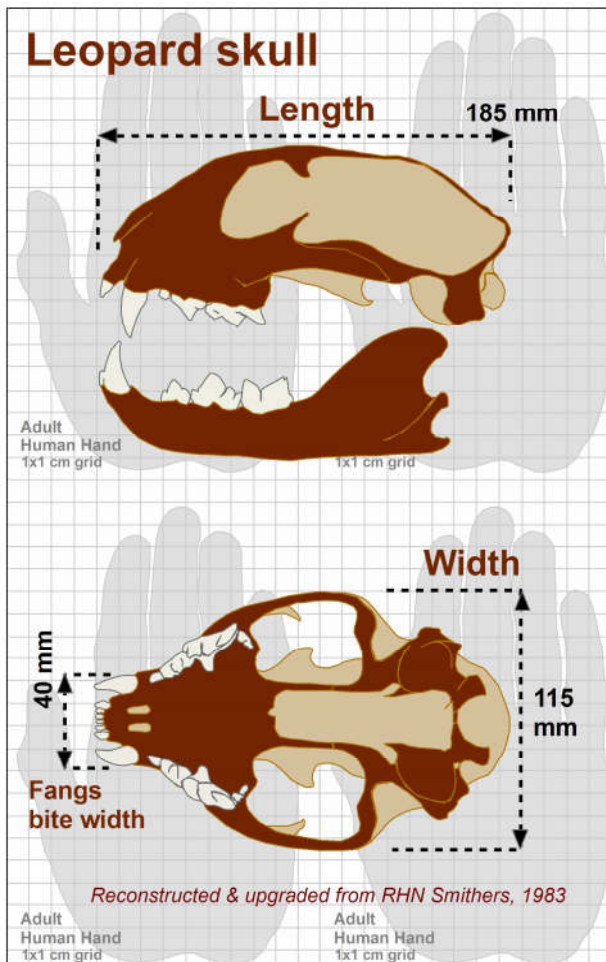
An adult alpha male can identify a female in oestrus on detecting her scent marks or hearing her vocalization over a distance of several kilometres. A female in oestrus will often move beyond her home range in search of a mate. There is no specific breeding or birth season as mating occurs at any time of the year. A mating pair displays a playful behaviour during courtship, chasing each other in circles. Copulation is of short duration and is repeated several times within 1-2 days. The majority of copulations are unsuccessful. Gestation varies from 90-106 days.

Leopards gain sexual maturity after 2 years and social maturity at first mating at 3-4 years.

Two to three cubs are born with closed eyes in a den that is either hidden between rocks, in a cave, a deserted burrow or in thicket vegetation. The eyes of the young only open at 8-10 days. Alpha males do not assist in the raising of the infants as they retreat to their own territory soon after mating. The mother abandons the litter for periods of up to 6 days while she is hunting. During this time the young are extremely vulnerable to predation, especially by jackal, caracal and python. The mother translocates the litter to a new den by carrying them in her mouth but when they are older the cubs follow her to the new hiding place. After the cubs are weaned at three months they begin to accompany their mother on hunting expeditions but only begin to hunt effectively after ten months. They become independent at 12-18 months and leave the litter to become solitary. The maximum live expectancy is 12 years.

Hunting ethics

Leopard has been declared protected game by the South African government and killing of, and/or transporting of leopard products is strictly forbidden. Only a limited number of hunting permits (<100 per annum) are issued and these must be applied for well in advance. Even a problem animal may not be killed by a landowner unless the relevant government authorities are notified. CITES regulations strictly prohibit any movement and/or trading of leopard products across international borders. It is advisable to check current legislation with the local Department of Environmental Affairs and Tourism as these regulations change annually.



