# ELEPHANTS IN ZOOS

## A LEGACY OF SHAME

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BORN FREE USA

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Unless otherwise stated, data used for analysis was extracted from www.elephant.se, 01 November 2021

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## COVER STORY

Billy the elephant, born in the wild in 1985, spent several years as a performing elephant, and was eventually relocated to the Los Angeles Zoo in 1994, where he lived in complete solitude for decades. Zoo visitors would often find Billy swaying back and forth and repetitively bobbing his head; abnormal repetitive behaviors often exhibited when an elephant experiences severe stress and psychological trauma. Despite public opposition against his living situation at the zoo, with many advocating for relocation to a sanctuary, the Los Angeles Zoo kept Billy. At the zoo, Billy was subjected to numerous invasive procedures intended to contribute to the zoo's captive breeding program. He remains at the zoo today, in a small enclosure with the relatively recent addition of three enclosure companions, though the demonstration of his repetitive behaviors remains.

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# FOREWORD


**Will Travers OBE,**
**Co-Founder and Executive President, Born Free Foundation**

Many people think that the genesis of the Born Free Foundation was the story of a lion, Elsa, and her successful rehabilitation to the wild. And in a way, they are right. But the true start of Born Free, or Zoo Check as it then was, resulted from the death, the destruction, of a young female African elephant at the London Zoo in 1983. Pole Pole (Poly Poly) had been in a film with my parents, Bill Travers and Virginia McKenna and had then been sent as a gift from the Kenya government of the day to the zoo.

Ten years elapsed and it was rumoured that, now living alone, she had become difficult to manage and potentially dangerous, and that she might be destroyed. Despite a decade apart, my parents visited her, and the mutual recognition was obvious as she reached out across the moat with her trunk to touch their outstretched hands. They determined to help her.

We found a place in southern Africa that would welcome her, but the zoo said no. Eventually the authorities attempted to move her to the Zoological Society's sister zoo, Whipsnade, but the moved failed; she damaged a foot, hobbled round for a week; was examined under anaesthetic; did not respond – and was euthanised in the elephant house.

My long introduction has a purpose. For many years I thought that Pole Pole's sad case was unique. But this report, *Elephants in Zoos – A Legacy of Shame*, proves, categorially, that this is not the case.

Each heart-breaking individual story in this report reveals a litany of mismanagement, suffering, and death. The report itself backs each case up with an avalanche of data and analysis that, in my opinion, provides cast iron proof that we have failed to deliver a life worth living for elephants in zoos and other forms of exploitative captivity. Zoos have failed to educate people about elephants; failed to produce a conservation dividend; abysmally failed to produce enough baby elephants to replace the number of elephants that have died in their care – zoos are, in fact, net consumers of elephants – and only managed to keep the whole ridiculous charade going by capturing and importing hundreds of elephants from the wild. To date the number of elephants that have been bred in captivity and returned to the wild can, generously, be counted on the fingers of one hand.

What more is there to say?

This simply must stop. No more imports; no more attempts at breeding; repatriation of elephants who have a chance of going back to the wild; rehabilitation of elephants to sanctuaries where that is possible, or to the best available zoos for the rest of their lives. This gross and tragic exploitation of elephants has gone on for far too long. There have been far too many elephant and, indeed, human, tragedies. There has been far too much suffering.

We have tinkered around the edges for long enough, and more baby steps are not the answer. Elephants do not belong in zoos. Pole Pole was just one tragic statistic in a catalogue that overflows with tragic statistics.

Let us be bold. Let us be brave. Let us be principled. Let's stop this now.

# EXECUTIVE SUMMARY

**Despite the large and growing volume of evidence highlighting the problems associated with keeping elephants in captivity, upwards of one thousand elephants are housed in zoos around the world, most of whom suffer in captive conditions that cannot possibly mimic their wild habitats or provide them with the social and cultural opportunities or choices available to their wild counterparts.**

As a result, elephants in zoos typically suffer shortened life expectancies, as well as poor reproductive success, high calf mortality, a variety of physical problems, and a range of behavioral abnormalities.

This report outlines the history and continuing plight of elephants in zoos across the United States, Canada, and Europe. Using specific individual cases, the report highlights the impacts of captivity on the physical and psychological health and welfare of individual elephants, the unsustainable nature of existing captive populations, and the impacts of wild capture for captive use on the social stability and conservation of wild elephant populations, with the consequent and serious knock-on effects on the wider ecosystems of which they are involved.

The report also highlights the ethical and public safety concerns associated with keeping elephants in zoos.

We conclude that elephants do not belong in captivity and recommend that keeping of elephants in zoos should be phased out. The capture of wild elephants for captive use and the breeding of elephants in zoos should be brought to an immediate end, and every effort should be made to ensure those elephants who must remain in captivity are provided with the best possible conditions to meet their welfare requirements and ensure their well-being for the remainder of their lives.

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# INTRODUCTION

The relationship between elephants and people goes back millennia, and elephants have an important place in the history and religion of many cultures. The capture of elephants is believed to have begun in the Indus Valley in South Asia more than 4,000 years ago and people have continued to capture, train, and work them since that time. However, our understanding of the highly intelligent nature of elephants, their social and cultural complexity, and the fact that they clearly experience considerable physical suffering and psychological distress in captivity, is much more recent. In the past, captive elephants were used in warfare, and for heavy work such as logging and construction. In more recent times, captive elephants are primarily used for display, religious ceremonies, and entertainment.

Despite the large and growing volume of evidence highlighting the problems captive elephants suffer, including stereotypic behavior, high infant mortality rates, and reduced life spans, demand for elephants by the zoo industry persists. Poor reproductive success achieved by zoos means that elephants continue to be captured from the wild and suspect elephant camps, often while they are still dependent on their mothers. Wild captures not only severely compromise the welfare and survival of the captured elephants, but they also disrupt the families and herds from which they are taken, with serious negative consequences for the well-being of wild elephants and their conservation. More than a thousand elephants are housed in zoos around the world, most of whom suffer in captive conditions that cannot possibly replicate their wild habitats or provide them with the social and cultural opportunities and choices open to their wild counterparts.

In 2021, there were 299 elephants housed in 67 North American zoos. In Europe, there were 580 elephants in 149 zoos. These numbers have increased over the previous 40 years largely through the import of wild-caught individuals.

While some zoos in North America and Europe have or are planning to divest themselves of their elephants for ethical, financial, or public safety reasons, others continue to spend very large amounts of money to develop or enhance public display exhibits. By persisting to keep these animals in zoos and other captive environments such as circuses, we are perpetuating untold and unnecessary animal suffering on a mammoth scale.

This report outlines the history and plight of elephants in zoos across the United States, Canada, and Europe from the perspectives of wildlife conservation, animal health and welfare, public safety, and ethics.

The report concludes that elephants do not belong in captivity.

**Table 1:** A summary comparison of elephants in the wild and in captivity. Table adapted from De Silva, 2013; Lee, 2013; Lee, 2016; Boedecker & et al., 2012.

| | African savanna elephant *(Loxodonta africana)* | Asian elephant *(Elephas maximus)* | Elephants in zoos |
|---|---|---|---|
| **Lifespan** | Median = 50 years<br>Max = 70+ years | Median = 40 years<br>Max = 70+ years | Median = <20 years (U.K.) |
| **Home range** | 3459.48-2,653,417.6 acres | 8401.58-246,364 acres | 1.98 acres<br>(Median U.K. enclosure size) |
| **Herd size)** | 9-16 | 7-10 | 3 (EU) |
| **Reproductive onset** | 11.9 years | 11.6 years | 4-7 years (Hermes et al., 2004) |
| **Reproductive lifespan** | Up to 65 years of age | Up to 60 years of age | Up to 30 years of age |
| **Age at dispersal** | Males = 14 (avg.)<br>Females = remain with family herd for life | Males = 11-20<br>Females = remain with family herd for life | 38% males <12yrs transferred to another zoo.<br>Females frequently transferred to other zoos |
| **Infant mortality rate (<5yrs)** | 9% | 5% | 40% |
| **Stillbirth rate** | 11.9% | 12.3% | 20.3% (U.K.) |
| **Avg. annual temp. in natural range** | 26.1°C/78.98°F | 26.5°C/79.7°F | 10.8°C/51.44°F (U.K. ) |

# RECOMMENDATIONS

- The keeping of elephants in zoos should be phased-out.
- The capture of elephants from range states for zoo export, and attempts to breed from existing captive elephants, must cease immediately.
- The separation of adolescent male elephants from their natal group before the age at which they would naturally do so in the wild to cease immediately; unless for verified and serious welfare concerns.
- The separation of adolescent females from their natal group to stop forthwith; unless for verified and serious welfare concerns.
- The separation / transferring of adult female elephants away from other family members should be ended.
- A detailed action plan should be drawn up to manage the remaining captive elephants, with a focus on providing the best possible lifetime care for these animals. The options available will need to be tailored to the individual elephants and their circumstances, but could include:
  - Transfer to wild or near-wild environments within their current or historic natural range.
  - Transfer to genuine sanctuaries that adhere to the standards set out by the Global Federation of Accredited Sanctuaries.
  - Consolidation of remaining elephants, where feasible and over time, in the best facilities available that can provide the highest levels of care for the rest of their lives.
- Wherever possible, solitary elephants should be relocated to facilities which can give them social contact with other elephants (including via adjoining enclosures where physical introduction is not possible).
- Male elephants should be provided with social opportunities and not be permanently housed alone.

# THE CASE OF CHAI

**Species:** Asian

**Sex:** Female

**Born:** 1979 wild (Thailand)

**Age at death:** 37 years

**Last location:** Oklahoma City Zoo, U.S.

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Chai at Woodland Park Zoo, 2009

© Kim Bartlett, Animal People Inc., flickr cc

Chai at Woodland Park Zoo

© Chuck Battles, flickr cc

Woodland Park Zoo, Jan 2008

Chai was a 37-year-old Asian elephant who died at Oklahoma City Zoo in 2016.

Chai was captured in the wild and gifted to the Woodland Park Zoo in Seattle, Washington, by Thai Airways International in 1980. She was transported to the United States as an infant at just one year old, around four years before she would have been naturally weaned from her mother. Chai shared her enclosure at the Woodland Park Zoo, which included an 8-by-18-foot south room and a 20-by-42-foot north room, with three other elephants. The zoo reportedly chained each elephant at night to prevent them from rolling over each other (Berens, 2012). According to the zoo's medical records, Chai and each of her enclosure-mates developed foot disease.

When Chai reached reproductive age, zookeepers began training her to accept artificial insemination methods. To accomplish the training, keepers chained Chai with anchors fastened to each of her legs, which prevented her from moving (Krishnan, 2011). She would stand for long periods of time immobilized in this way, while a three-foot-long hose was inserted into her reproductive tract. Chai underwent mock inseminations for two years, until the zoo received their first batch of elephant sperm from the Oregon Zoo in 1992. At this point, Chai would have been 13 years old.

The artificial insemination procedures were repeated ten times per month, sometimes twice per day, in attempts to inseminate Chai (Berens, 2012). In 1998, after 91 unsuccessful artificial insemination attempts, Woodland Park petitioned the Association of Zoos & Aquariums (AZA) for permission to move her to the Dickerson Park Zoo in Springfield, Missouri, to be bred to a bull, despite an outbreak of the virus Elephant Endotheliotropic Herpesvirus hemorrhagic disease (EEHV-HD) that had emerged there (Berens, 2012). EEHV-HD is considered the primary cause of calf mortality in the global captive Asian elephant population (Jesus et al., 2021). Despite the dangers of transmission and infection posed by EEHV-HD, and the very real chance that Chai could bring the virus back

with her to Woodland Park and infect other elephants, AZA granted the request. A few months later, at a cost of 50,000 USD, Chai was sedated and transported more than 2,000 miles to Missouri.

At this time, both Woodland Park and Dickerson Park were free-contact facilities, meaning that keepers could share the same space as the elephants with no protective barrier. To "control" the elephants, keepers would use bullhooks. Following her transition between facilities, potentially due to the stress associated with the forced separation from her companions, Chai demonstrated marked changes in her behavior that had not been observed previously at Woodland Park. While keepers at Woodland Park described Chai as shy with no aggressive history, keepers at Dickerson Park described her as dangerous, and allegedly required the use of bullhooks and restraints to handle her.

Chai experienced grave difficulties in assimilating into her new herd at Dickerson Park. The other elephants were aggressive towards her, sometimes resulting in severe injury; one time, Chai had to be separated from the other elephants because one of them had bitten off a piece of her tail. Keepers dosed Chai with Valium, an anti-anxiety narcotic, and azaperone, a tranquilizer, to make her easier to handle (Berens, 2012).

When Chai finally returned to Woodland Park in 1999, she weighed about 7,300 pounds – a loss of 1,300 since before the transfer. Despite this rapid decline, she also returned pregnant (Berens, 2012). In November of 2000, Chai gave birth to a female calf. Following a public naming contest, zoo officials picked the winner: Hansa, ironically, meaning "supreme happiness" in Thai, despite being born directly after a time of intense suffering experienced by her mother. Hansa died at the age of just seven years from a new variant of EEHV-HD.

