

Sworn by: Dr. William Keith Lindsay  
Sworn on: December 18, 2009  
Court File No.

**IN THE COURT OF QUEEN'S BENCH OF ALBERTA  
JUDICIAL DISTRICT OF EDMONTON**

BETWEEN:

**TOVE REECE, ZOOCHECK CANADA INC. and  
PEOPLE FOR THE ETHICAL TREATMENT OF ANIMALS INC.**

Applicants

-and-

**CITY OF EDMONTON**

Respondent

**AFFIDAVIT OF DR. WILLIAM KEITH LINDSAY**

I, Dr. William Keith Lindsay, of the City of Oxford, in the United Kingdom, MAKE OATH AND SAY:

1. I am a Canadian ecologist with over 30 years' experience in biodiversity research and conservation, environmental assessment and monitoring, land-use planning, information systems and institutional analysis in all parts of sub-Saharan Africa and in Asia, Europe and North America. I have attached my CV herein as **Exhibit 1**.
2. Publications that I have authored are listed in my CV some of which are directly related to elephant habitats.
3. I am qualified to discuss the spatial needs of elephants and the impacts on elephants of confinement in small spaces in general, as well as specifically to Lucy, a 34 years old female Asian elephant, while living at the Valley Zoo in Edmonton.
4. In preparing this affidavit, I have reviewed the authorities I reference below with respect to elephants in general. In relation to Lucy specifically, I reviewed documents and other material provided to me by Julianne Woodyer of Zoocheck Canada Inc. which I verily believe to be true and reasonably accurate:

- a. A spreadsheet summarizing information contained in the zoo's medical & keeper records from February 15, 1980 to June 24, 2009. A copy of that spreadsheet is attached hereto as **Exhibit 2**.
- b. Sketch maps, with measurements, of Lucy's indoor and outdoor enclosures. A copy of those maps is attached hereto as **Exhibit 3**.
- c. A video clip of Lucy in her indoor enclosure taken by Ms. Woodyer on April 25, 2007. A copy of this video clip is included on a DVD and attached hereto as **Exhibit 4**.
- d. A video clip of Lucy in her indoor enclosure taken by Ms. Woodyer on March 16, 2009. A copy of this video clip is included on a DVD and attached hereto as **Exhibit 5**.
- e. A video clip of Lucy on a walk during icy conditions taken by Ms. Woodyer March 16, 2009. A copy of this video clip is included on a DVD and attached hereto as **Exhibit 6**.
- f. A spreadsheet summarizing keepers' walk records with Lucy for the whole of 2008 and for March – July 2009. A copy of those records is attached hereto as **Exhibit 7**.

## **EXPERIENCE AND TRAINING**

5. I joined the Amboseli Elephant Research Project in southern Kenya in 1977, where I studied elephant feeding ecology and demography for my M.Sc. (1982, University of British Columbia) and Ph.D. (1994, Cambridge, UK). In these studies, I conducted field research on ranging, habitat use and demography of African elephants (M.Sc.) as well as feeding behaviour and demography of African elephants (Ph.D.) in relation to habitat conditions and local pastoralist communities in Amboseli National Park, Kenya.

6. My continuing involvement with elephants includes research on home range use, habitat interactions and ecosystem change, policy development for their conservation and management, and efforts to improve elephant well-being in the wild and in captivity. I have reviewed a wide range of documents in relation to elephants including journal articles, academic dissertations, research proposals and management plans. I have performed geographical analysis of changing habitat conditions in relation to ecological factors and human land use and the response of elephants to these changes.

7. I have also had the opportunity to observe elephants and their living conditions in captivity in five different zoos in the United States (Brookfield Zoos in Chicago; the Los Angeles Zoo; and the National Zoological Park in Washington), Canada (the Greater Vancouver Zoo) and the United Kingdom (the London Zoo).
8. I additionally had the opportunity to observe and view the outdoor and indoor elephant enclosures at the Lincoln Park Zoo in Chicago. I did not observe elephants at the Lincoln Park Zoo as its elephants had passed away by the time of my visit.
9. My direct, long-term experience has been with African elephants, but I am entirely familiar with the literature on Asian elephants and am in regular correspondence with researchers and conservationists in a number of Asian countries. In both behavioural, physical and ecological terms, African and Asian elephants share a great many characteristics and requirements.
10. My experience with elephants in the wild and captivity through direct observation as well as my study of the formal and informal literature, provide me with an understanding of the requirements for the well-being of elephants based on their natural biology. Knowledge of these requirements can then be compared directly to the conditions on offer to elephants in captivity in general, and to Lucy in particular.

