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Focus on the Hippopotamus (*Hippopotamus amphibious*)

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Hippopotamus

Hippopotamus amphibious (Linnaeus, 1758)

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

Seekoei
 Grossflusspferd
 Hippopotame
 Imvubu
 Imvubu
 Imvubu
 Kubu
 Kubu
 Mvuu/Ngwindi
 Mphubu
 !Khaos

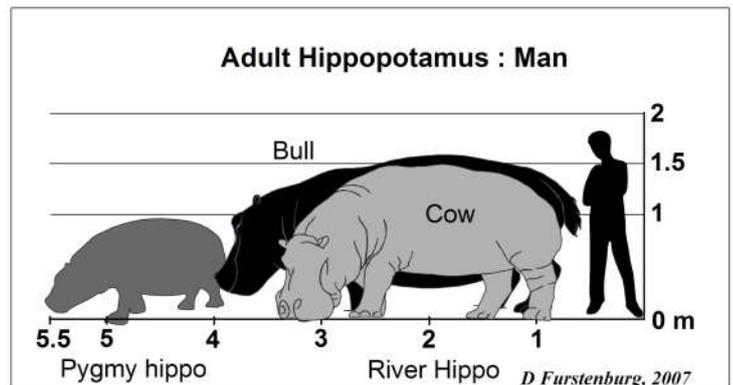


Photo: D. Furstenburg, adult hippo cow & male youngster

IUCN Conservation Status:

Lower Risk, least concern (LR/lc).

Extant global population is estimated as being between 125 000-150 000.

Hippo are the most unpredictable and moody of all African animals. Zee-paarden, the Dutch for “horse of the water” was the first citation on the wildlife of the Cape in Jan van Riebeeck’s journal. Eighteen days after landing in April 1652 a “zee-paard” was killed by his men for meat at the site of the present day Church Square. Van Riebeeck associated the animal with the sea, as hippo were abundant in nearby marshy lagoons, especially those of Muizenberg or Zeekoeivlei. There were also large numbers to be seen in the Berg River. Several other names followed; “zeekoe”, sea-horse, sea-cow and in the 1700’s those in the Nile River were called “Nylperd” or Nile-horse. Eventually the name hippopotamus or hippo was given to the animal. The “Behemoth” animal referred to in the Bible was an extinct hippo species.

Taxonomy	Kingdom:	ANIMALIA
	Phylum:	CORDATA
	Class:	MAMMALIA
	Supercohort:	LAURASIATHERIA
	Cohort:	FERUNGULATA
	Superorder:	CETARTIODACTYLA
	Order:	WHIPPOMORPHA
	Suborder:	ANCODONTA
	Superfamily:	Anthracotheroidea
	Family:	Hippopotamidae
	Genus:	<i>Hippopotamus</i>
	Species:	<i>amphibius</i>

The hippo was first described by Linnaeus in 1758 from a specimen shot in the Berg River in 1750 and shipped to the Paris Museum where it is still preserved. The name hippopotamus is derived from the Greek for horse “hippo” and from river “potamus”.

Studies of blood proteins, molecular systematics, mitochondrial DNA and fossil records indicate that the hippo’s closest living relatives are cetaceans or whales and porpoises. These share a common semi-aquatic ancestor that branched off from other even-toed ungulates 60 million years BP. Around 54 million years BP the ancestor split into two branches, the first evolving into the cetaceans, possibly beginning with the proto-whale *Pakicetus*. In the late Eocene the other branch evolved into the anthracotheres, a large family of semi-aquatic four-legged animals which resembled small, narrow-headed, skinny hippopotamuses. The hippos *Libycosaurus* split off from the anthracotheres *Merycopotamus* during the Miocene about 20 million years BP. All anthracotheres became extinct during the Pliocene. The oldest known true hippopotamid is the genus *Kenypotamus* found in Africa 20-8 million years BP. Fossils dating back 20 million years BP were found in Kenya. Hippopotamidae are believed to have evolved in Africa and then

spread across Europe, through Asia to Indonesia. They did not cross into the Americas. From 7.5–1.8 million years BP *Archaeopotamus*, an ancestor of the modern hippopotamus *Hippopotamus* and *Hexaprotodon* (also referred to as *Choeropsis*), lived in Africa and the Middle East. Scientists disagree as to whether the modern pygmy hippopotamus is a member of *Hexaprotodon* the Asian hippos from the Pliocene, or of *Choeropsis* from the older Pleistocene.

As many as three species of the dwarf Malagasy hippo became extinct on Madagascar during the Holocene. Two species ranged in Europe and the British Isles *Hippopotamus antiquus* and *H. gorgops*, but were extinct before the last Ice age.