By December of 2011, Chai had been artificially inseminated 112 times (Berens, 2012). In 2014, after several years of mounting criticism over the condition of its elephants, Woodland Park Zoo officials announced that they were closing their elephant exhibit (Thompson & Berens, 2014). In 2015, Chai and her enclosure mate, Bamboo, were moved to Oklahoma City Zoo, so they could join a larger herd (Blankinshipthe, 2015). Early on a cold morning in January 2016, Chai was found dead in her yard.

A post-mortem revealed that Chai had died from a combination of systemic blood infection and severe fat loss. Oklahoma City Zoo reportedly suspected that the infection was a result of pus-filled lesions on the side of her body, possibly sustained during an episode in which she was unable to stand and had to be raised using a hoist. Oklahoma City Zoo's medical records showed that Chai had suffered injuries, weight loss, skin lesions, chewing problems (likely as a result of deformed teeth), and other incidents in the months before her death (Doughton, 2016).

© Joe Mabel (Wikimedia Commons)

Woodland Park Zoo, Jan 2012

# A HISTORY OF CRUELTY

Routine chaining is still practiced in some zoos

Despite the overwhelming evidence indicating that elephants simply cannot thrive – and often struggle to even survive – in captivity, zoos continue to hold them and replace those lost by capturing others from the wild. The extremely low birth rates and high mortality rates among captive-born elephants (Hagan et al., 2020); typically foreshortened life spans by more than 30 years (Paxton, 2018; Keele, 2014); high disease occurrence (Clubb et al., 2008); transmission risks associated with fatal herpes viruses (Rees, 2003); and the inevitability of dangerous decreases in genetic diversity demonstrated by the North American AZA studbook projections (Hagan et al., 2020), indicate that the reality of maintaining elephants in captivity in zoos and circuses without restocking with individuals taken from the wild is not sustainable, and would likely lead to the rapid demise of the captive population.

The breeding failure observed frequently at zoos is specifically associated with captivity, as it is not observed in wild populations (Rees, 2003). For the captive Asian elephant population alone, it was stated in 2000 that zoos in North America would need to import four elephants per year simply to maintain the population at its current level (Wiese, 2000). Since 2000, in North America and the U.K., deaths still outnumber births. Infant deaths associated with calf rejection, infanticide, and reproductive disorders among pregnant mothers remain exceedingly high compared to those observed in the wild (Hartley & Stanley, 2016).

Despite these shortcomings, the AZA and the European Association of Zoos and Aquaria (EAZA) continue to pour exorbitant resources into fighting the uphill battle of keeping elephants in captivity. For example, the Los Angeles Zoo completed a pachyderm exhibit in 2010 at a cost of 42 million USD, which only provided about 5.9 acres of space for four elephants (Nazario, 2010). Similarly, Blackpool Zoo spent 6,618,175 USD in 2018 to provide just 2.47 acres for six elephants (Holmes, 2019).

## A RECORD TO REGRET

| | |
|---|---|
| **1900** | wild population ~100,000 Asian elephants |
| **1971** | wild population ~1.3 million African elephants |
| **1980** | 249 elephants at 69 North American zoos: 114 African, 135 Asian. Of these, 18 reported captive-born and 141 wild-born, the rest of unknown origin. 277 elephants held at circuses during this year (Shoshani, 1980)<br>280 elephants at 72+ European zoos: 74 African; 206 Asian African and Asian elephant populations within Europe sustained by import (EAZA, 2004) |
| **1981** | AZA-accredited facilities launched the Species Survival Plan (SSP) Program in North America |
| **1984** | 49 elephants at 20 U.K. zoos: 23 African, 26 Asian. Of these, 5 captive bred, 44 wild born<br>Zoo Licensing Act 1981 entered into law. British zoos required to be licensed and inspected |
| **1986** | 277 elephants held at 76 North American zoos and 5 private institutions: 144 African, 133 Asian. (415 additional elephants – at least 88 African and 277 Asian – in North American circuses, parks, and private institutions) (Shoshani, 1986) |
| **1989** | Estimated 610,000 wild African elephants |
| **1991** | EAZA *Ex-situ* Programme (EEP) for Asian elephants began |
| **1993** | EEP for African elephants began |
| **1995** | Elephant Endotheliotropic Herpesvirus (EEHV) first documented at the National Zoo, U.S. |
| **2002** | European Zoos Directive 1999/22/EC. EU Member States required to adopt measures for licensing and inspecting zoos – only 6 nations adopt measures by proposed deadline |
| **2003** | 285 elephants in North American zoos; 46 males; 239 females; 73 zoos<br>501 elephants in European zoos (205 African, 296 Asian). 202 males; 299 females. 50 zoos housing African and 90 housing Asian<br>32 African and 157 Asian elephants have been imported from the wild since 1980<br>U.K. amends Zoo Licensing Act to adopt measures outlined within EU Zoos Directive; duties on zoos directly related to welfare also included |
| **2004** | European population of African elephants accounted for 40% of the worldwide zoo population |
| **2006** | 300,000-500,000 African and 34,000-50,000 Asian elephants in the wild<br>286 elephants in 78 North American zoos: 147 African; 139 Asian<br>77 elephants in 13 U.K. zoos: 37 African, 40 Asian |
| **2010** | Elephant Welfare Group (EWG) established by the British and Irish Association of Zoos and Aquariums<br>70 elephants in 13 U.K. zoos: 36 African, 34 Asian |
| **2011** | EWG to collaborate with Department for Environment, Food and Rural Affairs (DEFRA) and external experts at the request of U.K. Government to assess and review the welfare of elephants in U.K. zoos over a 10-year period |
| **2012** | Secretary of State's Standards of Modern Zoo Practice (SSSMZP) produced by DEFRA to provide guidance and help ensure minimum standards within U.K. zoos |
| **2014** | AZA Asian Elephant Studbook contains a historic population of 423 individuals |
| **2016** | ~415,000 African elephants in wild (Great Elephant Census 2016) |
| **2017** | SSSMZP updated with an appendix specific to elephants. Appendix 8.8 requires zoos keeping elephants to be inspected in light of the criteria in the new appendix during licensing inspections |
| **2018** | 48,000-52,000 Asian elephants in wild<br>AZA African Elephant Studbook contains a historic population of 567 individuals |
| **2019** | ~305 elephants in 62 North American zoos; ~70 non-accredited zoos estimated to have elephants<br>50 elephants in 11 U.K. zoos: 24 African, 26 Asian |
| **2020** | African elephant EEP reports 7 births but 5 deaths for the year<br>Asian elephant EEP reports 18 births but 10 deaths for the year |
| **2021** | 299 elephants at 67 North American zoos: 162 African, 137 Asian; plus at least a further 93 in circuses, private collections and sanctuaries*<br>580 elephants in 149 European zoos: 226 African, 354 Asian; including:<br>49 elephants in 11 U.K. zoos: 23 African, 26 Asian<br>At least 42 elephants are estimated to be in circuses, private collections and sanctuaries across Europe*<br>10-year report from EWG due to be presented to Government |

*Population numbers are likely to be underestimates due to the difficulty in obtaining accurate numbers for circuses and private zoos/safari parks

"The irony with captive Asian elephants is that the maintenance of sufficient numbers has, inevitably, resulted in depletion of wild populations."

(Sukumar, 2003)

Further, the cost of artificial insemination, which remains the most successful strategy to increase captive elephant birth rate according to experts on the procedure, can cost 15,000 USD for a single session, with costs often believed to be higher due to various logistical factors (Platoni, 2003; Previch, 2005). A review of several female elephants in North American zoos found that artificially inseminated individuals had a higher conception rate than those mated by a male (Dow et al., 2011). However, individuals may endure this highly invasive procedure multiple times without any guarantee of success, with procedures lasting and possibly exceeding 30 minutes to two hours, taking the overall costs towards and beyond 130,000 USD (Brown et al., 2004). In the early 1990s, with artificial insemination still in its infancy, Woodland Park Zoo reportedly attempted to artificially inseminate an elephant named Chai 91 times over four years without success (Berens, 2012). More recently, Anjalee, an elephant in Auckland Zoo, New Zealand, underwent five separate artificial insemination procedures in the space of three years and still failed to become pregnant (Healy, 2020). It is estimated that at

**Table 2:** Current Elephants in Captivity in U.S. and Canada

| Country | Total | Facility | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Zoo | | Circus | | Private | | Sanctuary | |
| | | M | F | M | F | M | F | M | F |
| **Canada** | 24 | 5 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| **U.S.** | 386 | 68 | 207 | 4 | 35 | 8 | 36 | 3 | 25 |
| **Total** | **410** | 73 | 226 | 4 | 35 | 8 | 36 | 3 | 25 |

least 51 elephants have been conceived via artificial insemination in European and North American zoos (Elephant Database, 2022). Of these, 35% were stillborn or miscarried. As of February 2022, only 28 (54%) elephants produced via artificial insemination were still alive. Continued efforts to impregnate elephants using artificial insemination seem particularly irresponsible in the face of such poor success rates and the repeated use of often very young elephants (Rees, 2003).

Wild imports to boost captive numbers in zoos have occurred despite the steady decreases observed in wild populations for all elephant species. Asian elephants have declined by 50% or more since the early 20th century to between 40,000-50,000 individuals today. African elephants have experienced dramatic declines of more than two thirds since the 1970s, with recent reports estimating that as few as 415,000 remain (Williams et al., 2020; Gobush et al., 20211). While no African forest elephants are currently known to be in North American or European zoos, the species has experienced an 86% decline since the 1990s (IUCN, 2021).

> "Believing there to be no direct benefit for *in situ* conservation of African elephants, the African Elephant Specialist Group of the IUCN Species Survival Commission does not endorse the removal of African elephants from the wild for any captive use."
>
> (AfESG, 2003)

The number of individuals captured from the wild and corresponding resources needed to sustain them have simultaneously increased. Therefore, despite all elephant species being classified as Threatened with extinction and decreasing populations on the International Union for the Conservation of Nature (IUCN) Red List, zoos continue depleting these wild populations with no realistic goal of releasing their progeny into the wild, and consequently fail to provide any tangible improvement to their in-situ conservation status (Gobush et al., 20211,2; Williams et al., 2020). As of 2018, in North America, ~76% of all African elephants (165 individuals) and 58% of all Asian elephants (148 individuals) were wild caught just within the AZA population. Since the first entries in the AZA studbooks, between 1800-2018, 271 African elephants were wild caught (48% of the total) and 312 Asian elephants (74% of the total) were wild caught from ~1854-2014 (Paxton, 2018; Keele, 2014). From 1980-2003, 289 elephants were imported to European zoos (132 African and 157 Asian) (EAZA, 2004). Additionally, because any potential benefits to species and habitat conservation clearly do not outweigh the very real (and sometimes fatal) costs to individual animal welfare, any justification for efforts to keep elephants in zoos diminishes the more we learn about their captive struggle (Hutchins & Keele, 2006).

At its sixth meeting in 2003, the IUCN Species Survival Commission's African Elephant Specialist Group agreed that "captive use [of African elephants] presented no direct benefit to in situ conservation" (Niskanen 2004) and subsequently issued the following statement:

*"Believing there to be no direct benefit for in situ conservation of African elephants, the African Elephant Specialist Group of the IUCN Species Survival Commission does not endorse the removal of African elephants from the wild for any captive use.*" (AfESG, 2003).

Clearly, the keeping of captive elephants in zoos has had no meaningful positive conservation impact on wild populations. Indeed, zoos have been responsible for removing hundreds of individuals from their natural homes to put them on display.