### **LUCY'S PHYSICAL HEALTH ISSUES**

11. I have considerable experience of observation of healthy elephants in unconfined conditions, in their natural habitat. The summarized medical records from February 15, 1980 to June 24, 2009 indicate that Lucy is suffering from a number of ailments that I have never seen in wild African elephants and am similarly aware are not seen in wild or working Asian elephants.
12. It is abundantly clear from my experience observing captive and wild elephants, and well as from reviewing records of pain medication administered to Lucy (dating from 1 October 1991) that Lucy is suffering and is in privation. The combination of (1) a severely confined living space, (2) concrete substrate in Lucy's indoor enclosure and (3) inappropriate diet are very likely to be the ultimate causes of all the health problems noted below. These conditions of Lucy's captivity are in themselves quite sufficient to cause suffering and privation.

## Arthritis

13. The medical records show that Lucy was first diagnosed with rheumatoid arthritis on October 1, 1991 at the age of 16 and she was still being treated for daily pain related to her arthritis as recently as May 17, 2009. Symptoms reportedly include swollen knees, stiff joints, and difficulty with standing and walking.
14. Arthritis is virtually never observed in wild African or Asian elephants and I have never personally observed arthritis in a wild elephant. The literature on elephants held captive in North America (Kane et al., 2008a) and Europe (Clubb & Mason, 2002) indicates that arthritis is a very common condition in captivity. In Lucy's case, the conditions of her confinement, in combination with the concrete substrate in her indoor enclosure, her obesity and the prevention of her species-typical movements have very likely combined to cause her arthritis.
15. Elephants' limbs are like columns, bearing their enormous weight directly downwards on their joints and feet (Benedict, 1937; Kingdon, 1979). Under the natural conditions in which they evolved, elephants rarely stand still for more than an hour or two during periods of midday rest. In the middle of the night, even the largest adult elephants sleep lying stretched out on the ground or leaning on sand mounds or termite hills for 2-4 hours during the hours between midnight and early morning (personal observations). The remainder of their normal daily cycle involves walking, either slowly while feeding, or more rapidly with longer strides during movements between sites of forage, water, shade or wallowing opportunities. During periods of social interaction, they may move very quickly and even run. The summation of these movements means elephants normally cover tens of kilometres per day. Thus, elephants are vigorous animals, normally on the move for 18-20 hours a day (personal observations). The areas included in home ranges of both Asian and African elephants are on the order of hundreds of square kilometres, with the smallest recorded areas of around 50 km<sup>2</sup> and the largest of over 10,000km<sup>2</sup> (Sukumar, 2003; Poole & Granli, 2008).
16. According to the sketch maps set out in Exhibit 3, the area at the Valley Zoo for the outdoor enclosure is approximately 825m<sup>2</sup>. The total indoor area is 194m<sup>2</sup> with the main room of the indoor enclosure being less than half that size (79 m<sup>2</sup>). I calculated these areas based on the measurements set out in those sketch maps. These areas are larger than what is set out in the

Association of Zoos and Aquariums' 2003 Standards for Elephant Management and Care for a single elephant (the "AZA Standards") which state that indoor enclosures should be at least 37m<sup>2</sup> and outdoor enclosures be at least 167 m<sup>2</sup>.

17. It should be noted that the AZA Standards are several orders of magnitude smaller than what elephants experience in the conditions in which they normally live and have evolved. The AZA Standards appear to be much more strongly influenced by what most zoos are currently prepared to offer than what elephants may actually need. However, what is important is that the AZA Standards also recognize that keeping elephants indoors for extended periods is detrimental to their health and well-being. They note that "context is particularly important. [...] If [...] the zoo is located in a cooler climate and the animals are kept inside for many months during the winter, then the indoor space requirements must be met or, preferably, exceeded.". The very cold winter conditions in Edmonton, which last for several months of every year, mean that Lucy is unable to spend much time in her outdoor enclosure, which in any case is very small in relation to the real requirements of elephants for space, as noted above.

18. Also, it should be noted that the Government of Alberta Standards for Zoos in Alberta specifically state that "[e]xhibit enclosures must be of sufficient size to provide for the physical well being of the animal. All animal exhibits must be of a size and complexity sufficient to provide for the animal's physical and social needs and species typical behaviours and movements."

