



CONFINED GIANTS:

The Plight Of Giraffe In Zoos

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REPORT SUMMARY

- There are at least 579 captive giraffe at 103 zoos throughout North America and an estimated 800 in European zoos, including at least 150 in U.K.
- The keeping of giraffe in zoos significantly impacts the welfare of the individual animals involved and has no clear role in the overall conservation of the species.
- Born Free is therefore calling on the zoo industry to commit to the phasing-out of keeping giraffe in captivity and to focus conservation resources on the protection of giraffe populations in the wild.
- Instead of visiting and perpetuating the keeping of giraffe in zoos, Born Free encourages members of the public to support giraffe conservation in the wild.

As the world's tallest land mammal, the giraffe is a fascinating, well-known, and much-loved species, yet the suffering experienced by giraffe in zoos is rarely acknowledged.

As of 2020, there are at least 579 captive giraffe at 103 zoos throughout North America and more than 800 in European zoos, including at least 150 in U.K. The North American totals are likely even higher, as these numbers do not include giraffe kept in USDA-certified facilities including circuses, animal shows, and non-AZA accredited zoos. Unlike free-living giraffe, who form complex social relationships, many giraffe in zoos are deprived of this opportunity, and in several cases live alone or with just one other individual.

Captive giraffe are confined to enclosures that are a tiny fraction (typically <1%) of their average wild home range and are all too often bare and simplistic. Because giraffe cannot maintain their body heat in temperatures below 50 degrees Fahrenheit (10 degrees Celsius), they must be kept inside a heated barn for most of the winter months, thus further reducing their already significantly too-small living spaces.¹

Lameness, trauma, and nutritional diseases are common problems for captive giraffe, alongside behavioral disturbances. Most giraffe in zoos suffer reduced longevity.

These complex, social, wide-ranging, browsing animals are not suited to a life in zoos, and the role of zoos in the overall conservation of the species remains highly questionable.

Born Free is calling on zoos to commit to the phasing-out of keeping giraffe in captivity and urging zoos and members of the public to instead support giraffe conservation in the wild.

MARIUS'S STORY

February 2022 marked the eighth anniversary of the death of Marius, a healthy two-year-old, male, reticulated giraffe (*Giraffa camelopardalis reticulata*) who was born and spent his short life at Copenhagen Zoo, in Denmark.

Like all giraffe housed in zoos that are members of the European Association of Zoos and Aquaria (EAZA), Marius was part of a captive giraffe population managed by the EAZA breeding program (EEP). The stated aim of the giraffe EEP is to establish and maintain a viable and sustainable population of the different subspecies of giraffe in Europe.² With the support of the giraffe EEP, Copenhagen Zoo made the decision to kill Marius, as his genes were already represented in the EEP giraffe population and there was limited space available for young, male giraffe in EAZA-member zoos.^{3,4}

Despite protests and offers to rehome Marius (a giraffe of an Endangered subspecies), he was shot dead in February 2014, and his body was publicly dissected before parts were fed to the zoo's carnivores.^{3,5} Born Free spoke out widely, condemning the decision to kill Marius and calling for a review of policies allowing the killing of healthy animals in zoos. While Marius' death made headlines, dozens of others have died as a direct result of their captivity. A small number of stories from U.S. zoos can be found below:

November 2010: A three-year-old female giraffe named Akilah died at the Cincinnati Zoo & Botanical Garden in Ohio after her horns became caught in netting.

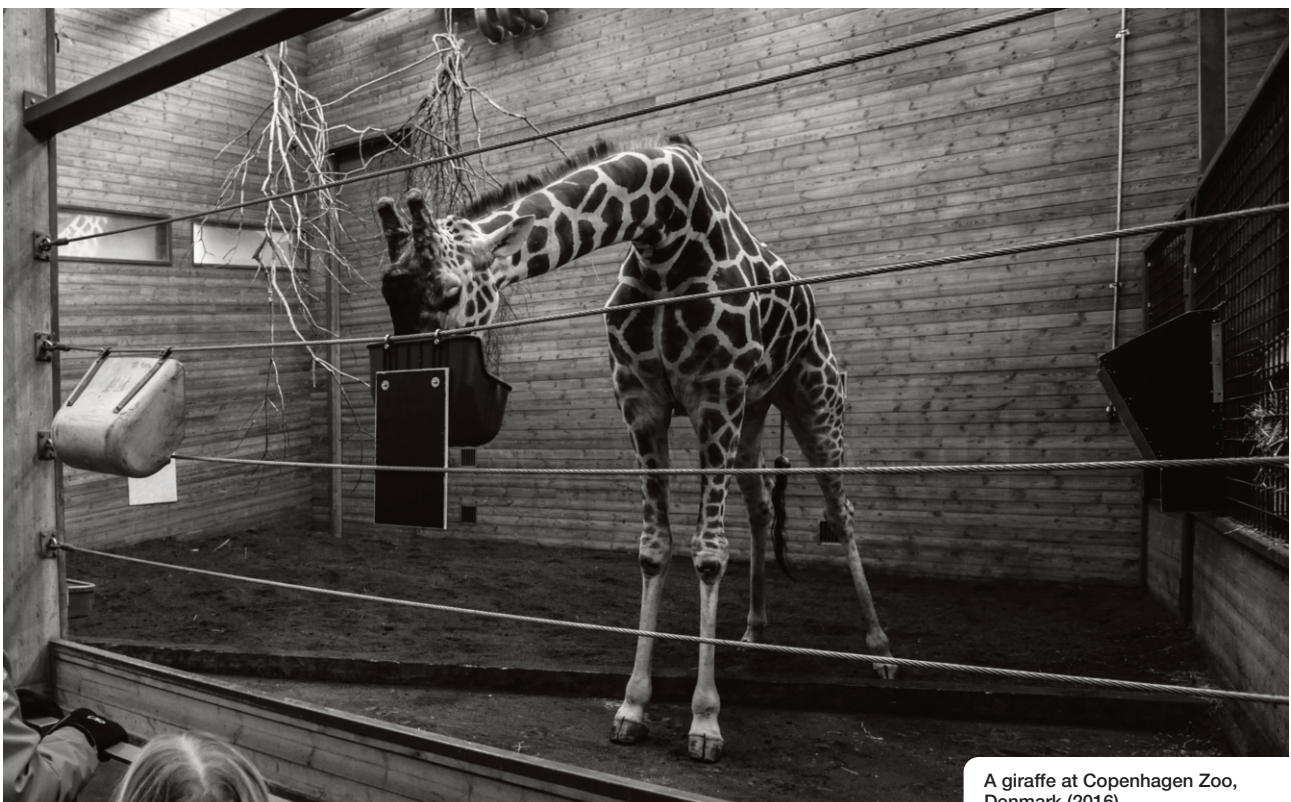
June 2010: A three-year-old male giraffe died at the Peoria Zoo in Illinois in front of visitors after his head and neck got caught in the fork of a tree. He flipped over in attempts to free himself.