# THE CASE OF MAGGIE

**Species:** African savanna

**Sex:** Female

**Born:** 1982 Wild (Zimbabwe)

**Age at death:** 41 years

**Location:** Alaska Zoo / ARK2000 (PAWS) Sanctuary, California, U.S

© Friends of Maggie

Maggie at Alaska Zoo

© Friends of Maggie

© Friends of Maggie

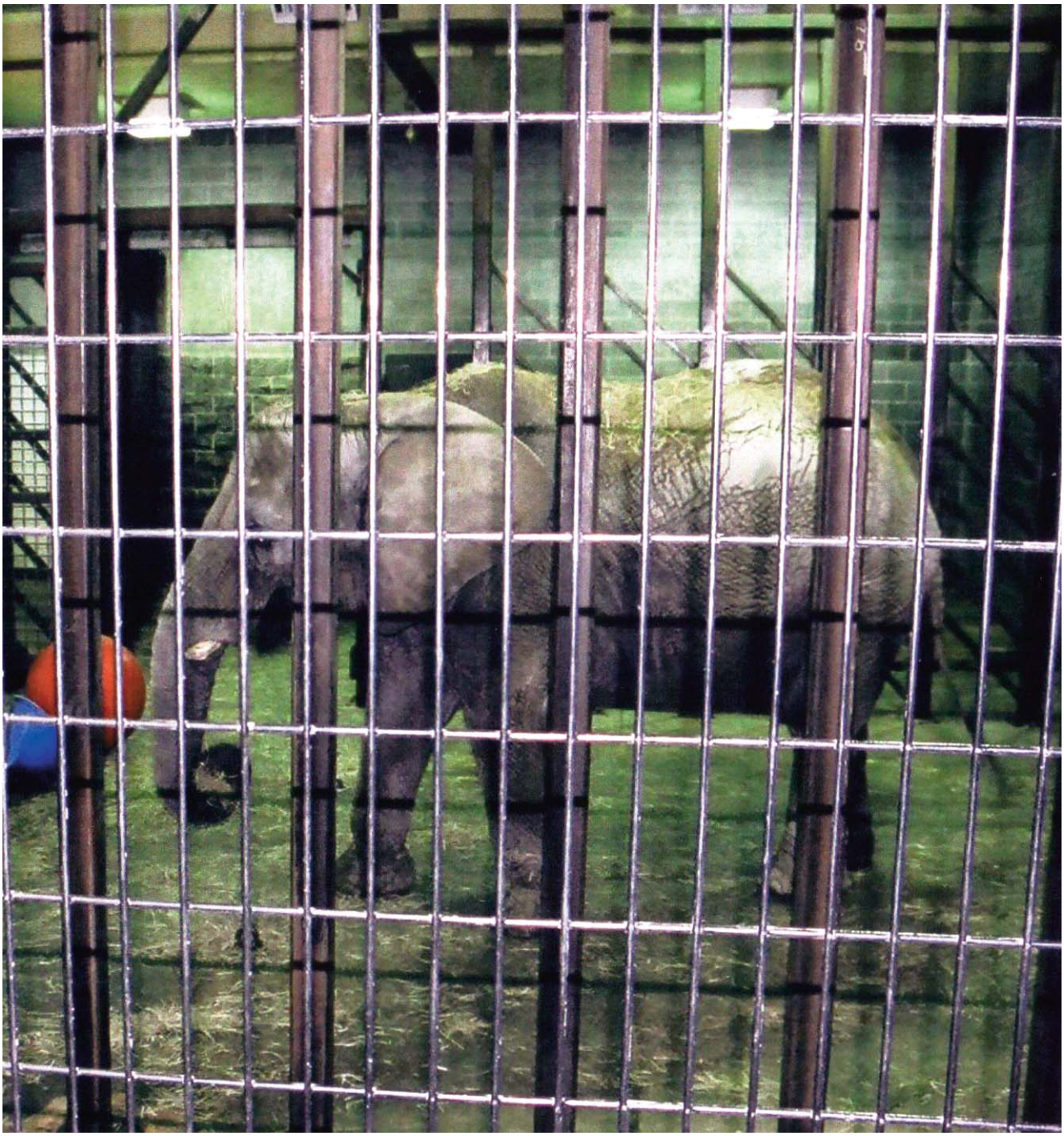
Maggie was born in Zimbabwe in 1982 and captured from the wild as a calf. Her mother was killed as part of a government-ordered culling, intended to reduce human-elephant conflict in the area.

After arriving in the United States, she spent 24 long years on exhibit at the Alaska Zoo. She survived her only companion, Asian elephant Annabelle, who was euthanized in 1997 after suffering from a chronic foot infection that had spread to her bones and bloodstream (Reamer, 2020). Following Annabelle's death, Maggie demonstrated drastic mental and physical declines in response to her forced solitude. She would sway excessively and developed numerous sores and cracks on her feet, likely due to the cold, concrete floor and cramped nature of her elephant house. During the winter, where temperatures would fall to below minus 10 °C/50°F, accompanied by several feet of snow, Maggie would spend many months shut inside.

She suffered from episodes of colic during which she would collapse and struggle to regain her footing. In 2007, firefighters were called twice in one week to hoist Maggie back onto her feet, after being down for seven hours (Irish Examiner, 2007). During these episodes, she would often drag herself around her enclosure, developing wounds all over her body as a result.

Keepers frequently chained Maggie's feet in attempts to subdue her aggressive behaviors during feeding and medication administration. According to Pat Lampi, the Alaska Zoo Executive Director, she had "gone after people a couple times" (Edge, 2016).

In 2004, Alaska Zoo's board of directors decided that Maggie would remain at the zoo, despite public concerns for her welfare and protests by a group of Anchorage citizens called 'Friends of Maggie.' Zoo staff had also reportedly urged for Maggie to be moved to a more tolerable, warmer climate (Holland, 2007). Following the board's decision, 500,000 USD was reportedly spent trying to upgrade Maggie's living conditions, including commissioning a custom-built, 20-foot-long treadmill designed to provide her with a means of much needed exercise to help improve her cardiovascular health.



© Friends of Maggie

Maggie at Alaska Zoo,2006

However, Maggie was very wary of the treadmill and, although she was eventually trained to stand on the conveyor belt, she would not use it when switched on (Rosen, 2007).

As Maggie's suffering became increasingly apparent, and in response to growing public pressure, in 2007 the zoo decided to move Maggie to the ARK2000 Sanctuary in Galt, California, operated by the Performing Animal Welfare Society Sanctuary (PAWS). Here, she finally joined other African elephants and formed a bond with residents Lulu and Toka in a 20-acre enclosure with rolling hills and lots of greenery. After spending 13 years at PAWS, Maggie passed away in 2021 at 41 years of age. Her post-mortem revealed that Maggie had suffered from severe arthritis and dental disease for most of her life (Cordova, 2021). These conditions had worsened throughout her time in captivity and ultimately contributed to her death.

Although Maggie spent the last third of her life in the best possible captive environment with the help of PAWS, she never recovered fully from the suffering she experienced at the zoo. She would still occasionally obsessively sway or make an abnormal clicking noise, both behavioral remnants from a traumatic past. While sanctuaries can offer much better conditions for captive elephants than most zoos, they cannot undo the physical and psychological damage caused by years of suffering in inappropriate captive conditions.

# HEALTH & WELFARE


## SUMMARY

- Captive elephant populations within U.K. and North American zoos are currently unsustainable. More deaths than births have occurred in both regions in the last 20 years, with wild import being the only consistent method used in attempts to maintain and grow the captive population numbers.
- Infant mortality and occurrence of stillbirths in captive elephants is significantly higher than would be expected in the wild due to females being mated too young, females having shorter interbirth intervals, and the high mortality rate in captive populations caused by the highly fatal Elephant Endotheliotropic Herpesvirus Hemorrhagic Disease.
- There is emerging evidence that all elephants latently carry Elephant Endotheliotropic Herpesvirus, but captive Asian juveniles are more likely to develop and succumb to hemorrhagic disease.
- The high prevalence of stereotypic behaviors among captive elephants is a consequence of long-term psychological damage resulting from confinement in impoverished, stressful environments.
- Twenty-eight elephants are housed in solitary conditions within European zoos, including two in the U.K.; at least 12 are solitarily housed in the U.S. and Canada.
- Most elephants in European and North American zoos are obese and likely to develop foot and musculoskeletal issues caused by unnatural enclosure conditions and substrates.
- At least 98% of elephants in European zoos have issue(s) with their feet. In North America, 67.4% of elephants from a sample of zoos were reported to have a foot abnormality.


### Population sustainability

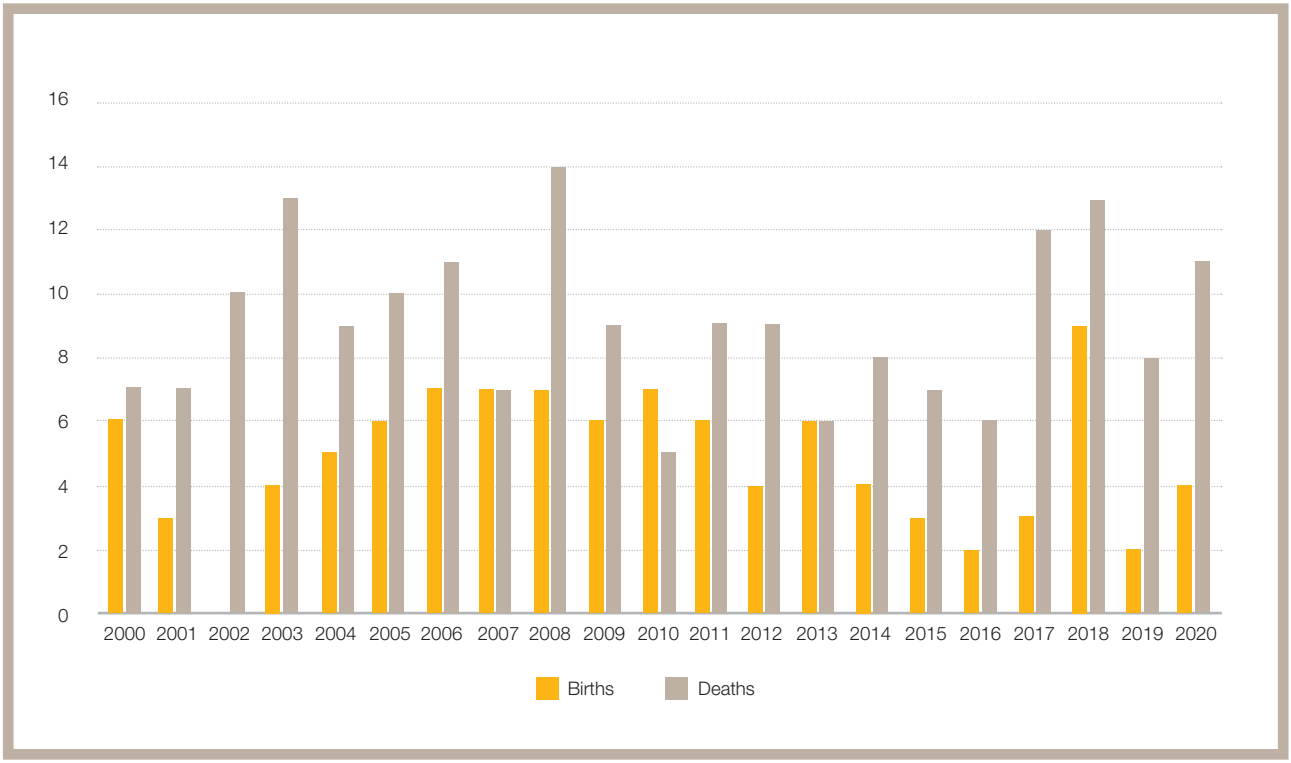
The European and North American zoo populations have previously been classified as not self-sustaining due primarily to poor reproductive success, reduced longevity, and high infant mortality rates. Projections indicate that, without imports from the wild, the European captive elephant population will cease to exist by 2045 (Clubb et al., 2008). Since 1990, approximately 160 calves were born within the European zoo population to approximately 85 mothers. Based on a captive infant mortality of 40% (see below – Infant Mortality), an estimated 96 calves will have survived. A similar number of wild female elephants, who reproduce approximately once every five years, would have produced more than 500 calves in the same time period. In addition, wild-caught female Asian elephants have demonstrated reduced breeding success in captivity relative to captive born females. The adverse effects observed in wild-caught elephants last for over a decade and are compounded by a reduced survival in calves produced from these females (Lahdenperä et al., 2019). Currently, 74.9% (260 out of 347) of female elephants over the age of 12 in European zoos are believed to have been wild caught. In the U.S. and Canada, this proportion is higher still at 80% (160 out of 200).

Within the U.K. population, which is part of the wider European breeding program, more deaths than births have occurred since 2000 (Table 3). Deaths have equaled or exceeded births in 13 of the 21 sequential years (Figure 1). Even with greater emphasis on breeding success, as of 2018, the European zoo population of Asian elephants, supposedly free from the challenges the species faces in the wild, with secure food, water, and with the added benefit of veterinary care, was found to be increasing at a rate of just 2.5% per year. Due to the vast number of aging females, this growth rate is predicted to fall back into the negative as these females reach the end of their lives. Furthermore, to maintain genetic diversity, researchers have suggested increasing the interbirth interval and the age at which females reproduce for the first time (Schmidt & Kappelhof, 2019).

**Table 3:** The number of elephants born in captivity from 2000-2020 in the U.K., the proportion of those individuals alive today and the number of captive elephants that have died in the U.K. from 2000-2020. www.elephant.se, November 1, 2021.

| U.S. & Canada births 2000 – 2020 | 2000 – 2020 Captive births alive today | Deaths 2000 – 2020 | Net |
|---|---|---|---|
| 101 | 68 (67%) | 191 | **-90** |

**Figure 1:** A comparison of the annual births and deaths of elephants in U.S. and Canadian zoos from 2000-2020. www.elephant.se, November 1, 2021.




In the U.S. and Canada, this net difference between births and deaths is even more substantial (Table 3). Deaths have equaled or exceeded births in 20 out of the recorded 21 years (Figure 1).

The AZA aims to achieve 90% genetic diversity retention for 100 years as a common management goal. Decreases in genetic diversity below 90% observed within the founding population have been associated with lower birth weights, smaller litter sizes, and greater neonatal mortality in some species (Paxton, 2018). Based on current population parameters and recent growth rate trends, as designated by the AZA, genetic diversity within the North American captive elephant population is projected to decline to 78.9% over the next 100 years if the current population grows to the target size of 225 individuals at its projected growth rate. The AZA calculates that there are 37 years until the current population is at or below 90% gene diversity. AZA projections indicate that, just to maintain the current population number, they would need 8-10 surviving births over the next three years. Since 2015, the average number of births has been 1.6 (Hagan et al., 2020).

## Infant mortality

The overall infant mortality rate for elephants in zoos was 40%, nearly triple the rate of free-ranging Asian and African elephants (Saragusty et al., 2009). These trends may result from captive females experiencing reproductive onset at too young an age – wild Asian and African elephants typically reach reproductive onset at 11.6 and 11.9 years respectively, whereas captive females as young as four years may be mated (Clubb et al., 2008; de Silva et al., 2013; Hartley & Stanley, 2016; Lee et al., 2016). Further, females appear to experience shorter interbirth intervals in captivity compared to their wild counterparts, which may enhance the probability of infant mortality (Lee & Moss, 1986). Thi Hi Way, at Chester Zoo, produced nine calves between 1993 and 2018: an interbirth interval of just 2.75 years compared to seven years in wild conspecifics (Rees, 2020).This may be explained by zoos forcibly impregnating individuals either through exposing immature, barely weaned females to breeding males, or through artificial insemination procedures.

