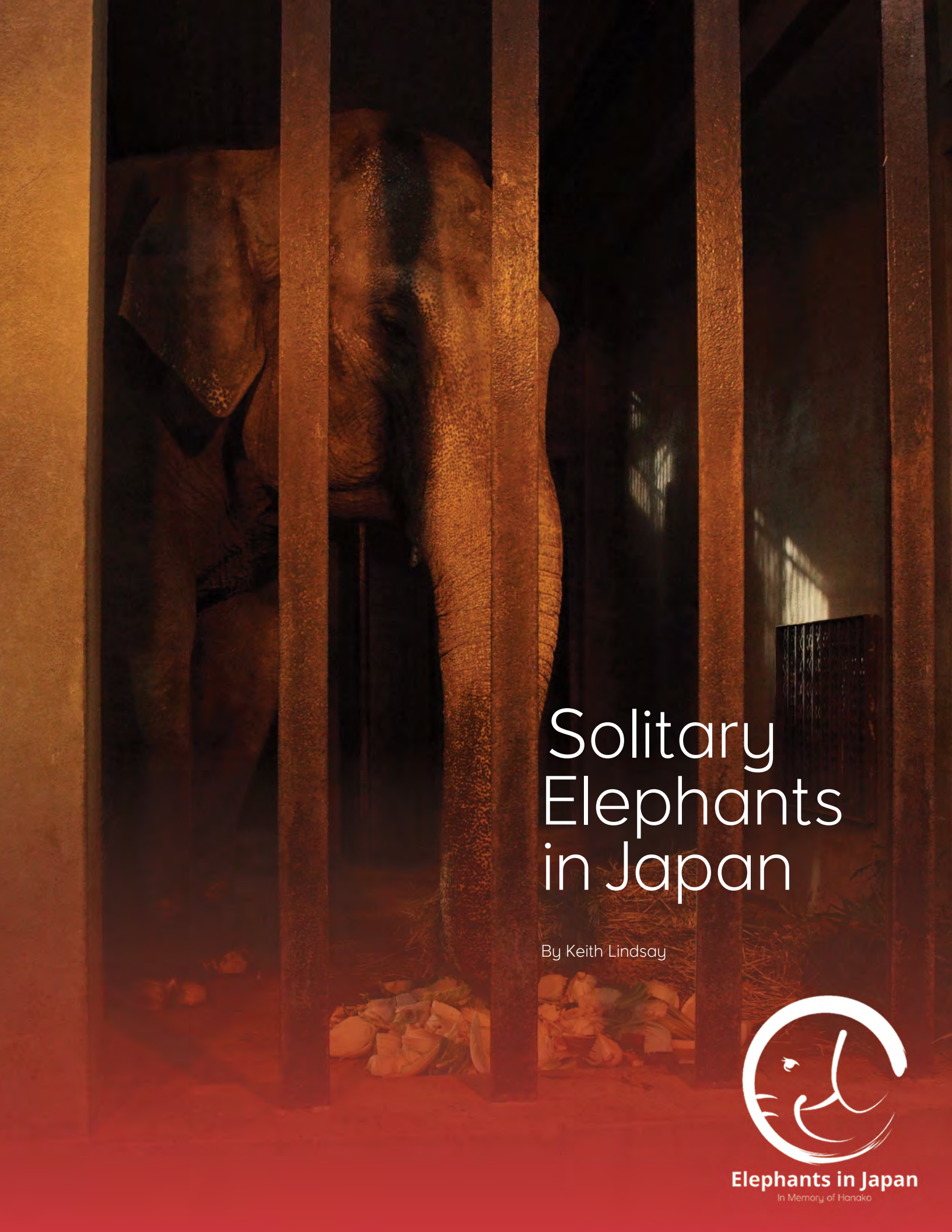

# Solitary Elephants in Japan

By Keith Lindsay

Elephants in Japan

In Memory of Hanako

Elephants in Japan: In Memory of Hanako
info@elephantsinjapan.com
www.elephantsinjapan.com
1 (669) 268-8405 (ph)

Zoocheck Inc.
788 1/2 O'Connor Drive
Toronto, Ontario M4B 2S6 Canada
1 (416) 285-1744 (ph)
zoocheck@zoocheck.com
www.zoocheck.com

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## About the Author

Dr. Keith Lindsay is a Canadian-British conservation biologist and environmental consultant based in Oxford, United Kingdom, with over 40 years' professional experience. His areas of expertise include: biodiversity research and conservation, protected area monitoring and management, environmental assessment, institutional analysis and climate change mitigation in Africa, Asia, the Middle East, the Caribbean and Canada.

Keith's life-long involvement with elephants began in 1977, when he joined the Amboseli Elephant Research Project in southern Kenya. Building second-hand radio-collars and peering at forage plants led to MSc and PhD research projects on feeding ecology, habitat interactions and population demography. He has remained closely engaged in Amboseli to this day, serving on its Scientific Advisory Committee and as collaborating researcher, and overseeing studies of ecosystem change using remote sensing, elephant ranging and human-elephant co-existence. There has been cross-over into his professional work as an environmental consultant; since the late 1980s/ early 1990s, he has had elephant-focused assignments in all parts of Africa, including southern Africa (elephant management policies in Botswana and South Africa), Central Africa (regional elephant conservation coordination for the Convention on Migratory Species), West Africa (research on the Gourma elephants in Mali) and East Africa (Kenya's national elephant strategy, forest conservation in Tanzania). His concerns include stopping the ivory trade through supporting African elephant range states in coordinated action on CITES (the Convention on the International Trade in Endangered Species). For the past 10 years, Dr Lindsay has been active in promoting improved well-being for elephants held in captivity in North American, European and Asian zoos and circuses.

# Table of Contents

## Acknowledgements

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Dr. Keith Lindsay

# Forewords

*"The question is not, 'Can they reason?' nor, 'Can they talk?' but 'Can they suffer?'"*

*— Jeremy Bentham, The Principles of Morals and Legislation*

## Elephants in Japan: In Memory of Hanako

When I first wrote about Hanako the elephant in my blog in late 2015, I had no idea her plight would resonate with people across the world. I knew there was just something deeply tragic about a sentient wild animal living alone in a barren concrete prison at the Inokashira Park Zoo in Japan—for more than 60 years. It struck me that this was as long as my own mother had been alive. So I wrote down my thoughts on the issue.

Rita Claessens, a retired schoolteacher and passionate elephant advocate from Belgium, was one of the first to come across my story. She immediately created an online petition demanding change for Hanako. Within a few months, more than 480,000 people had signed on. A media storm on Hanako's plight came simultaneously. Articles with headlines like, "The World's Loneliest Elephant,"

were published by some of the world's top media including CNN and The New York Times.

Hanako's story had struck a chord with people everywhere. It makes sense. After all, with the proliferation of digital technologies in recent years—including the Internet and social media—word is spreading that elephants are amazingly complex, highly intelligent, exceptionally social animals who have families and friends and who grieve their dead. Elephants have come to take up a special place in people's hearts.

With the worldwide attention on Hanako, I launched a grassroots crowdfunding campaign to "Help Hanako." It was successful enough that a visit to the Inokashira Park Zoo, accompanied by elephant welfare consultant and Elephant Aid International founder Carol Buckley, was arranged. During that visit, I saw Hanako in the flesh for the first time and I also met with the zoo management and staff, including Hanako's own caretakers.

Ms. Buckley assessed Hanako's situation and produced a report with a series of recommendations to improve her welfare in the short, medium and long term. She also determined what many experts had already suspected. Hanako, at 68 years, was simply too old to survive a journey to an elephant sanctuary overseas. But I still wanted to help Hanako and make her life better. So I was delighted when, to their credit, the Inokashira Park Zoo publicly committed to making many of the husbandry and care improvements recommended in the report. At this point, I had also connected with the wildlife protection organization Zoocheck, who provided invaluable support and guidance throughout. They are also closely involved in the making of this report.

Sadly, on the morning of May 27, 2016, before most of the improvements could be made, Hanako collapsed. She passed away that afternoon at the age of 69, reportedly from heart failure. Her long, sad ordeal was finally over and thousands of people around the world mourned her death.

During my efforts to help Hanako I learned that other elephants were in similar dire circumstances in Japan and elsewhere. Miyako was brought to a zoo in Utsunomiya as a baby and had spent 44 years alone in a stark, abysmally outdated enclosure. At the Kofu zoo, Teru had been isolated for the past 17 years in a featureless enclosure, bobbing her head and swaying her body vigorously for hours on end. They are just two of the 14 solitary elephants examined in this report.

My hope is that the information contained in this report is seriously considered by all of the elephant-keeping zoos, Japan's zoo association, policymakers at all levels of government and concerned members of the public. I hope it ignites discussion, debate and action for all of Japan's elephants, as well as other elephants around the world.

If there is anything I learned from the Hanako experience, it is that one person can make a difference. It is not a cliché. While it was too late to save Hanako, it is not too late for countless other elephants that need our help. I hope people will use this report as a tool to learn more about elephant welfare and to empower themselves with knowledge to drive educated awareness and positive change for elephants. For the elephants, it can't come soon enough.

For Hanako,

*Ulara Nakagawa*

Elephants in Japan
In Memory of Hanako

# Foreword

In recent decades, there has been an ever increasing body of knowledge about the welfare and wellbeing of elephants in captivity. Experts now understand that elephants are sentient, self aware, highly intelligent animals with complex, life-long social relationships and networks. That knowledge has made it increasingly clear that the cognitive, emotional and social needs of elephants have often not been satisfied in traditional zoo environments.

Many studies focused on captive elephant welfare reveal that elephants in zoos, circuses and other captive situations experience a  range of physical, psychological and social problems due to the inability of the institutions and businesses who keep them to properly satisfy their needs.

While there has been some movement toward more suitable and humane conditions in some zoos, so far, it has been limited. That's why, throughout the zoo world today, undersized enclosures, inappropriate hard substrates, lack of enrichment, incarceration of elephants indoors for long periods each day, often on chains, and seasonally during cold weather, poor nutrition, cruel handling practices, inadequate or unnatural social environments and abnormal behaviours, are still very common.

There is now a growing worldwide debate about the keeping of elephants in captivity, with many experts taking the position that elephants should not be kept in traditional zoos at all. Nowhere is this debate more relevant than in the discussion about elephants kept in social isolation, such as the elephants featured in this report.

In Japan, the keeping of solitary elephants in zoos seems to have been a relatively routine historical practice. While there is some evidence it is diminishing, today, there are still a significant number of solitary elephants in Japanese zoos.

It is our hope that this examination of Japan's solitary elephants will spur discussion, debate and a renewed effort on the part of government representatives, official agencies and Japanese zoos to do better for the lone elephants they house, manage, display and oversee. We also hope, for the sake of the elephants, that this report's recommendations are seriously considered and implemented as soon as possible.

We now know that elephants are among the most social animals on the planet and that keeping them in isolation is contrary to their nature and welfare. We also know that elephants require large spaces, complex flexible environments, including pasture to graze, soft substrates, a great deal of physical and mental stimulation and appropriate climates. Those are all essential ingredients to good elephant welfare. If appropriate conditions cannot be provided, then the captivity of elephants must be questioned.

The days of every zoo keeping elephants, no matter how inadequate the conditions, must come to an end. It is time to move forward into a more humane future for elephants.

**Zoocheck**

# 1. Introduction

## 1.1. Purpose of the report

This report comes one year after the death of Hanako, the solitary elephant at Inokashira Park Zoo, who died in May 2016. It is intended to survey and document the living conditions of many of the elephants who are currently living a solitary life in Japanese zoos.

A reconnaissance survey was undertaken during visits to 14 facilities holding solitary elephants in Japan during the last week of January and first week of February 2017. Visual assessments were made of their living conditions and their physical and psychological state. These on-site assessments were supplemented by photographs and short video recordings taken during the zoo visits, estimates of the area of zoo exhibits from inspection of Google Earth images and information publicly available from the zoos themselves, including on some of their websites.

The report makes recommendations on the treatment of such elephants, and gives some options for their future management.

## 1.2. Context and Background

Elephants are wild animals. Even elephants that have been kept in camps or used by people for physical work for hundreds of years in Asia, or more recently for tourism, are ultimately derived from the wild. They have never been domesticated, in the way that livestock have been selectively bred for generations to

thrive in the conditions of captivity. Instead, they have simply been trained to accept domination by people and submit to their requirements.

The international zoo community and their national and international organizations have now recognized that best practice in wildlife husbandry is to satisfy, as much as possible, the needs dictated by the biology of the animals they keep. In other words, the appropriate conditions for keeping wild animals are conditions that allow them to express their natural behavior. As wild animals, elephants should be provided an approximation of the life that they would live in the wild: space enough to continually move and forage, and to form normal social groupings of their own choice.

Another key feature of elephants, in common with higher primates, is their intelligence. In the wild, they use that intelligence to resolve foraging challenges and to manage their complex social relationships. For these reasons, it is clear that elephants have the freedom to make their own decisions about feeding and drinking, socializing or simply resting; their lives should not be restricted and controlled by people, because challenging their minds is at least as important as keeping their bodies active.

Japan, in common with many countries around the world, has established and maintained collections of wild animals in zoos for public entertainment and education. The website of the Japanese Association of Zoos and Aquariums (JAZA - http://www.jaza.jp/z_map/z_seek00.html) provides a list of 91 member zoos. According to unpublished estimates, there were some 74 Asian elephants held in 35 zoos and 37 African elephants in 16 zoos in 2010. Of these zoos, some 17 currently hold only one elephant.

As noted, the primary motivation for this report is concern over the keeping of lone elephants in conditions of solitude. The concern for Hanako centered on her well-being, as an aged elephant who had spent most of her 69 years of life alone, an entirely unnatural situation for such a thoroughly social animal, and which was likely the cause of considerable suffering. This concern over one particularly tragic case opens the window on wider issues of elephant keeping in Japan, as the public grows ever more aware of the need to consider the welfare of all animals, especially of wild animals kept in captivity.

The practice of keeping animals in zoos around the world has changed over recent decades, and modern thinking about managing zoos has led to the development of gradually improving guidelines; these guidelines are still evolving, albeit very slowly, towards best practice. The standards for keeping elephants in captivity have increased in small steps only, and not dramatically, as they are heavily influenced by the culture, capacity and tolerance of the various zoo association institutions to meet them. Often the approach to husbandry is based more on veterinary medicine rather than the sciences of biology, animal behavior and ecology.

Japan's scientists, including in particular its world-class primatologists, are members – indeed leaders – of the global academic and technical community, and they have a role to play in advising zoos on good husbandry practice. Its zoo directors and managers can also contribute to, as well as learn from, international best practice in keeping captive wildlife.

As noted, primatologists at Japan's leading universities are internationally recognized world-class scientists. With their scientific assistance and advice on modern best practice, some Japanese zoos have developed improved living conditions for primates, especially higher primates, that better meet the biological needs of the wild animals. The same principle of scientific evidence and best practice should be applied to elephant keeping. There is therefore no reason why Japan needs to lag behind in the design and management of the conditions where elephants are kept in Japan.

It is hoped that this report can provide some positive suggestions for steps on the way forward in improved elephant keeping in Japan.

## 1.3. Methodology

An attempt was made to visit as many zoos as possible during a two-week period. This timeframe was dictated by the available budget, but was also considered appropriate for a reconnaissance-level, almost simultaneous, survey across a range of husbandry conditions. In total, fourteen zoos (all members of JAZA) holding Asian elephants were visited, which accounts for most of the zoos in Japan with solitary elephants. An itinerary of zoo visits is provided in Annex 1.

Some zoos with solitary elephants could not be visited, either because it would have required considerable travel (Hokkaido), because exhibits were closed during the time of the survey, or because of other logistical reasons.

Observations were made at each zoo of the conditions of captivity. Visits lasted from 1.5 to 3.5 hours, and generally occurred during mid- to late morning, apart from two zoos (Utsunomiya, Himeji) that were the second zoo to be visited on the same day.

Aspects noted included:

1. The state of the elephant enclosure,
    - a visual estimate was made of the size of areas provided in stalls inside barns and in outdoor areas
    - in the indoor areas;
        - substrate: soil or concrete
        - food and water availability
        - general conditions
    - in the outdoor areas:
        - the presence and extent of soil/ sandy substrates, and of concrete paving in the outdoor areas
        - shade from direct sunlight,
        - ponds/ pools
        - presence or absence of moat structures, which pose potential dangers of falling
        - feeding opportunities on offer during the period outside
    - observations of general surroundings: noise levels, presence of amusement park, visual appeal
    - educational, interpretive materials present

2. The status of the elephant
    - Overall body condition: shape of the body and visibility of bones of the pelvis, shoulders, spine and tail, concavity of the skull - all indicative of the level of body tone, fitness and/or obesity
    - Condition of feet and nails, and ability to walk without showing discomfort on feet
    - Ability to lie down and stand without difficulty
    - Condition of the skin: presence of wounds or bumps
    - Other health issues, including reports of disease or apparent anomalies
    - General activity or listlessness
    - Performance of repetitive, stereotypic movements

3. The forms of management and husbandry practiced
    - Free contact, with or without the use of a bullhook, or Protected contact, with a barrier between the elephant(s) and keeper and positive reinforcement training
    - Performance of "tricks" in addition to management inspection
    - Timing of release into outdoor enclosure, and confinement indoors

Observations were supplemented, where possible, by discussions with zoo staff during the site visits. Photographs and short video clips were taken of the enclosures and the elephants, to provide a record and a reference for the visual observations.

The visual estimates of area of the outdoor enclosures were checked by reference to satellite images available on Google Earth. Information was also supplied for some of the zoos or city council officials, in correspondence with a key informant.

Additional information on the history and management of the zoos and of the elephants was obtained through internet searches, including reference to the websites of the zoos themselves.

## 1.4. Structure of the report

This report has the following structure:

- Description of the ideal for elephant – their life in the wild
- Summary of best practice in other zoos worldwide
- Summary of findings of this survey
    - range of conditions – physical facilities, management practices, elephant condition and behaviour
    - detailed observations at each zoo presented in Annex 3
- Analysis/ reflections/ comments
    - patterns: small/ poor, moderate, best
    - common features and differences
- Recommendations

## 2. The life of wild elephants

Information from the scientific literature on the life of wild elephants is provided to serve as a basis for comparison with the conditions experienced by captive elephants in zoos, and as a standard towards which zoos should aspire.

Asian and African elephants have some differences in their anatomy and physiology, ecology and behaviour, as do subdivisions within the two taxa, but their morphological similarities and shared evolutionary lineage means that the similarities are greater than the differences in most respects. The discussion will highlight the general patterns and note the distinctions when present. Much of the information on elephant biology provided here comes from Scholes & Mennell (2008) and Sukumar (2003), unless otherwise indicated.

**Taxonomy**

Asian elephants comprise a single species, but there are geographical races/ subspecies across their range. There is thought to be one subspecies on the Indian subcontinent/ mainland, another on Sri Lanka and a third on Sumatra. These divisions are yet to be definitively confirmed by genetic analysis (Choudhury et al. 2008).

On a taxonomic level, there are two African elephants: savanna and forest. Although there is some debate, most evidence now points to these taxa being distinct species, with clear genetic as well as behavioural and

ecological distinctiveness. There are also, slighter, geographical differences within the savanna taxon, with desert races described for north-western Namibia and in Mali.

**Body size and weight**

In African savanna elephants, adult females stand about 2.2–2.6m tall and, in wild conditions, weigh 2,000–3,000kg. Adult males grow substantially larger, to 3.2–4.0m at the shoulder and weights of 4,000–7,000kg. African forest elephants are generally smaller than savanna elephants, with males reaching only 2.5-3.0m in height and a maximum of 5,000kg in weight, while females are correspondingly smaller, at 2.1m tall.

Asian elephant females can grow to 2.4m and 2,500kg in the wild, while most adult males are thought to reach smaller height than African elephants of 2.8-3.5m and weight of 4,000kg, although larger animals have been recorded in the past.

Depending on diet changes throughout the year – see below – there can be fluctuations around average weight values. During periods of temporary abundance, elephants can increase their body weight and fat reserves, which are used to see them through dry seasons and prolonged droughts.

*Image by Smithsonian's National Zoo*

**Habitat and environment**

Asian elephants live in range of forest types, often preferring secondary forest in human-influenced areas, and are therefore adapted to environments with cover and shade. They will frequent forest glades, and sometimes open grassland areas where there may be water or salt. In these respects, they are similar to African forest elephants. The latter's savanna cousins spend most of their time in more open woodland and grassland habitats, but even they seek shade when it is available in the heat of the day. All elephants like to spend time in rivers, ponds or swamps, where they splash themselves with water or mud and take the weight off their feet. This seeking of water, which serves to cool as well as to protect the skin, is usually timed with the hot periods of the day. Elephants also dust themselves with soil, sometimes in combination with splashing/ wallowing, for further skin protection.

## Diet and foraging

"The huge body size allows elephants to overcome some of the predation pressures faced by smaller animals, but makes them slaves of their stomachs." (Campos-Arceiz & Blake 2011, p.543).

Because of their very large metabolic requirements, elephants are required to be generalist feeders and consume whatever is abundant from a wide variety of plant species: the bulk is usually grasses and woody plant stems. All elephants are hindgut fermenters, with digestion and fermentation of plant cellulose taking place in the large caecum and colon. This physiology allows them to process large quantities of low quality plant material and pass it through without impaction, as would happen in ruminant (foregut) fermenters. A wild elephant consumes about 4-8% of body weight per day; a mature bull requires about 150-300 kg (75 kg dry weight) per day and a mature cow 175 kg (42 kg dry wt.). They feed on plants and their parts from roots to high up in trees, and also knock over small trees and bushes.

Diets may vary through the year, depending on the seasonality of plant communities. In semi-arid savannas, African elephants select abundant, nutritious grass during wet seasons and switch towards woody browse – twigs, stems and bark – as grasses dwindle in the dry months. Asian elephants in open and/or seasonal habitats show similar shifts. Such seasonality may be reduced in many forest types, with less dramatic change in diets through the year. African elephants and Asian elephants in forests seek out fruit, which is generally patchily distributed, and also seek forage in openings where there is grass and emergent shrubs, as edible forage is less abundant on the floor of closed canopy forests. In some Asian and African forests, they select the leaves, shoots and stems of bamboo.

Elephants can spend up to 18 hours a day feeding, in both daylight and at night. They sleep for 4-5 hours or less in 24; dozing while standing in midday and often lying down for a few hours during the hours before dawn.

Elephants require access to water for drinking as well as bathing but in arid areas may go for several days without drinking. However an elephant would normally drink up to 100 litres at a time and 225 litres per day.

## Home range and movements

Elephants, with their long legs and measured regular striding, are clearly adapted to walking long distances on a continuous basis. Figures for animals' home range size are dependent on the methods used, both in collecting the data and its analysis. Conventional radio transmitters located from aircraft or the ground have been replaced by satellite tracking and, now, GPS-based systems using mobile phone networks. Connecting the outer dots in a polygon has been replaced by methods that assess the intensity of use of specific areas, typically giving lower but more accurate estimates of habitual land use.