July 2015: A three-month-old giraffe died at the Dallas Zoo in Texas when she ran into the perimeter of the enclosure and broke three vertebrae in her neck.

October 2015: A one-month-old giraffe died at the Fresno Chaffee Zoo in California from neck trauma after becoming entangled in a wire barrier.

January 2016: An eight-month-old giraffe named Wesley was euthanized after getting his head lodged between two posts at Zoo Miami in Florida. When he realized he was stuck, he panicked and his legs bucked from under him, causing a spinal injury.

March 2017: Jamili, a nine-year-old female giraffe, was found unresponsive at the North Carolina Zoo after becoming entangled in a toy-like piece of equipment.⁶



A giraffe at Copenhagen Zoo, Denmark (2016).

THE GIRAFFE POPULATION IN EUROPEAN AND NORTH AMERICAN ZOOS

There are at least 579 captive giraffe at 103 zoos throughout North America and more than 800 in European zoos, including at least 150 in the U.K. Unlike free-living giraffe, who form complex social relationships, many giraffe in zoos are deprived of this opportunity, and in several cases live alone or with just one other individual.

The International Union for Conservation of Nature (IUCN) lists giraffe as Vulnerable with a decreasing population trend, with up to a 40% population decrease observed since 1990. The main threats to free-living giraffe include habitat loss (primarily through deforestation and encroachment) and poaching. About 68,000 individuals remain in the wild today.⁷

The “Species Survival Program” (SSP) for giraffe (termed The Association of Zoos and Aquariums (AZA) Antelope and Giraffe Advisory Group) manages the captive population of giraffe throughout North America. The AZA giraffe studbook⁸ represents both the generic giraffe and the Masai populations. The generic giraffe population primarily includes (but is not limited to) the reticulated, Rothschild’s, and hybrid subspecies.

As of 2005, the main subspecies of giraffe in the EEP giraffe population were the Rothschild’s giraffe (230), and the reticulated giraffe (101); a further 138 animals were hybrids of two or more subspecies, a result of previously poor subspecies management.² The main goal of the EEP, outlined in 2006, was to establish and maintain a viable and sustainable population of the different subspecies of giraffe in Europe, to have giraffe of known subspecies only, and to phase-out hybrids.² The EEP also stated that as no zoo board will accept an empty giraffe enclosure, the short-term goal was to keep the existing facilities filled with giraffe; after this, new facilities could be stocked.¹ But to what end?