Only three species survived of which two are found in Africa, the first being the hippopotamus or river hippo *Hippopotamus amphibius* with five subspecies

- *H.a. amphibius* found in the Nile River from Sudan to the north of Tanzania, and down the Rift Valley to Mozambique. It was recently eradicated in Egypt.
- *H.a. kiboko* found in the Horn of Africa, Kenya and Somalia
- *H.a. capensis* distributed from Zambia to South Africa
- *H.a. tschadensis* found throughout western Africa to Chad
- *H.a. constrictus* of Angola, the southern Democratic Republic of Congo and Namibia,

The second species is the pygmy hippopotamus *Hexaprotodon liberiensis*, formerly *Choeropsis liberiensis* with two subspecies

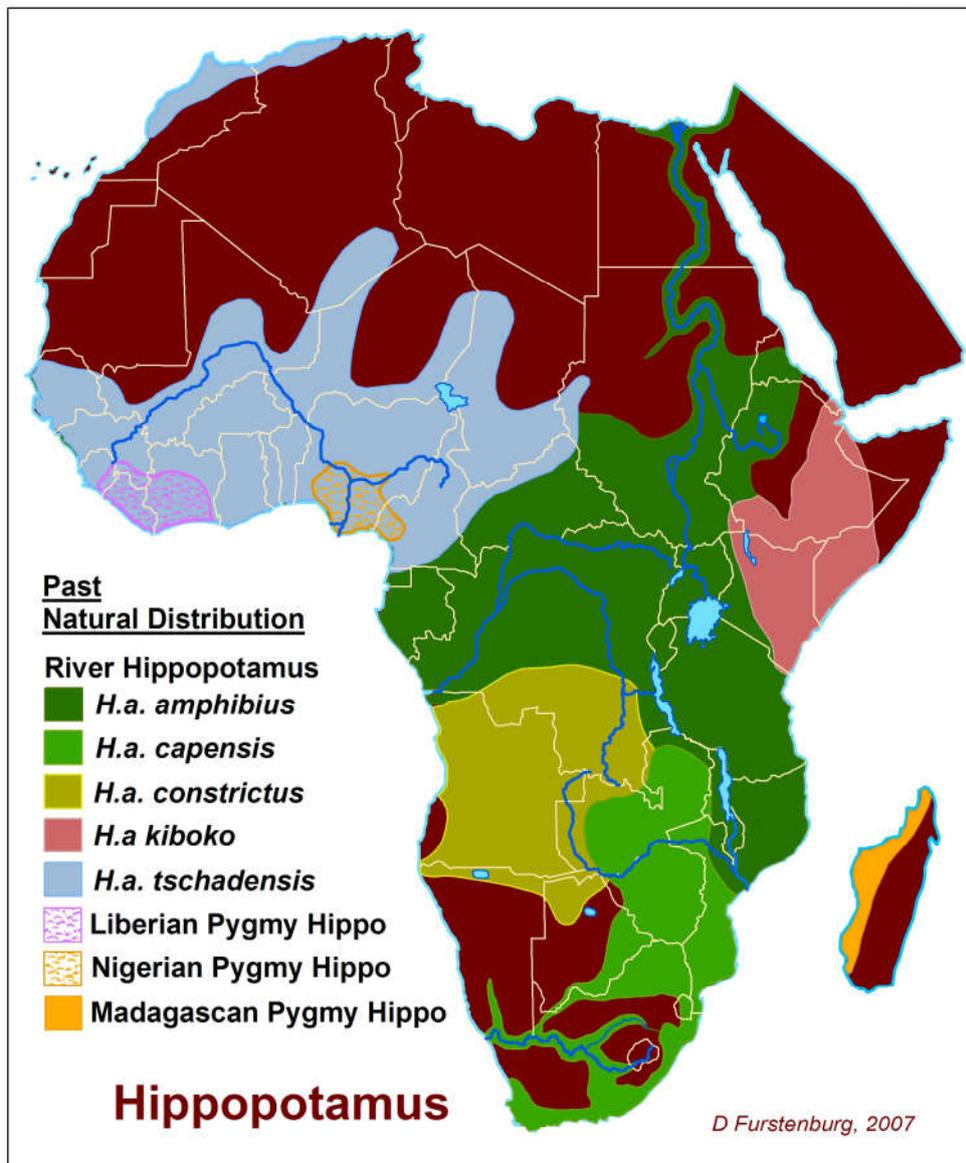
- *H.l. liberiensis* the Liberian pygmy hippopotamus
- *H.l. nigeriensis* the Nigerian pygmy hippopotamus

The last surviving species is the Madagascan pygmy hippopotamus *Hexaprotodon madagascariensis*.

Distribution

By 1768, only a few individuals remained in the Berg River in the southern Cape. Their decrease in numbers was due to heavy hunting for meat and fats, and for skins to make “samboks”, a South African whip. This resulted in the Dutch government instituting a penalty of 1 000 Guilden for the killing of a hippopotamus. Despite this, by 1770 hippo were extinct in the Cape, eastwards along the coastline and the interior to Plettenberg Bay. The very last hippo in the Cape Colony was shot in the Berg River by Mr Melek on 13 February 1869 after it had killed two coloured civilians. Records of 1836 show that numerous hippo were still to be found in the lower Orange River. However, in 1925 Fitzsimmons reported that, except for 25-30 individuals in a 500 km stretch of the Orange River between Augrabies and the ocean, the hippo had been entirely eliminated from the Cape Province, the Free State and KwaZulu-Natal. The last hippo disappeared from the

Orange River in 1930. In Africa, hippo had disappeared from the Nile delta by the mid 1800's.



Fossils and early documented sightings show that hippopotami were to be found in the northern parts of the East Cape Province, the Cape Midlands, the eastern parts of the Greater Karoo, the Klein Karoo, along the entire south-eastern coastline of South Africa and in all rivers throughout the Free State and KwaZulu-Natal.