The area of land used by elephants can be influenced by the dispersion of food resources and by human effects on behaviour. Habitats, such as forests and higher-rainfall savannas, with more consistently available forage supplies, are likely to allow smaller home ranges, while larger areas are needed where conditions are more arid or variable through time and across landscapes. Asian elephants are perhaps more limited by humans, as they share more of their landscapes with people across their geographical range. Asian elephant home ranges have been recorded to vary from 30 to 600km$^2$, forest elephant home ranges span 10s to 100s of km$^2$, while African savanna elephants have considerably larger ranges, on the scale of 100s of km$^2$ to as much as 10,000km$^2$.

Individual daily distances walked are, interestingly, less variable than the areas of ground encompassed by elephants. Radiotracking studies from a range of areas in Africa, including moist and very arid savannas as well as forests, indicate that most elephants walk a remarkably consistent average of 10km per day, every day, between limits of 2 and over 30km. These figures do not include the small, localised movements that are often included in estimates reported by zoos of elephant movements, but are the linear distances

traversed across the ground. Larger home ranges result when these movements are onward and directional, while smaller home ranges are typified by returning to previously visited sites.

**Social organisation, reproduction and intelligence**

The basic elephant social unit for both Asian and African elephants is a mother and her juvenile offspring. In Asian elephants and, it appears, African forest elephants, individual mother-offspring units are often found separate from others. In African savanna elephants a family unit, composed of related adult females and their immediate offspring, is a commonly seen stable association, with higher levels of association between family units known as bond groups. In Asian elephants, looser but relatively stable associations between adult females are seen to form on a voluntary basis; these are sometimes with related females but can also be with unrelated "friends". The structured associations of related animals at higher levels seen in African savanna elephants – of family units, bond groups, clans – have not been noted in Asian elephants. It is not clear whether this difference is a genuine species difference, or whether it is due to the human disruption of elephant populations in Asia. There has been more range overlap with people, and thus few undisturbed populations of Asian elephants, for many generations.

Males leave the natal group on reaching sexual maturity and associate increasingly with other males, forming bull groups, which are less stable in composition than associations between females and are often found in separate areas of the population range. This association of younger males with older companions appears to be important for their social development.

Larger aggregations of tens or hundreds of elephants of both sexes may form in both Asian and African species when food is abundant and/or widespread, as in open grassland patches and during wet seasons; these aggregations are temporary and varying, and the rates of social interaction are high.

In both Asian and African elephants, males reach physiological sexual maturity at around 10-12 years, but they cannot successfully compete for matings with older males until they are more than 20 years old. Females reach sexual maturity at a similar age, conceiving, bearing calves and remaining fertile until they are 55-60 years old. Breeding takes place when males seek out females who are in oestrus, which can be detected from behavioural and olfactory cues. Males contest with each other over access to oestrus females and the fighting can be intense if contests lead to escalation. Older males come into an annual state of heightened testosterone levels and behavioural aggressiveness (known as "musth"), which increases their ability and willingness to dominate other males. For their part, females encourage these contests by joining others in large groups that are more readily found, and controlled, by musth males. Such mating activity can occur at any time of year, but is most often associated with periods of improved nutrition and body condition, during times and years when forage is abundant.

Elephants are slow breeders, with an interbirth interval of 3-9 (usually 5) years. Life expectancy varies depending on the intensity of environmental challenges but maximum life expectancy in the wild for both Asian and African elephants is 65-70 years.

The large brains of elephants, with neuron types typically found in higher primates, allow (and compel) them to navigate their social complexity and wide-scale foraging and ranging challenges with an unusually developed working memory, good cognitive mapping skills and, clearly, deep intelligence (Byrne et al., 2009). Studies of cognition in wild African elephants (McComb et al., 2000, 2001, 2014) have shown that they remember and recognize a wide range of social companions with whom they have specific relationships; they can distinguish between humans who pose little or greater threat, and they retain knowledge of appropriate responses to predators and key forage locations into their old age. The role played by "matriarchs", the oldest female leaders of elephant families, in surviving environmental hazards for all group members underlines the importance of accumulated wisdom and social cohesion to elephants' lives.

**Ecology and role in ecosystems**

Asian and African elephants play a keystone role in shaping the structure of the forests, woodlands and savannas they inhabit, promoting spatial heterogeneity and landscape-level diversity through their foraging effects on the structure and composition of plant communities. The loss of such keystone megafauna from ecosystems could have profound and long-lasting negative effects on ecological structure and function (Beaune et al., 2013).

Removing elephants is clearly damaging to the functioning of natural ecosystems, to the diversity of plants and animals with whom they share the forests and savannas and even, it has been suggested, to the storage of carbon in such plant communities (Hance, 2011). Elephants are integral components of their habitats; without them, Asian and African landscapes would be very different places.

## 3. Best practice guidelines in worldwide zoos

The biology and ecology of wild elephants in Africa and Asia have been described in the previous section, with a view to cataloguing their basic needs. This section discusses how and to what extent zoos around the world are shaping their guidelines in the face of the challenge of meeting these needs.

The principles and practices of zoos have changed over time. Originally established in the 19th century as collections for study, "zoological gardens" became – through much of the 20th century – simply menageries for public amusement. Located in parks in major cities, they offered people the chance to see exotic animals up close. While there may have been some incidental educational value in this viewing, much of the emphasis was on the curiosity factor, a chance to encounter the unusual. It is only towards the end of the 20th century and into the 21st century that some zoos have attempted to shift their role into public education and conservation. However, the reality is that, despite their many claims, there are no zoos – anywhere – that have invested significant funds in genuinely educational materials at their facilities. Few, if any, zoos provide significant information about elephant biology and conservation issues beyond simple signboards with very limited factual content.

In the last few decades, and with the advent of alternative forms of media that offer much more in the way of education and viewing of wild animals, a number of zoos have begun emphasizing the contribution they make to conservation of wild animals in their native countries. When such claims are examined critically, it can be seen that the support by zoos to conservation of elephants in their natural ranges is very limited. Many zoos spend less than 3%, and most far less than 1%, of their annual operating budgets on in-situ conservation activities. Much of the reported support for conservation includes significant expenditures for activities, such as research on zoo-related diseases or reproductive performance, inside the zoos themselves.

It is clear that while some zoos have made much of their efforts to change their roles from amusement parks for public entertainment towards education and conservation, they have in fact done relatively little in those areas to justify the continued keeping of wild animals in captive environments.

### 3.1. Minimum standards for elephant enclosures

The rise of concern over the well-being of captive animals in general has led to increased interest by national zoo associations in promoting improved welfare for the wild animals held in member zoos. Despite some relatively encouraging signs, many of the core challenges facing animals in zoos, such as lack of space and of complex, flexible environments and social conditions that facilitate the expression of the full range of natural, species-typical movements and behaviors, remain substantially unaddressed in most zoos. True progress will have been made when principles of elephant husbandry in captivity are based on the needs of the elephants, from their perspective, rather than on the wishes of a public craving entertainment or the administrative procedures of zoos.

Zoos are not the only facilities that offer captive environments for elephants. In response to public apprehension over the living conditions of elephants in zoos and – even worse – in travelling circuses, there has been the emergence of elephant sanctuaries, which are dedicated to providing elephants with improved conditions for living out the remainder of their lives. There is a small number of genuine elephant sanctuaries in North America (chiefly, the Performing Animals Welfare Society – PAWS and The Elephant Sanctuary – TES), in Brazil (Elephant Sanctuary Brazil – ESB), and in Thailand (Boon Lott's Elephant Sanctuary – BLES), as well as others that are close to opening in the USA (Elephant

Refuge North America – ERNA) and in France (Elephant Haven). These facilities attempt to provide humane locations for elephants that have been exposed to cruel or inadequate conditions in circuses or zoos. The conditions offered to elephants in sanctuaries are generally at a higher level than in zoos.

*Performing Animals Welfare Society – PAWS in California, USA*

*Boon Lott's Elephant Sanctuary – BLES in Thailand*

Having noted that nearly all zoos have shortcomings, it is nevertheless worthwhile to consider the standards that have been developed and published by a number of national zoo associations around the world, as well as some of the key elephant sanctuaries. These guidelines include minimum requirements for indoor and outdoor space, social composition of groups, and other aspects of living conditions. Zoo organizations for which published standards are readily available include the Zoo and Aquarium Association – ZAA of Australasia (formerly the Australasian Regional Association of Zoological Parks and Aquaria – ARAZPA 2004), American Association of Zoos and Aquaria (AZA 2012), British and Irish Association of Zoos and Aquaria (BIAZA 2010), and the Central Zoo Authority of India (2012).

In 2003, a meeting was held at Tufts University in the United States to attempt to bridge the gap between zoo associations and organizations concerned with elephant welfare and well-being. This meeting launched an initiative of the Coalition for Captive Elephant Well-Being (CCEWB), which produced two key documents on best practice guidelines for elephant husbandry (Kane et al. 2005a, 2005b). The Global Federation of Animal Sanctuaries (GFAS 2015) has also provided guidelines for elephant enclosures, which appear to be modeled on the CCEWB standards.

These published guidelines all emphasize that the standards should be considered as the absolute minimum values for elephant well-being, with housing areas and social groupings to be exceeded whenever possible.

Some key points from the different guidelines on the dimensions of living quarters and on social groups are summarized in Table 1 below.

Table 1. Minimum standards for elephant enclosures

| Standard | Sex | Area indoors | Area outdoors |
|---|---|---|---|
| **ZAA (ARAZPA)** | Female, with or without calves | Not specified | 900m$^2$ for up to 2 adult elephants; 2000 m$^2$ for up to 8 elephants; 250m$^2$ for additional elephants >2 years' old |
| | Male | Not specified | 500m$^2$ per elephant |
| **AZA** | Female | 37m$^2$ | 500m$^2$ per elephant |
| | Female + calf | 56m$^2$ | 500m$^2$ per elephant |
| | Male | 56m$^2$ | 500m$^2$ per elephant |
| **BIAZA** | Female | 200m$^2$ for 4 females; 80m$^2$ per additional female | 2,000m$^2$ for 4 adult females; 200m$^2$ per additional female |
| | Male | 80m$^2$ | 500m$^2$ |
| **Central Zoo Authority, India** | Either | 48m$^2$ | 5,000m$^2$ |
| **CCEWB** | Female | 60m$^2$ overnight; 185m$^2$ winter quarters | Sufficient to allow walking of 10km/day |
| | Male | 110 m$^2$ overnight; 320m$^2$ winter quarters | Same as female |
| **GFAS** | Female | 240m$^2$ for 4 females; 80 m$^2$ per additional female | Sufficient to allow walking of 10km/day |
| | Male | 110m$^2$ | Same as female |

All of these organizations emphasize the need for the indoor areas to be large enough for elephants to be able to move, lie down and engage in social interactions. Outdoor areas should allow elephants to move around sufficiently for the maintenance of muscular and foot/ joint health, and to allow the elephants to occupy their minds continuously with foraging challenges. Most organizations indicate that elephants should not be confined for extended periods indoors and, ideally, should have access to the outdoor areas at all times of day and night.

A survey of US zoos for a cross-sectional study of welfare measures and outcomes for the physical and psychological health of captive elephants (Meehan et al. 2016) provides basic summary statistics for the size of indoor and outdoor enclosures, and percent time spent in each (see Table 2).

Table 2. Statistics from US zoos on size of enclosures and time spent indoors and outdoors

| Measure | No of zoos | Mean | Minimum | Maximum |
|---|---|---|---|---|
| Size of area | | | | |
| **Indoor** | 68 | 129m$^2$ | - | 799 |
| **Outdoor** | 68 | 3,921m$^2$ | 73 | 18,057 |
| Time spent in 24 hours | | | | |
| **Indoors** | 252 | 29% | 0 | 81 |
| **Outdoors** | 252 | 55% | 1.3 | 100 |

These data show that the average size of indoor and outdoor enclosures in US zoos is now almost 130m$^2$ and 4,000m$^2$ respectively, although with a wide range. The maximum size of indoor (800m$^2$) and outdoor (18,000m$^2$) enclosures is worth noting. Average times spent indoors and outdoors are 30% and 55% respectively, while the minimum indoor time (0%) and maximum outdoor time (100%) are also noteworthy.

All these organizations agree that the indoor area should be well-drained and, for foot and joint health, have a layer of soft flooring composed of either rubber or sand. Sand pushed into a pile assists larger elephants in lying down to sleep and to rise again. Food and water should be available continuously in the indoor area, so that elephants can eat or drink at will.

For outdoor areas, most associations concur that it is important for elephants to have room to move around, forage and interact with other elephants at their own choice. There is lack of agreement on the optimal size of outdoor areas, and many zoos are constrained by the amount of space they can offer, especially in the case of urban zoos. Zoo associations have therefore been reluctant to accept that the size of enclosures is important, although they have gradually increased the minimum area over the years as their member zoos have spent funds to increase their enclosure sizes.

The CCEWB Optimal Conditions suggest that outdoor enclosures should permit elephants to get out of visual contact with other elephants, and with people; this provision allows elephants to choose their own social environment. The enclosure should be complex, if possible with some slight hilly terrain, subdivided into connected paddocks, allowing isolation if needed and containing naturalistic habitat, enough grass to

regrow under grazing. Food should be available at all times and distributed around the compound to encourage elephants to walk and forage for some 10 km per day, as elephants do in the wild. This scale of movement could be achieved in a relatively small enclosure if the elephants are kept busy continuously, but obviously the most straightforward way to promote ranging behaviour is to provide a large space.

It is worth noting that in most elephant sanctuaries, the smallest enclosure is on the scale of 5 acres (some 20,000m$^2$), while other enclosures, as at PAWS, can be as large as 80 acres (324,00m$^2$) or even, as at TES, 200 acres (810,000m$^2$). Nevertheless, these large enclosures are still much smaller than any elephant home range in the wild.

Most zoo best practice guidelines now conclude that elephants should not be confined indoors in small stalls or enclosures for more than a few hours a day. In the wild, adult elephants are active for most of a 24-hour period, usually sleeping on the ground (at night) or dozing while standing (during midday) for only 2-4 hours a day. When elephants are kept in areas where weather is too cold in winters or too rainy to allow elephants outdoors, their indoor enclosures should be significantly larger.

All organizations agree that, for best practice, other features of outdoor enclosures should include:

- Shade from the sun and shelter from wind, rain, sleet or snow.
- A pool, pond or lake that will allow immersion to the extent of taking most of the weight off the feet.
- Sand or soil substrate over the majority of the enclosure, for foot and joint health and to allow the elephants to dust themselves; in combination with water, this would allow mud for wallowing.
- Fencing rather than steep-sided moats. It is now widely recognized that moats pose a danger of falling or being pushed by another elephant, with temporary or permanent injury an unacceptable risk.

*Elephant enclosure, Oakland Zoo (left)*

*Elephant enclosure, North Carolina Zoo (right)*

## 3.2. Minimum standards for social composition

The social environment, it is now recognized, is of primary importance. The recent survey of US zoos (Meehan et al. 2016) concluded that the social environment for elephants is more important to a range of welfare indicators than available living space alone.

Female elephants should be allowed to form social groups of at least three (according to the AZA) or four (ZAA, BIAZA) adult animals with whom they are on friendly terms (see Table 3). Positive social groupings are important to such a naturally gregarious animal, and are seen as extremely important for their psychological health. The evidence from the US zoo study shows that social group membership is associated with reduced stereotypic movements, while solitary animals show a wide range of behaviour problems. Social companions are also important to adult females for any calves that are born – raising calves successfully is improved when elephants are in groups of adult females. It is felt that males can be kept alone, although in contact with females, allowing separation if necessary for controlling breeding or reducing harassment of the females. However, since males also form semi-cohesive social groups in the wild, zoos should also consider providing multiple social partners for males.

Table 3. Minimum standards for social composition

| Standard | Females | Males |
|---|---|---|
| **ZAA (ARAZPA)** | 4 females of varying ages | 1 male, in contact with females |
| **AZA** | 3 adult females | 2 males or 3 elephants of mixed gender |
| **BIAZA** | 4 adult females | 1 male, in contact with females |

Under these guidelines, any zoos with fewer than 3 or 4 adult female elephants are required either to seek to add to their population, allowing space and time for friendships to form, or to close their exhibits.

Elephants in the wild form social groups of related animals which grow up in groups together, or they develop bonds with unrelated animals in a process dictated at their own pace and of their own choosing. The challenge of forming social groups of unrelated animals in zoos is that elephants who are placed together in a single enclosure, especially as adults, may not form positive relationships. If they are forced to remain in close proximity with animals they do not like, elephants may fight, bully and possibly injure each other. Dominance hierarchies based on aggressive behaviour are not a natural feature of elephant society; animals that do not get along simply move apart and their encounters are less frequent.

The importance of large enclosure size and complexity to elephants' social groupings in captivity is the opportunity that they give elephants the relative freedom to form positive relationships or avoid negative interactions. Most sanctuaries do not have strict guidelines on social group size, but they encourage all their elephants to form relationships of their own choosing. They recognize that elephants are ultimately happiest in the presence of other elephants, but many elephants who have spent their lives in unnatural situations in zoos may come with psychological problems that make it difficult for them to form bonds with other animals. It may also be necessary to keep animals with diseases such as TB separate from others. In sanctuaries, elephants are given the space to associate with or avoid other elephants.

Much is made by zoos of the importance of the relationships between elephants and their human keepers or care-givers. Certainly such relationships, if based on positive interactions, and not inhumane punishment, can be important in the lives of elephants who are otherwise deprived of the company of friendly conspecifics. Elephants may form stronger bonds with certain individual care-givers, especially if the relationship is based on trust, and they are likely to prefer the company of such people to strangers, such as zoo visitors.

On the other hand, if elephant handlers use cruel, coercive methods based on the inflicting of punishment and pain, the elephant involved may retaliate without apparent warning if given the opportunity. There are many examples of elephant handlers being injured or killed by elephants, and these are usually described as "accidents". Elephants rarely do anything by accident; their actions are generally purposeful and understandable in terms of their history of social interaction.

understandable in terms of their history of social interaction.

In many cases, zoo visitors constitute a noisy, demanding intrusion into elephants' lives. They are, understandably, concerned primarily with their own personal needs, and have come to the zoo with the expectation of seeing a wide range of animals doing interesting things. They seldom have the patience to sit quietly and watch elephants forage or interact with each other in subtle ways; there are commonly attempts to interact with the elephants to elicit amusing responses. In some cases, elephants seek out this interaction as a way to relieve the boredom of their captive existence, while in other situations, the elephants are seen to avoid the crowds, turning their backs or moving away from the viewing area.

## 3.3. Standards of captive elephant management

### 3.3.1. Feeding of elephants

The guidelines of the zoo associations and sanctuaries noted above all conclude that feeding of elephants should be as close as possible to wild food types and foraging opportunities. Wild elephants spend up to 18 hours a day in foraging on coarse, low quality vegetation. Using these food types has two benefits: it prevents excessive nutrient intake and resultant obesity; and it allows elephants to occupy their time in a rewarding way.

Forage provided to elephants in captivity should consist of natural food types – grass/hay and woody twigs, with very little fruit and vegetables or concentrates. It should be made available to elephants continuously, and spread around the enclosure and its margins on a regular basis so that elephants can spend most of their day feeding. Elephants should not be left standing around for hours at a time with nothing to do but wait for the next feeding of concentrated food. Woody plants and leafy material in particular offer elephants a foraging challenge that keeps them engaged for hours at a time.

The feeding of fruit and vegetables, sugar cane or concentrated animal cubes to elephants may seem like kindness, as they do select them whenever they are offered. However, a diet rich in such food types must inevitably lead to excessive weight gain, which puts an extra burden on elephants' feet and joints. Over-feeding leading to obesity, which is common in many zoos, is not in fact kindness but ultimately cruelty.

As with forage, fresh drinking water should be available to elephants continuously. Withholding water and providing it only by keepers is not good for elephants' health, or their freedom to choose their own drinking regime.

### 3.3.2. Management practices

As noted above, elephant husbandry should be aimed at providing captive elephants with a life that is as close to their natural conditions as possible. They should be kept active, mainly engaged in foraging, encouraged to move in search of food with a target of covering an average of 10km per day of clearly direct movement. Social interactions with other elephants should be at their own initiation, with the ability to choose, avoid or join social partners. Males and females should be able to join with each other or remain separate.

The methods employed by keepers to work with elephants fall into two broad categories: free contact with direct physical interaction and protected contact with a barrier always present between keepers and elephants. While it is possible to have direct contact methods that involve only positive reinforcement, generally free contact involves the use of metal sticks with a sharp point and a hook; these are known as

punishment to reinforce the message of the hook in hand. Elephants soon come to learn that a person holding a bullhook should be obeyed but, as noted above, when cruelty is used in training the elephant's response is never entirely predictable.

The alternative of positive free contact, requires much closer attention to elephants' behavioural cues, a great deal of patience, and strict adherence to protocols that involve never taking an elephant's response for granted. Positive free contact has been used in the past in at least one sanctuary (TES) but it does demand that keepers are well-trained and experienced at interpreting elephant behaviour and it does carry a serious level of risk when dealing with elephants that have previously been managed using bullhooks and punishment.

Protected contact is a system that should be based on positive reinforcement training, where elephants respond voluntarily to commands/ requests from a keeper on the other side of a barrier. It is fully possible to train and interact with elephants in a wide range of all essential husbandry procedures through positive reinforcement such as the provision of food rewards and encouraging words alone. When practiced properly, PC should not utilize negative physical and psychological sanctions. The greatest value of protected contact is that both elephant and keeper can avoid making a fatal error, since the two parties never share the same physical space. Protected contact should be coupled with relationship building and autonomy, a complete approach that considers the overall well-being of the elephant.

Elephants need never be ordered to submit to human interventions for more than essential inspection and veterinary care, including maintenance of feet and nails or skin, or to take blood samples or trunk swabs. For more invasive procedures, an elephant may be treated in a restraint device, to which they have been habituated, which allows safe access to the animal. If necessary, elephants can be sedated for medical procedures, such as surgery. Elephants should never be required to perform tricks for human audiences, but should be allowed the time and space to live their lives in as natural a manner as is possible.

## 3.4. Conclusions from best practice guidelines

It is clear from the current best practice guidelines of zoos around the world, and the principles of established sanctuaries, that the keeping of captive elephants in conditions that might approach the meeting of their biological needs is very demanding of resources. Significant financial commitment for capital development projects and recurrent expenditure is needed for the provision of adequate spatial areas that allow varied foraging conditions and the commitment of staff time to round-the-clock feeding and caring. Guidelines have continued to evolve in the direction of ever greater commitment of such resources to these very large animals, with their very large needs.

The importance to elephant well-being of essential and agreeable social companions requires special mention. It is now firmly established in the international practice of elephant keeping that the social environment is of primary importance. Elephants should never be kept in solitary conditions; females should live in social groups of at least 3-4 adult animals, while adult males should have the companionship of other males as well as of females. Relationships with keepers should be based on positive experiences only and could be an important supplement to elephants' lives in captivity, in contrast to the often submissive dominance-based relationships developed through training with bullhooks.

A number of zoos around the world (29 in the USA, 3 in Canada, 2 in Latin America, 6 in United Kingdom, 1 in Europe, ALL zoos in India), and an increasing number in Japan (3 to date), have recognized that the successful keeping of elephants is beyond their capabilities and is no longer suitable for their limited facilities. They have taken the enlightened decision to close or to signal their intention to

## 4. Summary of the survey findings

The zoos surveyed in the current study presented a range in elephant status and in living conditions provided by the enclosures, both indoor and outdoor, and in management practices. The findings of the reconnaissance survey are summarized in this section, with full details of observations presented in Annex 3. In the next section, the findings are assessed in relation to best practice in world zoos.