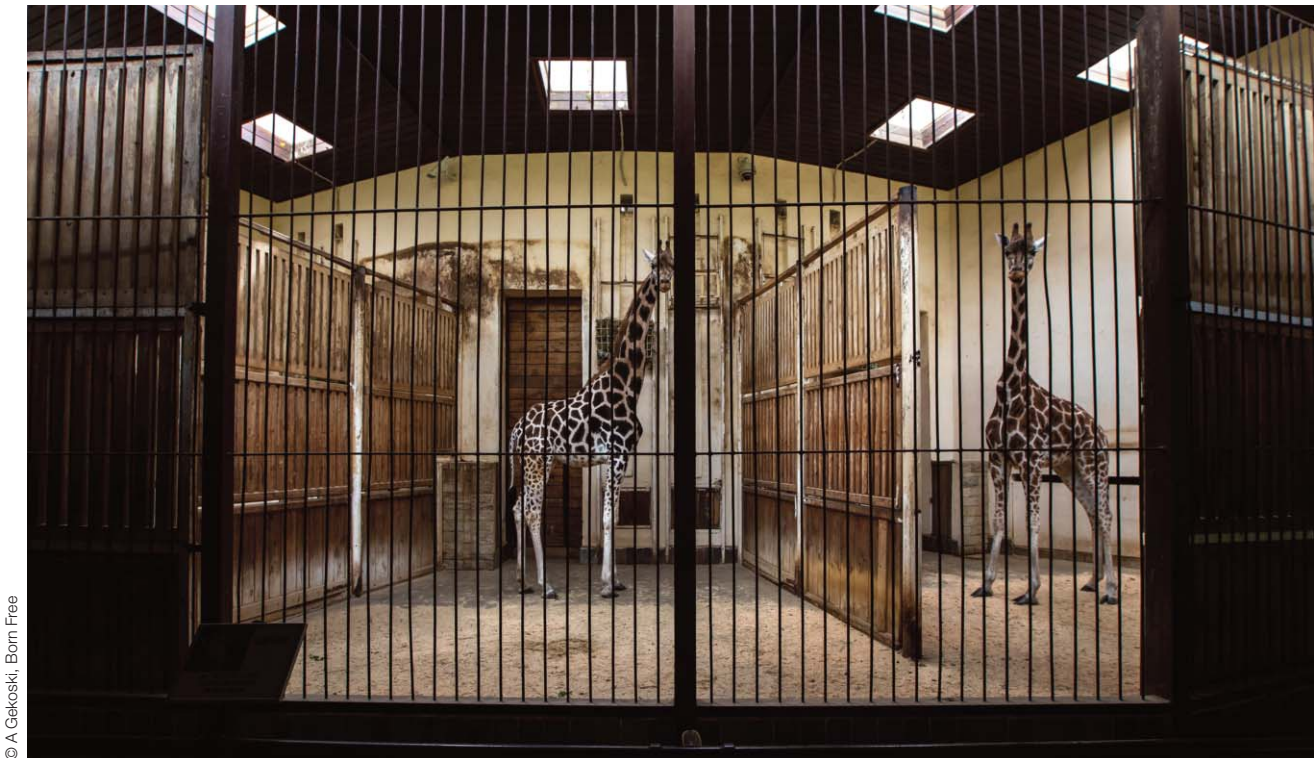
Highlighting similar failures to maintain genetic viability on the other side of the Atlantic, a study conducted in 2004 compared the genetic diversity of free-living giraffe populations throughout Sub-Saharan Africa to captive North American populations. While the genetic variance between the free-living giraffe in southeastern Kenya and those in captive populations in North America classified as Masai were in agreement, they discovered that the captive reticulated and Rothschild’s subspecies were largely not in agreement with the wild subspecies representatives. The low genetic differentiation observed in the captive populations suggested that the founders of the captive populations were misclassified. Therefore, any misclassified founders and all following offspring would produce hybrids not genetically viable for “reserve populations.”⁹ As in Europe, these results indicate poor subspecies management, and directly conflict with the goals of the SSP. A solution, according to the AZA Taxon Advisory Group (TAG) Regional Collection Plan, is killing. The SSP euphemistically refers to this practice as “humane euthanasia:” a “management tool that may be practiced to ensure that the population remains genetically and demographically healthy for the long-term.”¹⁰ But “euthanasia” correctly refers to the humane killing of an animal to relieve suffering, not the killing of perfectly healthy animal, unwanted by the industry that deliberately bred them into existence.

Potential roles that zoo breeding programs might serve in terms of the conservation of a species have been categorized as: 1) Addressing the causes of primary threats; 2) Offsetting the effects of threats; 3) Buying time; and 4) Restoring wild populations.¹¹ None of these have been clearly demonstrated as an outcome by either the EEP or SSP giraffe programs.² While it could be argued that the keeping of giraffe in zoos may be buying time, holding an “insurance” population of giraffe in zoos was not identified as a current or required conservation action in the IUCN Red List Assessments of any of the eight giraffe subspecies that have been assessed.^{11,13-18} Considering the restoration of wild populations, the West African giraffe (*Giraffa camelopardalis* ssp. *peralta*, a subspecies kept in relatively small numbers in zoos) is the only giraffe subspecies for which reintroduction has been identified as a required conservation action in its IUCN Red List Assessment.^{2,17} Reintroduction of this subspecies has been achieved to date through translocation of individuals within Niger in Africa, not through reintroduction from zoos.^{17,19} The zoo industry has previously acknowledged that a possible goal of reintroducing animals from the captive population to the wild seems very unlikely, given practical and financial constraints.²

Another potential role proposed by zoos of keeping giraffe in zoos in the overall conservation of the species is the establishment of an education and awareness program.¹¹ It has been suggested that captive giraffe in zoos may act as “ambassadors” for free-living giraffe, reaching large audiences to raise awareness of their decline across Africa and threats faced in the wild.²⁰ The IUCN has called on all donors and partners to raise global and local of giraffid declines, conservation needs, and funds for key actions.¹⁵ However, raising awareness does not require the use of captive giraffe and using captive giraffe for this purpose has significant welfare implications, given the overwhelming evidence of the negative impacts of captive keeping on giraffe welfare (see Our Five Main Welfare Concerns on pages 5-10). Targeted awareness campaigns and learning interventions, highlighting the decline of giraffe and their conservation needs, could be developed and delivered without keeping giraffe captive in zoos.

While the keeping of giraffe in zoos does not demonstrate a clear, positive impact on the overall conservation of the species, the negative impacts on the welfare of the individual animals involved are all too evident. In the following section, we outline our five main welfare concerns and why we are calling on zoos to phase-out the keeping of giraffe in captivity.