The rate of stillbirths is also higher in captivity than in wild populations. Between 2000-2020, 20 of 121 pregnancies (16.5%) among captive elephants in the U.S. and Canada resulted in stillbirths, with 13 of 64 pregnancies (20.3%) resulting in stillbirths among captive elephants in the U.K. over the same period. The rate of stillbirths in wild African elephants is estimated at 11.9%, and 12.3% in working Asian elephants (Hartley & Stanley, 2016).

## Infectious disease

A major cause of infant mortality among captive Asian elephants is due to hemorrhagic disease caused by Elephant Endotheliotropic Herpesvirus (EEHV): an infectious herpesvirus only found in elephants and one of the most fatal diseases in captive elephants worldwide (Long et al., 2016).

EEHV-HD was responsible for up to 65% of fatalities in Asian elephants between three months and 15 years of age in European and North American zoos from 1993-2013 (Zachariah et al., 2013). More recent research has indicated that EEHV-HD continues to be responsible for around half of all juvenile fatalities in zoos in Europe and North America (Howard & Schaftenaar, 2019; Jesus et al., 2021). Since 2010, at least 24 deaths in European zoos (including nine in the U.K.) and nine deaths in U.S. and Canadian zoos were due to EEHV-HD. Individuals appear most susceptible between one and eight years of age (Richman & Hayward, 2011). While African elephants are also susceptible to their own EEHV's, reported fatalities are fewer (Long et al., 2016). Research has revealed that previous EEHV-HD deaths within a zoo indicate a 3.8 times higher risk of future EEHV-HD deaths (Perrin et al., 2021). While EEHV occurs in wild populations, it is not associated with mortality of the magnitude seen in captive Asian elephants (Howard & Schaftenaar, 2019). The following factors have all been linked to a higher disease risk in captive elephants: stress, due to early weaning; EEHV being shed during other birth events in the herd; and transfers in/out of the group or between facilities (Sanchez et al., 2016; Perrin et al., 2021). Research from 2022 highlighted that captive elephants were more likely to shed EEHV during times of "social stress," including a new individual being introduced to an established herd or transferring individuals between facilities (Titus et al., 2022). Zoos with the most active breeding programs presented an exceptionally high overall offspring loss due to EEHV-HD: up to 50% of the total offspring. With more than 14 known strains in elephants, emerging evidence suggests that particular strains of herpesvirus are unique to each elephant species (Jesus et al., 2021; Howard, 2022).

All captive and wild elephants may latently carry EEHV, and immunosuppressed juveniles with lower antibody levels, possibly as a result of the risk factors previously highlighted, are more at risk of succumbing to the virus (Hornweg et al., 2021; Howard, 2022). Semi-wild juveniles were found to have consistently higher antibody levels than captive individuals, between the ages of one and four, during which time maternal antibody levels in captive individuals start to decrease (Hornweg et al., 2021). These findings suggest that the increased juvenile mortality of captive elephants from EEHV-HD is highly influenced by keeping and managing elephant populations in captivity.

Tuberculosis, predominantly associated with Mycobacterium tuberculosis infection, has been recognized in captive elephants for many decades. Outbreaks of TB worldwide in both captive and free-ranging elephant populations have been recorded, and infection can result in clinical disease and death. Since the mid-1990s, at least 60 elephants in North American zoos have been infected, some of whom died (Fobar, 2020). As well as being a concern for the health and well-being of captive elephants, their proximity to people gives rise to the possibility of zoonotic transmission, which has been confirmed in several geographic localities (Paudel & Sreevatsan 2020) and represents a particular risk for zoo staff. Methods for tuberculosis surveillance in captive elephants, predominantly via trunk washes and treatment regimens for infected individuals, have been devised (Stfmrpte, 2017).

## Stereotypies

Stereotypic behaviors are often indicators of compromised welfare (Mason & Veasey, 2010; Asher et al., 2015). Such behaviors include swaying, head-bobbing, pacing, and circling in captive elephants, and have been defined as "repetitive behaviors induced by frustration, repeated attempts to cope, and/or central nervous system [brain] dysfunction" (Mason, 2006). Captive elephants have little autonomy over their lives, with limited opportunities to express independent choices about their daily activity or social companions (Vanitha et al., 2016).

A high prevalence of elephant stereotypies has been documented in U.K. zoos, with 55% of all elephants demonstrating some form of stereotypy during the day and 49% at night (Harris et al., 2008). Within the U.S., these figures were even greater: 85.4% of elephants performing stereotypic behavior during the day and 68.8% during the night (Greco et al., 2016). These behaviors are a consequence of long-term psychological damage, often continue throughout the animals' lives, and remain present to a greater or lesser degree even if the elephant's captive circumstances improve.

Neuroscientists assert that human and nonhuman animals share comparable brain structures and processes that govern cognition, emotion, and consciousness (Bell Rizzolo & Bradshaw, 2019). Living in an impoverished, stressful captive environment results in physical damage to the brain. These changes have been documented in many species, including elephants, large primates, large marine mammals, rodents, rabbits, cats, and humans (Jacobs, 2020). Elephants, particularly those who experience one or more traumatic events, including injury, capture, translocation, or maternal separation, frequently exhibit damaged social and emotional functioning consistent with symptoms found in human survivors of trauma (Bradshaw et al., 2005; Bell Rizzolo & Bradshaw, 2016).

A recent assessment of the North American population of elephants in zoos identified spending time housed separately, a history of inter-institutional transfers, and being a member of a nonbreeding group of mainly unrelated females as risk factors for the development of stereotypic behaviors (Greco et al. 2016).

## Sociality

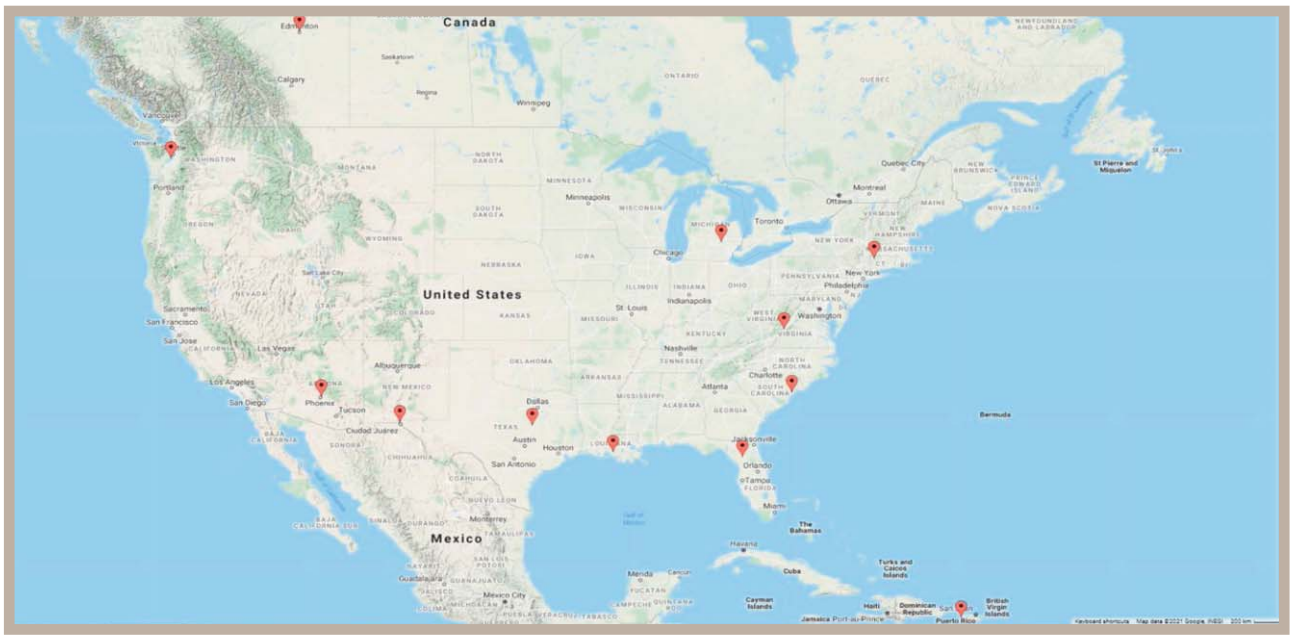
In the wild, African and Asian elephants develop complex and intricate social networks (Meehan et al., 2016). African savanna *(Loxodonta Africana),* African forest *(Loxodonta cyclotis)*, and Asian female elephants *(Elephas maximus)*, all live to varying degrees in fission-fusion societies (Schuttler et al., 2014; de Silva et al., 2016). Such societies are characterized by related females coming together to form bonded groups and then breaking apart into families, or vice versa. Several bonded groups may form a clan, with many clans forming a population, while male social dynamics are more complex. Resource distribution and availability influence elephant social dynamics (Aureli et al., 2008). Such processes are not possible within the confines of a captive environment. A 2016 study found that elephants in North American zoos spent on average 37.2% of their time housed separately with restricted physical access (Meehan et al., 2016).

Welfare can be further impacted by individual elephants being permanently transferred in or out of a zoo group. Greater kin structuring of a captive group enhances elephant welfare, as it reflects natural social structures. Studies indicate that kin structuring encourages more positive social interactions between individual elephants (Harvey et al., 2019) (See Captive Conditions – Relatedness – for comparison of captive and wild herds).

These social factors particularly affect the individual welfare of male elephants. Males require social networks consisting of a wide range of conspecifics, with the presence of older males being particularly important, and the creation of more naturalistic interactions is vital for male elephant welfare (Hartley et al., 2019; Allen et al., 2020). However, creating socially functional male groups over lifetimes in captive environments is extremely difficult and, as a result, males are frequently kept in social isolation. For example, an attempt made by one U.K. zoo to form a bachelor herd resulted in a 12-year-old elephant dying after suffering an attack by his enclosure companion (29 years old) (BBC, 2021). The suspected aggressor had never previously been successfully integrated into another group of elephants (Ward, 2021). The housing of mixed-age male elephants in a relatively small space resulted in criticism of the social grouping by Dr. Joyce Poole. Dr. Poole stated: “Keeping male elephants together in a small space like 20 acres is asking for trouble – there is nowhere for the others to go if one of them comes into musth. Mixing 12-,16- and 29-year-old males is unwise. In the wild, males tend to socialize with elephants of similar size and age, though not in permanent groups. Even the gap between 12 and 16 is on the borderline. I would question this age grouping, especially among captive males who have grown up without social role models and have no choice regarding play partners” (Born Free, 2021). The constraints of captivity not only prevented these males from growing up with social role models but sadly also restricted any opportunity for group members to disperse away from each other during times of aggression. The zoo stated it would launch an investigation into the incident but, at the time of publication, the outcome has not been made public.

There are currently 28 solitary housed elephants in zoos within Europe and at least 12 within zoos and private collections in the U.S. and Canada (Figure 2).

**Figure 2:** Location of current solitary housed elephants within North American zoos (circus and sanctuary elephants not included). www.elephant.se, November 1, 2021. Created using Easy Map Maker – www.easymapmaker.com



Foot maintenance at Oakland Zoo, 2012

© Born Free

## Foot and musculoskeletal issues

In the wild, an elephant's feet are exposed to various substrates and terrains every day. Walking across different surfaces helps keep their fat pads (equivalent to human heel) supple and their feet moist. Substrates provided for elephants in captivity often lack this variation, with hard surfaces, such as concrete floors, causing cracks and infections within the fat pad. Fat pads that are cracked or infected cannot effectively absorb pressure, which makes the outside of the foot and nails more prone to disease (Panagiotopoulou, 2017). Blackleg (bacterial inflammation with necrosis) and foot problems, such as pathological lesions in the pads and nails, abscesses, overgrown cuticles, split nails, torsion, and ulcerations are common in captive elephants due to inactivity and lack of access to natural substrate (Wendler et al., 2019; Saddiq et al., 2020). Foot rot issues can also develop from being confined indoors for long periods, standing on hard surfaces, in their own waste (Buckley, 2001). A study conducted in 2016 that analyzed elephant social dynamics and housing characteristics across 68 North American zoos and 255 African and Asian elephants demonstrated that these elephants spent up to 66.7% of their time on a hard substrate and an average of 28.9% of their time indoors (Meehan et al., 2016).

98.5% of elephants in European zoos were affected by at least one foot issue (Wendler et al., 2019). 43.6% of nails showed signs of lesions with cracks being the most common issue identified (19.0%). Only three out of 204 elephants within the study had no pathological lesions. In a similar study in North America, 67.4% of elephants had a foot abnormality (145 out of 215). Of those elephants with recorded abnormalities, nail abnormalities were present in 92.4%, fat pads abnormalities were present in 13.1%, and abnormalities in the interdigital space were present in 22.8% (Miller, 2016).