19. Confining an elephant in such a small barn and enclosure would limit her opportunity for movement to no more than a few strides at a time, despite the fact that elephants typically walk many kilometres over the course of a day. Under such restriction an elephant could spend very little time walking and activity would be limited to short pacing bouts, or simply standing on one spot for extended periods. Because Lucy is locked in the barn every evening when her keepers go home and because she is similarly confined throughout much of the very cold winter months in Edmonton, it has been estimated that Lucy spends roughly 70% of her total time indoors (Kiiru, 2007). The video clips I have seen of Lucy in her indoor enclosure (attached as Exhibits 4 and 5) indicate that her movements certainly appear to be limited to standing and occasionally moving one or two paces.

20. These observations, taken together and evaluated in light of the GASZA Standards comments on the need to provide adequately for elephants' physical needs and species typical behaviours and movements, lead ineluctably to the conclusion that Lucy's quarters are far too small. Lucy simply is unable to engage in her species-typical behaviour of extensive walking, which is required for both physical and psychological health (Poole & Granli, 2008), particularly during the winter when she is largely indoors.

21. Long periods spent standing must clearly put enormous pressure on joints and feet, without any relieving movement or exercise, and the impact on limbs is likely to be additionally acute when the animal is overweight or obese and when the substrate is made of concrete, which provides no shock absorption. Lucy's walk records (attached as Exhibit 7) show an average of less than two hours total time walking per day in 2008, with considerably less time in the winter months. The video clip (attached as Exhibit 6) show that she is kept under tight control by the keepers during these walks and that in the icy conditions of winter, her movements can be only slow and cautious. These brief periods of activity do not provide a significant addition to her generally immobile lifestyle (Kiiru, 2007). This immobility – even if it had not resulted in arthritis – causes significant suffering and deprivation to Lucy as she is not allowed to engage in her species-typical movements.

### **Foot Damage and Infections**

22. In the medical records, the first recorded instance of a foot infection was on September 22, 1989. Since then and for the past 20 years, there have been regular records of infections, lesions and cracked toenails, with symptoms including puss-filled bleeding blisters on one or more of her feet, making it painful for her to stand or walk. I have never observed these conditions in free, wild elephants, and if they were to occur, they must be very rare.

23. And as with her arthritis, Lucy's foot infections are apparently caused by the lack of opportunity to move, stretch legs, take the weight off individual feet and improve circulation that comes from having sufficient space (Kane et al., 2008a). Obesity is, of course, likely to contribute to the problem by placing greater weight on the feet, as is the hard, abrasive and unyielding substrate of concrete flooring (making for easy cleaning but not for healthy elephants), which will not cushion the impact of such weight.

24. Pain and suffering inevitably results. The Coalition for Captive Elephant Well-being recommended in its Best Practices document (Kane et al, 2008b) that elephants should have sufficient space so that they are able to walk at least 10 kilometers per day. Based on experiences from Oakland Zoo, this would appear to require a minimum area of at least 12,000 m<sup>2</sup> (3 acres), which is over 60 times larger than Lucy's current indoor enclosure and 15 times larger than her outdoor enclosure.

25. A useful comparison is the experience of captive elephants which have moved to the considerably less confining conditions of sanctuaries, where they have thousands to millions of square metres in which to roam. By their nature, the sanctuaries receive animals that may arrive with pre-existing foot problems, developed in the zoos or circuses where they lived previously. With time in the new environment, the condition of elephants' feet shows marked improvement when the elephants are able to move much more freely (Derby, 2008); in the Tennessee Elephant Sanctuary, foot disease problems are reported to disappear completely (Buckley, 2008).

26. Building a three acre indoor zoo enclosure for Lucy – which is what I believe would be necessary for her to be able to walk the 10 kilometers per day recommended by the Coalition for Captive Elephant Well-being (Kane et al., 2008b), would be an enormously costly endeavour. There is the cost of building the structure, heating it in the winter and maintaining it. Furthermore, the floor should not be made of concrete – otherwise Lucy would be very likely to continue to suffer from foot damage infections as a result of the abrasiveness and lack of shock absorption.

### **Obesity**

27. On December 7, 2005, the medical records show that Lucy weighed 8,900 pounds, just over four metric tonnes. The normal weight of an adult female Asian elephant in the wild in Tamilnadu and Karnataka, India, is reportedly 3,055 kilogrammes, or some 6,735 pounds (Sukumar 2003), so at the end of 2005 Lucy was overweight by over two thousand pounds. The record for December 7, 2005 indicates that she was then put on a special diet, but this change was ineffective; by March 12, 2009 her weight had risen to 9,440 pounds.