OUR FIVE MAIN WELFARE CONCERNS:



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1. SOCIAL DEPRIVATION

Like dolphins, chimpanzees, and elephants, free-living giraffe live in complex fission-fusion societies.^{22,23} These societies are characterized by the formation and dissolution of groups (herds) within a larger, stable community.²⁴ Herd sizes can be as large as 175 individuals, with an average herd size of three to nine individuals.^{17,19} Free-living giraffe alter their herd size when local environmental conditions change, such as food availability.^{23,26}

Age, sex, relatedness, and social preferences also shape free-living giraffe herds. Wild sub-adult males form bachelor herds with dominance hierarchies, while adult males are frequently observed alone, but can also be found in bachelor herds and mixed-sex, female-dominated herds.^{23,24} Wild female giraffe spend most of their time in a herd and form particularly complex social relationships.²¹ Females become more sociable as they reach adulthood; show both preferred and avoided relationships with other females; prefer herds with other females and close relatives; have long-term relationships with other females spanning many years; and form strong associations between mother and offspring that persist for years.²⁷⁻²⁹ Females with offspring also form nursery groups and maintain stronger associations than females without offspring, while nursery group calves still maintain strong associations with nursery group members when they are juveniles.

In stark contrast, the opportunities for giraffe held in zoos to form complex fission-fusion societies are severely limited. On average, North American zoos participating in the AZA currently hold 5.6 giraffe per facility (min: 1, max: 23). We found that 36 zoos reported holding three or fewer giraffe (totaling 35% of all AZA zoos that keep giraffe); 12 zoos held two giraffe; and two zoos held only one giraffe (the Erie Zoological Gardens in Erie, PA, and the New Zoo in Greenbay, WI).³¹

Further, female giraffe have previously demonstrated a limited ability to form both preferred and avoided relationships with other females. One zoo, Zoo de Granby in Quebec, Canada, held one female only pair.

The culling of Marius at Copenhagen Zoo at just two years old, and the explicit statement that killing giraffe is a viable and acceptable “management practice” in North America, highlights the lack of opportunity for captive giraffe in zoos to maintain the strong mother-offspring relationship observed in free-living giraffe. Wild male and female calves typically remain co-resident in the area with their mothers for approximately seven years, but male calves in zoos can be removed from their family group around the age of 18-24 months, depending on the individual, to prevent fighting, while female calves are removed from the family group at sexual maturity (which can be as early as two years) to prevent inbreeding.^{2,9,27}

It is not possible to provide giraffe with the opportunity to form complex fission-fusion societies in the vast majority of zoos given the limited capacity of zoos to house large communities of giraffe in a complex landscape. We call on zoos to commit to phasing-out the keeping of these highly complex social animals in captivity.

2. ENVIRONMENTAL RESTRICTIONS

Free-living giraffe range over large areas. On average, they spend approximately one third of their day walking, and reported mean home range sizes vary between 1,326 acres and 127,012 acres.^{33,34} This contrasts starkly with the shockingly small enclosures that house giraffe in zoos.

In a study conducted by the Animal Protection Consultancy, which calculated the absolute minimum home range size based on body mass in several animal species, it was determined that this area for giraffe is 19,200 acres. Among the 35 North American zoos that have their giraffe enclosure sizes publicly available, the average enclosure size is 1.2 acres, or less than 0.01% of the minimum home range size calculated for giraffe. This is the equivalent of a human living with a home range size of 247 acres being confined to a telephone booth for their entire life.³⁵ Several zoos also house giraffe with other species, including zebra, impala, ostrich, and other African hoof stock that further limits their space. The Los Angeles Zoo has the smallest giraffe enclosure size of the 35 zoos that house giraffe, with just 0.17 acres available to the giraffe. Even the four largest zoos in North America do not provide adequate space. The Henry Doorly Zoo & Aquarium provides just 5.7 acres, the Bronx Zoo provides 2.06 acres, and the San Diego Zoo provides 0.22 acres. The largest giraffe enclosure is found at the Columbus Zoo, but it is still only 12.6 acres in size – 0.065% of the average minimum natural range.

In a survey of EEP facilities housing giraffe in 2004, the average size of the outdoor enclosure for giraffe in the 70 facilities that responded was 0.64 acres, equating to a tiny fraction (0.0005-0.05%) of the average home range size of free-living giraffe.^{34,36} In 2013, Munich Zoo, Germany, opened a new Giraffe Savannah exhibit, providing only 1.24 acres of accessible space for the giraffe (equivalent to only 0.001-0.1% of the average wild home range size),^{34,37} Even if the U.K.'s largest zoo, ZSL Whipsnade Zoo, was able to provide giraffe with the entire space of the zoo site (593 acres), this would still be less than half the size of the smallest average free-living giraffe home range.³⁴

Given the limited size of zoos, it is not possible to provide these wide-ranging animals with the space they need to perform natural ranging activity. Restricted space impacts negatively on health: insufficient exercise has been linked with overgrown hooves in zoo-housed giraffe (see 4. Compromised Health) and stereotypic pacing is more likely if indoor enclosures are smaller (see 5. Stereotypic Behaviors).³⁸⁻⁴⁰

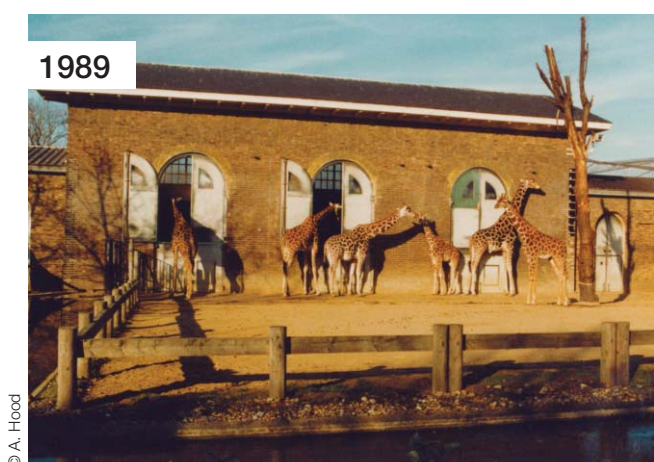


Very small outdoor giraffe enclosure at Dudley Zoo, U.K. (2016).