Musculoskeletal impairments are also a major health issue for captive elephants, including degenerative joint disease and low bone density. Captive elephants may suffer from abscesses, arthritis, hernia (Hernia perinealis), osteoarthritis, skin calluses (Tyloma olecrani), and swelling of the knee joints (Bursitis praepatellaris) (Kuntze, 1989). As with foot issues, a contributing factor is believed to be hard enclosure substrate. Elephants exposed to hard surfaces for four hours each day were found to be more likely to develop joint stiffness or lameness (Miller, 2016). A study of North American zoos found that 36% of zoos reported at least one case of arthritis within their elephant populations, and 18% reported at least one case of lameness, over a period of a year (Lewis et al., 2010). Such issues are likely magnified by the variable annual temperatures experienced in Europe and North America compared to the warmer climates that African and Asian elephants evolved to live in.

## Obesity

Obesity is a major problem for individual captive elephants that impacts the overall sustainability of the captive population (Morfeld et al., 2016). Captive diets often contain large amounts of non-forage items, including pelleted food, fruit, and vegetables. This diet combined with reduced space for exercise increases the likelihood of obesity. In the U.K., 92% (70 out of 76) of elephants in zoos were overweight (Harris et al., 2008).

Similar research conducted in 2018, which assessed 97% of the population of elephants in European zoos (518 out of 534), found 57.7% of the observed elephants to have an elevated body condition, with just 38.2% scored as having normal body condition (Schiffmann et al., 2018). In North American zoos, 74% of elephants (177 out of 240) had a body condition score above normal, with just 22% having a normal score (Morfeld et al., 2016).

These studies highlight that most elephants in zoos in both regions are still overweight, which likely increases their susceptibility to the foot and musculoskeletal issues outlined above.

# THE CASE OF SUKI

**Species:** Asian

**Sex:** Female

**Born:** 1964 Wild

**Age:** 57 years

**Current location:** Point Defiance Zoo, Washington, U.S.

**Number of moves:** 10

© Capt. Michael Greenberger (Wikimedia Commons)

Point Defiance Zoo, 2010

© Troy (Flickr cc)

Point Defiance Zoo, 2010

Records show that Suki was born in the wild in 1964 and imported, via a private dealer, to Detroit Zoo, U.S. in 1965 (Elephant Database, 2021).

She lived at Detroit Zoo for three years. During this time, Detroit Zoo also held two other elephants, a male and female. In 1969, Suki was either sold or transferred to a circus owner and elephant trainer in Indiana, where she spent just four months before being moved to Brookfield Zoo.

Suki was held at Brookfield Zoo for three years. There is no record of any other elephant being at Brookfield Zoo during Suki's time there. In 1972, she was moved to the Glen Oak Zoo (Preoria Zoo) in Illinois. In 1985, she was transferred to the Cole Bros. Circus (founded in 1884), which held several other female Asian elephants at the time. In 1986, Suki passed through the hands of Rex Williams, an elephant trainer and circus performer, before being transferred to Dickerson Park Zoo, in Missouri, where she spent just 11 months. In November 1986, Suki was moved to St. Louis Zoo until April 1987, when she was transferred back to Dickerson Park Zoo where she stayed for almost nine years (Elephant Database, 2021). News reports confirm that Suki attacked a keeper at Dickerson Park Zoo, "throwing them against a wall and trying to stomp on him," and may even have killed people at some point in the past (The Spokesman-Review, 1997). Several circus trainers had reportedly also deemed her to be "unmanageable." At Dickerson Park Zoo, Suki underwent surgical artificial insemination, which was not successful. She was apparently isolated from the other elephants (Doyle & Roy, 2006).

In 1996, Suki was moved to Point Defiance Zoo in Washington, where she lives today as the zoo's only elephant. Suki was branded as aggressive towards both keepers and other elephants. It is not clear as to the conditions Suki was kept in at the various locations she was held over the years, and to what extent she was able to mix with other elephants, but her reportedly aggressive nature may explain the number of times she was moved. Point Defiance Zoo has been described as a "national leader in handling elephants considered too dangerous to be kept and trained using traditional methods"

(Burck et al., 2011). Suki joined another elephant named Cindy, and in 1997 an elephant named Hanako was moved to the zoo (both were also considered “problem” elephants). Suki was said to be the dominant elephant at Point Defiance Zoo and did not get along with her companions (Doyle & Roy, 2006).

Suki has been diagnosed with uterine tumors (Point Defiance Zoo, 2022) and in 2019, both Suki and Hanako tested positive for tuberculosis, though were showing no symptoms of the illness (Dalbalcon, 2019). Hanako was euthanized in 2020, due to earlier diagnosed, inoperable cancer and advanced joint disease (Point Defiance Zoo, 2020). Suki is reportedly to be Point Defiance Zoo’s last elephant, with the zoo having no plans to bring in further animals once she has died (The Seattle Times, 2020).

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Point Defiance Zoo, 2013

© David Seibold, flickr cc

Point Defiance Zoo, 2019

# CAPTIVE CONDITIONS


## SUMMARY

- The median lifespan of captive-born elephants is approximately half that of wild conspecifics.
- The median captive herd size is three in European and U.S. and Canadian zoos, compared to 9-16 in wild African elephants and 7-10 in wild Asian elephants.
- Relatedness within captive herds is well below that seen in wild herds.
- 76% of elephants in European zoos and 78% in U.S. and Canadian zoos have experienced at least one transfer between zoos in their lifetime.
- Current enclosure sizes are many orders of magnitude smaller than the space used by wild elephants. The minimum outdoor enclosure space recommended by the European zoo industry is more than 4,600 times smaller than the lowest estimates of home range size for wild elephants.


### Age demographic and survivorship

The median lifespan for wild African savanna elephants is reported to be as high as 50 years, and for working Asian elephants existing in harsher conditions, the median lifespan is 40 years (Sukumar et al., 1997; Taylor & Poole, 1998; Moss, 2001). In contrast, the median lifespan for elephants born in captivity within the U.K. is less than 20 years, approximately half that of their wild conspecifics (Mason & Veasey, 2010), while the median lifespan for elephants in North America is 43 years for Asian elephants and 39 years for African elephants (Elephant Database). At present, no captive elephants in North America or Europe have reached the maximum ages seen in the wild (75-80 years) (Lee et al., 2013).

The truncated lifespan experienced by captive elephants results in imbalanced age demographics within each species, frequently highlighted by a greater number of individuals at either end of the age spectrum, with older individuals being remnants of historic wild captures to supply the zoo and circus industries. The skewed sex ratio towards males in younger age ranges also appears to support previous research, which found that Asian elephants in European zoos produced a higher ratio of males; particularly following artificial insemination (Saragusty et al., 2009) (Figure 3 & 4).

**Figure 3:** Age demographic of current Asian elephant population within North American zoos. Sixteeen individuals of unknown age not included. www.elephant.se 01 November 1, 2021.

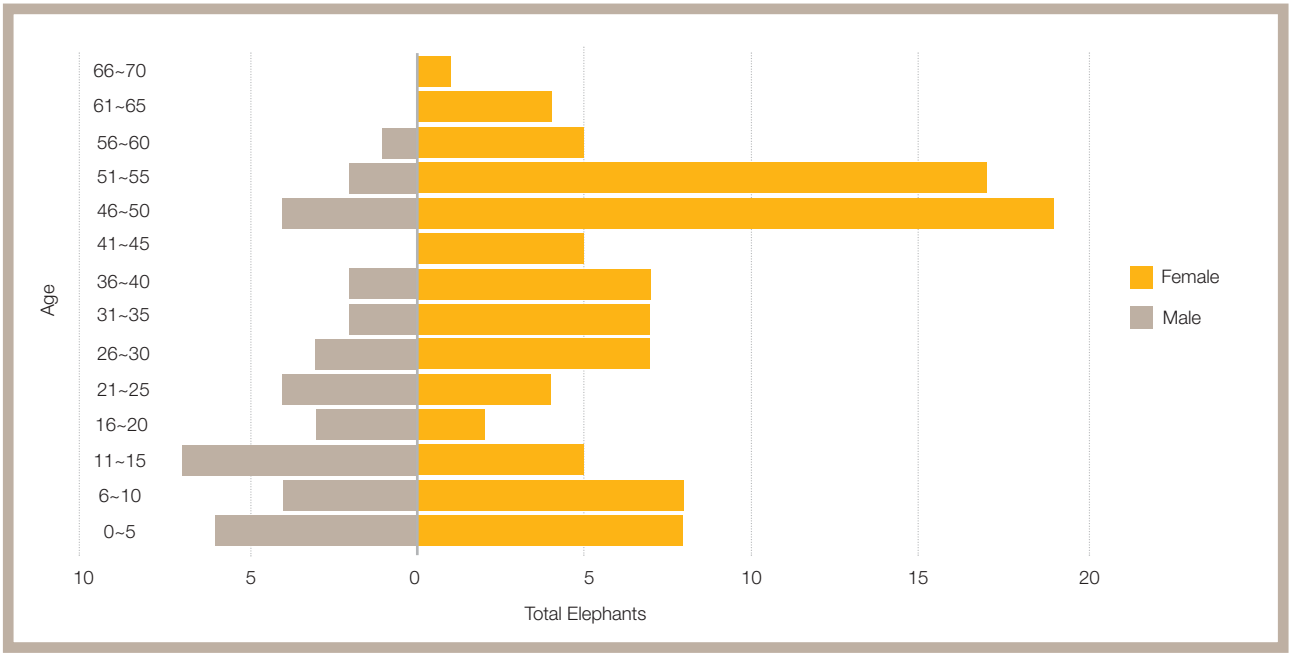
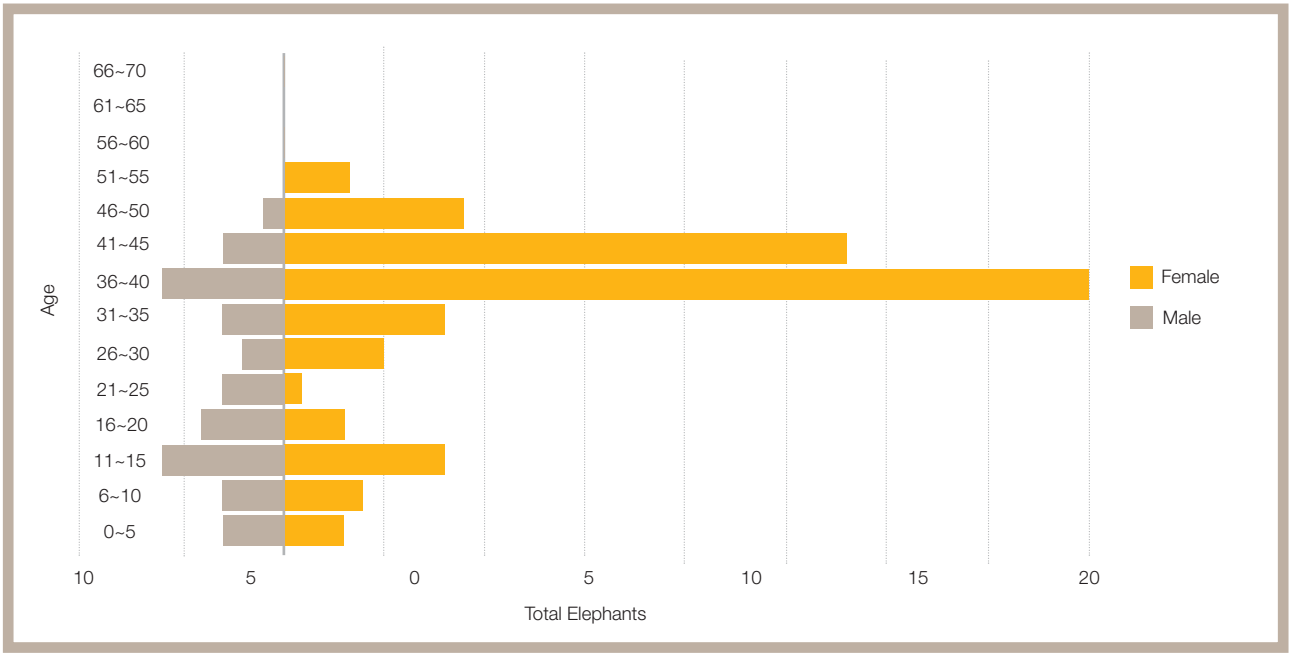


**Figure 4:** Age demographic of current African elephant population within North American zoos. 16 individuals of unknown age not included. www.elephant.se November 1, 2021.




## Social groupings and relatedness

The current median herd size for elephants in zoos in Europe and in North America is three (Figure 5). By comparison, median herd size for wild African savanna elephants is 9-16, and for wild Asian elephants is 7-10 (Katugaha et al., 1999; Wittemyer, 2001; Elephant Trust, 2022). Figures for captive herds include male and female individuals. As zoos frequently separate males from females, the effective herd sizes that captive elephants experience may be even lower than what is reported.

The average relatedness within U.K. captive elephant herds is 0.086 (0.070 when including solitary individuals), calculated based on the average proportion of genes shared between each individual within a herd e.g., mother – offspring sharing 50% of genes, grandmother – grandchild sharing 25% of genes, etc. (Table 4).