The findings are summarized here in two tables: Table 4 with information about the conditions of the zoos and Table 5 with information about the Asian elephants in the zoos themselves.

In six of the zoos visited (Ishikawa, Kiryugaoka, Utsunomiya, Himeji, Ikeda, Fukuyama), the elephants had been solitary all their lives; in one of these zoos (Ikeda), the solitary elephant had died during February 2016, before the survey, while in another (Kiryugaoka) the elephant died just over one month after the survey in April 2017. The facilities in four of these zoos – with Kiryugaoka and Fukuyama the exceptions – are designed to hold only one elephant, so any elephant at these zoos would always be solitary.

In the eight other zoos (Chausuyama, Hamamatsu, Kyoto, Kobe Oji, Fukuoka, Tokushima, Yuki Park, Tennoji), the elephants became solitary due to the death or movement of previous companions. In two of these zoos (Kyoto, Kobe Oji), the elephants were previously solitary but were recently joined, or re-joined, by one or more others. In these latter zoos, the experiences and responses to the addition of animals are still informative regarding the effects of solitary living.

The zoos surveyed fall into three broad categories:

- Substandard and unacceptable
- Standard but outdated
- Moderately improved

These three groups of zoos are discussed below.

## 4.1. Substandard zoos

Five zoos are considered to be in very poor condition. These are:

- Kiryugaoka
- Utsunomiya
- Himeji
- Ikeda
- Yuki Park

These zoos are typical of an old-fashioned model, dating from a time when exotic animal collections were still seen as a source of entertainment for the public. They all associated with amusement parks in urban or semi-urban settings and the animal exhibits, including the elephant enclosure, are simply display cases in a living museum. The enclosures all appear to have been designed and constructed in the 1950s, or earlier, at a time when zoo management was not at the progressive standard of the late 20$^{th}$ century, and they have not been modified significantly since then. The indoor stalls are very small (average size of stalls = 38m$^2$), dark and poorly furnished. The floors and walls are concrete, and some are not well-drained, so the elephant could be standing in water or urine for extended periods.

The outdoor display areas are also extremely small (average size = 166m$^2$), and either entirely or mostly bare concrete (average 86% of the outside area, with a range of 57-100%). There are drainage problems in the outdoor enclosure at both Himeji and Yuki Park, so the elephants spend much of the day with moist feet. The compounds all have moats with steep sides and are all very close to the public viewing area, with no screening or distance from the attentions of zoo visitors. With amusement parks immediately adjacent to the elephant habitat in several cases, the sites are noisy.

The elephants at these zoos were all moderately obese, with poor foot health, having cracked or badly trimmed nails. All showed pronounced stereotypic behaviour, apart from Izumi at Kiryugaoka Zoo – she showed little activity and must have been suffering from very ill health, because she died in April 2017, just over one month after the observations were made.

Both Merry at Ikeda Zoo (died in February 2016) and Miyako at Utsunomiya Zoo were reportedly considered dangerous by their keepers. Miyako interacts with members of the public in a generally unsupervised way: small items of food are sold at the entrance to the zoo/ amusement park and the elephant stretches her trunk out across the moat to take such items as coconut pieces from visitors. Often this feeding is unsuccessful, as food items drop into the moat.

These zoos are so inadequate in their provision of living space, falling far below the minimum of best practice standards, that they are unsuitable for keeping even one elephant and certainly not more than one. If these zoos intend to continue keeping elephants, the outdoor elephant enclosures should be enlarged considerably and indoor facilities built to accommodate more elephants.

## 4.2. Standard but outdated zoos

The elephant compounds of five zoos appear to have been designed and operated in a standardized format that may have been seemed acceptable some decades ago, but now falls far short of best practice guidelines. These zoos are:

- Ishikawa
- Chausuyama
- Kobe Oji
- Hamamatsu
- Fukuyama

The elephant enclosures in these zoos were either built in the 1980-90s, or built earlier and renovated during that period. Their similarity of construction and layout suggests that there was a template for zoo design during this period. As such, they represent an improvement over the old-style zoos in the "substandard" category but are still some decades out of date with the current best practice for elephant

management. Most of them are located in areas at the edge of urban areas, and claim to serve a somewhat different purpose from the zoos that are combined with amusement parks: there is more emphasis on nature appreciation and an educational mission.

The indoor stalls are somewhat larger than in the substandard zoos, but are still small (average size of stalls = 46m$^2$). In general, they had better lighting and facilities. The flooring is uniformly concrete, but in most cases, drainage is better.

The outdoor display areas are also larger and closer to the common best practice minimum of 500m$^2$ (average size = 418m$^2$). They have a lower relative amount of concrete paving (average 65% of the outside area, although with a range of 49-100%), and more soil/ sand. These enclosures are still much smaller than those of most modern zoos, for example in the US. However, like the substandard zoos, all have moats with steep sides but most have a greater distance between the elephant habitat and the public viewing areas.

The elephants at these zoos were all moderately obese to obese, with some skin abrasions but most had healthy feet. All showed pronounced stereotypic behaviour, apart from Fuku-chan at Fukuyama Zoo – she had been diagnosed with active tuberculosis in 2016 and appears to be given special treatment. The keeper was seen to engage very directly with her, providing a range of different foraging challenges over a period of some hours. Stereotypic behaviour was not seen during this time of active engagement.

Kobe Oji Zoo provided an example of an elephant that has become solitary over time. Mac, the only male elephant to be seen in the survey, had been kept together with a female, Zuze, since their arrival at the zoo in 1995. They succeeded in breeding four times, but in three of those cases the calf died, either at birth or fairly soon thereafter. With her fourth pregnancy, Zuze was moved to another facility where she gave birth to a surviving calf; after one year, she was separated from the calf and returned to Kobe. However, her current relationship with Mac does not seem to be positive, and he is now kept separately in a very small (35m$^2$) outdoor enclosure, which is smaller than his indoor stall (60m$^2$), while Zuze lives in the considerably larger main area (464m$^2$). Plans have been developed to subdivide this large area so that Mac can have half of it. It is not clear whether the relationship between the two elephants deteriorated in Zuze's absence, or whether it is function of Mac growing significantly larger, as well as more aggressive.

Handling of the elephants at these zoos includes both free contact (Ishikawa, Chausuyama, Fukuyama), a mixture of free and protected contact (Kobe Oji) or fully protected contact (Hamamatsu). At Kobe Oji Zoo, Zuze was ordered to perform tricks for the viewing public by a handler who stood outside the enclosure, while Mac was less willing to respond to commands and stood with his back to the viewing area.

## 4.3. Improved zoos

Four zoos appear to have made attempts, including some significant investment of funds, to improve the living compounds for their elephants. These zoos are:

- Kyoto
- Fukuoka
- Tokushima
- Tennoji

These zoos had existing enclosures – Kyoto's original elephant area was first built in 1923 – but they were all renovated in the period of 2001-2015. It appears that these renovations took cognizance of more modern approaches to elephant habitat design, with increased size and better features.

The indoor stalls are larger again (average size of stalls = 56m$^2$), with generally better lighting and facilities for managing the elephants. The flooring is still uniformly concrete, but all have better drainage.

The outdoor display areas are the largest seen in the survey and exceed the basic minimum standard (average size = 833m$^2$). They had the lowest relative areas of concrete (averaging only 14% of the outside area, with a range of 0-54%) and largest relative areas of soil/ sand (an average of 77%). However, despite their relatively large size amongst the Japanese zoos visited, these sites were still substantially smaller than the current average size of US zoos' outdoor compounds (nearly 4,000m$^2$), and they still do not offer much scope for movement or foraging challenge. There is still little room for the formation of appropriate social groups.

It was good to see that these zoos had recognized the problems posed by moats, and they had replaced them with cable fences that had no projecting points on the elephants' side and were generally further again from the public viewing areas. While this may have introduced a visual barrier between the elephants and the public, it greatly improves safety for the elephants.

There had been an attempt to make two of these habitats (Fukuoka and Tennoji) appear more "naturalistic", with walls of sculpted concrete that looked like rocky outcrops or logs. Pools at Tennoji looked like natural rock pools, although they were rather small. These improvements, along with landscaping of the area surrounding the elephant enclosure, create a favourable backdrop for visitors to observe the elephants. However, the areas available to the elephants remain rather barren.

There were visitor viewing sites at Fukuoka and Tennoji that were under shade, with very small windows in a wall that allows visitors to get very close to the elephant without disturbing her. Significant amounts of interpretive material was available at Tennoji, with much evidence of the conservation message; it was therefore surprising to see an emphasis on coercive training with bull-hooks in the sign-posted material, and the intrusion of keepers into the naturalistic compound at feeding time.

Most of the elephants at these zoos were in reasonable health, although still somewhat obese. Hanako at Fukuoka is actually very unhealthy, with some problems visible with her genital area and reported problems in getting to her feet on several occasions in the past. Her previous companion at the zoo had similar problems.

None of the solitary elephants were entirely free from stereotypic behaviour, which grew more pronounced as feeding time approached. The elephants had nothing to do during the several-hour intervals between feeding, and most were seen walking slowly around their compounds, seeking out small bits of hay or bamboo leaves left over from the much earlier feeding. The case of Mito at Kyoto Zoo is interesting from the perspective of joining elephants together in new social groups. She had been solitary at the zoo for 13 years from 2001, when her previous companion of some 20 years died; in 2014, 4 young juvenile elephants were brought in from Lao PDR. The four juveniles appear to interact well with each other most of the time, but when they were all introduced to Mito in 2015 when the new enclosure was completed, she did not form a positive relationship with them. She is now kept separate from them, and essentially still solitary, in a smaller enclosure adjacent to the main elephant area; this area was intended to hold a male elephant, presumably for the purposes of breeding. She spends her time in this enclosure standing and stereotypically swaying her head.

Elephant handling at these zoos is variable. At Kyoto and Tennoji, free contact is practiced, with the latter zoo employing very hands-on control, especially during feeding times. At Fukuoka and Tokushima, there is a mixture of free and protected contact.

## 4.4. Common Patterns

The 14 zoos visited during this brief survey had a relatively wide range of conditions, but there were some patterns that were common to all. These include problems with the physical and mental health of the elephants, constraints of space and limitations of the management practices.

Although most of the elephants were in moderate to good health, almost all were overweight, with a few approaching clinical obesity. This problem can be attributed to two causes: the lack of opportunity or the motivation to take exercise, and the nature of the elephants' diets. At all the zoos surveyed, it appeared

that fruit, vegetables, sugar cane and concentrated animal pellets/ cubes form a significant proportion of the daily food on offer. Hay and bamboo branches are also offered but really should be the dietary predominant components, with "treats" offered only as rewards during training. Feeding also appears to be managed by putting food in the outdoor area when the elephant is still indoors, then indoors when the elephant is in the outdoor enclosure. Feeding times are separated by hours when the elephant has nothing to do but pace around the empty enclosure, attempt to interact with zoo visitors or stand in place and sway or bob. More regular provision of coarse forage plants, distributed from the outside around the perimeter of the enclosure, would give elephants more opportunity to exercise as well as to lead more interesting lives; something that is clearly lacking at the moment.

None of the zoos surveyed made food readily available to elephants when they were in the indoor stalls, and in many cases, there was no drinking water available. Both of these essential needs should be met for the indoor quarters. All of the indoor facilities were found to have hard concrete floors – none had any areas of softer flooring nor was there any sand present.

Several of the elephants displayed minor health problems, with nail and foot problems unattended to. Attention to foot care was apparent only at a few sites.

All of the zoos appear to operate a regime that is dictated by the regular working hours of the keeping staff rather than by the natural activity budget determined by the elephants' biology. Elephants at all the zoos are kept indoors until mid-morning, let out of their small stalls for 4-8 hours and put back indoors again by mid-afternoon. Modern guidelines for elephant management emphasize the need to minimize the time spend confined indoors, and allow elephants the freedom to forage and interact with other elephants for the majority of a 24-hour period.

Almost all of the zoos practiced free contact management with bullhooks, which in some cases (Kobe Oji Zoo being a particular example) included giving elephants orders to turn in circles, lie down or perform other tricks. Although the training observed involved treats of fruit and vegetables, it was clear that the bullhook was always present. The only zoos where full protected contact appeared to be in use were Hamamatsu and Tokushima. The keeper at Utsunomiya suggested that they also practiced protected contact most of the time, as the elephant Miyako was too dangerous to handle under free contact.

One clear observation at many of the zoos was that the staff responsible for elephant keeping did genuinely care about the well-being of the elephants under their stewardship. A number of the individual keepers with whom elephant management was discussed appeared to know their animals well and to want to provide the best life for them that was possible. While in many cases they may have been unaware of aspects of elephant biology in the wild, they do recognize that more could be done to meet their basic needs under the current constraints of space and resources.

Table 4. Summary of information on the conditions at the surveyed zoos

| Zoo name | Indoors | | Outdoors | | | | | | | Management | Comments on zoo |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total area ($m^2$) | Water/ food | Total area ($m^2$) | Concrete (%) | Soil (%) | Pool (%) | Moat | Shade | Water / food | | |
| Kiryugaoka | 2 stalls x 36 | N/N | 244 | 85.2 | 0 | 11.5 | Moat | No shade | N/N | Let outdoors for a few hours a day | Built in 1950s, with some unspecified renovation in 1991. Small enclosures for most animals |
| Utsunomiya | 25 | ?/? | 102 | 100 | 0 | 0 | Moat | Trees out-side | N/N | Locked outside 6-7 hours per day (inside 17-18 h); Protected contact because elephant is dangerous | Very small indoor and outdoor enclosures. |
| Himeji | 63 | N/N | 199 | 57.3 | 27.6 | 15.1 | Moat | No shade | N/N | Keep inside 18 h/day; FC | Built in 1950s, not possible to renovate; small adjustment to roof in 2013-14; small urban zoo/ amusement park; very small enclosure |
| Ikeda | 28 | ?/? | 80 | 85.0 | 0 | 15.0 | Moat | No shade | Y/N | Merry died in 2016; no info on management; FC according to photos | Built in 1950s? Very small, noisy zoo/ amusement park; very small enclosure |
| Yuki Park | 2 stalls x 36 | ?/? | 207 | 100 | 0 | 2.3 | Moat | No shade | Y/N | Kept inside 17h/day; FC | Small urban zoo originally opened in 1919. Very small enclosures for all animals. |
| Average | 38$m^2$ | | 166$m^2$ | 86% | 6% | | | | | | |
| Ishikawa | 25 | N/N | 546 | 74.5 | 15.8 | 8.1 | Moat | Small tree | N/N | Free contact; Kept indoors during cold winter days | Built in 1990s; Standard template of small outside area with moat |

| Zoo name | Indoors | | Outdoors | | | | | | | Management | Comments on zoo |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total area ($m^2$) | Water/ food | Total area ($m^2$) | Concrete (%) | Soil (%) | Pool (%) | Moat | Shade | Water / food | | |
| Chausuyama | 2 x 36 | N/N | 529 | 65 | 24.6 | 10.4 | Moat | Trees out-side | N/N | Free contact; Let outdoors for few hours each day | Built in early 1980s; Small outside area with moat. Small outdated enclosures. |
| Kobe Oji – Mac | 60 | N/N | 35 | 48.6 | 54.3 | 0 | Bars, no moat | No shade | Y/N | Keep inside 16h/day; Mixture of PC with some FC; keep separate from Zuze | Opened in 1953; renovations to enclosure in 1966, 2003, 2004, with more planned. Still v small. |
| Kobe Oji – Zuze | 60 | N/N | 464 | 100 | 0 | 0 | Moat | Shade struc-ture | N/N | Keep inside 16h/day; Mixture of PC with some FC; Have bred her with Mac 4 times, 3 unsuccessful, Sent away for 4th calf, possibly reuniting; Keep separate from Mac | An urban park but at the edge of a forest/ garden area. |
| Hamamatsu | 2 x 42 | Y/N | 596 | 54.7 | 36.8 | 8.5 | Moat | No shade | N/N | Keep inside 18-19h/ day; PC | Large, landscaped park. Opened in 1950, renovated 1983, plans for more in future. Some exhibits OK, |
| Fukuyama main enclosure | 49 | ?/? | 405 | 47.2 | 36 | 15.9 | Moat and fence | Large tree | Y/N | Fuku-chan diagnosed with TB in 2016; keep indoors 18h/ day in summer, 21h/day in winter; FC with lots of stimulation/ feeding | Zoo opened in 1978; renovated elephant enclosure 2001; shift from recreation to education |
| Fukuyama 2nd enclosure not in use | 49 | ?/? | 350 | - | - | - | Moat & fence | Large tree | Y/N | Area not in use | |
| Average | 46$m^2$ | | 418$m^2$ | 65% | 28% | | | | | | |

| Zoo name | Indoors | | Outdoors | | | | | | | Management | Comments on zoo |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total area ($m^2$) | Water/ food | Total area ($m^2$) | Concrete (%) | Soil (%) | Pool (%) | Moat | Shade | Water / food | | |
| Kyoto – Mito | 60 | N/N | 458 | 0 | 92.9 | 7.1 | Fence, no moat | Small tree | Y/N | Keep inside 19h/day; FC; keep her separate from others | Small urban zoo; improved enclosures for some primates and in 2015 for elephants (no moat, all soil), though still small |
| Kyoto – juveniles | 4 x 50; 1 x 60 | N/N | 1,006 | 0 | 87.5 | 12.5 | Fence, no moat | Large and small trees | Y/N | Keep inside 19h/day; FC | Four juveniles well-socialised, but enclosure small for so many animals |
| Fukuoka | 2 x 72 | Y/N | 829 | 17.4 | 75 | 7.6 | Fence, no moat | Small trees; roof of building | N/N | Normally keep inside 18h/ day, more if there are disturbances outside; Need to lift elephant when she cannot get up; PC | Landscaped park but elephants near noisy street; First elephant enclosure in 1953, rebuilt in 2009; some innovative features but still v small |
| Tokushima | 2 x 36 | Y/N | 902 | 53.8 | 43 | 2.3 | Fence, no moat | Shade can-opy | N/N | Keep inside 18-19h/ day; mostly PC; controlled public feeding | Elephant enclosure completed in 1997, barrier dividing enclosure in 2001 |
| Tennoji | 1 x 60; 2 x 48 | Y/N | 969 | 0 | 85.8 | 14.2 | Fence, no moat | Shade trees | Y/N | No info on housing times; FC with considerable control | First elephants were housed in 1950; renovation in 1995 and 2003. Innovative and naturalistic, but still small |
| Average | $56m^2$ | | $833m^2$ | 14% | 77% | | | | | | |

Table 5. Summary of information on the elephants in surveyed zoos

| Zoo name | Elephant | | Dates | | | | Physical condition | Behaviour |
|---|---|---|---|---|---|---|---|---|
| | Name | Sex | Birth | Arrival at zoo | Alone since | Died | | |
| Kiryugaoka | Izumi | Female | 1955 | 1964 | Whole time | April 2017 | Slightly obese; Skin OK; Feet – walks OK, but v long nails front feet | Not very active, no obvious stereotypy |
| Utsunomiya | Miyako | Female | 1973 | 1973 | Whole time | | Slightly obese; Skin OK; Feet – walks OK, but long nails hind feet | Active, continuous movement around small area; slaps head, chews steel bar; reaches to people for food |
| Himeji | Himeko | Female | 1977 | 1994 | Whole time | | Mildly obese; Skin shows lesions on left side of head, front leg; Feet – Problems with left front and hind feet, nails long on both front feet | Little walking; vigorous, continuous, prolonged head-bobbing and swaying; faces away from visitors |
| Ikeda | Merry | Female | 1965 | 1967 | Whole time | Feb 2016 | Reportedly died from illness relating to poor foot health | Keeper blog indicates caution needed when entering her compound |
| Yuki Park | Teru | Female | 1978 | 1980 | 2000 | | Slightly obese; Skin rubbed on forehead; Feet: Walks OK, cracked nails on right front foot | Walks with food in very small compound; pronounced stereotypic swaying and bobbing, swinging feet, when food Is finished |
| Ishikawa | Sunny | Female | 1979 | 1988 | Whole time | | Slightly obese; Skin on head & sides rubbed; Feet – wet but walks OK | Active; stereotypy slight; reaches outside stall; throws at people |
| Chausuyama | Fuko | Female | 1979 | 1983 | 2008 | | Obese; Skin on head rubbed; Feet –walks OK | Active; stereotypic pacing; reaches to people |

| Zoo name | Elephant | | Dates | | | | Physical condition | Behaviour |
|---|---|---|---|---|---|---|---|---|
| | Name | Sex | Birth | Arrival at zoo | Alone since | Died | | |
| Kobi Oji | Mac | Male | 1992 | 1995 | 2013; 2014 but kept apart | | Slightly thin;<br>Skin OK;<br>Tusks left tusk broken;<br>Feet – Walks OK, some cracks in soles | Only small movements in tiny stall; shifting feet and swaying; chirping vocalisations; faces away from visitors |
| | Zuze | Female | 1990 | 1995; 2014 (away 1 year) | | | Obese;<br>Skin – both ears torn (by Mac?)<br>Feet – walks OK | Active when fed or trained; stands and sways when alone; faces visitors |
| Hamamatsu | Hamako (3rd) | Female | 1971 | 1972 | 2008 | | Slightly obese;<br>Skin OK but trunk tip partly missing - old wound;<br>Feet – walks OK, some nails cracked or deformed | Relatively active; no standing stereotypy, but large-scale repetitive movement pattern around perimeter of outdoor enclosure; slightly avoids visitors |
| Fukuyama | Fuku-chan | Female | 1998 | 2001 | Whole time | | Diagnosed TB-infected in 2016; Well-fed but suffering some weight problems? Skin – some rubbed areas on head; Feet – Walks OK, nails on front feet long | Active, walks vigorously to different parts of outside area in search of food placed there; much interaction with keeper; inquisitive |
| Kyoto | Mito | Female | 1971 | 1979 | 2001; kept apart | | Only v slightly obese;<br>Skin OK, a few bumps (old wounds?); Feet – walks OK, some cracks in nails | Only small movements; some stereotypic swaying; no interaction with other elephants – kept apart, fought with the new arrivals |

| Zoo name | Elephant | | Dates | | | | Physical condition | Behaviour |
|---|---|---|---|---|---|---|---|---|
| | Name | Sex | Birth | Arrival at zoo | Alone since | Died | | |
| | Fuyumi Tonkin; Natsumi Bunnyun; Harumi Kampat; Akito Tonkam | Female; Female; Female; Male | 2008; 2010; 2010 2011 | 2014 | | | All in good health; Natsumi has large tear in right ear | Active; continual interaction with each other; Natsumi spends some time apart |
| Fukuoka | Hanako | Female | 1971 | 1973 | 2012 | | Not overly obese but generally unhealthy; Vulva prolapsed; Back arched; Skin under left legs rubbed from slings that support her weight at night; She has been unable to rise to her feet on several occasions Feet – Problem with left hind foot; nails long on front feet | Confined in stall but still inactive; stereotypic rocking back and forth when not feeding; faces away from visitors |
| Tokushima | Mary | Female | 1990 | 1996 | 2008 | | Obese; Skin lesions on left hip and right cheek;Feet: problem with putting weight on right hind foot; nails OK | Lethargic; stereotypic rocking before feeding; attentive to visitors |
| Tennoji | Hiroko | Female | 1969 | 1970 | 2014 | | Only slightly obese; Skin rubbed on left cheek; Some damage to central spine? Feet: Walks OK, slowly, but left front foot has a problem | Slow walking around all parts of area, searching for food particles; when food finished, stands at door to barn swaying repeatedly in vigorous circular motions |

## 5. Analysis and comments

None of the zoos visited has outdoor enclosures that offered much novelty or challenge to the lives of the elephants. Since this survey was focused on solitary elephants, it is possible that the zoos visited had smaller, less developed facilities that are not broadly representative of the range of practices in modern Japanese zoos. It is thus possible that there are better conditions, approaching optimal husbandry practices, in use at some of the larger establishments. It is recommended that a wider survey of Japanese zoos, including those keeping two or more elephants, be conducted to assess the full range of elephant husbandry in the country.