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The giraffe enclosure at Bioparco di Roma, Italy. The small, bare enclosure has only been enlarged from 350m² to 1,700m², providing giraffe with just a tiny fraction (0.0003-0.03%) of their average home range size. Other renovations have focused on recovery of the unusual building architecture and provision of public viewing and educational spaces.



The giraffe enclosure at ZSL London Zoo, U.K. Giraffe currently live in the same house as they did when giraffe were first brought to the zoo almost 200 years ago. The enclosure remains small and bare.

As well as being severely restrictive in size, zoos present several other environmental challenges for giraffe. Giraffe are adapted to tropical climates, having evolved across southern and eastern Africa, with smaller isolated populations in west and central Africa.⁴² In the temperate climates found in most of Europe and North America, giraffe need their outdoor access restricted when temperatures drop, because prolonged exposure to cold temperatures can cause frostbite and considerably increase energy requirements to maintain normal body temperature.^{2,37} In locations with colder fall and winter months, giraffe may be confined to their indoor barns, which provide significantly less space than their outdoor enclosures, for the majority of these seasons, which may exceed five months of the year if the temperatures do not exceed 50 degrees Fahrenheit.

The complexity of the wild environment is not replicable in zoos. Giraffe are most often found in savanna/woodland but have adapted to a variety of habitats, ranging from savanna/woodland to desert.³³ Their movements through the landscape are influenced by a combination of environmental factors such as season, rainfall, and vegetation density.³⁴ In contrast, giraffe in zoos typically live in simplistic and barren enclosures. Typical enclosure furnishings include water and food stations, rubbing posts (e.g., trunks of dead hardwood trees to which small amounts of browse may be affixed), various ground substrates including soft bedding, and some form of outdoor sun/wind shelter, which may just be walls, a shed, or trees, which are often protected from damage by a barrier or wire netting.^{1,28} In many cases, these simplistic environments have changed very little over time (e.g., see images above). Lack of recent environmental change has been linked to stereotypic pacing (see 5. Stereotypic Behaviors).³²

The captive environment for zoo-housed giraffe can and should be enhanced through enrichment, in particular provision of browse enrichment and complex feeders which increase the amount of tongue manipulation required by giraffe to obtain food and may reduce stereotypic behaviors (see 5. Stereotypic Behaviors).^{37,38} However, enrichment is no replacement for the vast and complex environments that giraffe naturally inhabit. Giraffe in zoos remain severely restricted in their ability to fulfil natural ranging and browsing behaviors (see 3. Inadequate Nutrition).^{27,39,40} We call on all zoos to commit to the phasing-out of the captive keeping of these wide-ranging animals, adapted to life in complex, natural environments.