Historically hippo occurred in all the water courses throughout sub-Saharan Africa. According to 24 site notifications by Mauny, an early scientist, hippo formerly inhabited the central and western regions of the Sahara. Fossilised hippo remains from the upper Sunday and Great Fish Rivers in the Cape Midlands date back 500 years BP. A complete skeleton was found near Hofmeyr in the historic Vlekpoort wetland area, an area that is now

Karoo scrubland.

Description

The hippopotamus is classed as a mega-herbivore. It is not built for speed as its shape is that of an enormous pig with a large, barrel shaped body and short, stout legs. The head is broad and well developed and allows the hippo to float with both the eyes and nostrils projecting above the water simultaneously. It also supports a massive mouth with jaws that open up to 50 cm wide. The river hippopotamus has four incisors and the pygmy hippopotamus six. Other extinct hippos had only two incisors.

Other than some sparse, brush-like hair on the chest, lips, neck, ears and the tail end, the skin is virtually naked, smooth and moist. It dries rapidly in direct sun and must be dampened regularly. The hide is generally a dark, greyish-brown with a pink tinge but is pinkish-yellow in the folds of the skin, on the underside of the belly and around the ears and eyes. The skin appears pinker when the hippo is out of the water due to a red, slimy, viscous fluid secreted by unique glands in the endoderm of the inner skin layer. Its colour has given rise to the myth that hippos sweat blood. This secretion aids in the healing of wounds, scars and broken skin. The outer epithelium of the skin is 3-5 mm thick and is relatively thin compared to the inner endoderm that varies from a thickness of 10 mm on the head and belly to 50-60 mm on the back.

The nostrils contract and close when a hippo is submerged. On surfacing they are opened with a blow of air that clears the airway of excessive water. Hippos can stay submerged for durations of up to six minutes.

Despite their bulky body, hippo can charge at speeds of up to 35 km/hr on land. When in water they cannot swim but rather walk or gallop on the bottom at speeds of up to 22 km/hr. The gallop consists of a series of leaps propelled by kicking the bottom with the right and left feet alternately and floating forward between leaps

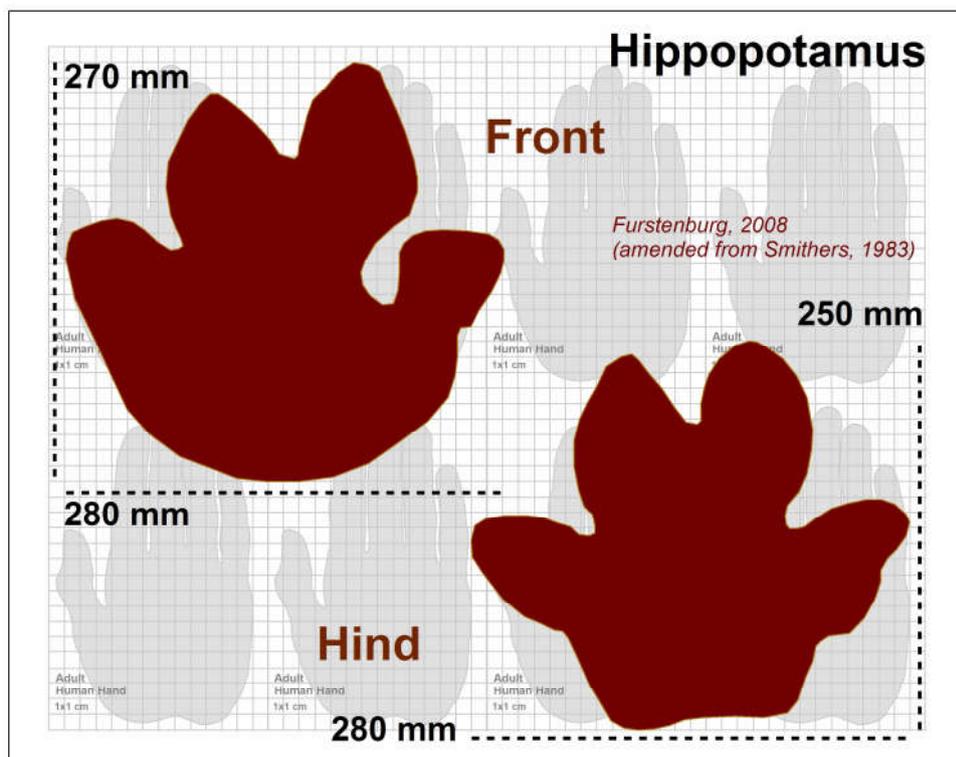
Adult cows have a mean body mass of 1 350 kg and a mean shoulder height of 144 cm. Adult bulls are larger with a mean mass of 1 500 kg and a mean shoulder height of 150 cm. According to Owen Smith the hippopotamus is one of the largest mega-herbivore in the world. In order these are the

- African elephant, 2 500-3 800 kg
- Hippopotamus, white rhino & Indian rhino, 1 400-2 000 kg
- Black rhino, 1 000-1 300 kg
- Giraffe, 800-1 200 kg
- Asiatic guar, 940 kg
- American bison, 900 kg
- Savannah buffalo, 860 kg

The pygmy or dwarf hippopotamus is much smaller with a mean adult body mass of 160-190 kg for cows and 200-280 kg for bulls and with a mean shoulder height of 82 cm. The snout is smaller and narrower than the river hippo and the hide is bluish-black, sometimes with a dark green tinge.