All zoos visited confined their elephants indoors for most of the day, with only a maximum of 7-8 hours outside and often much less. These regimes of elephant management seemed to be more constrained by the working hours of the zoo staff than by any considerations of benefit for the elephants. In most of the zoos, the staff assigned to caring for the elephants had other duties to attend to as well, so that it was not possible to spend extended periods engaged in feeding and stimulating the elephants through behavioural interventions. The exception was Fukuyama, where specific effort was made to provide feeding challenges to the young female, Fuku-chan.

All the elephants seen (apart from Fuku-chan) exhibited some form of stereotypic behaviour, which was more extreme and pronounced in some than in others. This swaying or rocking appeared to be a response to the lack of anything to do until the next feeding time, which was generally some hours away. This stereotypic behaviour was seen in the more "modern" zoos as well as in the substandard or standard design zoos.

The solitary nature of the elephants' lives undoubtedly added to their psychological distress and, thus, stereotypic repetitive behaviour. As was noted in the US zoo study, such abnormal behaviour is greatly reduced when animals have social companions. Stereotypic behaviour is largely absent in elephant sanctuaries, where the elephants have much larger areas to move in, more natural forage sources and very often the presence of several other elephants with whom they can interact on a voluntary basis.

The challenge of introducing elephants to companions was apparent for the elephants who had been solitary for a long period, such as Mito at Kyoto Zoo, or even a relatively short period, such as Mac at Kobe Oji. These elephants did not appear to respond well to the introduction or re-introduction of social partners. At Tennoji Zoo, the records show that Hiroko did not interact well with the other elephants who were already there, and she had to be kept separate. The small size of the current zoo enclosures does not allow elephants the space to form natural social bonds, or to avoid elephants with whom they have "disputes".

Despite these concerns, it was encouraging to see that there are zoos in Japan that are making special efforts to adopt modern, internationally accepted best practices of elephant husbandry, and to attempt to design and build improved enclosures. However, the missing feature in the four "improved" zoos in this survey is still the size of enclosures. None of the outdoor enclosures observed approached the size of the better zoos of USA or UK, at some 4-20,000m$^2$; and even these larger American zoos are much smaller than enclosures at sanctuaries, where it is possible to have greater success in elephant management.

It is also encouraging that some zoos appear to recognize the need to shift their focus from amusement towards education and conservation. The more modern zoos, from an elephant perspective, also appear to have better enclosures for the higher primates. It is likely that the design of these enclosures has benefitted from the advice of members of Japan's esteemed primatological research community.

The improvement of elephant facilities could equally benefit from inputs by experts, in Japan and from overseas, in elephant biology and veterinary science.

The Japanese Association of Zoos and Aquariums (JAZA) could be encouraged to develop guidelines for elephant management that are in line with modern international best practice in zoos and sanctuaries. Such guidelines would build on the momentum that is already apparent in Japan, as seen in the group of four improved zoos. There is a growing body of expertise in Japan that should be encouraged, and that could work in positive partnership with international experts on elephants, from zoo and sanctuary settings as well as field researchers of wild elephants.

The adoption of such guidelines might well prescribe the closure of some facilities currently holding elephants in poor conditions, and especially where elephants are living a solitary existence. There is undoubtedly public pressure on zoos to keep elephants, because a section of the population has grown accustomed to the idea of seeing one or more elephants in their local area. However, there is a role for zoos and JAZA to explain to the public the reasons for decisions that may lead to the closure of elephant exhibits, and for changing public pressure for seeing elephants as a form of entertainment towards an interest in elephant welfare and conservation.

The fact that there are still so many zoos with solitary elephants is a cause for concern. The obvious solution would be to move those animals to facilities where they can join with other elephants, but such an operation is not always straightforward. Great care must be exercised when introducing strange elephants to each other, with patience and spatial separation important factors. There is considerable expertise available to advise Japanese zoos on such operations, especially among the operators of elephant sanctuaries.

## 6. Recommendations

Recommendations can be made for the short, medium and longer term.

### 6.1. Recommendations for the short-term for solitary elephants

1. The solitary elephants in Japan, especially at the substandard zoos, should be moved and the exhibits closed. The elephants still alive at these zoos should be moved to zoos with larger facilities.
2. Moving the elephant to another zoo, if this action is taken, should be done with care taken to provide opportunities for socialization or separation at the new location. Expert advice should be sought from international experts, especially from sanctuaries.
3. If it is decided that moving the solitary elephant is inadvisable on health grounds, efforts should be made to improve enrichment conditions so that its quality of life is improved.
4. All elephants, both solitary and in groups, should be able to spend the majority of their time active with increased hours out of doors.
5. Feeding regimes should be changed towards continuous provision of lower quality forage so that solitary elephants are kept active for up to 18 hours per day.
6. To achieve points 3-5 above, it would be necessary to increase the number of keeper staff and the time spent on elephant management; this would allow more time to be spent with the elephants, and two shifts for a longer working day.
7. The public should be informed of the positive reasons for the move of a solitary elephant, so that public pressure for seeing elephants as a form of entertainment is changed towards an interest in

elephant welfare.

## 6.2. Recommendations in the medium term for zoos with limited facilities

1. Elephant exhibits should be increased in size and complexity. The efforts made by the improved zoos in Japan should be extended in scope, with more space available, and the programme should be expanded around the country.
2. All elephants should be kept in social groups, and should be able to spend the majority of their time active, with increased hours out of doors. Feeding regimes should be changed towards continuous provision of lower quality forage so that solitary elephants are kept active for up to 18 hours per day.
3. The number of keeper staff and the time spent on elephant management should be increased.
4. Strategic decisions should be made about which zoos can continue keeping elephants and which should consider phasing out their elephant exhibits where adequate improvements are not possible. Fund-raising efforts through government or other sources will probably need to be initiated for those zoos that wish to continue keeping elephants.
5. Public information campaigns should be developed for explaining the reasons for decisions on facility expansion or closure, so that public pressure for seeing elephants as a form of entertainment is changed towards an interest in elephant welfare.

## 6.3. Recommendations in the longer term for Japanese zoos

1. A wider survey of Japanese zoos, including those keeping two or more elephants, should be conducted to assess the full range of elephant husbandry in the country.
2. A strategy and guidelines for elephant keeping should be developed on a national scale, in coordination with JAZA and the responsible government Ministries in line with meeting or exceeding international best practice. Legislation could be developed or modified, as appropriate, to support such guidelines on elephant well-being and welfare.
3. All zoos should be encouraged to change their mandate from entertainment to animal welfare, education and support for in-situ conservation initiatives.
4. The goal of achieving 10km of direct movement every day for each elephant should be set as a benchmark that would inform facility design and management practices.
5. Zoos and the national zoo association JAZA should work with recognized academic experts in the fields of elephant biology and animal husbandry, within Japan and in partnerships with international experts and groups, to define and design appropriate conditions for keeping elephants in a focused number of world-class zoos within Japan.
6. Consideration should be given to the development of true elephant sanctuaries and behaviour-based husbandry and management regimes.
7. Importing of elephants from their range states for life in captivity, for any reason, should be discouraged.[1]

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[1] Removing elephants, especially juvenile elephants, from the natural habitats has negative impact on wild populations of this endangered species. It is evident that even so-called elephant camps and orphanages are stocked by animals taken from the wild, and should also be avoided as a source for imports of live elephants.

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# 8. Annexes

1. Itinerary of zoo visits
2. Zoos that have closed their elephant exhibits
3. Detailed description of individual zoos and elephants surveyed

## Annex 1. Itinerary of Zoos visited

| Date | Zoo visited | Elephant(s) |
|---|---|---|
| 23-01-2017 | Nomi Ishikawa | Sunny |
| 24-01-2017 | Nagano Chausuyama | Fuko |
| 25-01-2017 | Kiryugaoka | Izumi (later died) |
| | Utsunomiya | Miyako |
| 26-01-2017 | Hamamatsu | Hamako (3rd) |
| 27-01-2017 | Kyoto | Mito |
| | | Fuyumi Tonkin; Natsumi Bunnyun; Harumi Kampat; Akito Tonkam |
| 28-01-2017 | Kobe Oji | Mac |
| | | Zuze |
| | Himeji | Himeko |
| 29-01-2017 | Okayama Ikeda | Merry (died) |
| 30-01-2017 | Fukuyama | Fuku-chan |
| 31-01-2017 | Fukuoka | Hanako |
| 01-02-2017 | Tokushima | Mary |
| 02-02-2017 | Yuki Park | Teru |
| 03-02-2017 | Tennoji | Hiroko |

## Annex 2. Zoos that have closed their elephant exhibits

| Zoo name | Date | Notes |
|---|---|---|
| United States | | |
| Virginia Zoo (Virginia) | 2016 | In November 2015, the Virginia Zoo announced that it would be moving African elephants Lisa and Cita to Zoo Miami; the transfer took place in April 2016. |
| Nashville Zoo (Tennessee) | 2015 | Moved three African females – Rosie, Hadari and Sukari – to The Elephant Sanctuary (TES) while renovations to their elephant exhibit take place. The move was originally considered to be temporary but became permanent as work plans were extended. Rosie and Hadari have now died at TES. |
| Lee Richardson Zoo (Kansas) | 2015 | Moved African females Missy and Kimba to Cheyenne Mountain Zoo in Colorado, noting that "this transition, which gives them more social opportunities with other elephants, is best for their welfare". There are no plans to keep elephants in future. |
| Six Flags Discovery Kingdom California) | 2015 | Transported African elephant Valerie and Asian elephant Liz to Wildlife Safari in Winston Oregon. |
| Woodland Park Zoo (Washington) | 2015 | It transferred Asian elephants Bamboo and Chai to the Oklahoma City (OKC) Zoo. Chai died at the zoo in 2016. |
| Greenville Zoo (South Carolina) | 2014 | After African elephant Ladybird died in March, Greenville Zoo decided to send the remaining elephant, 44-year-old Joy, to another facility. Joy died during transportation. |
| BREC's Baton Rouge Zoo (Louisiana) | 2013 | It transferred the last elephant, an Asian female named Bozie, to the Smithsonian National Zoo (SNZ) in Washington, D.C. |
| Niabi Zoo (Illinois) | 2013 | It transferred the last two elephants to the Little Rock Zoo in Arkansas. |
| Central Florida Zoo & Botanical Gardens (Florida) | 2011 | It transferred the last elephant to Zoo Miami. |
| The Jackson Zoo (Mississippi) | 2010 | It transferred two African elephants to the Nashville Zoo in Tennessee. |
| Brookfield Zoo (Illinois) | 2010 | The last remaining elephant, Joyce, who was "on loan" from Six Flags Discovery Kingdom, was returned to Vallejo, California. |
| Lion Country Safari (Florida) | 2010 | It transferred African elephants Stumpy and Mama to the Dallas Zoo in March 2010. |
| Philadelphia Zoo (Pennsylvania) | 2009 | It transferred two African elephants to the Pittsburgh Zoo's elephant-breeding center in June 2009. |
| Alaska Zoo (Alaska) | 2007 | It transferred its only (African) elephant, Maggie, to the Performing Animal Welfare Society (PAWS) sanctuary in San Andreas, California. |
| Abilene Zoo (Texas) | 2007 | It transferred the remaining elephant, 29-year-old Tanya, to the Cameron Park Zoo in Waco, Texas. |
| Gladys Porter Zoo (Texas) | 2006 | Citing its inability to increase the size of its elephant exhibit, sent its only elephant, Ruth, a 28-year-old African, to Milwaukee County Zoo. |
| Lincoln Park Zoo (Chicago) | 2005 | After all three of its elephants died within a six-month period, announced that camels will be moved into the empty elephant exhibit. |

| Zoo name | Date | Notes |
|---|---|---|
| Detroit Zoo (Michigan) | 2005 | In 2004, citing problems with keeping elephants in captivity, it announced its decision to close its elephant exhibit and send the two female Asian elephants – Winky, age 51, and Wanda, age 46 – to PAWS sanctuary. |
| San Francisco Zoo (California) | 2004 | It announced its decision to close its elephant exhibit and send Tinkerbelle, a 37-year-old Asian elephant, and Lulu, a 38-year-old African elephant, to PAWS sanctuary. |
| Chehaw Wild Animal Park (Georgia) | 2004 | It retired Tange and Zula, both 30-year-old African elephants, to TES because the elephants "deserve to live out their remaining years in the very best captive environment possible." |
| Henry Vilas Zoo (Wisconsin) | 2000 | It retired Winkie, a 34-year-old Asian elephant, to TES, and transferred Penny, a 21-year-old African elephant, to Riverbanks Zoo in North Carolina. |
| Louisiana Purchase Gardens and Zoo (Louisiana) | 1999 | It retired Shirley, a 51-year-old Asian elephant, to TES because "[i]t was in Shirley's best interest to retire her to a place that was more suitable." |
| Mesker Park Zoo (Indiana) | 1999 | It retired Bunny, a 46-year-old Asian elephant, to TES. |
| Frank Buck Zoo (Texas) | 1998 | It transferred Sissy, a 20-year-old Asian elephant, to the Houston Zoo, then to El Paso Zoo, and finally to TES. |
| Sacramento Zoo (California) | 1991 | It sent lone elephant Winky to the Detroit Zoo because the zoo's elephant enclosure was considered "totally inadequate." |
| Buttonwood Park Zoo(Massachusetts) | Pend-ing | In 2013, it announced that when the elephants currently there pass away, the elephant exhibit will be closed. |
| Point Defiance Zoo & Aquarium (Washington) | Pend-ing | In 2011, it announced that when the elephants currently there pass away, it will likely be the end of the elephant exhibit. |
| Santa Barbara Zoo (California) | Pend-ing | In 2006, it announced that it will not take any more elephants after the current two die. |
| Bronx Zoo (New York) | Pend-ing | In 2006, it announced that when two of the three elephants pass away, the remaining one will be sent to another zoo and the elephant exhibit will close. |
| Other countries | | |
| Mendoza Zoological Park (Argentina) | 2016 | Transferred four elephants to Elephant Sanctuary Brazil |
| Calgary Zoo (Canada) | 2014 | Sent two Asian females, Kamala and Swama – both aged 39 years – to SNZ , Washington, DC. |
| Toronto Zoo (Canada) | 2013 | City of Toronto ordered Toronto Zoo to transfer three African elephants, Toka, Iringa and Thika, to the Performing Animal Welfare Society in San Andreas, California. |
| Greater Vancouver Zoo (Canada) | 2003 | Sent Tina, the African elephant, to TES, with no plans to get any additional elephants to replace her. |
| San Salvador Zoo (El Salvador) | 2010 | After the zoo's only elephant, Asian female Manula, died at age 60, the zoo closed its elephant exhibit. |

| Zoo name | Date | Notes |
|---|---|---|
| Frankfurt Zoological Garden (Germany) | 1984 | Frankfurt Zoo decided in 1984 to close the elephant exhibit for good, after the last Asian elephant died in 1981. The decision was made since the small urban zoo is not able to offer the necessary terrain and adequate habitat for large animals such as elephants, that require an enormous amount of space |
| All zoos in India | 2009 | As mandated by a decision of India's Central Zoo Authority, the government announced its intention to transfer of all 140 elephants living in 26 Indian zoos to wildlife parks and sanctuaries where they can graze more freely. |
| Inokashira Zoo (Japan) | 2016 | After the death of the solitary Asian female, Hanako, the zoo decided to stop keeping elephants |
| Ikeda Zoo (Japan) | 2017 | After the death of Merry in 2016, the zoo was unable to get another elephant because national regulations require that it keep two elephants for breeding purposes and it is unable to do so. |
| Kiryugaoka Zoo (Japan) | 2017 | After the death of Hamako, the zoo was unable to continue keeping elephants for the same reason as Ikeda Zoo; its facilities are too limited to allow the keeping of a male and female elephant. |
| Twycross Zoo (United Kingdom) | 2017 | Announced that they will be sending their four Asian female elephants - Mimbu, Tara, Noojahan and her daughter Esha – to a facility in France, as yet unspecified; for two of the females, this move "would allow them to breed". They said: "Whilst artificial insemination is a suitable method for some individuals in certain situations, breeding within a strong social structure, with males present, is the preferred option." And they do "not have the facilities or expertise to manage adult bull elephants, which are larger, more powerful and sometimes more aggressive than females". |
| Dudley Zoo (United Kingdom) | 2003 | Transferred African elephants Flossie and Flora to Planet Sauvage in Nantes, France. (Dudley Zoo had admitted for some years that its enclosure was not appropriate, and fundraising to build a new enclosure was unsuccessful, so the zoo finally decided to find a new home for the elephants and has no plans to have more elephants in the future.) |
| Longleat Safari Park (United Kingdom) | 2003 | Closed the elephant exhibit at its 350-acre Wiltshire site and relocated five African elephants to the Zoo Parc de Beauval in France. In 2011, an Asian elephant Annie was rescued from a circus to Longleat and facilities have been upgraded. Initially, plans were announced to provide a "sanctuary" for additional elephants but it now appears that no new elephants will be acquired and Annie will live out her days alone at the Park. |
| Bristol Zoo (United Kingdom) | 2002 | Euthanized the lone 42-year-old female elephant, Wendy, after years of suffering from arthritis. (She had been kept alone in a tiny enclosure since 1986.) Bristol Zoo elected not to replace her. |
| London Zoo (United Kingdom) | 2001 | Permanently relocated three female Asian elephants (Mya, Layang-Layang, and Dilberta) to Whipsnade Wild Animal Park, closing the zoo's 170-year-old elephant exhibit. (London Zoo's enclosure had been heavily criticized for years, and a keeper was killed in October 2001.) |
| Edinburgh Zoo (United Kingdom) | 1988 | No longer keeps elephants because of fears that captivity may cause harm to the animals. |

# Annex 3

## Detailed description of the 14 individual zoos and elephants surveyed

## Ishikawa Zoological Garden

http://www.ishikawazoo.jp/index.html

**Location**

600 Tokusanmachi, Nomi City, Ishikawa Prefecture, 923-1222

**History**

The Ishikawa Zoo opened in Tatsunokuchi Hill Park on October 9, 1999 on a site of 23 hectares. It is located in woodland hills at the outskirts of city/ residential areas.

**General description of zoo**

According to their website, they see four roles: Recreation, Education, Welfare (enrichment) and breeding (inter-facility loans), and Conservation (Rescue/ release and research for application).

Facilities for many species are rudimentary, with small, barren enclosures outdoors and indoors; primates look particularly miserable. The climate near the north-west coast includes snow in the winter (and on the day of visit), so that many animals must spend extended periods indoors.

**Elephant details**

Name: Sunny
Species/ sex: Asian, female
Date of birth: 1979
Arrival at zoo: 1989
Alone since: Solitary her whole time at the zoo

**Elephant enclosure**

Indoor

- Dimensions
  - One stall: estimated 5x5m = 25m$^2$; management area in addition
  - Compare to estimate of indoor "bedroom" provided by the zoo: 36m$^2$
- Description
  - Steel bars in the front, also at right side where there is a management equipment area
  - Floor concrete, flat, sloping towards drain at management side, wet
  - No food hoppers
  - No ad lib water source
  - Fixture/ u-bolt w short chain in middle of floor, and u-bolt at back corner of floor 2m away
  - Walls inside the stall have dark, rubbed patches; rubbed area also outside the bars at the front.
  - Visitor viewing area is 3m from the stall, with a 1.5m fence.
  - Windows on outside of visitor area allow sighting of elephant even when door to inside is closed.
  - Doors to indoor visitor area are sliding glass on steel rollers; door mechanism is noisy, making a rumbling noise each time it opens or closes.

Outdoor

- Dimensions
  - Overall (including pool): roughly 21m x 26m = 546m$^2$
  - Compare to that provided by the zoo: 558m$^2$
  - Tree inside fenced protection: 3.5m diameter = 9.5m$^2$
  - Pool: 44m$^2$ at deep end; ramp outside enclosure 3x6m = 18m$^2$
  - Soil/sand area: 13.25 x 6.5m = 86m$^2$
  - Concrete paving (Overall minus pool deep end, soil & tree fence): 407m$^2$

- Description
  - Barren, no shade structure although the fenced-off tree may provide a small patch of shade when in leaf; there is some low shrubbery in the soil area.
  - Structure, concrete 'pergola' with uprights and cross-bars – for rubbing? One hanging tire
  - No place away from public view
  - Pool at the back wall, opposite side from the viewing area, with a ramp outside the main enclosure; 2m deep?
  - Moat: 3m wide, 2.5m deep, with viewing area along one side of the enclosure; walls on the other two sides and the barn on the final; Low (20cm) wall on the elephant side.

**Elephant status**

Physical condition

- Hips well-rounded, shoulders, scapula same. No protruding bones; No big rolls of fat under belly
- Head not concave at all.
- Tail long with small tuft of hairs
- Skin OK, no obvious wounds. Some areas – shoulders, head – a bit shiny from rubbing against walls.
- Ears OK, no cuts, holes or ragged edges
- Feet no signs of cracked nails or damaged soles; no sign of favouring any foot, limping. But look wet around soles and up over nails – wet from urine, or washing water? Walking appears OK.

Behavior

- Activity: fairly continuous movement around small stall, not obviously stereotypic in pattern
- Exploring, reaching out w trunk on visitor side of bars. From smudges on the wall, it looks like this has been a habitual pattern.
- After feeding by the keeper, some stereotypic swaying. Turns her back to visitors.
- Summary of elephant status
- General health: Well-fed to slightly obese. Feet could pose a problem if they are continually wet, especially if she stands in urine
- Behaviour: During the brief period of observation, there was some sign of stereotypy, but it was not pronounced. The elephant was continuously active, and was not listless.

Management and husbandry

- Management area adjacent to stall on right side. Giraffe stall area on other side of management room.
- With snow on the ground, and snowfall in progress, the elephant is kept indoors. In this region of Japan, the weather would appear to dictate long periods of confinement. The extensive rubbed patches on the walls of the stall indicate that the elephant spends much time indoors.
- Free contact: Keeper goes right into stall, shoveling dung into a bucket with his back to the elephant. Then brings in a hose pipe and washes the dung and urine into the drain. Gives elephant water from the hose into her mouth.
- 13:15pm: Keeper feeds elephant about 4 cups of chopped bananas, apples and animal cubes. He moves her around the stall using the bullhook blunt end, then goes out while the elephant continues feeding.
- Interpretation signs at outside One small sign with a map of Asian elephant range and some text; Bigger board with some information on it; Apparently some information saying that the elephant likes to throw things at visitors, so be prepared.