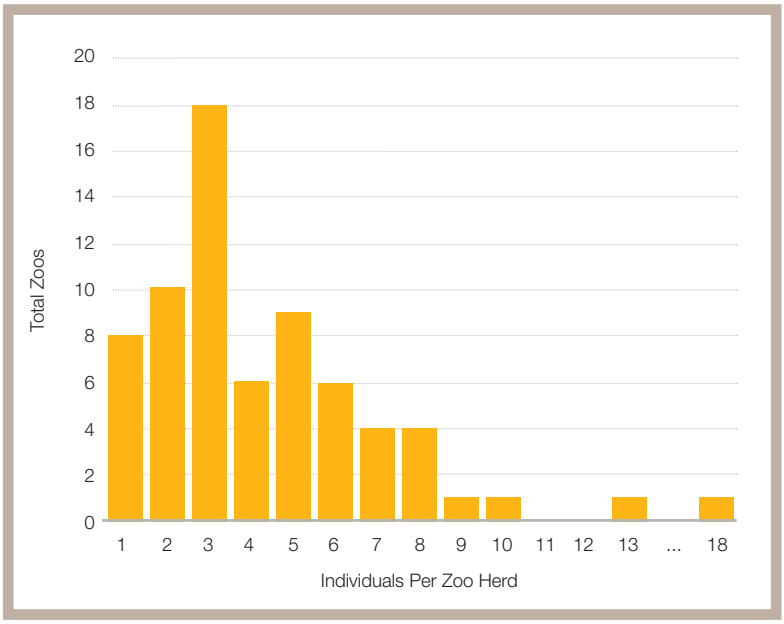
Analysis of a random sample of 10 captive elephant herds within the U.S. and Canada resulted in an average relatedness of 0.068 (African – 0.048; Asian – 0.097; no solitary individuals were included). These relatedness coefficients are well below the average relatedness observed within wild herds of both African and Asian elephants. The average relatedness of wild Asian elephant herds was 0.285 in Cat Tien National Park, Vietnam, and 0.220 in Alur, Southern India (Vidya et al., 2007; Chakraborty et al., 2014). Similar studies of wild African elephant populations observed an average relatedness of 0.124 outside and 0.150 inside the Amboseli National Park, Kenya (Archie et al., 2006; Ahlering et al., 2012). Relatedness within wild herds was also found to predict patterns of fission-fusion between female groups (Archie et al., 2006). Similarly, the average relatedness within captive herds is below that of smaller wild herds (ranging from 1-6 individuals) in areas of high poaching pressure (average relatedness = 0.130) (Gobush et al., 2009).

**Table 4:** Example of herd relatedness calculation. The total proportion of genes shared within the herd is calculated and then divided by the number of possible connections between individuals within the herd.

| Name | Elephant 1 | Elephant 2 | Elephant 3 | Elephant 4 | Total |
|---|---|---|---|---|---|
| Elephant 1 | X | 0.5 | 0.5 | 0 | 1 |
| Elephant 2 | 0.5 | X | 0.25 | 0 | 0.75 |
| Elephant 3 | 0.5 | 0.25 | X | 0 | 0.75 |
| Elephant 4 | 0 | 0 | 0 | X | 0 |
| **Total** | 1 | 0.75 | 0.75 | 0 | 2.25 |
| Herd relatedness = 2.25 / 12= **0.188** | | | | | |

With the exception of one zoo, the relationships within U.K. captive elephant herds rarely extend beyond parent-offpsring and sibling-sibling. In contrast, wild herds frequently consist of relatives that include aunts, uncles, grandparents, and cousins (Elephant Trust, 2022). The presence of such relatives provides collective benefits for individuals within the herd. Grandcalves within working Asian elephant groups demonstrated increased survivability when their grandmothers were present (Lahdenperä et al., 2016). Within wild African elephant populations, high reproductive output was associated with high levels of social bonds and high relatedness between herd members (Gobush et al., 2008). Sadly, these bonds are frequently broken in zoo environments due to transfers to other zoological collections.

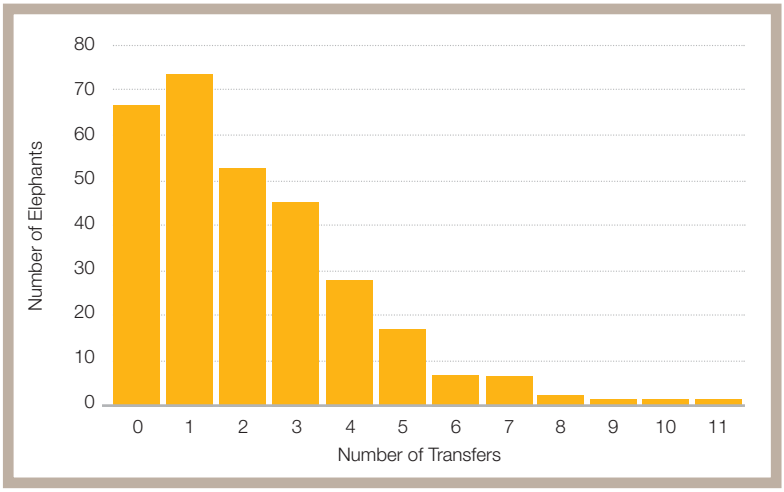
**Figure 5:** The sizes of captive elephant herds housed in North American zoos. www.elephant.se November 1, 2021.




## Transfers

Of all the elephants currently housed in European zoos, 76% (438 out of 580) have been transferred between institutions at least once. The median number of transfers per elephant was one (range 0-8). In total, 580 elephants in European zoos have experienced 945 transfers throughout their collective lives. In addition to the detrimental effects on the welfare of the individual being transferred, such transfers can also be detrimental to the zoo herds (Clubb et al., 2008). Damaging impacts include the physiological and psychological effects of herd and family separation, crating, possible sedation, travel, and introduction to a new zoo, diet, environmental/climatic conditions, and possibly unknown elephants. Any future transfers need to put the health and welfare considerations of the individual elephant first.

**Figure 6:** The number of transfers experienced by each elephant currently housed in a North American zoo. Transfers include zoo – zoo, wild capture – zoo, circus – zoo, circus – circus, zoo – circus and zoo – sanctuary. www.elephant.se November 1, 2021.




In U.S. and Canadian zoos, 78% (232 out of 299) of elephants have been transferred at least once (Figure 6). Similarly, in 2012, Prado-Oviedo et al. discovered that 84% of all captive North American elephants had been transferred. The median number of transfers per elephant was 2 (range 0-11). In total, the 299 elephants housed in U.S. and Canadian zoos have experienced 633 transfers throughout their collective lives.

A 2012 study found that 42% of all captive-born elephants in North America no longer reside with their mother (Prado-Oviedo et al., 2012). Within the U.S. and Canadian elephant populations, 42% (49 out of 116) of captive-born elephants have experienced one or more transfers in their lifetime. This is despite the AZA Elephant TAG/SSP Steering Committee acknowledging that female elephants in the wild often stay together for life (AZA, 2016). In Europe, with 52% (156 out of 298) of captive-born elephants having experienced one or more transfers. 38% (30 out of 79) of juvenile males under the age of 12 have experienced one or more transfers. EAZA recommendations from 2018 suggest that juvenile males should remain with their mothers until their natural age of dispersal (Sach et al., 2019). In the wild, African male elephants disperse from their family herd, on average, at 14 years old, and Asian males at 11-20 years, depending on the first onset of musth (reproductive hormones) (Lee et al., 2011; Srinivasaiah et al., 2019). Based on historical zoo transfers, it can be assumed that some, if not most, of these transfers on both continents will have resulted in offspring being prematurely separated from their mothers.

## Enclosure size

Zoo enclosures are a tiny fraction of the space used by wild elephants. African elephants have been found to range across areas from approximately 2,650,000 acres (Owen-Smith, 1988; Galanti et al., 2006; Williams et al., 2020). Range size for Asian elephants is reported to be from 8,402 to 246,000 acres, depending on range country (Alfred et al., 2012; Ecology Center, 2022). Smaller home ranges are often a result of restrictions imposed by human activity (Williams et al., 2020). Numerous factors influence home ranges including protected area size, food availability, water sources, terrain, poaching pressure, and human-elephant conflict. Home ranging patterns vary between sexes and across seasons.

The zoo industry states that enclosure complexity is more important than just the size (EAZA, 2020), however the limited space provided in captivity ultimately restricts the environmental complexity a captive elephant can experience.

Currently within Europe, the SSSMZP (U.K. only) and the EAZA Elephant TAG Best Practice Guidelines recommend a minimum outdoor area for elephants of 0.74 of an acre, less than half of a rugby union pitch (DEFRA, 2017; EAZA, 2020). In North America, the AZA has previously recommended a minimum of 0.12 of an acre per elephant, less than twice the size of a double's tennis court (AZA, 2012). These minimum enclosure size requirements are dictated by the space available to the zoo industry, rather than based on the needs of the elephants confined within them. In reality, these minimum sizes are wholly inadequate when compared to the home ranges elephants use in the wild or the functional and behavioral needs of elephants. For example, the minimum European outdoor enclosure space is over 4,600 times smaller than the smallest reported wild home range.

Analysis of elephant inspection report forms, obtained via Freedom of Information requests for U.K. zoos housing elephants, reveals that the current median enclosure size for U.K. captive elephants is just 1.97 acres, just slightly larger than a soccer pitch. In total, there is just 66.2 acres of space available for elephants housed in U.K. zoos, compared to the smallest home ranges of 3,460 acres and 8,400 acres for wild African and Asian elephants respectively. When considering the total number of elephants in U.K. zoos, each elephant on average has just 1.24 acres. The SSSMZP currently acknowledge that five or fewer adult elephants may require enclosure spaces which exceed 4.94 acres (DEFRA, 2017) which while still shockingly small compared to wild elephant home ranges, would be met by just four of the 11 U.K. zoos housing elephants. If all zoos were required to comply with such a revised minimum size, it would increase the total space available within U.K. zoos by just 22.2 acres.

The actual space available to a captive elephant on a daily basis may be even less as enclosures are frequently subdivided for management purposes. The differences between environments provided for captive elephants and what they experience in the wild remain stark. Enclosures provided for elephants in captivity are less complex and multiple orders of magnitude smaller than the area that their wild counterparts would typically use. These restrictions ultimately stifle natural behavior and prevent fission-fusion social dynamics, preventing captive elephants from having choice over their lives, who they affiliate with, and who they avoid.

Defenders of zoos frequently point towards optimal foraging theory to justify enclosure sizes. This theory suggests animals who have large home ranges in the wild do not require the same space in captivity as the resources they require to survive are made available within their enclosure (Young, 2017). However, these assumptions are based on an oversimplistic view of the needs of elephants. For example, Asian elephants in Zoo Heidelberg fitted with GPS tags covered comparable walking-distances to wild Asian elephants despite being restricted to a 0.62 acre enclosure (Linti & Reichler, 2018). Research into the distances walked by captive African and Asian elephants in North American zoos produced similar findings (Holdgate et al., 2016). Captive elephants who experienced unpredictable feeding schedules walked 319 acres per day more than elephants that were fed on a predicable schedule, a finding that is testament to their generalist herbivorous nature (Holdate et al., 2016). This highlights that elephants retain their natural exploratory behaviors in a captive setting. The complexity of the enclosure does not dictate whether an elephant expresses that behavior, but rather influences the degree to which the behavior can be expressed. Through scheduled feeding regimes, zoos can stimulate behaviors at certain moments in time, however this is in stark contrast to natural foraging behaviors, where animals employ their evolved and learned foraging responses to seek, prepare, and consume food items to meet nutritional needs.

# THE CASE OF MLILO

**Species:** African savanna

**Sex:** Female

**Born:** Wild (Swaziland)

**Age:** Approx. 19 years

**Location:** Dallas Zoo, U.S.

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Mlilio at Dallas Zoo, 2022

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Ajabu & Mlilo at Dallas Zoo 2019

Mlilo was born at Hlane National Park, Swaziland, where she lived with her wild herd for approximately 15 years before being captured and loaded, along with five other elephants, onto a 20-hour flight to Dallas Zoo in 2016.

Mlilo was one of 17 wild elephants, aged between six and 25, captured in Swaziland and sent to three U.S. zoos (Dallas Zoo in Texas, Sedgwick County Zoo in Kansas, and Henry Doorly Zoo in Omaha, Nebraska). Zoo officials described the import as a “rescue mission” due to drought conditions degrading the landscape in Swaziland, and to make room for Critically Endangered rhinos (Conway-Smith, 2016). In exchange for the 17 elephants, the zoos reportedly donated 450,000 USD to a “Swaziland wildlife conservation trust for rhinos” (Morley, 2016). The export was met with international outrage and fierce objections, including from 80 of the world’s top elephant scientists and conservationists, with legal challenges launched to try and halt the plans (Siebert, 2019).

Dallas Zoo stated that Mlilo arrived thin and underweight, gaining 300 pounds in a few weeks. It turned out that Mlilo was pregnant (and had therefore been transported in contradiction to International Air Transport Association guidelines), though prior hormone testing had reportedly proved to be “inconclusive.” She gave birth to baby Ajabu just two months after she arrived at the zoo (Lydia, 2017). Mlilo and Ajabu currently live at Dallas Zoo with six other African elephants, including male Tendaji and female Zola, the remaining two of her fellow captives from Swaziland. The other two, Nolwazi and Amahle, were transferred to Fresno Chaffee Zoo in California in 2018. As Mlilo’s calf Ajabu is a male, he will need to be separated from his mother in the coming years to avoid potential inbreeding. Whether this will involve him or any of the other elephants being relocated to another zoo remains to be seen.