Spoor

The rudimentary foot has four reduced toes, each with a flat, rounded cushion beneath. The cushions unite to form a palm under the foot and support the weight of the animal. Due to their heavy mass hippos cannot walk on the tips of their toes like antelope but walk flat-footed on the palms. This is known as plantigrade movement. Footprints measure 26x28 cm and are rounded, with three indents on the front demarcating four toes of 5x7 cm. The front spoor is larger than the hind due to the weight of the well developed fore quarters and the large head. The spoor is similar to that of the rhino although rhino spoor has only three toes compared to the four of the hippo. When walking on land hippo spoor forms two close, parallel rows of spoor divided by a 5 cm wide ridge. In contrast rhino and elephant spoor is a widely spaced, single row of prints.



Information table

Hippopotamus information table			
Characteristic		Bull	Cow
Adult body weight	kg	1 900 - 2 500	1 500 – 2 000
Adult shoulder height	cm	152	130 – 140
Sexual maturity age	years	7	3 – 4
Social maturity age (1st mating)	years	8 – 10	5 – 7
Gestation period	months		7,5 – 8,5
1st Calf born at age	years		5,8
Calving interval	months		12 – 14
Rutting season		Year round	
Calving season			Year round (peek Oct – Mar)
Weaning age	months	5 – 6	
Gender ratio: entire population (natural)		1,2	1
Gender ratio: entire population (production)		1	3
Mating ratio: adults (natural)		1	3 – 5
Mating ratio: adults (production)		1	5 – 8
Calf birth ratio		1,2	1
Maximum lifespan	years	35 – 40	40 – 45
Home range	ha	1 500 – unlimited	1 500 – unlimited
Territory range	ha	5	None
Large stock grazing unit (adult)	LSU	3,3 per animal (99% of diet)	3,3 per animal (99% of diet)
Browsing unit (adult)	BU	5,38 per animal (1% of diet)	5,38 per animal (1% of diet)
Maximum stocking load	8 animals per 1 000 ha grazing & 3 animals per 100 m river front		
Minimum habitat size required	ha	1 400	
Annual population growth	5 – 37% (mean 14%)		

Trophy

Hippopotamuses do not possess horns but have ivory tusks similar to those of the elephant and warthog. The canines of both jaws and the incisors of the lower jaw grow continuously. They are popular in the ivory trade as, unlike elephant ivory, hippo ivory does not change colour with age. The lower incisors grow forward horizontally while the lower canines grow vertically upwards in a half circle. The upper canines grow vertically downwards and are rudimentary compared to the lower canines. The river hippo has four incisor tusks and the pygmy, six.

Hippopotamus trophy records					
Rowland Ward (XXVII edition 2006)					
Minimum qualifying value = 29 ⁷ / ₈ " (75.88cm)				Measuring method 5	
Rank	Inch	cm	Locality	Year	Source
1 st	64 ¹ / ₂ "	163.83	Congo	1933	Paris Museum, Orléans
2 nd	64 ¹ / ₂ "	163.83	Kenya	1909	F.J. Jackson

3 rd	61"	154.94	Awash Reserve, Ethiopia	1933	H.A. White
4 th	54 ¹ / ₂ "	138.43	Kenya	1909	G.A. Macdonald
5 th	54"	137.16	Kenya	1933	H.H. Maharajah
Pygmy Hippopotamus (<i>Hexaprotodon liberiensis</i>); Minimum qualifying value = 5 ⁷ / ₈ "					
1 st	12"	30.48	Warri Prov., Nigeria	1943	I.R.P. Heslop
Safari Club International S.C.I.					
Minimum qualifying value = 50" (127.00)				Measuring method 4	
1 st	88 ⁵ / ₈ "	225.11		1986	M. Haindl
Confederation of Hunters Associations of South Africa CHASA					
Minimum qualifying value = 26" (66.04 cm)				Measuring method (K)	
1 st	33 ¹ / ₂ "	85.09	Zambia	1967	C.A. Ghenzi

The largest tusk trophy is not necessarily to be found in the oldest hippo as tusks are inclined to wear after reaching social maturity at an age of 20 years. The Rowland Ward Register records larger trophies from hippos in central Africa than in southern African. This difference in size is possibly due to continued, selective harvesting of large tusked bulls that has resulted in a reduction of genetic quality in the small populations of the southern region.

Habitat requirement

Permanent river systems or water rich environments such as a dams or wetlands can be considered suitable habitat for hippo. These must have deep pools with gradually sloping bottom slopes, dry sandbanks and at least a 5 km radius supply of suitable grazing. These habitats can be found from the rivers of the equatorial tropics to desert environments such as the Nile River in the Sahara, the Orange River in the Richtersveld and the Fish River in the Namib. Hippos rapidly change the structure of tall grass stands to their preferred short grass grazing.

Hippos readily move up and down watercourses between temporary pools. They climb the steep slopes of mountains and ridges to an altitude of 2 400 m in search for food and suitable habitat and may remain there for many years if left undisturbed.

In contrast, the pygmy hippopotamus prefers forest-like habitats similar to those of the bushpig *Potamochoerus larvatus*.