**Overall assessment and remarks**

- The indoor stall is small, with a hard floor that allows water to sit on the surface, keeping the elephant's feet wet. There is no drinking water or food available for the elephant to take at her choice.
- There is indoor capacity for only one elephant here, so any elephant would always be solitary.
- The outdoor area appears to allow some walking space, and has soil for dusting and softer substrate underfoot, as well as hard concrete. The pool in the corner is just large enough to accommodate the elephant. There is no shade apart from a small tree. In the winter, the elephant would appear to be confined indoors for extended periods.
- The elephant, Sunny, appears healthy, although slightly obese. There is a concern over her feet being wet for long periods on the hard concrete floor. She is not stimulated by the features of the indoor or outdoor enclosures, and it seems that she must spend extended periods indoors. There may be some attempts to compensate for her isolation by interactions with zoo visitors in the outdoor area, such as throwing objects. In the rather noisy indoor environment, she appears to be disturbed by visitors.

## Nagano Chausuyama Zoo

http://www.chausuyama.com/institution/

**Location**

570-1 Shinonoi-Odori Nagano City, Nagano Prefecture, 388 8016 Japan

**History**

The zoo opened on August 8, 1983 as part of the commemoration project of the 80th anniversary of the Nagano city system. It is a JAZA member.

**General description of zoo**

It is located in the green forest of Mt. Usu, a gently rolling hilly area above the southwestern part of Nagano city center. It forms part of Chospeyama Park area together with a botanical garden, dinosaur park and mini-golf course. The objectives appear to be to provide recreational learning opportunities in a scenic environment, to see and interact with animals more closely and in a "natural state", to protect and grow rare animals, such the lesser panda, and conservation of wild animals in other areas, such as ginkgo and salamander. There are zoo festivals in April and October, and night openings in August.

The zoo buildings are old (reportedly with no renovation since the opening in 1983) and somewhat dirty. The exhibits for most animals are very small, particularly for primates including chimps and orangutan, which are kept in concrete indoor areas. The outdoor areas are not much larger.

**Elephant details**

Name: Fuko
Species/ sex: Asian, female
Date of birth: 1979
Arrival at zoo: May 1983, from a (private?) zoo in Wakayama Prefecture.
Alone since: 2008, since the death of Dumbo

Other elephant:

Name: Dumbo
Species/ sex: Asian, male
Date of birth: 1974
Arrival at zoo: May 1983, from a zoo in Kyushu.
Death: December 2008, cause not specified

**Elephant enclosure**

Indoor

- Dimensions
  - 2 stalls, left one currently empty. Does not appear to be in current use.
  - Stall size estimated 6x6m =36m$^2$; two stalls would total 72m$^2$
  - Compare to total size of indoor area provided by the zoo: 114.4m$^2$; if this includes the area between the stalls and the visitor area (=3.5x12m, see below), then 114-42 =72m$^2$
- Description
  - Rectangular metal bars in front, somewhat sharp edges at a gap
  - Floor concrete, sloping towards front, drain; clean and dry
  - No feeding bins
  - Water trough in front, outside bars; no water in it at the time of observation, though elephant is seen reaching in with her trunk, apparently trying to find water to drink
  - Chain U-bolts in floor, back two corners
  - Small corner safety cubicle in right rear; metal spikes along top edge
  - Walls: back and right wall tiled, wall to adjoining stall is smooth plaster, but with a powdery surface
  - Steel sliding door to outside
  - Visitor area is 3.5m from the elephant enclosure bars; an apparently original low (0.5m) fence has been supplemented by a 4-cable fence now 1.5m high; the viewing area goes across both elephant stalls, with entry/ exit at both ends through glass doors; solid wall behind
  - It is very noisy when one family (parents and two small children) comes in at 11:50.
  - Extractor (or heating?) fan is on, deep throbbing noise
  - Interpretation includes a few small signs about Asian elephants and this elephant, including one that describes the elephant diet.
  - Temperature control: warmer than outside but not hot; thermometer says 9$^o$C

Outdoor

- Dimensions
  - Overall estimate: roughly 22.5m x 23.5m =529m$^2$
  - Pool: ramp – 3m widening to 6m, 6m long =27m$^2$; deep end 7x4m =28m$^2$; total pool =55m$^2$
  - Total outdoor area minus pool = 474m$^2$:
  - Soil/sand area: 10x13m =130m$^2$
  - Concrete: (Overall minus soil+pool) =344m$^2$
  - Compare to total outdoor area size provided by the zoo = 463.6m$^2$; pool is additional = 70m$^2$
- Description
  - Concrete area: 3m wide concrete ramp area from 2 steel barn doors leading to 2m wide concrete path around perimeter of area; steps – wide and fairly shallow - back up toward the barn
  - No shade, but some overhanging trees outside enclosure
  - Two rectangular "arches", having 4 concrete pillars, could be used for rubbing/scratching
  - Water pool at barn side corner; sloping, widening ramp leading to 2-3m at deep end; empty at the moment; spikes on top of wall at outside edge of the pool.
  - Moat: 0.5m high wall on elephant side, electric wire along the top; 4m wide, 3m deep
  - Viewing area around 3 sides of area, barn on 4$^{th}$ side; no screen away from visitors
  - Hedge 3m wide back to visitor path
  - Interpretation: a few small signs about Asian elephants; one sign suggests that the elephant sprays water at people.

**Elephant status**

Physical condition

- Shoulders, hips v rounded, spine fully packed; folds around neck
- Head rounded
- Skin: callus right elbow; otherwise no signs of wounding, scars; lots of rubbing marks on head, front & sides
- Feet look OK, no cracked nails, no limping; walks OK on all 4 feet

Behavior

In stall

- Stereotypical pacing: Presses head to wall in left front corner, walks backwards to left rear corner, walks forwards across to right front of the stall, then to the left front; repeat.
- When at the left front, she often flings her trunk out directly towards a visitor. Can include water (spittle?) in this flinging. There is a sign telling visitors that this is a common occurrence.

When door is opened,

- Elephant goes in and out, initially remains at door area. Eating snow – possibly due to thirst?
- Moves along the perimeter path at the edge of the moat to stand in front of us, trunk out; vocalizes, with a small chirp and then rumbles.
- 12:13 Goes back inside. Keepers have put lucerne hay in the stall. She eats some there, then brings big trunkful outside, eats it outside doorway, standing in sunshine.
- When we walk around the perimeter, she follows us, stops when we stop, reaches out trunk towards us at each stop.

Summary of elephant status

- General health: Physically healthy, but obese; without obvious wounds or serious foot problems; energetic rather than lethargic
- Behaviour: Signs of stereotypic pattern in the continual body movements inside the stall. There is similarly an obsessive pattern in the following and reaching towards visitors, both indoors and outdoors.

**Management and husbandry**

- 11:05. Young keeper comes in, walks across in front of bars, gives elephant some bamboo branches and 5 slices of white bread through the bars; more leaves piled close to visitor barrier. She eats the bread, finishes the leaves in about 5 minutes, and resumes the pacing pattern.
- Blocks (4?) of lucerne hay stacked up in front of second stall.
- 11:10 Older keeper comes in, feeds her more bamboo leaves, crusts of white bread.
- 11:48 Elephant defecates, no urine
- 11:54 Open sliding steel door to outside; elephant goes outside; sunny now but still close to 0º C. Snow is melting a bit.
  - When we first arrived, entire outdoor area was covered with fresh snow. Keepers have cleared the concrete path around the perimeter, heaping snow up in central area.
  - There are signs outside, similar to indoors, warning that the elephant sprays water at visitors.

**Overall assessment and remarks**

- The indoor stall is smaller than optimal; the floor does not drain well and appears to allow moisture and urine to persist
- The outdoor area allows some, but limited walking space; the pool in the corner is just large enough to accommodate an elephant, but appears to have additional sharp spikes
- There is capacity for a maximum of only two elephants, and this elephant has been solitary since 2008.
- The outdoor area is surrounded by a moat, which could pose a risk when there are two elephants.
- The elephant, Fuko, while seemingly healthy, is overweight. She is not motivated by the features of the enclosure or the feeding regime and appears to compensate for the lack of social or environmental stimulation with stereotypic movements in the stall and by attempting to interact with zoo visitors.
- The management regime appears to keep the elephant inside her stall for extended periods; in the winter, the cold weather limits outdoor time to a few hours a day at most.

## Kiryugaoka Zoo

http://www.kiea.jp/Zoo.html
http://www.city.kiryu.lg.jp.e.wt.hp.transer.com/zoo/index.html

**Location**

3-8-13, Miyamotocho, Kiryu-shi, Gunma Prefecture, Japan

**History**

The zoo was reportedly first established in 1916. In 1952 the zoo began "rescuing" wild animals and in 1953, it was officially launched as Kiryugaoka Zoo by Kiryu-shi as "Kiryu ka okakoendobutsuen", the prefecture's only public zoo. It joined the Japanese Association of Zoos and Aquariums at this time. The Kiryugaoka Amusement Park, also owned by the city council, was opened in 1971. The latest renovation was in March 1991.

**General description of zoo**

The zoo is located in a scenic location on a hill overlooking the city of Kiryu. It encompasses about a 6.1 hectare area, and has a range of species in addition to an elephant, including lions, giraffes, zebras, flamingoes, penguins, monkeys, a variety of snakes and a large aquarium along with domestic animals. An amusement park is situated on the other side of the access road from the zoo, which slopes away from park.

The park has landscaping of cherry trees and azaleas, which are in bloom in the springtime. During these seasons many families and groups visit the zoo. Entrance to the zoo is free of charge. The enclosures and cages of most animals are old-fashioned, small and not particularly clean (somewhat smelly).

**Elephant details**

Name: Izumi
Species/ sex: Asian, Female
Date of birth: 1955, in Thailand. Moved to Japan in 1957, in a private zoo in Kanagawa Prefecture, which was shut down.
Arrival at zoo: April 1964
Alone since: Solitary her whole time at the zoo
Died: April 2017

**Elephant enclosure**

Indoor

- Dimensions
  - 2 stalls 6x6m each =36m$^2$; two stalls would total 72m$^2$
  - Compare estimate provided by the zoo of indoor rooms: 33.6m$^2$ x2 ＝67.2m$^2$
- Description
  - Steel doors to outside; steel door between the two stalls.
  - Steel pipes along one side (viewing side); concrete walls other 3 walls.
  - Concrete floor, walls; sloping towards edge of stall with bars; hay scattered on floor – ele has been in here.
  - 2$^{nd}$ stall appears to have concrete walls on all 4 sides; elephant is in this stall.
  - Viewing area along the side of one stall, sliding glass doors (closed); can't see in the other where the elephant is – just see her head in doorway; can't see into the stall very well. Head-bobbing? Keeper said they are keeping the doors closed because it is cold outside and they want to keep her warm.
  - Grating inside windows – to keep people from throwing food? Windows 3m. from bars of stall.
  - Management/ storage area to right side, at back of stalls.

Outdoor

- Dimensions
  - Overall estimate (including pool): 18x12m (+ 28m$^2$) = 244m$^2$
  - Compare to zoo's estimate of outdoor area = 237m$^2$
  - Moat: 3m wide
  - Pool: ramp 2.8x2.8m =7.8m$^2$, deep end 4x5m =20m$^2$; total pool =28m$^2$
  - Concrete area (overall area minus pool) =208m$^2$
- Description
  - Concrete entirely, sloping to edge
  - U-hook in middle of floor, right of center.
  - No feeding hoppers or bins; no water; no enrichment
  - No shade
  - Moat; 3m deep, 4m wide around 3 sides of area, barn on fourth side; low wall (0.25m) on ele side, sloping up to
  - Viewing fence 0.5m from edge of moat; low hedge; 0.75m high fence

**Elephant status**

**Physical condition**

- Rounded hips, shoulders, back; slightly obese
- Head not concave
- Skin: no wounds or rubbing
- Feet: walking OK, not limping; VERY long nails on front feet.
- No tail hairs

**Behavior**

- No obvious stereotypy observed, but perhaps did not stay for long enough.
- 11:00 door opens and elephant comes out. After being let outside, she stood in one spot feeding on hay.
- 11:20 when the hay was finished, she walked slowly backwards into barn

**Summary of elephant status**

- General health: The elephant, Izumi, appears to be in good physical condition, although slightly overweight. While there is no clear indication of foot or joint problems, her toenails, especially on the front feet, are not well-trimmed. She is not very active.
- Note: On 7 April 2017, it was announced that Izumi had died. http://the-japan-news.com/news/article/0003622216
- Behaviour: Observations were limited, and behaviour appeared normal enough, apart from the backwards walking into the barn and some apparent head-bobbing inside the barn before she was let outside.

**Management and husbandry**

- free contact management
- keeper(s) put hay in outside area before the door to outside was opened at 11:00am

**Overall assessment and remarks**

- The indoor stall is small and rather dark. There did not appear to be drinking water or food available for the elephant.
- There is indoor capacity for only one elephant here. Izumi was solitary since her arrival at the zoo in 1964 at the age of 9 years.
- The outdoor area is entirely hard concrete, with no soil for dusting or a softer substrate. The pool in the corner is small. There is no shade structure. In the winter, the elephant would appear to be confined indoors for extended periods.
- Izumi looked physically healthy, although slightly obese, and her toenails needed trimming. She appeared subdued and listless.
- With Izumi's death in April 2017, the zoo should close its elephant exhibit.

## Utusnomiya Zoo


http://www.utsunomiya-zoo.com/

**Location**

552-2,Kamikanai-machi Utsunomiya-Shi Tochigi-ken

**History**

Could not find information on the history of this private zoo.

**General description of zoo**

This is a private zoo, with an amusement park in very close proximity to the animal cages. The animal area is noisy, with the nearby park rides clacking and music playing. All animal enclosures are very small, and are in generally poor condition.

**Elephant details**

Name: Miyako
Species/ sex: Asian, female
Date of birth: 1973, in Thailand
Arrival at zoo: 1973, at age of 6 months
Alone since: Solitary her whole time at the zoo

**Elephant enclosure**

Indoor

- Dimensions
  - Stall 5x5m =25m$^2$ (estimated from outside)
- Description
  - No visitor viewing
  - Concrete floor
  - No skylights, very dark
  - Heated

Outdoor

- Dimensions
  - 8.5x12m = 102m$^2$
  - Moat: 3m wide
- Description
  - Concrete floor
  - 2 u-bolts for chain attachment at opposite sides
  - Keeper safety cage in far corner
  - Moat, 2m deep, on two sides of the enclosure, a boundary fence is on the 3$^{rd}$ side, with the barn on 4$^{th}$ side; at the edge of the moat, there is no wall at all on elephant's side – she stands right on the edge of the moat, with front feet overlapping the edge
  - Visitor fence 0.5m high, 0.75m from edge of moat, low hedge in gap.

**Elephant status**

Physical condition

- Hips, shoulders, back rounded, not much belly fat; slightly obese
- Head not concave
- Skin: no scars/ wounds/ scrapes visible; callus left elbow
- Tail: no hairs
- Feet: walks OK on all feet; nails long on hind feet

Behavior

- Continuous vigorous pacing
- Regularly goes to structure at back, next to keeper safety shed, puts mouth around horizontal pipe at head height and appears to bite down and shake it.
- Hits head with trunk, straight backwards on forehead with back of trunk
- Flinging trunk at people; quite a few people here, despite wintry conditions
- People are encouraged to feed her – and many zoo animals: food packets are sold at the entrance, containing bits of fruit and nuts.
- Sign indicates that they should not feed unless there is a keeper present to guide them, but many people do this. They throw food onto the concrete area, or try to reach out their hand with food; she stands right at edge of moat and reaches out her trunk, which is just not long enough, so food usually drops into the moat. It is possible to feed her at the corner next to the barn, which is closer to the edge.

Summary of elephant status

- General health: Miyako appears to be in good physical health, although somewhat overweight. Her feet and joints also seem healthy, although there is need for trimming of the nails on her hind feet. She is active rather than listless.
- Behaviour: She exhibits a number of stereotypic behaviour patterns in her continuous movement around the very small outdoor area, including repetitive walking patterns and gripping/ shaking a steel bar with her teeth. There are continual attempts to interact with people, who provide food items.

**Management and husbandry**

- The keeper says they practice "mostly PC", because the elephant is big and strong – and presumably aggressive towards them. They go in with her only when she is sick (?).
- She is put outdoors in the morning, 9-9:30; the barn door is locked and she is let back in the evening, kept in all night.
- This is done all year round, except when it is actually snowing; then the barn door is kept open and she can go in and out.
- She came here from Thailand when she was 1 year old and has always been solitary.

**Overall assessment and remarks**

- The indoor stall is small, hard-floored and dark. There does not appear to be any drinking water or food available apart from what is provided directly by the keepers.
- There is indoor capacity for only one elephant here, so any elephant would always be solitary.
- The very small outdoor area is entirely hard concrete and has no soil for dusting or softer substrate underfoot. There is no pool. There is no shade apart from a large tree outside the enclosure which may provide some shade when it is in leaf. In the winter, the elephant is confined indoors only on days when it is snowing.
- The elephant is kept indoors until 9:00-9:30am and returned to the barn in the afternoon, every day of the year.
- The keepers appear to be somewhat afraid of this elephant, and have largely adopted Protected Contact management to protect themselves from injury. It is not clear to what extent they train her for necessary inspection, but they do not seem to do any foot inspection or treatment.
- The elephant, Miyako, is physically healthy. She is not stimulated by the very limited features of the enclosure or the feeding regime and appears to compensate by continuous attempts to interact with zoo visitors.

## Hamamatsu City Zoo

http://www.city.hamamatsu.shizuoka.jp/hamazoo/
http://www.hamazoo.net/

**Location**

199 Kanzanjicho, Nishi Ward, Hamamatsu, Shizuoka Prefecture 431-1209, Japan

**History**

In 1950, the zoo opened with 30 species of animal on display, including the first elephant named Hamako.

A new elephant enclosure was completed in 1962. Construction on new zoo facilities began in 1979 and was completed for opening in 1983, with 130 species kept. Hamamatsu City has plans to renovate the zoo including the elephant enclosure in the future.

**General description of zoo**

The zoo is located in a landscaped park, at the edge of town near the seaside. There appears to be an extensive interpretation programme, promoting public engagement especially with kids. Some of the exhibits are naturalistic – the tiger has a largish outdoor area with rocky cliff-face, with areas where it is possible to hide from the public. The lion enclosure is similar but somewhat smaller. But the indoor quarters for all the animals are very small. In general, it is quiet, but the occasional large plane flies over – is there an airport nearby?

**Elephant details**

Name: (3rd) Hamako
Species/ sex: Asian, female
Date of birth: 1971, unknown
Arrival at zoo: March 1972
Alone since: 2008, with death of Miyo

Other elephants:

Name: 1st Hamako
Species/ sex: Asian, female
Date of birth: unknown
Arrival at zoo: 1950
Departure: "left zoo", details unknown

Name: 2nd Hamako
Species/ sex: Asian, female
Date of birth: unknown
Arrival at zoo: 1956
Death: 1971

Name: Matsuo
Species/ sex: Asian, female
Date of birth: unknown
Arrival at zoo: 1971
Death: 1980

Name: Miyo
Species/ sex: Asian, female
Date of birth: 1975, unknown
Arrival at zoo: January 1983, from Yokohama Zoo
Death: July 2008

**Elephant enclosure**

Indoor

- Dimensions
  - 2 stalls, each of size 6x7m =42m$^2$
  - Compare with estimate provided by zoo of the "Bedroom" = 2x45.5m$^2$
- Description
  - 2 stalls separated by bars. A sliding bar door joins the two stalls but it is closed now.
  - Concrete floor, smooth, sloping towards from of stall, drains outside stall.
  - Steel door to outside, studded
  - Keeper safety box in corner
  - Water box with water in it, accessible from both stalls
  - Visitor area 3m from stall, 1.5m fence; enter through hinged glass door at side, can walk along to see both stalls.
  - Skylights; v light inside
  - Temperature is 9.3º C according to thermometer; a heater is in place though not currently in use – petrol or electric?
  - There is a lot of interpretive material, with signs explaining elephant husbandry

Outdoor

- Dimensions
  - Overall, including pool: estimated as 595.5m$^2$
  - Compare with zoo's estimate of "paddock" of 610m$^2$
  - Concrete path areas =326m$^2$;
  - Soil/sand/grass: 219m$^2$
  - Pool: deep end 6x5.5m =33m$^2$; ramp 7x2.5m = 17.5m$^2$; Total = 50.5m$^2$
  - Moat: 2.75m wide
- Description
  - Concrete path, 2m wide at moat side, 4.5m wide area in front of the barn
  - Sandy soil with patchy short grass in the centre; log lying on side
  - 4 rough concrete rubbing posts
  - No shade
  - No food bins, enrichment; no water source
  - Pool (dry now) at corner of wall and moat; ramp down into it, maybe 2m deep at end
  - Moat on two sides, wall of other enclosure on 3$^{rd}$ side, barn on 4$^{th}$ side; 2.5m deep 3.5m wide
  - Visitor fence 2m from moat, low hedge; one visitor access area in indentation of hedge, right up to edge of moat. Food/ picnic area under canopy 5m away with five benches. Food dispensing machines nearby, making musical noises when anyone approaches.
  - Interpretative material: quite a lot in a set of posters outside barn. More, limited, information at outside viewing places, and indoor area.

**Elephant status**

Physical condition

- Hips, shoulders, back rounded
- Skull not concave
- Skin: no signs of wounds, but trunk tip is missing the upper 'finger' and has bright pink pigmentation
- Tail: no hair
- Feet: walks OK, no sign of limping; nails on left hind foot look cracked – 2nd outer nail looks split, 2nd inner nail strange shape/ deformed; length OK

Behavior

- No bobbing, rocking or swaying seen but there is a stereotypic walking pattern: walks from barn along path around perimeter, stops about halfway around, stops, turns and walks back to the barn, stops backs into wall, turns outward REPEAT, over and over again.
- Occasionally breaks off from this pattern to cross soil area to other side, searching grass around log a bit. Also spends time exploring the gates into both stalls. A keeper is moving behind there. Seems to avoid visitors somewhat.

Summary of elephant status

- General health: Hamako looks to be in good health, "well-fed" but not seriously over-weight. The nails on her hind feet need treatment and might cause problems if not attended to. There is an old injury to her trunk tip, but it does not appear to affect the current use of her trunk.
- Behaviour: Hamako has the apparent energy and motivation to walk in her outdoor compound, and uses both concrete and softer substrates. But there are no regular foraging opportunities to encourage movement; her response appears to be a repetitive movement pattern with which she occupies her time until the next "feeding time".