Scrutiny and investigation surrounding the export of Mlilo and the other 17 elephants from Swaziland in 2016 has continued. Reports in 2019 suggested that many of those who worked for the “Swaziland National Trust Commission” at the time, an organization that oversaw the country’s national parks and reserves, were livid over the export of the elephants. Organization officials reportedly claimed that there was ample

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Ajabu & Mlilo at Dallas Zoo 2016


New York Times, 2019

space and food in other reserves in the country that could have provided an alternative solution for these elephants, but that they were never consulted (Siebert, 2019).

The 2016 export was almost identical to the that of 11 elephants sent from Swaziland to two U.S. zoos (Lowry Park Zoo in Tampa, Florida, and San Diego Wild Animal Park in California) in 2003. These juvenile elephants were taken from wild herds in Hlane National Park and Mkhaya Game Reserve, reportedly to help ease overpopulation there and to rescue them from being killed. However, statements from San Diego Wild Animal Park following the elephants' arrival also claimed that their import was necessary to revive captive breeding efforts, due to an aging zoo population in the U.S. (Moss, 2003). It was also reported that the zoos paid 133,000 USD to the Swaziland Parks, which was supposed to be put towards its improved management of their wild population to prevent the need for other elephants to be captured in the future. Sadly, for Mlilo and her cohorts, further captures and exports were clearly not prevented (Siebert, 2019).

# CONSERVATION AND ENVIRONMENTAL CONCERNS


## SUMMARY

- According to most recent assessments, both African savanna and Asian elephants are Endangered, while African forest elephants are Critically Endangered.
- Capture of wild elephants has adverse consequences on the individual and the herd.
- Wild elephants have a profound impact on their habitats and their decline inevitably affects the ecological role wild elephants perform, with consequences for the wider environment.
- The IUCN Species Survival Commission does not endorse the removal of African elephants from the wild for any captive use.


The capture of wild elephants for captive use clearly has devastating impacts on the welfare and well-being of the individuals involved. Given the importance of elephants as a keystone species, their intelligence and communicative abilities, and their social and cultural complexity, such captures also have serious consequences for the stability of the family groups from which individuals are taken, and by extension the conservation status of populations and the integrity of the wider environment which they inhabit.

Elephants are in serious decline across much of their remaining range. The Great Elephant Census, conducted across 18 African range states between 2014-2016, concluded that savanna elephant populations declined by 30 percent between 2007 and 2014 (The Great Elephant Census, 2016). According to the most recent assessments on the IUCN's Red List, both African savanna elephants and Asian elephants are Endangered, while African forest elephants are Critically Endangered (Gobush et al., 20211; Gobush et al., 20212; Williams et al., 2020). The capture of individuals from wild populations for captive use is considered desirable by some in an attempt to maintain genetic diversity within the captive population, but it hinders long-term conservation goals by reducing remaining wild populations (Jackson et al., 2019). Wild capture only exacerbates the threats wild elephants face from habitat destruction and fragmentation, conflict with people, poaching, and hunting.

Any attempt to capture a wild elephant, whether adult, sub-adult, or infant, will inevitably have adverse consequences. The removal of an adult female from a matriarch-led group can result in the fracture of the group's social dynamics and the development of hyper-aggressive behavior (Bradshaw et al., 2005), or the removal of a younger female caregiver can reduce the chances of infants surviving (Lee, 1987).

Elephant infants or juveniles are most frequently targeted for capture and export for captive use. From 2010–2019, 194 African savanna elephants have been captured and sent to zoos around the world including China (147 elephants), Mexico (18), United States (17), Cuba (6), United Arab Emirates (4) and the Republic of Korea (2) (CITES, 2020). The techniques for capturing these animals commonly involve separating them from their family groups using helicopters, and/or harassing the group using shotguns or other mechanisms that generate loud noises until the target animals become exhausted and separated. They may then be tranquillized from the air and captured by ground crews, while the remaining elephants in the group are kept at bay using further harassment (Cruise & Russo, 2017). This traumatic process is inhumane, highly stressful, can last up to several hours, and can result in injury or sometimes mortality among both target and non-target individuals (Poole & Moss, 2008). The long-term impacts on both the captured elephants and remaining family groups have been likened to Post-Traumatic Stress Disorder, and can result in physical, psychological, and behavioral problems including depression, lethargy, anxiety, and aggression (Bradshaw et al., 2005). This in turn can lead to the long-term disruption of family groups, with negative consequences for the viability of sub-populations and the safety of humans in the area who might encounter traumatized survivors.

If captured individuals are housed within the range of the family group from which they have been removed, it is not unusual for the group to seek out and attempt to access the captive animals, exacerbating the distress to both captured animals and their family members.

The IUCN Red List assessment for Asian elephants notes that "Live trade of elephant calves also poses a threat to their wild populations, especially in Myanmar, from where elephants are traded to Thailand for tourism


purposes. Similarly, capture of elephant calves from the wild and their subsequent live trade, particularly from NE India to other parts of the country, poses an additional threat to wild elephants in source habitats."

Elephant populations are far from homogeneous, and the removal of individuals can have profound implications for specific habitat-adapted sub-populations. Plans announced by Namibian authorities in 2020 to auction a number of live wild elephants from the northern Kuane region could exacerbate existing threats to fragile desert-adapted populations, which already suffer from reduced and fragmented habitat, conflict with people, low numbers of breeding males, and high levels of infant mortality. According to researchers, if elephants are captured from the Omatjete/Kamanjab area in which they are already severely depleted, it could have detrimental effects on the future survival of Namibia's isolated desert elephants and their unique culture (Cruise & Sasada, 2021).

Elephants have been dubbed a super-keystone species (Shoshani, 1993). They have a profound impact on their habitats and benefit countless other species (Puri et al., 2019). Sometimes described as "mega-gardeners of the forest" (Campos-Arceiz & Blake, 2011), elephants disperse more seeds of more species of trees and over greater distances than any other animal on this planet (African Forest Elephant Foundation, 2017). The removal of individuals and the disruption of family groups will inevitably affect the ecological role wild elephants perform, with consequences for the wider environment. Each adult elephant produces roughly one metric ton of dung per week, 52 weeks per year for decades, which fertilizes soils, feeds invertebrates, and enriches biodiversity (Redmond, 2016). The removal of one individual results in a measurable loss to their habitat.

Studies published by the International Monetary Fund suggest that the average carbon sequestration value produced by forest elephants may be upwards of 1.75 million USD over their lifetimes (Chami et al., 2020), (at the price of carbon in 2019, which has subsequently almost tripled). Ongoing work will establish how this value might be realized through the use of international carbon markets in order to benefit local communities that live alongside wildlife to incentivize its protection (Rebalance Earth, 2021). Similar calculations have yet to be done for savanna or desert elephants, but research indicates that they have a positive effect on the level of soil carbon in their respective habitats (Sitters et al., 2020; Sandhage-Hoffman A. et al. 2021.). When individuals are removed from populations for captive use, typically at a very young age, these long-term ecosystem benefits are lost, along with any potential market value amounting to millions of dollars that it might bring.

In 2008, South Africa prohibited the capture of live, wild elephants for export under its National Norms and Standards for the Management of Elephants in South Africa. The document seeks to ensure elephants are managed in a way that is "ethical and humane" and which "recognizes their sentient nature, highly organized social structure and ability to communicate." Its guiding principles note that "elephants are intelligent, have strong family bonds and operate within highly socialized groups and unnecessary disruption of these groups by human intervention should be minimized" (Staatskoerant, 2008).

Believing there to be no direct benefit for in situ conservation of African elephants, the African Elephant Specialist Group of the IUCN Species Survival Commission does not endorse the removal of African elephants from the wild for any captive use. (AfESG 2003). The African Elephant Specialist Group is also concerned by the poor breeding success and low life expectancy of captive African elephants and has stated that it does not see any contribution to the effective conservation of the species through captive breeding per se (AfESG 1998).

# THE CASE OF THIKA & TOKA

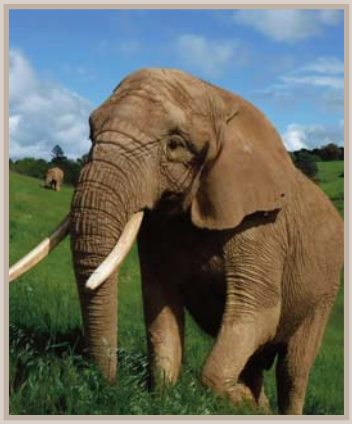
**Species:** African savanna

**Sex:** Female

**Born:** 1980 Captive (Toronto Zoo, Canada) and 1970 Wild (Mozambique)

**Age:** 41 and 51 years

**Location:** ARK2000 (PAWS) Sanctuary, California, U.S.



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Sanctuary landscape, California

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Thika & Mara at PAWS Sanctuary, California

Thika and Toka live at the ARK2000 Sanctuary in California which provides lifetime homes to rescued and retired elephants.

Toka was born in the wild in Mozambique. Her monther was reportedly killed in a cull in 1972 and Toka was subsequently captured, at the age of two. Along with six other young, wild elephants, she was then sold to Toronto Zoo in 1974 (PAWS1, 2022). Thika was born at Toronto Zoo in 1980. Her parents were among the wild elephants imported from Mozambique with Toka. She had a sister three years later, who was moved to another zoo (and died aged 26). Their father Tantor died in 1989 (aged just 20) and her mother Tequila died in 2008 (aged 38).

Thika and Toka, along with Iringa, another of the wild captures from Mozambique, were transferred from Toronto Zoo, Canada in 2013, following a spate of elephant deaths at the facility. The Toronto Zoo board voted to end the zoo's elephant program and find an alternative home for its remaining elephants. The Toronto City Council then voted to move them to the ARK2000 elephant sanctuary.

The ARK2000 sanctuary, operated by the Performing Animal Welfare Society, provides its resident elephants with a vast 100 acres of varied natural terrain to roam, heated state-of-the-art barns, lakes, and pools to bathe in, including an indoor therapy pool (PAWS2, 2022).

Many of the elephants that have come through ARK2000's gates over the years, arrived with medical issues such as joint and foot problems – common ailments experienced by captive elephants, particualrly those that were held on unnaural and concrete surfaces, such as at Toronto Zoo. Sadly Iringa had to be humanely euthanised after 18 months at ARK2000, aged 46; she had degenerative joint and foot disease.

At ARK2000, the resident elephants can socialize with each other, which enables close bonds to develop. In her eight years at the sanctuary, Thika has formed a close friendship with 39-year-old Mara, who arrived from a private U.S. zoo in 2002

(she was believed to be wild-caught in the 1980s). They are said to never be far apart as they roam and forage in the landscape (PAWS1, 2022).

Toka has formed a bond with former San Fransisco Zoo elephant Lulu, a 55-year-old captured from the wild at two years of age. They are usually close by each other's side, frequently enjoying a mud bath together (PAWS1, 2022).

Toka and Lulu were also close companions of Maggie, who had been transferred from Alaska Zoo after living there for 24 years, ten of which were alone. Public outcry opposing Maggie's situation eventually resulted in the Alaska Zoo board of directors voting to move her to a warmer climate (PAWS1, 2022). In 2021, after 13 years at ARK2000, 41-year-old Maggie passed away reportedly under her favorite shady tree. She had suffered significant arthritis and dental disease for most of her life.

Where possible, elephants in zoos should have the opportunity to live out the rest of their lives in a place of sanctuary, such as at ARK2000 in California and The Elephant Sanctuary in Tennessee, but without a change in attitudes and a willingness by zoos to relinquish their animals, hundreds of elephants will remain in poor conditions living compromised lives.

© PAWS

Lulu & Toka at PAWS Sanctuary, California

# PHASING ELEPHANTS OUT OF ZOOS


## SUMMARY

- Since 2010, 22 zoos in Europe have stopped keeping elephants, but 21 zoos have started keeping elephants during the same period.
- Current national zoo legislation within the U.K. and North America still permits the use of “free contact” (no safety barriers between elephant and keeper) and bullhooks.
- Zoos continue to spend vast sums of money on elephant exhibits, despite growing scientific evidence over 20 years highlighting the problems captive elephants suffer.
- Phasing elephants out of zoos could include transferring herds to genuine sanctuaries, consolidation of individuals at zoos with the best resources and conditions, and transferring herds to wild or semi-wild environments in their natural range, whenever possible.
- A phase out would also require an immediate halt to captive breeding and the prevention of any further wild imports.


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## Recent phase outs and changing practices

Within Europe, 22 zoos (11 EAZA, 11 non-EAZA) have stopped keeping elephants since 2010, however 21 zoos (eight EAZA, 13 non-EAZA) are reported to have begun keeping elephants during the same period. With the majority of zoos to start keeping elephants since 2010 being non-EAZA members, it raises concerns about the conditions these elephants will have to endure. Of those zoos that stopped keeping elephants, 10 (45%) transferred their elephants to other zoos, nine (41%) facilities' elephants died without being replaced, two (9%) sent their elephants to circuses, and one (5%) transferred its remaining elephant to a sanctuary. Tierpark Berlin has temporarily stopped keeping elephants while they renovate their elephant house at a cost of 38.4 million USD (Tierpark Berlin, 2020). Alarmingly, only 38% of zoos that began or restarted keeping elephants since 2010 are EAZA accredited (Table 8). In 2017, Twycross Zoo, stated that they did not have the resources to house a male elephant as the reason for ending their elephant program and moving their remaining female elephants to Blackpool Zoo (Twycross Zoo, 2017). Sadly, as recently as 2017, The British and Irish Association of Zoos and Aquariums (BIAZA) and EAZA reiterated that they would still allow their member zoos to import wild-caught elephants (BIAZA, 2017).