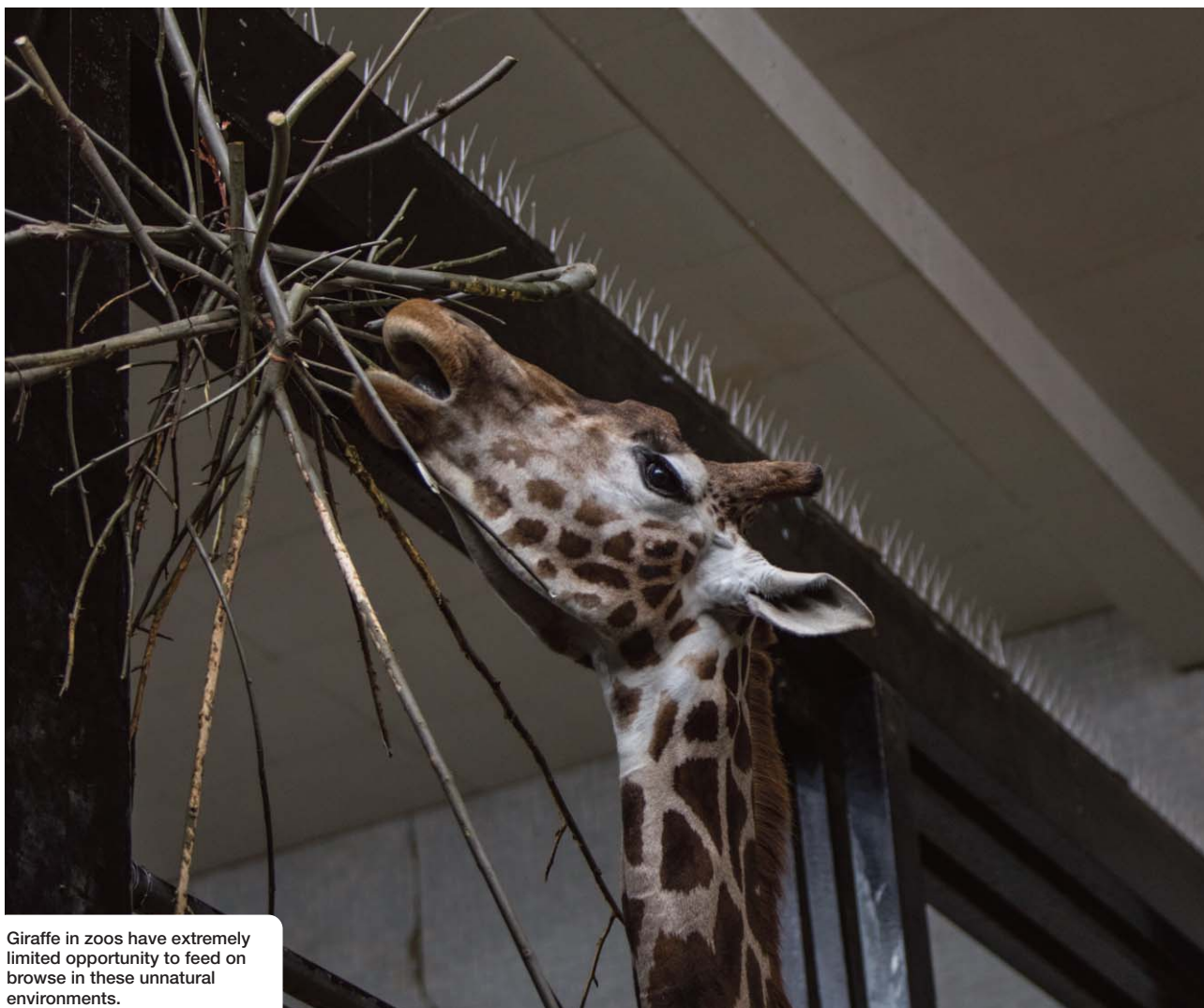
3. INADEQUATE NUTRITION

Giraffe naturally spend most of their day feeding (on average 72.4% and 55.4% of daylight hours for adult females and males, respectively) and rumination is their dominant activity at night.⁴⁷ They are browsers, feeding predominantly on the leaves and stems of trees and shrubs, and consuming smaller, variable amounts of climbers, herbs, flowers, fruits, and bark.^{47,49} All giraffe populations concentrate their feeding on a core of specific plant species, but also supplement their diet with numerous other species of plant.^{48,49} In zoos, it is not feasible to provide giraffe with a large amount and variety of browse; therefore substitute food items must be provided.⁴⁸ This often results in compromised health and welfare.

Many nutritional diseases have been reported in giraffe housed in zoos, including serous fat atrophy or acute mortality syndrome, abnormal tooth wear and other dental diseases, phytobezoars (accumulated masses of indigestible plant material that can become trapped in the gut), rumen acidosis (which may also contribute to laminitis and oral stereotypic behavior), rumenitis, and foreign body ingestion.^{2,48,50} At least 48% of giraffe were in poor to emaciated body condition at the time of death in one survey of zoos in the giraffe EEP, and no definitive diagnosis of the underlying problem was reached in many of these cases.⁵⁰

The EEP made recommendations to improve the diets of zoo-housed giraffe in 2006.¹ By 2016, although several improvements were noted, inappropriate foods such as cereal grain products and produce (fruit and vegetables) were still being fed in 33% and 85% of zoos respectively.⁴⁰ Even if dietary recommendations are met in zoos, substitutes for the natural diet merely aim to meet requirements and the species' digestive capacity to the greatest possible extent and prevent pathological consequences or behavioral disturbances.⁴⁸ Zoo-housed giraffe will still be deprived of the opportunity to spend most of their day performing the one behavior they have evolved to spend most of their time doing in the wild: browsing trees and shrubs.⁴⁷ The absence of research investigating nutrition-related diseases among captive giraffe in North America and the failure to correspondingly update existing diet regulations in the AZA Animal Care Manuals further highlights the inability of zoos to streamline the captive care of giraffe and prioritize their individual welfare.

We call on zoos to commit to the phasing-out of the captive keeping of these browsing animals, adapted to foraging and consuming a varied, browse diet.



Giraffe in zoos have extremely limited opportunity to feed on browse in these unnatural environments.

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A survey published in 2006 showed that 54% of giraffe groups in the giraffe EEP had at least one case of overgrown hooves, laminitis, joint problems, or a combination of these.

4. COMPROMISED HEALTH

Giraffe suffer from a number of captivity-associated health problems. As well as nutritional disease (outlined above), lameness is frequently reported in zoo-housed giraffe.³⁹ The most common causes of lameness include hoof overgrowth, arthropathies (particularly arthritis), fractures, and laminitis.³¹ In a survey of zoos in the giraffe EEP published in 2006, 54% of giraffe groups reported at least one case of overgrown hooves (47% of facilities), laminitis (14%), joint problems (35%), or a combination of these.³⁹ Various aspects of captive husbandry are thought to contribute to the development of overgrown hooves, including insufficient exercise, nutritional imbalances, inappropriate enclosure substrates, and trauma.^{37,38} Suboptimal diet is likely a factor in the development of laminitis; in a survey of zoos in the giraffe EEP, giraffe in facilities that reported laminitis cases were fed higher proportions of easily digestible feeds in the diet (bread, pure grains, fruits, vegetables) than giraffe housed at facilities that did not report laminitis.³⁶ Although the cause is not understood, arthritis appears to occur from a particularly early age in captive giraffe; in one U.S. zoo that evaluated the feet of its entire herd of 22 giraffe with radiographs, all giraffe over seven years had osteoarthritis in at least one digit, and evidence of osteoarthritis was also found in one digit of a five-year-old giraffe.⁵¹

Giraffe in zoos commonly suffer from trauma involving entrapment, entanglement, slips, and falls.⁵² Trauma has been recorded as one of the most common causes of giraffe deaths in zoos, both historically and in recent years.⁵² In a review of 83 post-mortem reports from 14 European zoos participating in the giraffe EEP between 1962-2003, six cases of traumatic fractures of the skull or neck were reported.⁵⁰ Giraffe in zoos have died after their horns became entangled in hotwire, fencing, and enrichment devices, and giraffe have hung themselves in the crooks of trees, on pulley ropes used to open stall doors, and in the supports of a shade structure.⁵²