Bibliography

- Baily, TN, 1993. *The African Leopard: Ecology and Behaviour of a solitary Felid*. Colombia Univ. Press.
- Bertram, BCR, 1982. Leopard ecology as studied by radio tracking. *Symp. Zool. Soc. Lond.* 49:341-352.
- Bothma, JduP, Knight, MH, Le Riche, EAN & van Hensbergen, HJ, 1997. Range size of southern Kalahari leopards. *S.Afr. J. Wildl. Res.* 27:94-99.
- Bothma, J du P, 1990. Leopard, *Game & Hunt* 5(7).
- Bothma, JduP & Le Riche, EAN, 1984. Aspects of the ecology and behaviour of the leopard in the Kalahari desert. *Koedoe* (Suppl.) 27:259-280.
- Bothma, JduP, Nel, JAJ & MacDonald, A, 1984. Food niche separation between four sympatric Namib desert carnivores. *J. Zool., Lond.* 202:327-340.
- Bothma, JduP, van Rooyen, N & Le Riche, EAN, 1997. Multivariate analysis of the hunting tactics of Kalahari leopards. *Koedoe* 40:41-56.
- Bothma, JduP, 2002. *Game ranch management*. Van Schaick Publishers. pp709..
- Furstenburg, D 2004. Luiperd. *Game & Hunt* 10(3).
- Furstenburg, D, 1970-2008. Personal field notes (unpublished).
- Hamilton, P, 1976. The movements of leopards in Tsavo National Park, Kenya as determined by radio-tracking. *M.Sc. Thesis*, University of Nairobi.
- IUCN, 2006. *IUCN Red list of Threatened Species*, Gland, Switzerland: <http://www.iucnredlist.org>
- Kingdon, J, 1997. *The Kingdon Field Guide to African Mammals*. Princeton University Press, Princeton.
- Kingdon, J, 1979. *East African Mammals, Vol. IIIA, Carnivores: An atlas of evolution in Africa*. Academic Press, London.

- Le Roux, PG & Skinner, JD, 1989. A note on the ecology of the leopard in the Londolozi Game reserve, South Africa. *Afr. J. Ecol.* 27:167-171.
- Norton, PM & Henley, SR, 1987. Home range and movement of male leopards in the Cedarberg Wilderness Area, Cape Province. *S.Afr. J. Wildl. Res.* 17:41-48.
- Norton, PM, Lawson, AB, Henley, SR & Avery, G, 1986. Prey of leopards in four mountainous areas of the south-western Cape Province. *S.Afr. J. Wildl. Res.* 16:47-52.
- Nowell, K & Jackson, P, 1996. *Wild Cats. Status Survey and Conservation Action Plan.* IUCN/SSC Cat Specialist Group. IUCN, Gland, Switzerland. 382 pp.
- Schaller, GB, 1972. Predators of the Serengeti. *Nat. Hist.* 81:38-69.
- Skead, CJ, 1987. *Historical Mammal incidence in the Cape, Vol 1 & 2*, Government Printer, Cape Town.
- Skinner, JD & Chimba, CT, 2005. *The Mammals of the Southern African Subregion, 3rd edn.* Cambridge University Press.
- Smithers, RHN, 1983. *The Mammals of the Southern African Subregion.* Pretoria: University of Pretoria.
- Stander, PE, 1997. Field age determination of leopards by tooth wear. *Afr. J. Ecol.* 35: 156-161.
- Stander, PE, Haden, P & Kagece, GX, 1997. The ecology of asociality in Namibian leopards. *J. Zool., Lond.* 242:343-364.
- Ward, R, 2006. *Rowland Ward's Records of Big Game, 27th edn.* Rowland Ward Publications.
- Wikipedia Encyclopedia, 2008.
- Wilson, D E & Reeder, DM, 1993. *Mammal Species of the World: A Taxonomic and Geographic Reference.* 2nd edn., Smithsonian Institution Press, Washington.

Gallery



Photos: Alan Minnaar, adult leopard



Deon Furstenburg
Wildlife Scientist - Risk Manager
+27 72 575 3289

f: 086 262 1032
e: Deon@geowild.co.za
w: www.geowild.co.za
a: 3 Kiaat Str, Overkruin, Heidelberg 1441
p: P O Box 1802, Heidelberg 1438





Expert support to the wildlife industry