Behaviour

The activities of the hippo are restricted mostly to the night hours between 20:00-4:00 and feed for 7-8 hours per day. They move distances of up to 30 km with a mean of 5-8 km per night on land. Hippo roam an average distance of 3-5 km from water to a maximum of 10 km. Most daylight hours are spent lying either in the water or on dry sandbanks. Adult bulls are sometimes found asleep under thick bushes on land during midday hours, while cows and calves retreat to the water and sandbanks immediately after feeding.

When alarmed while roaming or grazing on land the hippo steamrollers without hesitation,

following the shortest route to water and will not stop or detour for anything crossing its path. Any animal finding itself between a charging hippo and its pool is in danger of being snapped in half by the hippo's enormous jaws. In the early 1970s a field ranger's truck was severely damaged when it crossed a hippo's path on the banks of the Sabi River in the Kruger National Park. During this attack the hippo's tusks shredded both the bonnet and the front wheel guards. Many campers have lost their lives or have had their camps destroyed for unknowingly camping on hippo pathways near river pools. Like rhino, hippos are readily agitated by lights and campfires and may charge without notice.

Cows with calves become extremely aggressive towards boats and attack regularly. The hippo is second to the crocodile *Crocodylus niloticus* in causing loss of human life in Africa.

Unlike the river hippo that take refuge in water, the pygmy hippo dashes into thicket forest when alarmed. The pygmy hippo is far more terrestrial in its activities than the river hippo.

Hippos are intolerant of crocodiles as they prey on small hippo calves. They are attacked aggressively, driven out of the immediate vicinity and sometimes killed. The museum at the Serengeti Park has a display of the remains of a 4 m crocodile that was halved by an angry hippo bull in the Serona River.

Several rare "hippo-savings" have been documented

- a kudu bull darted into a water pool to escape a clan of spotted hyaena; two hippos assisted the kudu, pushing it ashore with their snouts
- well known footage filmed by Dixk Reucassel in the Kruger National Park shows an impala battling for its life for 15 minutes after being pulled into the water by a crocodile. A hippo bull attacked the crocodile and pushed the impala ashore. The hippo then tried to lift the impala to its feet on two separate occasions and stood over it until the impala died of exhaustion and blood loss.

In contrast, agitated hippo bulls sometimes vent their anger on animals of other species as seen in the Shitlave Dam incident in the Kruger National Park. An adult hippo bull charged a herd of drinking eland from the water, grabbing a stranded eland calf from the mud shallows and ripping it apart. Campers must be extremely cautious as hippos have a reputation for charging from the water to attack humans on shore. This behaviour is most likely due to dominant bulls defending their territories.

Feeding & Nutrition

Hippopotami are monogastric, non-ruminant herbivores. There is no evidence to show that hippo actually feed on carcass matter although they may sniff at a carcass, pick it up and let it fall again. Their diet consists 90% of palatable, sweet grasses and 10% reeds and dicot herbs.

The most prominent grasses of the diet are: buffalo grass *Panicum maximum*, couch grass *Cynodon dactylon*, signal grass *Urochloa mosambicensis*, finger grass *Digitaria* spp, blue buffalo grass *Cenchrus ciliaris*, red grass *Themeda triandra*, the spear grasses *Heteropogon contortis*, swamp couch *Hemarthia altissimo*, jungle rice *Echinochloa puyamdalii*, turf grass *Ischaemum arcuatum* and several *Setaria* spp. The less palatable grasses *Sporobolus*, *Bothriochloa* and *Cymbopogon* are avoided. It is interesting to note that hippo do not consume most aquatic plants.

Even though the hippo is classed as a rough phase feeder consuming plant matter with high crude-fibre content, it remains a specie specific selector of palatable species with high nutrient values. The hippo is thus a partly selective roughage feeder. Short grass grazing <12 cm height is preferred, although taller grass may be consumed until the habitat has been transformed into a lawn-like stand.

Feeding takes place mostly at night and a mean of 40 kg fresh grass material, approximately 10% of its body mass, is consumed per adult hippo per night. In captivity they can be maintained on 1-1.5% of their body mass per day. The massive mouth with its bite width of 30-49 cm, takes the grass between the upper and lower lips and, with a slight sideways jerk of the head, cuts it off against the upper incisors. A grazing hippo leaves a trail like the path of a lawnmower. Agricultural lands near rivers inhabited by hippo can suffer severe damage.

Hippo in fenced ranches and enclosures readily take dried lucerne in the dry season. When environmental conditions deteriorate and food and water are not available, they often survive in muddy wallows for weeks by lowering their metabolic rates and relying on the stored body fats in the endoderm of the skin.

The 3 m long stomach has four chambers divided into two blind sacs by a septum. This fragmentation contributes to a slower digestive process than that of ruminants. This slow rate, enhanced by calm resting after rapid feeding on land at night, results in an improved digestion and absorption of ingested dietary nutrients. The hippo lacks the caecum found in hindgut digesters such as the elephant. Digestion is thus restricted to the foregut and food breakdown is mainly by means of microbe-fermentation.

Cattle benefit from having the highest digestive rate of most ruminants implying a more efficient use of food resources and thus a greater ability to survive. According to W. Van Hoven, a well known digestive physiologist, the hippo can digest cellulose fibre better than domestic cattle and can hydrolyse 16.48 g cellulose per litre rumen fluid per 24 hr compared to the 13.8 g of cattle. From this it appears that the hippo has a greater ability to utilize cellulose which gives it an edge over other ruminants.