The longevity of many giraffe in zoos does not even come close to the maximum reported longevity of giraffe in the wild (40 years).⁵³ In a review of post-mortem reports from European zoos participating in the giraffe EEP between 1962-2003, three animals were below one year of age at the time of death.⁵⁰ Of the 56 giraffe that were known to be over one year old at the time of death, 77% had died at less than 15 years of age.⁵⁰

Data in the 2020 AZA studbook⁸ dates back to the first documented giraffe in 1945, and logs almost 9,800 individuals in total (1,195 of these individuals, or 12.2% of all entries, were marked as “Lost to Follow-up” or main life events were otherwise unclear, indicating that their age, location, and complete transfer history at the time of death are unknown). Among the remaining 8,605 individuals with known life histories, the average life expectancy was 8.3 years (39.5% of their natural lifespan), and 703 individuals died before they reached the age of two years (8.2% of the total). On average, that is equivalent to 9.25 giraffe under two years of age dying each year from 1945 to 2021. Therefore, in North American zoos, captive giraffe live 12.7 fewer years than their wild counterparts, who typically live up to about 21 years of age.⁵¹

In terms of captive rearing, the 2011 AZA studbook indicates that just 55% of hand-raised giraffe lived more than one year and only 54% of fostered giraffe lived more than one year. These high mortality rates may be attributed to a relatively high frequency of inbreeding and unnatural captive rearing techniques.⁵²

The AZA studbooks also indicate that at least 889 giraffe (10% of the total) were transferred once or more during their lifetimes: 350 giraffe were transferred once; 265 were transferred twice; seven were transferred three times; 160 were

transferred four times; 85 were transferred three times; 18 were transferred five times; and 6 were transferred seven times. Zawadi, a male giraffe born in 2002, experienced the highest number of transfers during his lifetime: eight. He was transferred multiple times during the same year on three separate occasions: twice in 2006, twice in 2009, and three times in 2013. At the minimum, he spent 82.5 hours in transit and traveled over 5,200 miles. He died at the age of 13.⁸

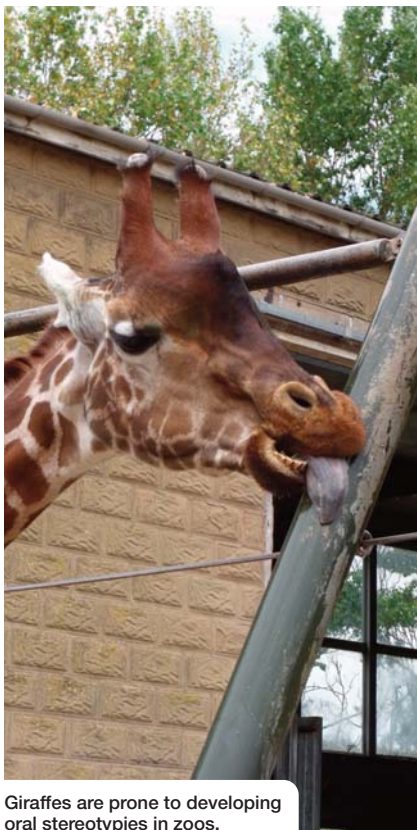
Given the significant captivity-associated morbidity and mortality reported in giraffe housed in zoos, we call on zoos to commit to the phasing-out of keeping giraffe in captivity.

5. STEREOTYPIC BEHAVIOURS

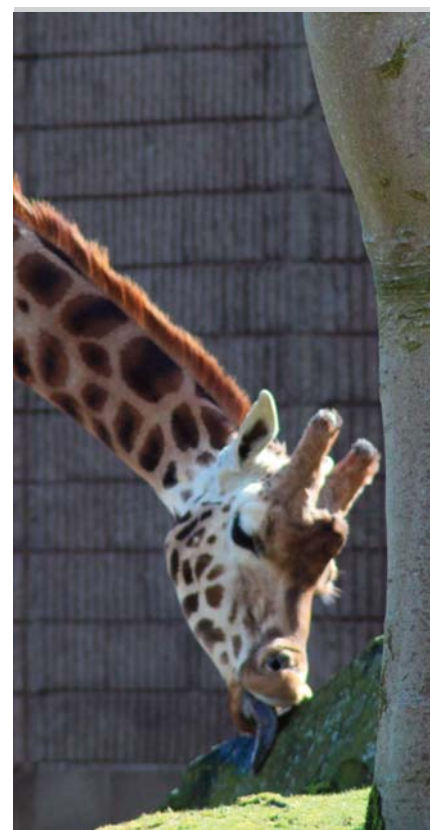
Stereotypic behaviors are repetitive behaviors observed in captive animals that are induced by frustration, repeated attempts to cope, and/or central nervous system dysfunction frequently linked to poor animal welfare.⁵⁶ Giraffe are prone to stereotypic behaviors in captivity, particularly oral stereotypic behaviors involving the tongue.⁵⁶ In a survey of AZA accredited North American zoos, 79.7% of 214 giraffe showed stereotypic behavior, most commonly repetitive licking of non-food objects and pacing.⁴⁰ Other reported stereotypic behaviors were self-injury, head tossing, and tongue playing.⁴⁰ The giraffe EEP stated in 2006 that giraffe develop behavioral disturbances in almost every zoo and it has been estimated that giraffe and okapi together represent the species with the largest total number of animals affected by stereotypic behaviors in the global zoo animal population.^{2,56}