**Management and husbandry**

- According to a conversation with a keeper, the routine is:
  - Open door, feed her outside at 9am
  - Bring inside, wash and inspect her feet, feed her again at around 2pm – 2 feedings per day
  - Keep inside after that feeding until the next morning
- Food is fruit and veg, lucerne hay in compressed mats – they probably break it up before giving to her
- It APPEARS that they use PC, for foot work at least; no sign of keepers entering compound with her
- She sleeps lying down at night for 1 hour, standing for 3 hours
- Swims/ wallows in pool in the summer, not winter

**Overall assessment and remarks**

- The indoor stall is small, but apparently large enough to allow lying down at night. There is drinking water or but no food available for the elephant to take at her choice.
- There is indoor capacity for only two elephants here.
- The outdoor area has soil for dusting and softer substrate underfoot, as well as hard concrete. The pool in the corner is apparently deep enough to allow entering but possibly not much weight support. There is no shade.
- Hamako, appears healthy, although there may be some potential problems developing with her hind feet. She has some room to move and appears active, but is not stimulated by the feeding regime and appears to compensate by pacing in a regular, repetitive pattern.
- Hamako is allowed outdoors from 9:00am to 2:00pm (5 hours) every day, all year. For the remaining 19 hours of each day, she is confined in her indoor stall.

## Kyoto City Zoo

http://www5.city.kyoto.jp/zoo/
http://www5.city.kyoto.jp/zoo/lang/en

**Location**

Okazaki Park Okazaki Park Sakyo-ku, Kyoto 606-8333

**History**

The zoo opened on 1 April, 1903, with animals transferred from the Imperial Household Agency. It received its first elephant, the male Parma Gou, from Thailand in 1907. In 1923, the first Elephant House was completed. The new and current elephant enclosure was completed in 2015.

**General description of zoo**

Located within Kyoto city, it is adjacent to a main (and somewhat noisy) road, although it is also next to a shrine complex, which provides a calmer environment along one side of the grounds. Space is limited, but there is a positive attempt to engage the public, with particular involvement of children.

The exhibits for gorillas and chimps are good, if on the small side. These spaces provide complex environments, with living vegetation. Food for these animals appears to include branches and leaves, not just fruit and animal chow. Many other exhibits, however, are more typical of other zoos, with tiny enclosures/ cages for lions, tigers, penguins, bears, etc.

The new elephant enclosure was designed to accommodate four adult females and one adult male. There is a small compound for the proposed male elephant, and a larger compound for the female group; each animal would have its own stall, a total of five.

**Elephant details**

Name: Mito
Species/ sex: Asian, female
Date of birth: 1971 (?), Malaysia
Arrival at zoo: 1979, from Malaysia
Alone since: Solitary since 2001 after death of Tomo and possibly another elephant, but joined by four juveniles in 2014. There was an attempt to integrate her with the new arrivals, but she did not respond well to these juvenile animals, so she has been kept in the separate compound originally planned for an adult male elephant, on the other side of a cable fence from the others.

Other elephants:

Name: Parma Gou
Species/ sex: Asian, male
Date of birth:
Arrival at zoo: 1907, from Thailand
Date of death: not given

Name: Tomo
Species/ sex: Asian, female
Date of birth: 1980
Arrival at zoo: 1980, 2-3 months old

Death: 2001
Name: Unknown
Species/ sex: Asian, Female
Date of birth: no details
Arrival at zoo: 1950
Death/ departure: no details

Asian elephants who arrived from Lao PDR, in November 2014:

- Fuyumi Tonkin – female, born 2008 – has small tusks
- Natsumi Bunnyun – female, born 2010 – tear in middle of right ear
- Harumi Kampat – female, born 2010
- Akito Tonkam – male, born 2011 – has tusks

**Elephant enclosure**

Indoor

- Dimensions
  - There are five stalls, roughly 9mx7m = 63m$^2$ each.
  - Compare with information from zoo on "bedrooms": 1x60m$^2$ intended for a male elephant (now occupied by Mito), 3x50m$^2$ and 1x60m$^2$ for female elephants.
- Description
  - Steel pipe uprights and horizontal cables; open at 3 sides; sliding metal doors to outside
  - Management areas along back and left (viewing) side
  - Smooth concrete floors
  - No U-bolts for chains in the floor but U-brackets on upright posts at the back corners.
  - Example of day's food on display: sack of hay, bamboo branches & 3 sacks of leaves, bucket of apples (8?), 1 heart of palm
  - No feeding bins or water troughs
  - Viewing area along side of left-most stall, not along ends of all stalls; 3m from nearest stall
  - Glass window in viewing area, closed.

Outdoor

- Dimensions

  2 areas:

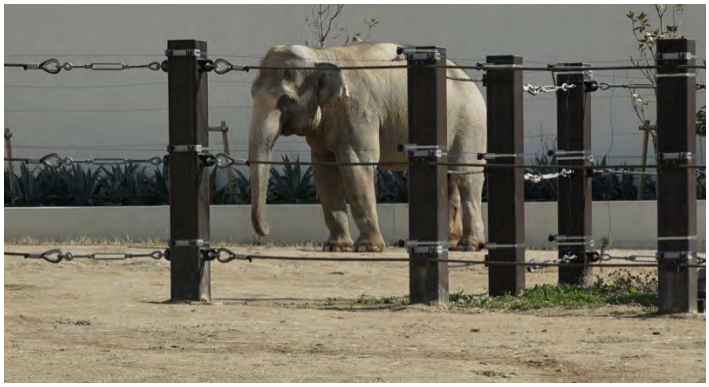
  1. Mito
     - Overall (including pool) = 457.5m$^2$
     - Compare with information from zoo: "Paddock for male elephant" 650m$^2$ including (?) pool 25m$^2$
     - Soil/sand: 25x17m = 425m$^2$
     - Pool: 5x6.5m = 32.5 m$^2$

2. Four juveniles
    - Overall: 22x30m + two smaller sections, including pool = 1,006m$^2$
    - Compare with information from zoo: Paddock for female elephants 980+160 = 1140m$^2$ including (?) pool =210m$^2$
    - Soil/ sand: 880m$^2$
    - Pool: concrete landing 5x11m =55m$^2$; wide steps 4x4.75m = 19m$^2$; deep end 13x4m =52m$^2$; total =126m$^2$

Description

1. Mito's area
    - Packed soil
    - No shade structures, but one small, fenced-off tree that may provide some shade when in leaf
    - Small pool at corner opposite barn
    - Behind young elephant's paddock on one side, a rank of concrete pillars on viewing side, so hard for visitors to see, solid fence on 3rd side, barn on 4th side.
2. Area for four juveniles
    - Packed earth over the whole area
    - No shade structures, but three small fenced-off trees in the enclosure, one large tree next to the barn, which could provide some shade when in leaf.
    - Scratching pillars
    - Pool at visitor edge of enclosure; concrete; 1.5m deep?; running water splashing into it; broad steps down to it; also a shelf next to the steps where elephants can stand and drink.
    - No moat: Fence of 15cm concrete cylindrical posts, with three thick cables; 2m high; around two sides, Mito's area on 3rd side, barn on 4th side
    - No food hoppers; hay scattered on the ground especially around edges of enclosure, still some bits here and there at the time of our arrival.
    - No enrichment mechanisms
    - Visitor's viewing area 2m back from elephant fence along two sides of the enclosure; 1.2 m metal bar fence w wooden shelf on top.
    - Viewing area near the barn with small windows, allow people to get very close to the elephants, who may be attracted into the area by food provision.
    - Interpretation signs w info about elephants in general, and the specific elephants here

**Elephant status**



Physical condition

- Mito:
    - Rounded hips, shoulders, backbone; no ribs visible; little belly fat

  - Head not concave
  - Bump in skin left upper leg; large (10cm ?) round bump on right rump; left elbow callus
  - Tail long, w long hairs
  - Feet: walking on all four feet OK, no sign of limping; possible cracks in middle nail(s) of front foot
- Four juveniles:
  - All seem in good health, active
  - Natsumi Bunnyun – large tear in middle of right ear; spends some time separate from others

Behavior

- Mito:
  - Walks slowly in her small enclosure, occasionally comes to fence with adjacent enclosure.
  - 10:45am: stands swaying her head back and forth for 20 minute period; stops, moves, resumes swaying head.
- Four juveniles:
  - Move around the whole enclosure individually and joining, re-joining; interacting, vocalizing; rolling in dust
  - Chirps and rumbles; oldest female, when standing with others at pool, taps outside of her trunk on the concrete edging.
  - Drink from platform at edge of the pool

**Summary of elephant status**

- General health:
  - Mito: Appears healthy, if slightly overweight and relatively inactive. Toenail(s) on front feet may be cracked, but there was no obvious sign of foot problems. There are two apparently old wounds, now healed, in the skin of the right and left hind legs.
  - Four juveniles: All appear healthy, but one female (born 2010) has a tear in the middle of her right ear.
- Behaviour:
  - Mito: Slow movements and stereotypic swaying suggest a lack of motivation. Shows occasional interest in the fence area between compounds, but stands facing away from the other elephants, reinforcing her isolation.
  - Four juveniles: Very mobile and interacting socially with each other.

**Management and husbandry**

- When the juveniles were brought in, the keepers initially tried to introduce the juveniles to Mito, keep them together; but she acted aggressively; keeper said she is much larger than them and aggressive
- They try to integrate them by putting food along the fence between the two enclosures, but when the young elephants take food, she gets angry; she now often ignores this food taking, but is still aggressive at the fence on occasion; we did not see any aggression when we were there.
- Feeding 3 times a day
- Let outside at 10am, brought back in at 3pm; every day, throughout the year, apart from occasional night openings, when spotlights are used.
- Give apples as incentive to come inside
- Photos on wall inside suggest that they use FC

**Overall assessment and remarks**

- With the reconstruction of the elephant enclosures in 2015, the zoo made moves toward international best practice. There is no moat, which has been recognized as posing a danger to subordinate animals, and the entire substrate of the outdoor compounds is packed soil rather than concrete. There are pools in both compounds. There are no shade structures but there are a few fenced-off trees to provide shade when they are in leaf.
- The arrival of four juvenile elephants – three females and one male – in 2014 would appear to be a move to make use of the designed facilities, and to provide companions for Mito. However, the resident elephant, Mito, was much older than the arrivals and it appears that her years of solitude have affected her tolerance of other elephants. She does not get along with the new animals, and has been kept in the "male enclosure" to prevent her aggressive actions potentially causing injury to one of the other elephants. Although the compound is relatively large by the standards of most zoos, in Japan at least, there is not enough space for animals to avoid each other if they are incompatible. The keepers are trying to encourage Mito to accept the other elephants, but the process is slow.
- There is indoor capacity for five elephants here. The indoor stalls are of reasonable size and are well-lit. However, the floors are all hard concrete. There is no drinking water or food available for the elephants to take at their choice.
- As with all zoos in Japan, the elephants are confined indoors for 19 hours per day, being allowed out only from 10:00am to 3:00pm almost every day of the year. The feeding regime means that food availability is periodic rather than continuous.
- The adult, formerly solitary elephant, Mito, is reasonably healthy. However, she is listless and not stimulated by the features of the enclosure or the feeding regime, and appears to compensate by stereotypic swaying. It is not clear whether her sense of isolation has been reduced or exacerbated by the arrival of the four juveniles.
- The juvenile elephants appear healthy, active, and socially well-integrated. Whether this situation will persist through time as they grow older is not clear. As noted, the compound does not provide sufficient space for elephants to avoid each other if they develop personality clashes.

## Kobe Oji Zoo

*Zuze's outdoor enclosure with Mac's smaller enclosure visible in the back.*

http://www.kobe-ojizoo.jp/

**Location**

3-1 Oji-cho Nada-ku, Kobe-shi 657-0838

**History**

A private zoo in Suwayama Park was opened in 1928, and it was transferred to Kobe City administration in 1937. It was closed in 1946 following World War II, and was re-opened as Kobe Oji Zoo in 1951 on the site of the Japan Trading Industry Expo of 1950, its current location. Additional animals were added to the collection in 1953. Reportedly there were adjustments to the elephant enclosure in 1966, 2003 and 2004. Reconstruction to subdivide the current elephant enclosure is planned to start soon.

**General description of zoo**

The Oji Zoo is one of three large zoos in the Kansai area. The total area is more than 80,000m$^2$, with 850 animals from a total of 150 different species on the premises, including rarely seen animals such as giant panda, koala, golden snub-nosed monkey, Amur tiger, and snow-leopard among others.

**Elephant details**

Name: Mac
Species/ sex: Asian, Male
Date of birth: 1992, at Circus Knie in Switzerland
Arrival at zoo: 1995
Not currently alone: Re-joined by Zuze in December 2014, but kept in separate outdoor enclosure.

Name: Zuze:
Species/ sex: Asian, Female
Date of birth: 1990, at Riga Zoo in Latvia

Arrival at zoo: 1995; removed in October 2013 but returned in December 2014

Kobe Oji Zoo, and its predecessor Suwayama Zoo, have had a rather unsuccessful history of breeding and raising elephants.

Suwako, a female elephant born in Thailand in 1943, arrived at the zoo in approximately 1950-51 and survived to age 65 in 2008. However, another Asian female for whom official records are unclear – Mayako, reportedly died in 1956 at the age of 17 from TB. A male Asian elephant, Taro, was brought to the zoo in 1957 for the purpose of breeding with Suwako, but no calves were born and in 1994, Taro died. Suwako chose to not associate with the new arrivals, Mac and Zuze, and remained for most of the time in her indoor stall until her death.

Zuze has mated and conceived calves with Mac, possibly at least four times, and three of these conceptions resulted in the death of the calves. In 2002, there was apparently a stillbirth, although this is not mentioned on the Kobe Oji web site. In 2004, the female calf Momo was born; she was raised by a keeper and died "because of fractures" in 2005. In 2007, a male calf Oji was born; he was also raised by a keeper and died in 2012, reportedly unable to stand since October 2008 because of osteomalacia, a weakness of bones from impaired metabolism resulting primarily from inadequate levels of available phosphate, calcium, and vitamin D. Zuze was moved to Ichihara Elephant Kingdom in 2013 when pregnant to be assisted with the birth of the latest calf. She gave birth to a female, Yuki, in 2014; once again, the calf was raised by keepers when Zuze was returned to Oji Zoo. There is some suggestion that the calf Yuki will come to Oji when reconstruction is completed.

**Elephant enclosure**

Indoor

- Dimensions
  - Mac:
    - 10x6m =60m$^2$
    - Other two stalls:
      1. 10x5m =60m$^2$
      2. 7x6m =42m$^2$
    - Total =162m$^2$
    - Compare with information from the zoo on the total area of the "Den" =211m$^2$
- Description
  - Mac:
    - Left side and back wall rendered concrete; right side and front steel girders
  - Other two stalls:
      1. Larger
         - Right side and back plastered concrete
         - Left side and front, steel girders

2. Smaller
    - Left and right sides, front – steel girders
    - Unknown if this one in use.
- All stalls:
    - Floor: flat, concrete paving stones
    - Steel girders for bars
    - None have water obviously available
    - No food bins
    - No skylights, dark; only light comes from windows of viewing area

Outdoor

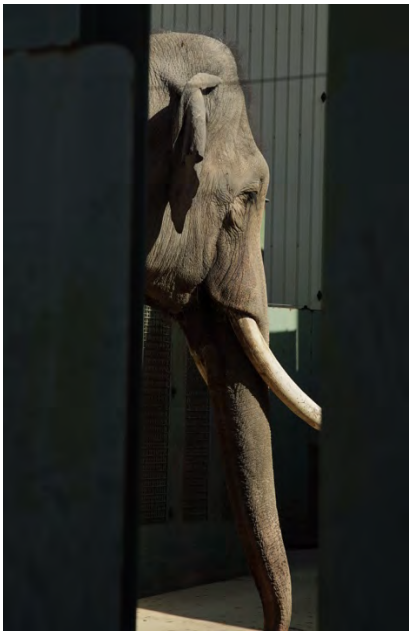
- Dimensions
    - Overall: 490m$^2$
    - Compare with information from the zoo: total = 499m$^2$
    - Mac's enclosure: 5x7m = 35m$^2$
        - Concrete:17m$^2$
        - Soil/ sand: 19m$^2$
    - Zuze's enclosure (all soil) = 464m$^2$
    - Neither section has a pool
- Description
    - Mac:
        - Small outdoor stall
        - Hard-packed sand in the middle, 1x7m concrete path along long axis, 2m wide at barn end
        - Metal girders at front, concrete wall on right side, fence with metal girders and strong mesh on left side, bordering larger area
        - Steel sliding door connects the two areas; steel sliding door to indoor stall
        - Keepers' safe area in right back corner
        - Small water bin in right back corner
        - No food bins
        - No moat, level with ground
        - 2m to viewers' fence, 0.7m with low hedge stall side.
    - Larger main enclosure with a female elephant – Zuze
        - Roughly rectangular

- Mostly packed sand and dirt
- No water, no pool
- Shade 'parasol' on concrete post sculpted to look like a tree trunk; some other shade from nearby trees
- Scratching pillars near edge of moat
- Moat: low wall elephant side, sloping inside, wire along elephant side top edge; sharp-edged, 1.5m deep, 1.5 m wide; wire on top of outside edge; 2m wide hedge to visitor fence 0.75m high
- One rubber tire on the ground
- Two steel doors to the barn
- Noise of generator (?) constant throbbing; ferris wheel in background

**Elephant status**

Physical condition

- Mac:



  - Hips, pelvic bones visible; spinal vertebrae visible, pronounced dip to 2nd vertebra from pelvis
  - Skull concave
  - Skin: no obvious wounds or scars; ears OK; trunk OK
  - Tail bones visible, no tail hairs
  - Tusks: longish – right tusk 0.75m, grooves worn in outer edge; left, tip broken 0.5m
  - Feet: flaking skin around edges, nails look to have no cracks, but there are cracks (?) in soles of all feet; not moving very much but does not appear to be limping/ favouring any particular foot
- Zuze:
  - Hips, shoulders, back v rounded; some belly fat
  - Breasts slightly swollen, not full – first (only) time to see ANY breast development in Japanese captive elephants
  - Skull not concave
  - Skin: ears right - torn at back; left – torn across middle to back

    - Trunk: longitudinal cut in left side, now healed
    - Feet: nails seem OK, not limping

Behavior

- Mac:
    - Standing in place, facing away from public viewing side, making slight movements including shifting his feet, and swaying
    - Vocalizations include occasional chirps
- Zuze:
    - Active when keepers are providing food, requiring performance of tasks
    - When alone mostly standing next to moat facing towards visitors, slight swaying

Summary of elephant status

- Mac:
    - General health: Although there are no obvious signs of injury or foot problems (apart from possible cracks in the soles), Mac does appear to be thin, with skeletal bones prominent.
    - Behaviour: Mac is listless in his small stall, moving continuously but only slightly. He faces away from the public, who can approach closely to him. He is much less responsive during training episodes in comparison with Zuze.
- Zuze:
    - General health: Well-fed appearance, verging on slightly obese. Feet and joints appear healthy. She appears to be recovering from pregnancy and possibly suckling a calf. There is evidence of some wounding of the ears – cause unknown but could be caused by Mac? This could be why they are kept separately.
    - Behaviour: Zuze is active when the keepers are present and requiring her to perform for food rewards. At other times, she adopts stereotypic swaying with attempts to reach towards visitors.

**Management and husbandry**

10:25am – feeding of elephants, including training/ performance

- Zuze:
    - Starts at barn: keeper on roof, dangles with pole a slice of white bread, then a bamboo branch – elephant stretches up, goes down on rear haunches and stretches up with trunk.
    - Then keeper comes to viewing area opposite barn, issues serious of instructions, and after compliance with each, gives food reward (pieces of apple, banana, melon, carrot):
    - Turn, walk in circle, walk backwards, go down on stomach (sternal), go down on rump/ hind legs, lift trunk up and show mouth
- Mac:
    - Keeper outside viewing area bars.
    - The training/ performing is less successful than with Zuze; Mac appears not very interested in food rewards
    - Chirps, raises trunk, goes down on haunches when instructed but only halfway down before rising again.
    - Tricks over at 10:45am
    - 11:30am
        - Bring Mac inside, short training with bananas - move forward, raise trunk
        - While he was inside, keeper outside cleaned stall, put bamboo leaves at outer bars near viewing area
    - Talk with keeper

- They do training every day at 2:30pm for one hour, with bullhook; otherwise much of the contact is through the bars or from the other side of the moat, i.e. not in direct free contact.
- Let outside at 8:00am, inside at 4:00pm every day

From information on the website and supplied by the zoo, it appears that Mac had been kept in the larger enclosure together with Zuze for many years, indeed since they were brought to the zoo as young juveniles. They have mated and Zuze has produced four offspring, with only the most recent surviving after separation from her. However, Zuze was taken to another zoo for one year, and it appears that it is now necessary to keep them in separate fenced areas, with Mac in a very small compound. There are plans to subdivide the main enclosure into two parts, so that Mac can have half of this, while Zuze and her calf are reunited in the other half. It is not clear when this will occur, and how the reunion will work (if at all).

**Overall assessment and remarks**

- The indoor stalls are the standard small concrete boxes/ cages with metal bars. There are no drinking water or food bins allowing the elephants to take water and food at their choice. The space is dark, with no skylights; the only light comes from windows of viewing area
- There are three indoor stalls for three elephants here, but little space for more than one elephant per stall.
- The outdoor area has soil for dusting and softer substrate underfoot, as well as hard concrete. There is no pool for wallowing or weight support. There is a shade structure in the large enclosure. The elephants are confined indoors for 16 hours per day, every day.
- Mac is not particularly healthy, looking slightly underweight, and is not stimulated by the features of his very small enclosure or the feeding regime. He is listless and unresponsive, even to keepers. He avoids contact with visitors, and compensates by swaying and vocalizing.
- Zuze is somewhat obese but is relatively active, particularly when engaged by the keepers in their training.
- The management regime follows the standard limitations on outdoor access for only about 8 hours per day, apparently in line with keepers' working hours.

## Himeji City Zoo

http://www.city.himeji.lg.jp/dobutuen/

**Location**

Castle East side of 68 Honmachi, Himeji 670-0012

**History**

The zoo opened in 1951 and it appears that the animal exhibits have not been upgraded significantly since that time. Its location immediately next to the Himeji Castle world heritage site most likely subjects it to a number of restrictions regarding land use and expansion plans. In 2013-14, the roof and other small areas were renovated.

**General description of zoo**

Himeji Zoo is a combined zoo/ amusement park in the grounds of the Himeji Castle complex, which is visible on the hill from the zoo entrance. The entry fee is for the zoo and amusements, as one attraction. Animal cages are located immediately adjacent to the rides and other entertainment, which generate a lot of noise and disturbance. A loudspeaker from the direction of the castle is also very noisy. The land area of about 30,000m$^2$ is small, even when compared to other zoos in Japan.