Territory & Home range

Hippopotami are non-static and move regularly in search of alternative habitats during

annual environmental changes. This is not a true migration but rather a cyclical pattern that returns to its starting point. Due to their dependence on surface water most movement follows drainage lines and waterways although nightly movements of up to 30 km can occur between dams. As a result hippos are sometimes found in remote farm dams. One documented incident records the travels of the hippo bull, Huberta. Between 1928 and 1930 Huberta covered a distance of 1 800 km between the St Lucia Lake in northern KwaZulu-Natal and the Keiskamma River in the Eastern Cape. If the food supply is sufficient they can remain at the same location for up to eight years.

Hippo bulls are strictly territorial in the water and on the immediate adjacent shoreline. Dominant bulls in the hierarchy defend their territories against intruder males to the death. Occasionally they charge other animal species, including humans, which enter the shoreline area. Stevenson Hamilton, the pioneer field ranger of the Kruger National Park, watched a bull fight on the Sabi River that lasted four days before one of the opponents died. The victorious bull also died of infected wounds several days later.

Territory is marked by a repeated series of open mouth displays, a sideways swinging of the head in the water, short mock charges and vocal snorts. Permanent defecation middens with a diameter of 3-4 m are established along the pathways leading to the water territory and are visited daily. The dung is spread over the middens by a rapid wagging of the tail while defecating. Other members of the family and submissive lower ranking bulls in the group also use the middens of the dominant leader.

When water sources are depleted, families form temporary mass herds of up to 150 individuals and share the remaining pools. During this time the social order of the herd is disrupted, creating an enormous confusion among the dominant bulls that attack and kill the young. These aggregations break up when the last of the water has evaporated and individuals become single nomads. These nomads often die if alternative resources are not quickly found.

Territorial bulls of >20 years generally rule a shoreline of 50-200 m along small rivers and up to 500 m along large rivers and lakes. The feeding home range of hippo families on land is pear shaped, with the narrow end towards the water on the shore. The home range has an area stretching 0.4-1.2 km inland during moist seasons and up to 0, 7-2.3 km during dry periods. In an extreme drought the area can increase up to 10 km inland. This gives a varying terrestrial home range size of 40-2 500 ha depending on the ambient climate. A distinct grazing corridor of 0.5-10 km (average 3 km) wide is evident along most of Africa's the larger rivers and lakes inhabited by hippo populations.

Social structure

Hippo are semi-gregarious or semi-socialised animals living in small family groups in the water during daylight hours. At night the groups split up and roam and graze as individuals or couples that are mainly mothers and calves. Family groups consist of 5-30 individuals

although groups of 10-15 are more common. Groups generally include two adult bulls aged >20 years, one of which is dominant, five or more adult cows of >11 years, several sub-adult females of 4-8 years, 4-8 sub-adult males of 4-10 years and calves <4 years of age. The sub-dominant bull and the sub-adult males generally avoid conflict with the dominant bull by keeping to the perimeter of the family. They are not tolerated by cows.

Other non-territorial or young bulls of >10 years not associated with family groups form bachelor bull herds of 4-8 individuals that inhabit their own water pool. Bulls have two stages of dominance. The first takes place within the bachelor herd with its strict hierarchal structure and the second, as an adult competing socially for mates within the herd.

Dominant bulls tolerate sub-dominant bulls between the ages of 20-45 years providing that they remain submissive to their leadership. At the first sign of a challenge to its leadership the dominant bull immediately attacks aggressively. Territorial behaviour is restricted to the water environment and to the immediate shoreline. Social or hierarchical behaviour does not exist inland. In the water, family groups occupy the desired pools while bachelor groups tend to keep to less desirable, marginal pools. Most post-mature bulls that lose their dominance do not associate with bachelor herds again and become solitary nomads occupying smaller bodies of water.

Reproduction

Mating occurs throughout the year and calves are born at any time. There is an increase in the birth rate during the summer rainfall season with 70% of calves being born between October and March. Dominant bulls move constantly between the cows in their family groups, testing them for oestrus. The cow's urine falls onto the snout of the bull and is tested with the Jacobson-gland situated at the front of each nostril opening. This behaviour differs from the Flehmen behaviour of antelope where the urine is tasted on the inside of the male's lips. If the test proves positive, mating follows immediately and there is no prolonged courtship as with many other animal species. When testing the cow, the bull cautiously approaches her with a submissive attitude as any sudden or forceful approach causes unrest among the cows and two or more may attack him viciously.

A single calf is born after a gestation of 240 days. The cow enters shallow waters alone and the calf is born in thick vegetation such as reeds, with the lower half of its body submerged in the water and the upper half above surface. Both mother and calf re-unite with the family after 10-14 days. Suckling takes place underwater on any lactating cow of the family; the calf is not restricted to its own mother which enhances its survival when food is scarce and milk production poor.

At night, while the rest of the hippos are grazing and roaming on land, the calves form a crèche in the water that is guarded by an adult cow. They start grazing at 6-8 weeks age and wean between 4-12 months depending on the environmental conditions and the related food supply.

Depending on the environmental conditions, cows reach sexual maturity at 3-12 years with the majority falling between 6-8 years. As a consequence, the first calf is born when the mother is 4-13 years old with the majority being born between 9-11 years. The overall fertility of cows is 5% at 4 years age, 50% at 9 years, 66% at 10 years, 100% at 11 years, 90% at 26-35 years and 88% at 36-43 years. Calving interval ranges from 22-34 months. Throughout the average natural lifespan of 45 years, a cow remains actively reproductive for 15-25 years and gives birth to 8-11 offspring.