Researchers have investigated potential causes of stereotypic behaviors in giraffe. Given that zoo-housed giraffe are unable to spend most of their day using their tongue to browse trees and shrubs, as they would in the wild, it is unsurprising that several factors associated with oral stereotypic behaviors are related to food type and foraging.^{40,48} Giraffe fed browse, additional meadow hay or more roughage; provided with food in closed or slatted-top feeders (requiring more work from giraffe to obtain food) or complex feeders that require tongue manipulation to access food; and animals that spent more total time engaged in feeding behaviors were less likely to show oral stereotypic behaviors.^{40,56-59} Environmental and social factors also play a role. Giraffe were more likely to show oral stereotypic behaviors during periods of colder ambient temperature.⁵⁶ Oral stereotypic behaviors were also more likely if giraffe had access to members of their own species at night, perhaps due to increased competition for resources such as food in indoor housing.⁴⁰ If they were hand-reared, giraffe were more likely to show oral stereotypic behaviors when observed by humans.⁶¹ Stereotypic pacing has been associated with factors relating to the environment and feeding: animals that had larger indoor enclosures; were exposed to environmental change in the past year; and were provided with browse enrichment at night were less likely to pace, while animals were more likely to pace if fed concentrated chow.^{40,46}

These findings indicate that stereotypic behaviors have a complex, multifactorial origin in zoo-housed giraffe, relating to how they are fed, housed, and socially grouped in captivity. The alarmingly high prevalence of these abnormal behaviors points to the conclusion that these complex, social, wide-ranging, browsing animals are not suited to a life in zoos.



Giraffes are prone to developing oral stereotypies in zoos.



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WHAT CAN BE DONE TO END THE SUFFERING OF GIRAFFE IN ZOOS AND PROMOTE GIRAFFE CONSERVATION IN THE WILD?

- **Born Free calls on zoos to commit to the phasing-out of keeping giraffe in captivity.**

A zoo is no place for giraffe, where these complex, social, wide-ranging, browsing animals are subjected to a life of social deprivation, environmental restrictions, and inadequate nutrition, and as a result, frequently suffer compromised health and develop stereotypic behaviors. The keeping of giraffe in zoos significantly impacts the welfare of the individual animals involved and has no clear role in the overall conservation of the species.

A strategic and humane phase-out of giraffe in zoos would require careful planning. An end to breeding would be a first step, as not adding to the captive population would mean that over time, as animals die ‘naturally’, the captive population would start to shrink. To improve the welfare of giraffe remaining in captivity, the social grouping, environment, nutrition, health, and stereotypic behaviors of giraffe should be assessed at each zoo and changes made to improve the lives of individual animals. Where appropriate, this may involve consolidating animal collections to provide more appropriate social grouping and to house remaining giraffe within the largest, most complex environments available.

- **Born Free urges zoos to focus conservation resources on the protection of giraffe populations in the wild.**

Alongside the phasing-out of keeping giraffe in zoos, conservation efforts and resources should be focused on giraffe conservation in the wild. The giraffe is a threatened species in the wild and the population sizes, trends, and extinction risk of the different giraffe subspecies vary widely.³⁴ The subspecies at highest risk of extinction are the Kordofan giraffe (*Giraffa camelopardalis* ssp. *antiquorum*) and Nubian giraffe (*Giraffa camelopardalis* ssp. *camelopardalis*), both categorized as Critically Endangered, followed by the Masai giraffe (*Giraffa camelopardalis* ssp. *tippelskirchi*) and reticulated giraffe (*Giraffa camelopardalis* ssp. *reticulata*), both categorized as Endangered. The Thornicroft's giraffe (*Giraffa camelopardalis* ssp. *thornicrofti*) and West African giraffe (*Giraffa camelopardalis* ssp. *peralta*) are categorized as Vulnerable, while the Rothschild's giraffe (*Giraffa camelopardalis* ssp. *rothschildi*) is categorized as Near Threatened and the Angolan giraffe (*Giraffa camelopardalis* ssp. *angolensis*) as Least Concern. A valuable application of available conservation inputs (such as funding, time, knowledge, and other resources) would be the conservation action and research needs identified for the threatened giraffe subspecies in their IUCN Red List Assessments. The IUCN has specifically called for increased fundraising and capacity-building for management and monitoring of giraffid range state protected areas and for help to restore the integrity and security of threatened protected areas in the ranges of giraffe.¹⁵ Some zoos already contribute to the conservation of giraffe in the wild through specific research projects in Africa and through collaboration with, and provision of resources to, NGOs, working groups, and governments in Africa. However, this work does not require giraffe to be kept in zoos. Conservation efforts and resources should be focused on the protection of free-living giraffe populations and zoos should commit to the phasing-out of keeping giraffe in captive collections worldwide.

- **Instead of visiting and perpetuating the keeping of giraffe in zoos, Born Free encourages members of the public to support giraffe conservation in the wild.**

Every person has the power to make a positive impact on the lives of giraffe. Giraffe in many zoos suffer from social deprivation, environmental restrictions, inadequate nutrition, compromised health, and stereotypic behaviors. Members of the public could show that they do not support the keeping of giraffe in captivity by writing to their local zoo, press, and lawmakers to express their concerns.

Members of the public can have a direct impact on the conservation of giraffe by supporting giraffe conservation in the wild. Giraffe are threatened in the wild and have experienced a species-level population decline of 30-40% in the number of mature individuals across their range in Africa over 30 years (1985-2015).³³ By supporting the conservation of free-living giraffe, members of the public will be helping to protect the species from extinction.

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