**Elephant details**

Name: Himeko
Species/ sex: Asian, Female
Date of birth: 1977
Arrival at zoo: October 1994
Alone since: Solitary her whole time at the zoo

**Elephant enclosure**

Indoor

- Dimensions
  - Stall 9x7m =63m$^2$
  - Compare with zoo's figure of 66m$^2$
- Description
  - Steel bars on viewing side; lattice and straight sections
  - Concrete floor
  - Keeper safety box in back right corner
  - Windows high up on back wall; no skylight
  - No water source; no feeding bin
  - Food piled in stall: lucerne hay, horse cubes
  - Viewing windows 2m from bars; sliding, open at the moment

Outdoor


- Dimensions
  - Overall: 12.5x13.5m =169m$^2$ (including pool =199m$^2$)
  - Compare with information from the zoo = 167m$^2$ (not including pool)
  - Concrete =114m$^2$

  - Dirt/soil: 6.5x8.5m = 55m$^2$
  - Moat: 2m wide along long side opposite barn, 2.7m wide along shorter side
  - Pool: 5x6m = 30m$^2$
- Description
  - 2m wide concrete path around 3 sides, 3.5m on barn side
  - Sandy soil in middle; evidence soil is used for dusting
  - U-racket (for chain?) in middle
  - No shade, no scratching posts (uses door supports for scratching/ rubbing)
  - No source of drinking water, no feeding bins
  - Moat: 2.5m deep, 3m wide – on 3 sides of area; wire along top of low wall
  - Pool in back next to barn; is it accessible? It is behind a steel fence; is this removable?

**Elephant status**

Physical condition

- Hips, shoulders, backbone rounded; little belly fat;
- Head not concave
- Small tusks
- Long hairs under belly; tail hairs short and few
- Bare/ scraped skin patch left side of head; broken skin patch on left front leg below shoulder
- Feet: seems to keep her weight off the left front and rear feet; dry/ whitish skin between nails; nails long on both front feet

Behavior

- Not much walking around the very small area
- Vigorous, continuous head-bobbing and swaying for long periods; facing away from most visitors
- Defecates, urinates on concrete at spot where standing; continues to stand in urine pool while head-bobbing
- Bout of repetitive banging of tail against steel door
- Summary of elephant status
- General health: Himeko appears well-fed and is not noticeably obese. However, there is some concern that her feet may not be healthy, with poorly trimmed nails and flaky skin, and she does not walk well. There are skin lesions, which may be self-inflicted by rubbing.
- Behavior: Although she is not listless, Himeko shows pronounced and continuous stereotypic bobbing and swaying. She avoids contact with visitors.

**Management and husbandry**

- 3:30pm keeper comes; gets hosepipe, sprays from outside moat into her trunk, she drinks trunk to mouth
- 3:40pm, two keepers go into enclosure; one gives orders, has bullhook under arm; orders Himeko to move around in a circle, stand still for brushing back and head with broom (she bends forward), washing back and feet with hosepipe; he looks at feet but does not do any work, no trimming
- 4:00pm Gets her to walk in another circle, then into stall.
- They have set up food for her inside stall: placed carrots, bananas, apples on horizontal pipes of bars on visitor side of stall; bamboo leaves hung from bars above head.
- Keeper says they let her out at 9:00am, take back inside at 4:00pm every day all year around.

**Overall assessment and remarks**

- The indoor stall is small and not well-lit, with a hard concrete floor. There is no drinking water or food available for the elephant to take at her choice. There is indoor capacity for only one elephant, so any elephant would always be solitary.
- The outdoor area is small and featureless. It has a small area of soil for dusting, but is mostly hard concrete. It is not clear whether the small pool in the corner is accessible. There is no shade and no scratching post, so Himeko uses the side of the door or other hard structures for grooming. She is kept indoors for 18 hours every day.
- Himeko, appears physically healthy but there are concerns about her foot condition. She is not stimulated at all by the features of the small enclosure or the feeding regime and appears to compensate by almost continuous stereotypic movement.
- Management is through free contact. The performance of simple tricks and supposed "foot care" is little more than a public entertainment show.

## Ikeda Zoo

http://www.urban.ne.jp/home/ikedazoo/index.html

**Location**

700-0015 Okayama Prefecture, Okayama, Kita Ward, Kyoyama, 2–5–1

**History**

According to one report, Mr. Takamasa Ikeda, the founder of the Ikeda Zoo, started a farm in 1948 to provide food for the local population, particularly children. The farm eventually transformed to the zoo, with education and interaction with the animals becoming the main purpose. The zoo remains privately owned.

**General description of zoo**

The zoo is in Okayama city at the edge of the Kyoyama Mountain, and is combined with an amusement park. The elephant exhibit is right at entrance, next to a food area, in a very noisy location. The exhibits for all animals are very small and appear unclean and smelly. There is currently no elephant in the exhibit; maps on some fences still depict an elephant exhibit but the brochure has a blank green space in that area and the signboard at the entrance has its location painted over.

**Elephant details**

Name: Merry
Species/ sex: Asian, female
Date of birth: 1965
Arrival at zoo: May 1967
Alone since: Solitary her whole time at the zoo
Died: 14 February 2016

**Elephant enclosure**

Indoor

- Dimensions
  - Estimate 4x7m = 28m$^2$
  - Barn: 8x6.5m = 52m$^2$
- Description
  - No visitor access; exhibit closed

Outdoor

- Dimensions
  - Roughly 12x5m, with additional side areas and pool =80m$^2$
  - Pool: 2x6m = 12m$^2$
  - Moat: 2.5m wide
- Description
  - Entirely concrete floor
  - Water box in the right back corner next to barn
  - Pool in back left corner next to the barn
  - Moat: no inner wall, 2m deep 2m wide

**Elephant status**

Physical condition

- Keeper said that the elephant died because "her feet were rotten"

**Management and husbandry**

- Keeper says that they want to get another elephant, but "it is difficult".
- From archive photographs, it is clear that management was free contact, and reports indicated that keepers had to be careful not to surprise the elephant when entering the enclosure with her.
- The public was encouraged to feed her, as part of the owner's philosophy of interacting with the animals.

Overall assessment and remarks

- It was not possible to see the indoor stall, which in any case was not open to public viewing. However, judging from the size of the barn, it did appear to be very small.
- There is indoor capacity for only one elephant here, so any elephant would always be solitary.
- The outdoor area is also very small and is entirely concrete-floored. The pool in the corner is tiny and there is no shade.
- Merry arrived at the zoo at the age of two years and reportedly died from illness related to bad foot health at the age of 51, having spent her whole life alone.
- This is a prime example of extremely poor practice in elephant-keeping.

Fukuyama City/ Municipal Zoo

http://www.fukuyamazoo.jp/index.php

**Location**

276-1 Ashidamachi Fukuda Fukuyama City, 720 1264

**History**

The Fukuyama Municipal Zoo opened on 1 April 1978. The current elephant building and outdoor enclosure were completed in 2001.

**General description of zoo**

The zoo is located in a countryside area outside the main town, adjacent to a river/ watercourse, and the surroundings are attractive. Although initially established for recreation and entertainment, the philosophy of the zoo has moved towards an education role. As a "symbolic" natural park in the local area, it intends to show animals in the "wild state", while encouraging contact between people and animals. There is also the intention to breed the wildlife held in the zoo.

**Elephant details**

Name: Fuku/ Fuku-chan
Species/ sex: Asian, female
Date of birth: 1998, in Borneo, Malaysia

Arrival at zoo: April 2001
Alone since: Solitary her whole time at the zoo

Other elephants:

Name: Fuziko
Species/ sex: Asian, female
Date of birth: 1968
Arrival at zoo: Unknown
Alone since: Solitary her whole time at the zoo; now solitary at Okazaki Zoo (?)
Relocated: To Okazaki Zoo in 1982

**Elephant enclosure**

Indoor

- Dimensions
  - Small building, approx. 10x11m = 110m$^2$ for two stalls
  - Compare with description from the zoo: Indoor area =49m$^2$ x 2 rooms total space / 254.99m$^2$
- Description
  - Staff only, no public viewing of the stalls
  - Dark inside? no evidence of skylights.

Outdoor

- Dimensions
  - Two areas:
    1. Right side – to which the elephant currently has access
       - Overall: 405m$^2$
       - Concrete: 191m$^2$
       - Dirt/soil: 149m$^2$
       - Moat: 2.5m wide
       - Pool: 52m$^2$; ramp 5x2.5m =12.5m$^2$
    2. Left side: 2$^{nd}$ compound
       - 14x25m = 350m$^2$
  - Total for the two areas = 755m$^2$
  - Compare with figure from the zoo =750m$^2$
- Description
  - The enclosure is divided in two, with separate doors to the barn: the right side is in use by the elephant; left side not currently used, with herbs growing in soil in the middle; connecting gate closed
  - Paving around perimeter, 2m wide; sandy soil in middle

- No shade, but deciduous tree in middle, protected by posts in area dividing the two sections
- U-bolt and ring for chain in ground near front (viewing) side of area
- Pool at right front; broad steps into it; water in it but not running, 2m? deep
- Moat 3m deep; on the exhibit side, there is a steel fence of vertical pipes with three cables and wires along top; height 1.5m
- Public viewing area 1m from the moat, low hedge, fence 1m high; wall along right side of area, along end of pool and beyond towards barn; small viewing windows in the wall

**Elephant status**

Physical condition

- Shoulders rounded; spinal vertebrae not distinct; slight evidence of pelvic bones
- Skull very concave
- Tail long, long tail hair; fat, no evidence of tail bones
- Skin around front wrists looks worn – possibly from chaining.
- Pink rubbed area on right side of skull, smaller similar one on left side
- Feet: no limping; nails on front feet look a bit long

Behavior

- 1:00pm comes out of stall
- Four staff members with bullhooks on belts, though not in use, lead Fuku out and get her to walk around; then to low wall next to steps to the pond where she shows the bottom of her feet for inspection
- She is walking vigorously around the outdoor area, continuously searching for food
- A lot of interaction with tires and objects with food inside provided for her.
- No clear pattern to movements, no evidence of repetitive movement
- Searches for foot items – 10cm sections of sugar cane - that had been placed around the compound for her
- Walks to front where a webbing tube on a rope has peanuts inside, and she shakes and squeezes it to get the peanuts out
- Kicks a soccer ball in a canvas net that had been hung on the gate structure at front
- 1:30pm keeper brings out bamboo leaves and branch and stuffs them into webbing sling; Fuku comes to feed on it

- 1:40pm keeper appears on balcony of barn, puts peanuts in a 30cm bamboo tube hung at 3m height; she reaches up and shakes it to get them
- 1:50pm and subsequently – keeper stuffs peanuts in canvas tubes and tosses it into the compound; she shakes it around and searches for the peanuts on the ground.
- 2:00pm – keeper comes to gate structure at front, puts peanuts in Perspex tube 0.5m long, holds one end out to her; she sucks peanuts out of the tube by inhaling with her trunk

Summary of elephant status

- General health: Fuku appears well-fed but she is not obese. Learned from the keeper, and other sources, that she was diagnosed with tuberculosis in March 2016, which could explain her concave skull; nevertheless, she moves actively. Her feet and joints appear healthy, and she walks normally, but the nails on her front feet are too long. There are some skin lesions on her head, possibly from rubbing, and on her front wrists, possibly from chaining.
- Behaviour: Movements around the enclosure, encouraged by the provision of food rewards, appeared vigorous and inquisitive.

**Management and husbandry**

- The main keeper says that it was discovered during last year that she has TB – in a blog on the zoo's website (http://www.fukuyamazoo.jp/zoo_blog.php?y=2016&m=3), it is stated that she is infected with the bacterium, which indicates that it is more than just a positive test for anti-bodies. Problems with feeding and attendant weight loss were reported, but were said to be resolved through intensive action by the zoo staff. It was also noted that staff have all tested negative for TB. It is thought – on what basis, it is not clear – that Fuku came with the infection from the wild, rather than getting it while in captivity.
- In cold weather (winter months), she is kept inside until 1:00pm, taken back inside at 3:30-4:00pm; in summer, she is let out at 10:00am; said that time is restricted outdoors as precaution for TB. There is a reportedly a heater in the indoor stall to keep her warm during cold winter months.
- They treat her for TB (it was not said how) at 3:00pm
- She was three years old when she came to the zoo and is now 18 years old
- Initial management, training and inspection was done by free contact with a bullhook, but subsequent 'enrichment' activities with food rewards were from protected positions. The keeper works v hard to keep her active, takes notes of her movements around the compound; says he communicates with other keepers by internet.

**Overall assessment and remarks**

- The indoor stall seems small. It was not possible to tell if there is drinking water or food available for the elephant to take at her choice.
- There is indoor capacity for two elephants here, but it appears that Fuku has always been solitary.
- The outdoor area is largely concrete but has soil for dusting and softer substrate underfoot. The pool in the corner appears to allow immersion. The shade is provided by a small tree. In the winter, the elephant would appear to be confined indoors for some 21 hours per day; in summer this is reduced to 18 hours, which is still substantial.
- Fuku is obviously not entirely healthy, as the TB does appear to affect her weight and may be a significant problem in the long term, but the zoo staff have worked hard to make as comfortable as possible. Clearly, she cannot be moved to another zoo, nor can another elephant be brought to Fukuyama because of her infection.
- The outdoor enclosure itself is rather small but Fuku is stimulated by the consistent actions of the keeper, who provides direct attention and feeding opportunities that challenge her and keep her active.

## Fukuoka City Zoological Garden

http://zoo.city.fukuoka.lg.jp/general/index_en

**Location**

1-1, Minami-Koen, Chūō-ku, Fukuoka, Fukuoka, Japan

**History**

The gardens were originally established near the city's East park in 1933 as part of the celebration of the coronation of Emperor Hirohito. The zoo was closed to the public in 1944 towards the end of World War II. In 1949 the city approved the establishment of a zoo in the city's South park. The Fukuoka City Zoological Society was established in 1952, and Fukuoka Municipal Zoo and Botanical Garden, also known as Fukuoka City Zoological Garden, opened in 1953. The area and number of animals in the collection were expanded in 1954 and 1956. In 1955 the zoo was transferred to the jurisdiction of the Ministry of Economic Affairs and Tourism Division, Fukuoka.

There was a single female Asian elephant, Ofuku, in the zoo when it opened in 1953 and a female calf, Hanako, was brought in during 1973. In 2009, a new barn had been constructed and the elephants were moved into this building but kept in their stalls until March 2011, when they were encouraged to use their now-completed outdoor enclosure; it apparently took them several months to start going out into it. The new barn included a winch system for lifting elephants, as by now Ofuku was in poor health.

**General description of zoo**

Combined with a well-kept Botanical Garden, it is located on a hill away from most city streets, although West gate entrance is next to a busy road. The entry fee is for both plant and animal collections. There is a very good orangutan/ gibbon enclosure, which is large on two levels with natural vegetation, towers,

viewing areas on bridge at high side, windows at ground side. The enclosures for most other species, including lions and tigers, are smaller and, although clean, are typical of many other zoos.

At the time of the visit, there was building construction immediately next to the elephant enclosure, near to west gate entrance; the pile-driving was very noisy.

**Elephant details**

Name: Hanako/ Hana
Species/ sex: Asian, female
Date of birth: 1971
Arrival at zoo: March 1973
Alone since: 2012, since death of Ofuku

Other elephant:

Name: Ofuku
Species/ sex: Asian, female
Date of birth: 1950
Arrival at zoo: August 1953
Died: November 2012

**Elephant enclosure**

Indoor

- Dimensions
  - Stalls divided in four quadrants, 6x6m each; total stalls =144m$^2$
  - Compare with information from the zoo: 49m$^2$ x 2 rooms, total =255m$^2$ (presumably including management areas outside the stalls).
- Description
  - Walls of stalls are steel pipes 15cm. on outer sides, steel girders on inner walls; There is a mechanism to slide the gates upwards between the four quadrants; at the moment all the internal doors are open, Hanako has access to the whole area though remains mostly in right front quadrant
  - Two steel doors to outside
  - High ceiling with skylights
  - Floor is smooth concrete bricks, sloping towards drains outside stalls
  - Concrete cylinders in corner of each quadrant for water
  - Basket at 2.5m height on bars outside stall on viewing side; sign indicates that keepers put

apples in there although there are none at the moment; there are no other food bins
  - No sign of u-bolts for chains
  - Webbing straps are strung across corners of the stall
  - Viewing windows along side of one stall, 3m from stall bars; glass sliding windows that can be kept closed or opened.

Outdoor

- Dimensions
  - Overall: 829m2
  - Compare with information from zoo for "paddock" =1,016m$^2$
  - Concrete: 144m$^2$
  - Soil: 622m$^2$ (minus 3 planters: 95+46+16m$^2$ = 157m$^2$) gives soil area accessible to elephants =465m$^2$
  - Pool: Ramp =3x4m =12m$^2$; main pool =63m$^2$
- Description
  - Naturalistic design, with sculpted rock outcrops and walls; including three large planted areas in the middle that protect low trees from elephants.
  - Soil with grass in the middle/ outer areas away from barn; paved with concrete near the barn and along west side
  - Shade area under projection on side of barn, and next to the small trees when in leaf
  - Pool, now dry, at west side away from barn; sloping ramp, 5m wide at deep end, 1m deep.; next to window in viewing area; Google Earth photo indicates that when it has water, there is a splashing water inlet pipe high up on end side of pool
  - On the west side of the enclosure, there is no moat but instead a fence with round steel posts and cables 2m high; 3-4m to viewing area with a 1.25m glass fence which has a wooden shelf on top for visitors to lean on.
  - Along the back of the area is a viewing/ interpretation area under cover, on the same level as the elephant(s), with small square windows right next to the elephant habitat; water box next to windows
  - On east side, there is a moat (?) 16x2m with water in it but no elephant access; there are steel pegs in the ground along the inner edge to prevent elephants going into it; 0.5m from edge of moat to viewing barrier; glass fence1.25m high with a wooden shelf on top
  - To the right of this viewing area, there is a wall with Perspex cylinders sticking out. Presumably, keepers put food in here and elephant reaches in to feed, so visitors can see the

elephant's trunk.

**Elephant status**

- Physical condition
  - Hips, shoulders, back rounded, no protruding bones; no belly fat
  - Skull concave
  - Hanako's vulva looks prolapsed; there is pink skin hanging down, showing all the time
  - Her base of tail looks very low; Back arched downwards?; outer edge of tail just beyond base is swollen
  - Skin: old cut mark diagonally across forehead, now healed; rubbed/ pink area of skin on left elbow and outer side of front leg; rubbed area under left hind leg
  - Feet: favouring left hind foot; nails long on front, especially left front foot outer nail
  - Keepers say she lay down last year and could not get up again, so they used a winch to lift her. Notes on the website indicate that this has happened three times since January 2014 – see below. She now sleeps standing up, sometimes with the aid of the webbing straps, which are passed under her body to support her weight – this would explain the rubbed skin on her legs.
- Behavior
  - Feeding on hay and bamboo leaves when I arrive at 11:10am
  - Food is next to bars and viewing area, but Hanako is facing away. This facing away from visitors is also seen on Google Earth Street View photos.
  - 12:30pm food finished, she starts stereotypic rocking back and forth, putting right foot forward and back, continues until 1:11pm, feeds a bit but still rocking. Such rocking is also seen on YouTube videos.
  - 1:20pm keeper arrives with more bamboo leaves and hay, puts it at left front
  - Hanako starts feeding again, initially facing viewing area left front, then takes food back to right stall, facing away from visitors.
  - Summary of elephant status
  - General health: Hanako appears well-fed, if slightly obese. She appears to have a possible internal problem that is manifested by extruded vulva and arched-back posture. Her foot and/ or joint health is not good on the left hind leg. Her nails are not kept trimmed, and it also suggests that she does not walk around much. She does not have the strength to get to her feet when she lies or falls down.
  - Behaviour: Hanako is not very mobile, even when allowed outside. She avoids visitors by facing away when feeding or standing. Stereotypic rocking was noted, at any time when she was not actually feeding.

**Management and husbandry**

- A keeper says elephant is not going outside today because she is not happy with the construction noise

- Normally she is taken outside and doors are shut at 9:30am – "if not too cold", otherwise she is kept indoors longer. She is brought back in at 3:30pm every day
- In summer it is very hot, and she often comes back inside at 12:00pm (it was not established if this is a voluntary choice by the elephant); they keep the door open and she can come inside or go out if she wants
- According to the notes on the zoo website (http://zoo.city.fukuoka.lg.jp/news/detail/728), Hanako has been unable to get to her feet unassisted on five occasions between January 2014 and February 2017.
- The keeper told me that when Hanako could not get up, they got a winch and raised her to her feet. She doesn't sleep lying down but standing up, uses the webbing slings for support while sleeping – possibly explaining the marks under left hind leg.
- Management appears to be Protected Contact.

**Overall assessment and remarks**

- There is indoor capacity for two elephants here. Hanako has been solitary since 2012, and there was only one other elephant since Hanako arrived in 1973.
- The redevelopment of the indoor and outdoor enclosure for the elephants that began in 2009 was clearly an attempt to improve and modernize the exhibit. There are several features that are an improvement over the more old-fashioned exhibits: a fence rather than a moat, a naturalistic design and a more open area indoors. However, the area is still very small, and husbandry practices have not evolved significantly from the conventional approach.
- The indoor stall is adequate for short periods, especially at the moment as there are no other elephants. There is drinking water, but no food, available for the elephant to take at her choice.
- The outdoor area appears to allow for some movement and has soil for dusting and softer substrate underfoot, as well as hard concrete. The pool in the corner would appear to allow cooling but does not appear to be deep enough to support body weight. There is some shade, including from small trees, but it is very hot in the summer.
- For much of the year, Hanako is kept indoors for some 18 hours every day, and the indoor stall is not big enough to allow much movement. In the winter, she may be confined indoors for longer periods.

- Hanako is slightly obese and appears to have some potential internal problem manifested by her protruding vulva. Her feet and/or limbs are not healthy and she has trouble walking and getting to her feet if down. She is not stimulated by the features of the enclosure or the feeding regime and appears to compensate by stereotypic rocking.

## Tokushima

http://www.city.tokushima.tokushima.jp/zoo/

**Location**

Nyudo-22-1 Shibuno-cho, Tokushima, Tokushima Prefecture 771-4267, Japan

**History**

There is not a great deal of historical information available on this zoo. One source suggested that the zoo opened in the late 1990s, but this would need to be confirmed. The current elephant enclosure was apparently completed in 1997, and fences between the two paddocks were built in 2001. It is city run and a JAZA member.

**General description of zoo**

The zoo is located in forested countryside, at the outskirts of the city. At the entrance plaza, there is an interpretive centre, with emphasis on engaging children. The park is landscaped, with facilities spreading down a hillside. To quote the zoo's website: "The expansive grounds of Tokushima Zoo provide natural surroundings with temperate, tropical, savannah and arctic zones, and also a children's petting zoo."

Most animals are nevertheless kept in small cages. There is a big picnic area below the elephant enclosure.