Since 1991, 32 North American zoos have closed their elephant exhibits, and three zoos plan to phase them out in the near future; while two zoos have begun keeping or restarted keeping elephants since 2010. The Detroit Zoo and the San Francisco Zoo became the first zoos in the early 2000s to close their elephant exhibits based on ethical concerns (Cohn, 2006; Siebert, 2019). The decision to close pachyderm exhibits largely stems from the 2016 AZA requirement that zoos must have enough space for at least three elephants, though zoos also cite economic restrictions, the increase in minimum space requirements, the poor welfare experienced by captive elephants, and chronic health issues as reasons for phase-outs. Zoos that fail to adhere to the AZA requirements concerning space and number of individuals risk losing their AZA accreditation. From 2006 to 2018, of the facilities that committed to phasing-out their elephant exhibits, 11 (41% of the total) sent them to other zoos; nine (33%) sent them to sanctuaries; five (19%) facilities' elephants died without being replaced, and two facilities' elephants were sent to unspecified locations (PETA, 2018).

In 2011, Toronto Zoo estimated it would cost 12.5 million USD of investment to provide facilities that met revised AZA standards, together with an annual operating cost of 704,100 USD. This led the CEO of Toronto Zoo to recommend the zoo phase out its elephant program (Tracogna, 2011).

In response to revised elephant standards within the SSSMZP, ZSL Whipsnade Zoo estimated it would cost 9-10 million USD to develop their elephant facilities, but the figure could rise to 34-36 million USD on top of an annual cost of approximately 782,300 USD (Sach et al., 2019).

The eventual goal of regional zoo associations is to move from "open/free contact" management, where keepers occupy the same space as elephants, to "protected contact" management, where a barrier or posts enables a degree of physical contact between elephants and keepers. Similarly, transitions are underway within European zoos as announced in the "EAZA Position Statement on the Evolution of Elephant Management Systems at Member Zoos" (EAZA, 2019). This announcement stated that member zoos participating in EAZA's elephant EEPs must transition towards "protected contact" management by January 1, 2030. As part of "free contact," some zoos still use bullhooks or the ankus (a stick with sharp curved, pointed, usually metal tips). The ankus is frequently referred to as a "guide" or similar, yet this method of handling elephants relies on coercion rather than cooperation and on the reinforcement of painful or aversive stimuli. Elephants handled using a bullhook are aware of the pain that the implement can inflict, and typically move away when they see it. AZA, which had, until 2019, defended the use of the bullhook as an "essential management tool," decided to begin phasing them out. The phase-out will stop the use of bullhooks at all AZA accredited facilities by 2023, with the exception of (undefined) emergency situations (Brulliard, 2019). Current national zoo legislation within the U.K. still permits the use of "free contact" and bullhooks, with zoos simply having to provide justification for their continued use (DEFRA, 2017). A number of U.K. zoos, including Colchester Zoo and Woburn Safari Park, still employ the use of bullhooks as part of their husbandry practices.

Despite the argument that keepers use bullhooks for "safety" reasons, or that similar tools and aversion strategies reduce the danger associated with elephant interactions, Born Free USA has documented 168 dangerous incidents in North America directly involving elephants in our Exotic Animal Incident Database from 1990-2017, including escapes, injuries, and deaths. Over half of these incidents (58%, n=98) occurred at zoos. Of the total, 53 of these incidents resulted in a human injury; 17 resulted in a human death; 19 resulted in an animal injury; and 12 resulted in an animal death.

## Human endangerment

Human safety issues may be a factor in some zoos closing their elephant exhibits. Regardless of the level of animal husbandry training zookeepers receive, no amount of preparation can guarantee the prevention of a dangerous elephant incident/attack. Elephants are responsible for the most keeper deaths compared to any

**Table 5:** Notable incidents involving elephants in captivity across Europe and North America.

| Year | Location | Incident | Outcome |
|---|---|---|---|
| 1991 | Knowland Park Zoo, California, U.S. | Senior zookeeper struck by trunk or leg of elephant (AP News, 1991) | Keeper death |
| 1992 | San Antonio Zoo, Texas, U.S. | Keeper grabbed and thrown to the ground (BFUSA Exotic Animal Database) | Keeper death |
| 1994 | Circus International, Hawaii, U.S. | Elephant, Tyke, attacked staff and later escaped (Thornhill, 2014) | Trainer death<br>Staff and spectators injured<br>Elephant shot by police |
| 2000 | Port Lympne Zoo, U.K. | Keeper found with multiple injuries in elephant's stall (Kelso, 2000) | Keeper death |
| 2001 | .Chester Zoo, U.K. | Keeper struck by trunk and crushed against wall (Ward, 2002) | Keeper death<br>Elephant euthanised |
| 2001 | ZSL London Zoo, U.K. | Keeper fell / was knocked down in elephant enclosure and trampled (Matthews, 2001) | Keeper death |
| 2002 | Pittsburgh Zoo, Pennsylvania, U.S. | Keeper knocked over and crushed by elephant (CNN, 2002) | Keeper death |
| 2005 | Vienna Zoo, Austria | Keeper attacked by young bull elephant (Independent, 2005) | Keeper death |
| 2012 | Circus Luna, Germany | Young boy struck in the face (Bolton, 2015) | Suffered a broken jaw |
| 2013 | Dickerson Park Zoo, Missouri, U.S. | Senior keeper knocked over and crushed in corridor between elephant's house and outdoor area (Wicentowski, 2013) | Keeper death |
| 2021 | Endangered Ark, Oklahoma, U.S. | Woman attacked during visitor encounter experience (Peta, 2022) | Visitor left disabled and disfigured |
| 2021 | Cabárceno Nature Park, Spain | Senior keeper hit by an elephant's trunk and knocked into the iron bars of the enclosure (EuroWeekly, 2021) | Keeper death |

other captive animal (Health Day, 2020). Using a minimal but unstoppable amount of energy, elephants have killed people by standing on their heads and crushing them by force, pinning them against an object, or throwing them across an enclosure (Table 5).

Despite the clear and apparent dangers involved with coming into open and unprotected contact with elephants, several zoos offer visitors the chance to pose with elephants for photos or even sit on their backs. One zoo within the U.K., Woburn Safari Park, still offers visitor experiences where members of the public can, "come face-to-face with the female Asian elephants" with "no barriers" between them (Woburn Safari Park, 2022).

### Costs of constructing new enclosures

As many zoos phase out keeping elephants due to financial, spatial, safety, and/or ethical concerns, the Milwaukee County Zoo opted to invest 16.5 million USD in 2019 to build a new elephant enclosure designed to house up to five elephants in space measuring just 0.47 of an acre. In 2021, Belle, the last elephant to leave Riverbanks Zoo in South Carolina, joined Brittany and Ruth in this new enclosure. In 2019, this zoo was mentioned in an article published by the group In Defense for Animals titled: "10 worst zoos in the country for elephants," calling the new exhibit "Africa on Ice" and an "elephant-sized mistake," and citing Wisconsin's freezing temperatures and the limited space provided by the updated enclosure (ABC News, 2019).

Within Europe, zoos have constructed a number of new elephant exhibits in recent times costing millions of euros. Yet these new enclosures still only provide an area that is many orders of magnitude smaller than what is available to their wild counterparts (Table 6).

Sadly, not only are hundreds of millions of dollars, euros, and pounds being spent on the continuing and unnecessary captive housing of elephants, this money delivers little meaningful value to the captive elephants they hold, and is also potentially being diverted away from valuable in situ conservation projects that could provide significant benefits to wildlife and the protection of wider ecosystems and the thousands of species they support.

**Table 6:** Recent expenditure by European and North American zoos on elephant exhibits. *Estimated size

| Year | Zoo | Cost | Space |
|---|---|---|---|
| 2012 | Planckendael Zoo, Belgium (ZooLex, 2020) | 13.75 million USD | 2.9 acres |
| 2015 | Oregon Zoo, Oregon, U.S. (Anstey, 2015) | 49.4 million USD | 3.9acres |
| 2017 | Magdeburg Zoo, Germany (ZooLex, 2020) | 8.5 million USD | 2.2 acres |
| 2017 | Basel Zoo, Switzerland (Zoo Basel, 2017) | 28.12 million USD | 1.2 acres |
| 2018 | Oklahoma City Zoo, Oklahoma, U.S. (Reidl, 2018) | 21.12 million USD | 8 acres |
| 2019 | Blackpool Zoo, U.K. (The Gazette, 2019) | 6.52 million USD | 2.4 acres |
| 2021 | Forth Worth Zoo, Texas, U.S. (Calimbahin, 2021) | 30.76 million USD | 6 acres* |
| 2021 | Cincinnati Zoo, Ohio, U.S. (Demio, 2021) | 48.1 million USD | Scheduled completion: 2023 |

## Possible solutions

In October 2021, Elephant Haven, France, welcomed its first resident, Gandhi, to their sanctuary. There is limited space at Elephant Haven, with room for two additional elephants (Elephant Haven, 2022). With only two Global Federation of Animal Sanctuaries-accredited elephant sanctuaries in North America and until one or more large-scale elephant sanctuaries are established in Europe, availability for elephants is limited, however as of 2022 none of these three sanctuaries are considered to be at capacity. This offers some solutions, but phasing out elephants would best be achieved primarily through shifting elephants between zoos to consolidate resources and create as natural groupings as possible. Once zoos complete the phase-out, they could divert all available funding to in situ conservation efforts (Rees, 2003). Another solution, suggested by Leslie Schobert, retired General Curator at the Los Angeles Zoo, proposes that North American zoos might collaborate to run their own regional sanctuaries. They could buy enough land to house larger herds in the warmer southern states. There would have to be agreement between the zoos, however, to prevent the breeding of new individuals to complete the phase-out (Cohn, 2006). Further, zoos with more space and a better opportunity to provide a higher quality of care could accept elephants rehomed from smaller zoos and private facilities to improve overall individual welfare for those animals living in especially cramped circuses, traveling shows, or private wildlife safaris (Hutchins & Keele, 2006). Again, breeding would have to be prevented.

Returning captive family groups to the wild is also a proposed, but relatively unexplored option. In 1997, a project was initiated to release captive-reared Asian elephants into national parks and sanctuaries in Thailand, with 104 being released to date (Thitaram et al., 2015; Baker & Winkler, 2020). The Sheldrick Wildlife Trust in Kenya report to have rescued more than 260 orphaned African elephants with the aim of releasing them back to the wild (Sheldrick Wildlife Trust, 2022). Of the orphans returned to the wild, 48 have gone on to successfully reproduce. A number of African males used in the safari industry have previously been returned to the wild (Evans et al., 20132). Instances of African females being released are however much less common. In 1982, two elephants from North American zoos were released into Pilanesberg National Park, South Africa (Moore & Munnion, 1989). In 1997, a female, Tembo, held in captivity in Arusha (northern Tanzania) for 27 years was returned to the wild in the Mkomazi Game Reserve, Tanzania, with the help of Born Free, the George Adamson Wildlife Preservation Trust, and the Kenya Wildlife Service (Born Free, 2020). In 2003, an orphaned female elephant raised in captivity and used in the safari industry was successfully released into the Okavango Delta, Botswana (Evans et al., 20131. All released females went on to mother calves and form their own herds or join existing social groups. In 2021, the Aspinall Foundation-operated Howletts Wild Animal Park announced its intention to rewild the largest captive herd of elephants within the U.K. to Kenya (Aspinall Foundation, 2021). Outcomes from such operations may inform potential solutions for the phasing out of keeping elephants in captivity along with insight from organizations with expertise in the rehabilitation and return of elephants to the wild, such as the Sheldrick Wildlife Trust and Game Rangers International.

# CONCLUSION

## The evidence from the case studies, data analysis, research, and academic literature summarized in this report clearly demonstrates that elephants suffer in captive environments, and that continuing to keep elephants in zoos, primarily for the purpose of public entertainment, cannot be justified.

Low birth rates and high infant mortality from EEHV-HD and other causes, together with diminishing genetic diversity within the elephant population in zoos, continues to drive demand for wild elephant capture for export to zoos around the world, with knock-on consequences for the social stability and conservation of dwindling wild populations. Animal sentience is increasingly being recognized and incorporated into legislation and policy, along with the ethical and practical need to ensure good welfare among sentient animals. In particular, we are becoming increasingly cognizant of the intelligence, self-awareness, social complexity, and ecological importance of elephants.

The zoo environment cannot possibly provide elephants with the space or complexity of habitat they require, nor can it enable the complex social groupings and bonds to develop that are clearly so important to normal elephant society. Seen in this light, the physical, psychological, and behavioral pathologies and abnormalities so frequently seen in captive elephants are hardly surprising, albeit no less distressing to witness. Even some within the zoo community have come to recognize this demonstrated by certain zoos ending their elephant programs.

To quote Canadian journalist Graydon Carter:

*"We admire elephants in part because they demonstrate what we consider the finest human traits: empathy, self-awareness, and social intelligence. But the way we treat them puts on display the very worst of human behavior."*

**Elephants belong in the wild. It is surely time to bring keeping elephants in zoos to an end.**

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