Only 50% of bulls are sexually mature at 6 years age and 90% at 15 years. The testicles are only fully developed at 12-19 years. Bulls reach social maturity and dominance after 20 years. A body mass of 770-950 kg is reached at 7-8 years, of 1 400 kg at 11 years and >2 000 kg after 20 years age.

Production

In general one of the following parameters must be met in order to sustain one viable, reproductive family group of hippo of 8-12 individuals and two bachelor groups of 4-6 males

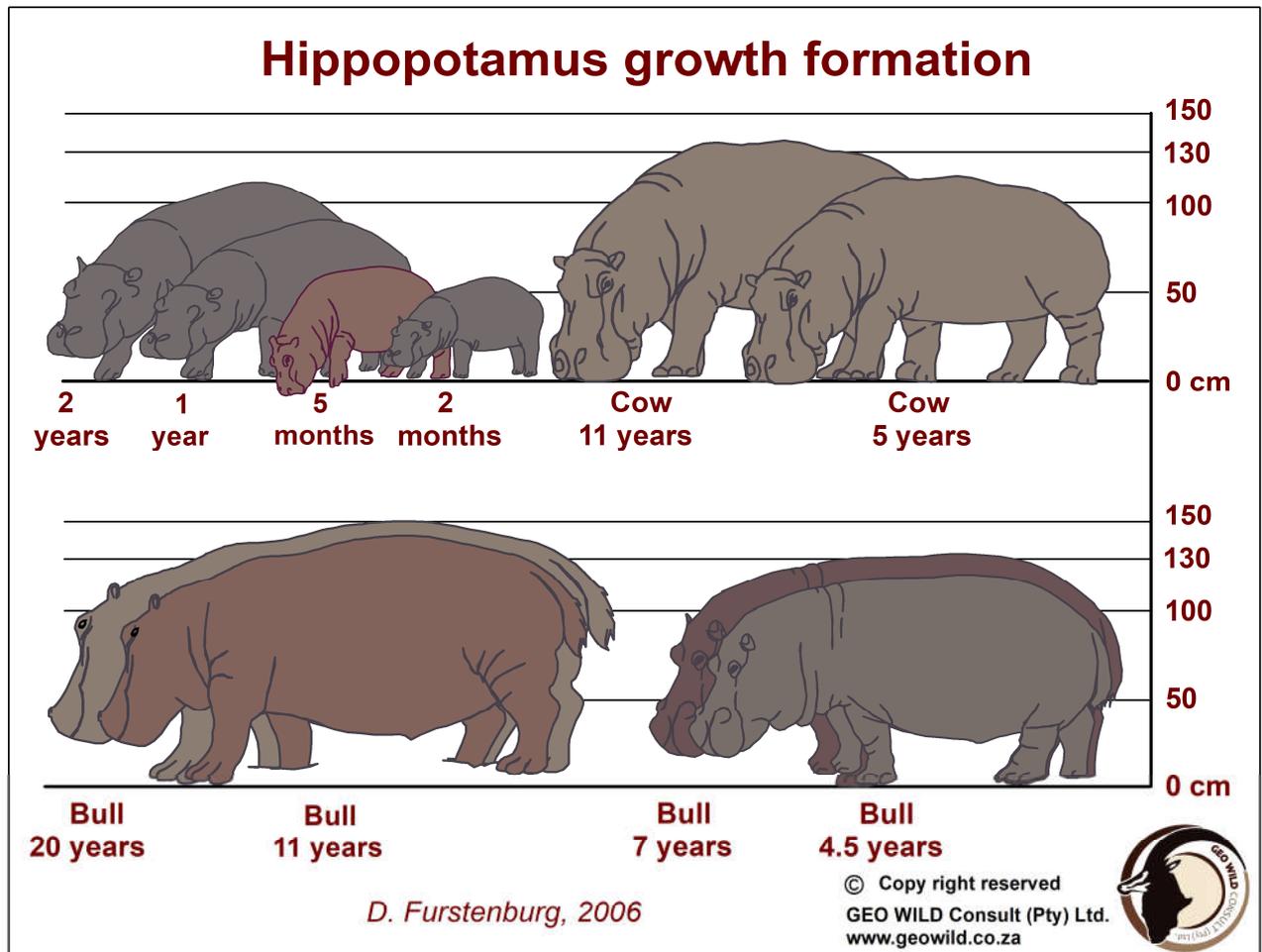
- a minimum of 2 km river water and a corridor with suitable grazing. This corridor must have a minimum width of 500 m on both sides of the river
- a minimum of at least one dam with a 1.5-2 ha permanent water, two small dams with a 0.5-1 ha permanent water each and a minimum of 2 500 ha grazing
- one large dam with >5 ha permanent water and 2 500 ha suitable habitat.

Single groups consisting of one adult bull and 1-3 family members are often kept in small remote dams on ranches. This is a recipe for disaster as there is no alternative habitat or space to support the social structure of the additional male offspring in the system. This can result in fights to the death or to the escape of hippo bulls into neighbouring grounds.