**Elephant details**

Name: Mary
Species/ sex: Asian, Female
Date of birth: 1990, in Sri Lanka

Arrival at zoo: May 1996, from Pinnawala Elephant Orphanage, Sri Lanka
Alone since: 2008, with death of Ranga

Name: Ranga
Species/ sex: Asian elephant, Male
Date of birth: born 1992, in Sri Lanka
Arrival at zoo: May 1996, from Pinnawala Elephant Orphanage
Died: June 2008, cause unknown

**Elephant enclosure**

Indoor

- Dimensions
  - 2 stalls; 6x6m = 36m$^2$ each, for a total of 72m$^2$
  - Compare with information from the zoo: "bedroom" = 91m$^2$ with a viewing space of 11m$^2$ and a managing space of 89m$^2$
- Description
  - Rectangular steel posts at front, 0.75m apart
  - Concrete wall right side and at back; sliding steel door at left back; steel posts with steel mesh on left side, division to adjacent stall; steel mesh all around the second stall, now looks like a storage area as it is not being used by an elephant.
  - Both doors to the outside are open; the door between stalls is open
  - There is one water box in front outside the stalls, between them serving both
  - The concrete floor is smooth, sloping; drain trough just inside front bars
  - Skylights provide light
  - There are U-hooks in the floor, in corners right back and left back near door; chains hanging on hook next to tools in management area
  - A keeper safety alcove is in the right rear corner of the stall in use
  - Electric/ gas heater in middle of management area
  - Viewing area 3m from stall bars; 1.25m fence; accessible through small door at same side as outdoor viewing area; From this area, visitors can see into only one stall, right side – the one in current use.
  - There is a management office and storage area to left at end of gap from viewing fence
  - A food tray is laid out: Lucerne/green hay, coarser/yellow hay
  - Interpretive signs have Questions & Answers; one mentions the importance of foot care, while another says the elephant sleeps standing up and never lies down (translated for me by another visitor)

Outdoor

- Dimensions
  - 2 sections:
    1. Viewing side
       - Concrete: 145m$^2$
       - Canopy (over concrete): 3 x 4m = 12m$^2$
       - Soil/ sand: 205m$^2$
    2. Wall side
       - Concrete: 222m$^2$
       - Canopy (over concrete): 4 x 4m = 16m$^2$
       - Soil/ sand: 191m$^2$
       - Pool: 6x10m = 60m$^2$; ramp 2.7 x 7.6m = 20.5m$^2$
  - Common area outside barn (concrete): 9x10m = 90m$^2$
  - The total outdoor area is 902m$^2$
  - Compare with information supplied by the zoo for "paddock": 957m$^2$
- Description
  - The area is long and relatively narrow, divided into two sections by a fence with 1.5m high steel cylinders; the gate between the two sections is now open, with both areas accessible to, and used by, Mary
  - The barn is at one end, with a 50m visitors' path along long axis, a path around end, and a high fence along other long axis; there is no place that is not visible to visitors
  - Concrete paving around perimeters; 25m of concrete paving at barn end of enclosure; sandy soil in middle roughly 8x25m in each section
  - There is a shade canopy near the barn
  - Four big scratching posts at non-barn end of canopy
  - A weighing scale – steel plate – is set in the ground under one corner of the shade canopy; readout machine on fence near barn.
  - No drinking water source
  - No feeding bins but some hay apparent on the ground in parts of the compound
  - There is a smallish moat, but not really; 1.25m vertical edge on elephant side, sloping up to level on viewing side, 4m wide; A cable fence 1.5m high on the elephant side keeps her inside.
  - A visitor contact area, right up to the cable fence, is set halfway along the long axis; Perspex windows can be moved into place, with small holes in them; feeding of elephant scheduled for 2pm on Sundays and public holidays for the 'first 100 visitors' – I observe such feeding with

carrot sticks later, apparently an event arranged for some young zoo visitors.

**Elephant status**

- Physical condition
  - Hips, shoulders, back fully packed, rounded; folds of skin under neck, some belly fat – obese?
  - Skull not concave
  - Skin: Small lesions (rubbed or cut?) on left hip and right cheek; Callus on right and left elbows
  - Tail, some small hairs; swollen tip, whitish patches on left side
  - Hindquarters much lower than shoulders
  - Feet: walks with some difficulty on right hind foot; makes clicking action when weight transferred on it; right heel dry and cracked; nails look OK, possibly even trimmed

- Behavior
  - 12:20pm initially, slow walking along concrete path on visitors' side, searching for small food items
  - Standing, leaning with head over fence, resting head on it; attentive to visitors (me)
  - At that time, no obviously repetitive pattern in movements, but appears listless, slow.
  - 1:40pm standing near the door to the barn, a bit of rocking, walks away around the canopy area, comes back to door area, rocking
  - 2:00pm: I notice staff have come into management office – three older staff and five young people, talking – can she hear them?
  - 2:20pm: still rocking, right up against door area
  - 2:30pm: keepers come out with the young people (possibly interns or school visitors); they (and elephant) walk to Perspex screen at visitor spot, move screens into place; allow them (and me) to feed the elephant carrots through the holes
  - After this feeding is finished, at 2:40pm they open the barn door and she is allowed inside.
- Summary of elephant status
  - General health: Mary is well-fed to the point of appearing obese. She has some problems with her feet, particularly the right hind foot, which appear to be recognized by the keepers in their emphasis on foot care. She has skin lesions, probably from rubbing against the walls of her stall.
  - Behaviour: She lacks energy, appearing listless as she walks slowly around the enclosure searching for small bits of food that had been placed there before she was let outside. She

compensates for this boredom by vigorous stereotypic rocking in the period before the public feeding exercise and her feeding inside the enclosure.

**Management and husbandry**

- 2:30pm: keepers come out with the young people (possibly interns or school visitors); they (and Mary) walk to Perspex screen at visitor spot, move screens into place; allow them (and me) to feed the elephant carrots through the holes
- After this exercise is finished at 2:40pm, they open the barn door and she is allowed inside.
- Mary is instructed to present her feet through bars for inspection. The keeper picks bits from the soles of her feet, but there is no trimming of nails. Under instruction, she stands next to the bars and lesions on left and right side are inspected
- Keeper does something behind each ear, possibly take a blood sample but could not confirm
- They give small food/ fruit rewards when instructions are obeyed
- Keeper then gives an order and she goes to sternal recumbency on left side of stall against bars; two keepers go in while she is down and scatter hay and horse cubes; after they come out, she is told she can rise up. She is told to stand for 30 seconds, and then is allowed to feed – a demonstration of their control.
- Management appears to be protected contact. There was no obvious free contact handling during training
- She will stay inside now until tomorrow. I did not find out what time she is allowed out in the morning but it was probably not much earlier than 9:00-10:00am.

**Overall assessment and remarks**

- The indoor stall is small, concrete and featureless, although it is well-lit and heated. There is drinking water but no food available for the elephant to take at her choice; food is provided when she is brought indoors.
- There is indoor capacity for only two elephants here, and Mary has been solitary since 2008.
- The outdoor area has soil for dusting and softer substrate underfoot, as well as hard concrete, but is otherwise uninteresting. The pool in the corner is small and it is not clear whether it would support the weight of an elephant. There is a shade structure near the barn, where there is also a weighing scale. It is not clear if this scale is used to adjust the diet to maintain a healthy body weight, as Mary appears to be obese.
- Although Mary seems healthy and able to get down on her haunches and back up again, she reportedly does not lie down to sleep. If this report is accurate, it would place additional pressure on her feet and limbs.
- A fence was built in 2001, four years after the new enclosure was completed, to subdivide the outdoor area into two parts. This may have been done because the two elephants did not get along with each other.
- Although it was not confirmed, it appears that Mary is confined indoors for at least 18 hours a day. She does not appear to be stimulated by the features of the enclosure or the feeding regime and appears to compensate by stereotypic rocking.
- The management regime seems to be mainly protected contact, which is unusual among the zoos observed during this survey.

## Yuki Park, Kofu City

https://www.city.kofu.yamanashi.jp/zoo/

**Location**

Yuki Park Zoo Garden No. 10 No. 1 Ota Town, Kofu City, Yamanashi Prefecture, 400 0865, Japan

**History**

Although there is not much information available on Kofu City Yuki Park zoo, it does appear to have been opened in Taisho 8th year (1919). It is a city-owned zoo.

**General description of zoo**

It is an urban zoo located near the center of Kofu City, with a total area of about 14,000m$^2$. The website suggests that it is a zoo that allows anyone enjoy watching animals at close hand, but this is largely due to the fact that the cages are very small. The facilities look be very old and, possibly because of this, dirty.

**Elephant details**

Name: Teru
Species/ sex: Asian, Female
Date of birth: 1978
Arrival at zoo: April 1980
Alone since: death of Mimi, 2000

Name: Mimi
Species/ sex: Asian elephant, Female
Date of birth: born 1979, place unknown
Arrival at zoo: unknown
Died: September 2000, cause unknown

**Elephant enclosure**

Indoor

- Dimensions
  - There are two stalls, roughly 6x6m =36m$^2$ each, for a total of 72m$^2$
  - Compare with information from the zoo: Bedroom including a terrace = 85m$^2$
- Description
  - Steel bars on sides, separating them; solid wall on far side
  - Concrete floor
  - Dark, no skylights; hard to see inside
  - Viewing area to side of one stall, same side as the outdoor viewing area
  - There is a window of sliding glass, which is open; 3m from stall; A glass-house lean-to shelters this window on the outside of the sliding doors, 1m from them; The sliding doors of the glass enclosure are closed now
  - It is possible to see tools leaning against wall inside, include a baseball bat.

Outdoor

- Dimensions
  - 2 sections, joined together:
    1. Concrete floor, 10x10m =100m$^2$ including a water pool (quarter circle, radius 4m =4.8m$^2$); excluding the water pool, the concrete area = 95.2m$^2$; moat 5.75m wide
    2. Concrete floor, 12x6m =72m$^2$; shed/canopy 5x7m = 35m$^2$; storage area under canopy (not available to Teru): 5x4m =20m$^2$
  - Total area available to elephant =207m$^2$
  - Compare with information supplied by the zoo: Total space (indoor + outdoor?, including moat?) = 480m$^2$
- Description
  - Whole area is concrete, sloping towards right front corner
  - There is a small pool, in the shape of a quarter circle of about 5m radius; Water splashes into it from pipe high on back wall; It is not possible to see how deep it is, if it is intended as a wallowing pool, or if there is an access route into it; Teru drinks from it
  - Water from the pool leaks onto main standing area, across towards drain, making the concrete continuously wet underfoot

- The barn is on the right side, the viewing area along long axis; There is a concrete wall to left side, and a concrete wall along long axis at back
- Two steel doors to barn with metal studs on surface
- Moat: 1.5m deep; low wall on elephant side, topped with small spikes; there is a ramp into/ out of moat in the middle of enclosure: this ramp has a locked gate on the elephant side; on the viewing side, there is a low wall 1m high and a hedge 1m from the moat;.
- Keeper alcove in right rear corner next to the barn, topped with metal spiked posts, and a keeper gate through the wall to the outside;
- Barred (round steel posts) roofed area in left rear corner; two sections: 1. 5x4m closed to elephant, has materials stored in it, 2. 5x7m area with gate open could possibly serve as shade area for elephant.

**Elephant status**

- Physical condition
  - Hips, shoulders, back rounded, spine filled in; some belly fat
  - Head not concave
  - Tail not bony, v few tail hairs
  - Skin: forehead between eyes shows a rubbed area; Callus on left elbow
  - Back horizontal
  - Feet: skin dry, nails cracked on right front foot; no obvious limp

- Behavior
  - Just before our arrival at 1:10pm, Teru had just been given a 1m long piece of sugar cane and some horse cubes at edge of the pool
  - She carried cane across to left side of area, ate it until finished then walked back across to eat the horse cubes
  - 1:30pm began swaying next to the barn, very pronounced, swinging left foot then right foot; bobbing head
  - She was still swaying/ bobbing when we left at 2:30pm

- Summary of elephant status
- General health: Teru appears to be well-fed, if slightly obese. Although she seems to walk reasonably well, her feet are dry and nails appear cracked; foot problems could develop in future. There are a few skin problems resulting from rubbing on metal features.
- Behaviour: With very little to challenge or stimulate her, Teru compensates with vigorous side-to-side swaying.

**Management and husbandry**

- A keeper says Teru is shut outdoors during 9:30am – 4:30pm, and indoors for the rest of the time, all year.
- He says the place is very hot in the summer, very cold in the winter
- The presence of a baseball bat in the management area suggests a level of cruelty may be used in controlling Teru.

Overall assessment and remarks

- The indoor stall is small and dark. It does not appear that there is drinking water or food available for Teru to take at her choice.
- There is indoor capacity for only two elephants; Teru has been solitary since the death of Mimi in 2000.
- The very small outdoor area is entirely concrete and has no soil for dusting or softer substrate for foot relief. The pool in the corner is tiny and does not look like it can be used as a wallow. There is no shade apart from a small enclosed area.
- Teru appears well-fed to the point of obesity. She is not stimulated by the features of the enclosure and compensates by continuous stereotypic swaying.
- The design of the elephant exhibit is very old-fashioned and far too small for one elephant, and certainly not two elephants. The site in a city neighbourhood is very noisy. There is no justification for keeping elephants under these conditions.

## Tennoji Zoo

http://www.jazga.or.jp/tennoji/
http://www.tenzoo.jp/index.html
http://www.tenzoo.jp/english/tennnouji.html

**Location**

1-108, Chausuyama-cho, Tennoji-ku, Osaka City, Osaka Prefecture, 543-0063 Japan

**History**

The Tennoji Zoo opened in January 1915 as the third zoo in Japan. It has remained popular as a place for recreation. Having expanded considerably over the years, the zoo currently houses about 1,000 animals of 230 different types in an area of about 11 hectares. It serves as an oasis in the midst of Osaka city, and attracts more than 1.5 million visitors annually.

The opening of a Reptile House in 1995 was followed by the opening of a Hippo House, Rhino House and Herbivorous Animal Area in the African Savanna Zone, as well as an Elephant House in the Asian Tropical Rainforest Zone. A new Asian elephant enclosure was completed in September 2003 and opened in April 2004.

**General description of zoo**

The zoo is at the edge of a larger park in Osaka city. The entrance is off a busy arcade area with shops and restaurants. It claims to "reproduce as closely as possible the original habitats and environments of

animals, also serves as a kind of 'ecological exhibition' to introduce to the public how these animals live." However, many exhibits are somewhat old-looking and not well-maintained.

The chimpanzee exhibit is an example. It is a moderate sized, concrete area with wooden/ tree-like towers, concrete shelves in back, and viewing areas below and above. The orangutan enclosure is a largish cage with climbing structures and live vegetation. The orang(s) were inside their building on the (somewhat cold) day of the visit. The polar bear pit is white painted concrete, sculpted to look like arctic 'pack ice'. There is a thin, single polar bear pacing rapidly in small repetitive strides, swinging its head around violently, over and over.

The elephant enclosure and barn is more modern and naturalistic. Some effort has been made to create a planted/ forested area around the enclosure; there is quite a lot of interpretive material about the conservation challenges to Asian elephants and their habitats. However, there is a noisy, elevated road bridge nearby, with repeated rumbles from it; city noises intrude regularly.

**Elephant details**

Name: Hiroko
Species/ sex: Asian, female
Date of birth: November 1969, in India
Arrival at zoo: May 1970
Alone since: 2014, death of Haruko

Other elephants' details:

Name: Haruko
Species/ sex: Asian, female
Date of birth: 1949, Thailand
Arrival at zoo: April 1950
Death: 2014, unspecified cause

Name: Yuriko
Species/ sex: Asian, female
Date of birth: 1950, unspecified location
Arrival at zoo: June 1950
Death: May 2000, cause said to be heart disease

**Elephant enclosure**

Indoor

- Dimensions
  - three stalls (the third is hard to see): 1. 8x7m =56m$^2$ 2&3. 8x6m =48m$^2$; 152m$^2$ in total, plus

management area of about 60m$^2$
  - Compare with information from the zoo: 3 stalls 1. 60m$^2$ 2. 48m$^2$ 3. 48m$^2$ (=156m$^2$ in total) plus "extra room" (management area?) 56m$^2$ for a total of 212m$^2$
- Description
  - 2m high steel cylinder two-cable fence on viewing side; steel rectangular posts on other sides.
  - U-brackets for chains at base of post on all four corners
  - Sliding post/ bar door between stalls; currently closed
  - Floor smooth concrete, sloping toward drain trough outside stall; floor currently damp – washed?
  - High ceiling, skylights
  - 3m area outside stalls on all three sides, wall of barn and doors to outside on fourth side
  - No food bins/ hoppers
  - Water box outside stall at junction between the nearest two stalls, opposite end from doors
  - Viewing area along long axis of one stall, second (and third?) stalls further back; solid glass, no opening window; steel shutter/ blind inside; viewing area under canopy/ cover but no doors
  - a lot of interpretive material, about elephant history etc. Also about the husbandry at the zoo; says they use bullhooks (and a whip?) for training

Outdoor

- Dimensions (estimated)
  - 2 sections:
    1. Viewing side
       - soil: 350m$^2$
       - pool including ramp: 4x8m = 32m$^2$, plus 1.5x8m blocked off with rock barrier = 12m$^2$
    2. Far side
       - soil: 481m$^2$
       - pool: 5x16m = 80m$^2$; ramp 3.5x4m = 14; total area = 94m$^2$
  - Total:
    - Overall: 969m$^2$
    - Soil: 831m$^2$
    - Pools: 126m$^2$, 138m$^2$ if blocked area is included
  - Compare with area values provided by Tennoji Zoo:
    - Whole area, including pond: 1,160m$^2$
    - Pond: 138m$^2$
- Description
  - The design is naturalistic, with the back wall sculpted stone-like concrete; barrier to adjacent elephant enclosure concrete sculpted to look like logs
  - Substrate is ALL sandy soil, in both enclosures; second enclosure short grass cover, not in use?
  - Small boulders in the middle, short grass growing around edges
  - No shade structure, but shade is provided by large trees around the margins of the enclosure
  - No food hoppers/ bins; food was scattered in the area before Hiroko was let in
  - Scratching posts rough concrete, look like rocks
  - The section in use by Hiroko slopes toward the pool, with the viewing area on a deck with trellis
  - Pool is also naturalistic, maybe 1m deep; ramp into it; still water, no splashing/ flowing inlet; steep rocks keep elephant from 1-2m wide shallow area to viewing fence.
  - Second enclosure also has similar pool, but with a small waterfall

- Viewing area 0.5m wooden bar fence in some places next to the planted area; not really a barrier keeping visitors back
- In an area adjoining the two sections, there is a viewing area under a thatched cover/ canopy; it has a wall with small horizontal windows, not disturbing to the elephant; Hiroko comes right up to it, perhaps to look for the remains of food placed there.

**Elephant status**

- Physical condition
  - Hips, shoulders rounded; back bone in middle very high and bony (noted in interpretive photo, with some description); back otherwise looks well-packed
  - Skull slightly concave
  - Tail thick, no bones visible, tail base fat, no tail hairs
  - Skin: left side of head/ cheek pink patch (possibly from rubbing)
  - Left ear folded outwards at the top (also pictured in interpretive photo); right ear folded outwards a bit at the top.
  - Feet: no obvious sores, but she seems to step gingerly on her left front foot. Walks very slowly, especially up the slope from the pool.
- Behavior
  - 10:35am: standing next to water pool in front of viewing area
  - 10:37am: digs soil, dusting; searching out bits of hay and eating them; walks slowly around the enclosure, searching for bits of hay
  - 11:00am: small 5 minute bout of swaying, then resumes food searching, walks across to viewing shelter area, far end from barn
  - 11:14am: walks to gate to barn, explores for a short while then starts swaying for about 8 minutes; searches for food a bit, then resumes swaying
  - 12:40pm: still swaying, becoming more pronounced; circular motion with head, sinuous shaking of length of body
  - 12:50pm: pressed up to gate, rubbing base of trunk against gate; really swaying; keeper can be seen behind wall near the barn
  - 1:00pm: gets new food from keepers, feeds after they allow her to.
  - 1:20pm: leaves finished, searches for scraps
  - 1:26pm: goes back to gate, sways for a 1-2 minutes, searches for food items for 1-2 minutes
  - 1:30pm resumes swaying
  - Summary of elephant status
  - General health: Hiroko appears well-fed and only marginally overweight. Her feet seem unhealthy, however, especially the left front, and she does not walk very well. There are a few concerns about the skin on her cheek and her ears. She seems to have a problem in the mid-spine area – possibly an injury.
  - Behaviour: She moves fairly continuously around her enclosure searching for small remnants of food left over from the early feeding but her movements are slow and somewhat listless. When she has run out of food, she spends most of her time swaying stereotypically and vigorously next to the door to the barn.

**Management and husbandry**

- 1:00pm: two keepers come in with cleaning tools, including a wheelbarrow, and a bale of leaves, probably bamboo, placing them at the edge of the pool; both have bullhooks in their hands, one holds his upside down; order the elephant to stand still, lift her right foot for 15-20 seconds, then allow her to feed.
- They tidy up dung with rakes, shovel and wheelbarrow, then stand at the back of the enclosure while she feeds – posing for photos? Lots of visitors are taking photos of Hiroko feeding with the keepers in the background.
- 1:20pm: keepers leave enclosure
- The was no chance to interact with the keepers, to find out letting out and bringing in times
- Notes on previous elephants:
- Yuriko was moved to the zoo around the same time as Haruko in mid-1950; both were young juveniles at the time, and they were reportedly good friends, with Haruko behaving like Yuriko's older sister or boss. Hiroko joined them as a juvenile in 1970 when they were in and in later years, she pushed Yuriko into a moat twice (before 2004, the old enclosure had a moat). In 2000, Yuriko died of heart disease and within a few years, Hiroko began to stalk and fight with Haruko. In the new enclosure, there are two separate sections, and it appears that the elephants were kept separate, However, there was still tension between the two elephants over the following decade, including aggressive encounters over the top of the fence between the sections. This was described in a keeper's blog from 2010:
- http://www.jazga.or.jp/tennoji/nakigoe/2010/06/report01.html
- The gate between the two sections appears to remain closed, so that Hiroko is kept in her original, smaller section.

**Overall assessment and remarks**

- The indoor stall is fairly large and well-lit, but the floor is concrete. There is drinking water but no food available for the elephant to take at her choice.
- There is indoor capacity for three elephants here. Hiroko has been solitary since the death of

Haruko in 2014, and of Yuriko who died in 2000. She had a bad relationship with both elephants, engaging in fights first with Yuriko, whom she pushed (twice) into the moat that was part of the exhibit until its reconstruction in 2003. After the death of Yuriko, reportedly from heart disease rather than from complications relating to her falls in the moat, Hiroko fought with Haruko. These incidents required the separation of Hiroko from other elephant(s).

- The substrate of the outdoor area is entirely soil, which allows for dusting and less damage to feet than standing on hard concrete. The pool in the corner is small and deep enough only for cooling rather than taking weight off the feet. There is no shade structure but trees provide shade when in leaf.
- Hiroko is physically healthy, although there are some concerns over the health of her feet, skin and backbone. However, her mental state does not seem good: apart from the reports of fighting with the previous elephants, she appears listless and spends a lot of time in stereotypic swaying.
- The zoo management has made a clear attempt to create a habitat that presents a positive image to the viewing public, with a lot of educational material about elephants and their conservation challenges. It has a number of features that are good for the elephant(s) kept there: soil/ sand substrate throughout the outdoor area, shade trees, water available at all times. However, it remains a small area and its management does not provide foraging challenges to occupy Hiroko during the time she is allowed outside. As well, there was evidently not enough room for two elephants, who were not on friendly terms, to share the enclosure or making choices about if and when to associate with each other.
- Management of Hiroko is free contact with much control exerted by the keepers. An interpretive sign shows a cartoon with the keepers using bullhooks and even a whip in this training regime. During the 1:00pm feeding "show", the keepers remained in the enclosure with Hiroko; this hands-on management, with keepers much in evidence, is strangely out of line with the attempts to create a naturalistic enclosure and surroundings to the exhibit.