The mean natural hippo density in the wild is 7 hippos per 100 m shoreline of lakes and large dams and 3 hippos per 100 m water surface length of rivers. The maximum natural density found in the optimal habitat of the lakes in the Luangwa Valley is 22 hippo per 1 km shoreline.

The natural population growth, or breeding minus mortalities, varies from 5-37% with a long-term mean of 14%. The growth rate depends upon the availability of water pools, the abundance of the food supply and the density of hippo in the area. The growth rate is rarely affected by diseases or predation.

Growth formation



Management

Despite it being the norm for bulk roughage feeders to have little impact on veld condition, hippos have a major, destructive impact and transform the habitat to the detriment of veld conservation. They deliberately transform habitats to suit their own preferences and thick stands of grass 12-25 cm high are degraded to short lawns. Hippos are selective of deers, sweet, palatable grasses that are replaced by unpalatable, non-nutritious, increaser grass species when utilized by high densities of hippos for a prolonged period.

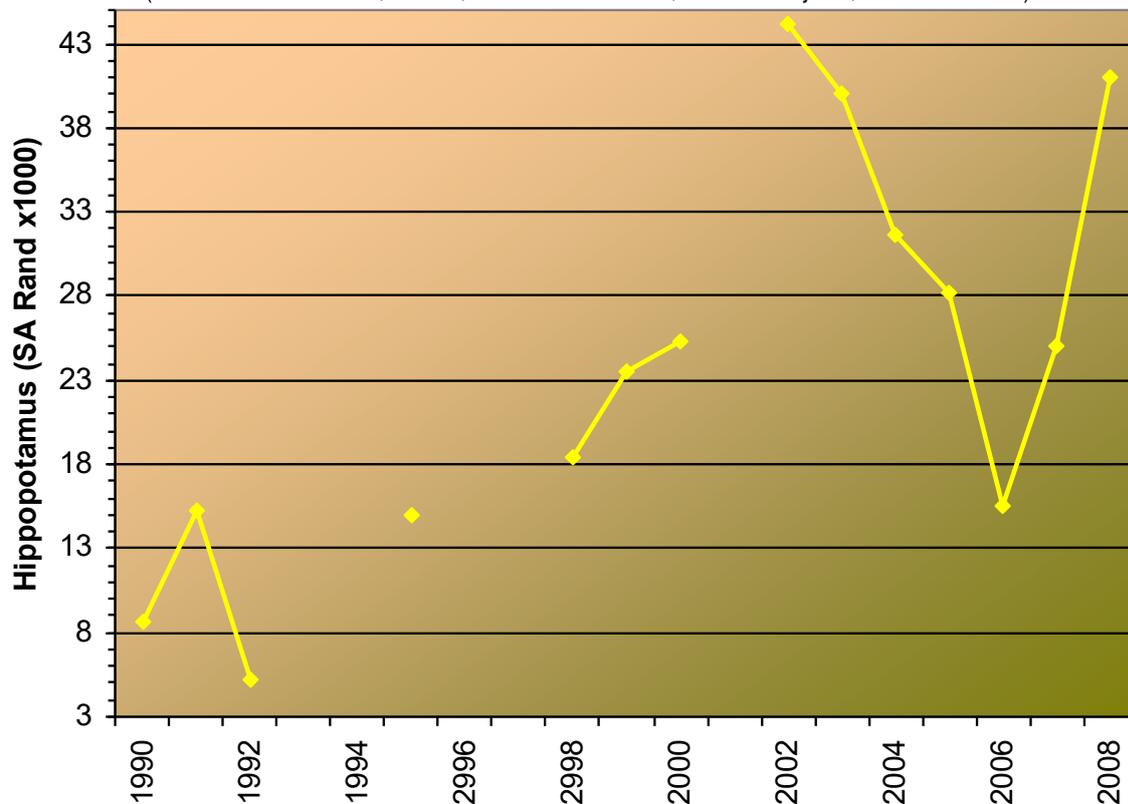
The paths that hippos follow daily are concentrated along sensitive shorelines and often cause severe donga soil erosion. Additional sheet erosion is caused by the concentrated grazing pressure on the shores and extensive trampling of the vegetation. *Acacia* and *Maytenus* bush encroachment often follows and results in further degradation of the environment. A ring or belt effect of veld degradation is evident in the habitats of hippo populations. This is seen as a gradient from the most severe degradation closest to the shore, to the least affected 10 km from the water.

The manure in the dung middens on the shores enrich the soil and assists with the re-establishment and growth of herbaceous vegetation. However, this counterbalance to soil erosion takes place too slowly to be effective.

Mean age related growth rate and development for Hippopotamus		
Age	Live body mass (kg)	% of cows that are sexually mature
Birth	30 – 40	0
4 years	380 – 520	5
7 years	770 – 950	20
9 years	900 – 1 200	50
10 years	1 000 – 1 300	66
11 years	1 200 – 1 400	100
20 years	1 800 – 1 900	96
26 years	>2 000	90
36 years	>2 000	88
43 years	>2 000	85

Trend in mean annual Hippopotamus prices

(Data from: Vleissentraal; T. Eloff, Univ. Potchefstroom; Cloete & Taljaard, Univ. Free State)



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Gallery



Photo: Johan Van der Vyver, adult hippo cowr



Photo: D. Furstenburg, hippo infant, adult cow & bull



Photo: D. Furstenburg, adult pygmy cow

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