28. According to a recent announcement by the Valley Zoo (Anon, 2009), Lucy has lost approximately 400 pounds over the last month, with the goal being that she lose 1,000 pounds in

a year. With the recent weight loss, Lucy remains approximately 2,300 pounds overweight. Even if Lucy manages to lose the targeted 1,000 pounds, she will continue to be extremely obese and will likely continue to experience the health complications related to her obesity – namely: arthritis and foot infections. (I cannot comment on whether the rapidity of Lucy’s recent weight loss will have any detrimental effect on her health.)

29. Elephants’ food in the wild is generally of low quality and very fibrous (personal observations), which they compensate for by feeding for long periods and passing large quantities of plant material through their digestive tracts (Kingdon, 1979; Sukumar, 2003). It is often the case that zoo-keepers provide food to elephants as a reward, or even a “tranquilizer” to keep them happy and occupied (Lair, 1997). Generally this food has much higher nutrient content and much lower fibre than natural diets, and on such diets elephants experience considerable weight gain (Lair, 1997). At the same time, the lack of opportunity to exercise continuously, as noted above, is painful and causes suffering because it is likely to compound the problem of weight gain and maintenance, as has clearly been the case with Lucy.

30. Such obesity will add to the pressures put on joints and feet, as noted above, and will have other health consequences, including cardio-vascular problems and conditions related to poor circulation, such as chronic infection (Kane et al., 2008a). Lucy’s medical records show a long history of infected wounds (since 21 October 1983) and ears (since 7 February 1990) and blockages of breathing passages (since 9 February 2000). Accompanying the obesity of confined, over-fed elephants is a general impoverishment of muscle tone and overall poor health.

31. In sanctuaries, elephants often lose the excess fat of an obese zoo animal and, in any case, their muscle tone is greatly improved (Buckley, 2008).

### **Stereotypic behaviour**

32. The stereotypic behaviour often seen in confined elephants – head-bobbing, swaying from foot to foot, moving back and forth repeatedly along a similar short path – is evidence of inadequate environmental stimulation that would otherwise be provided by a sufficiently large and challenging living space (Lair, 1997; Poole & Granli, 2008; Kane et al. 2008a). In the two video clips I have seen of Lucy in her indoor enclosures (attached as Exhibits 4 and 5), Lucy engaged in stereotypic movements of her head and feet. In the Exhibit 4 video, Lucy spent the



entire length of the clip (5 minutes 47 seconds) with her head in the corner against the wall bars, rocking backwards and forwards, shifting her weight from hind to front feet and back and bobbing her head slightly up and down with each motion. In the Exhibit 5 video, after walking slowly and scouring the bare concrete floor with her trunk in an apparent search for food items for 4 minutes 10 seconds, she spent over five and half minutes in the familiar forward and backward rocking/ bobbing rhythm, initially with her head in the corner (50 seconds) and then with her back to the wall bars (4 minutes 42 seconds).. This repetitive behaviour is quite simply a response to boredom and stress (Kane et al, 2008a). As with the foot and joint problems described above, I have never seen wild elephants perform this kind of clearly pathological fixed-action behaviour, nor is it seen in more stimulating captive situations, such as sanctuaries (Buckley, 2008).

33. Poor psychological health, as evidenced by stereotypy, is likely to result in reduced physical health and a weaker immune system (Bradshaw, 2009). It clearly can only reflect Lucy's privation and suffering in her present environment of extremely limited and unstimulating living space.

#### **LACK OF AN ELEPHANT COMPANION**

34. Keeping such a naturally social animal such as a female elephant in isolation from her conspecifics is something that never occurs under normal conditions and is completely unnatural on a psychological level. Based on this fact alone, it can only be concluded that Lucy, in her current socially isolated state is suffering and in privation.

35. Elephants are very social and sociable by nature. They are born into family groups, with one or (usually) more adult females, a number of juvenile females and elephant calves of both sexes. There is continuous contact and interaction with these relatives, with whom female elephants remain for their entire lives (Lee & Moss, 2008). When they become separated from family members during the course of daily movements through complex habitats and then are reunited, they display excitement and enter into vocal, visual and tactile displays of bonding. On the other hand, when elephants die, the surviving family members show evidence of a form of emotional response that is clearly analogous, if not identical, to what humans interpret as grief (personal observations). These bonds usually involve close kin, but elephants have also been

seen, occasionally, to develop similar attachments to unrelated animals. From long-term studies (Lee & Moss, 2008) and vocalization playback experiments (McComb *et al.*, 2000) in Amboseli, Kenya, it has been established that elephants can identify and determine their relationships with over 200 different unique individuals of whom they are socially aware. It is entirely reasonable to conclude from these observations that the social environment is extremely important to the psychological well-being of elephants.

36. Observations of individual elephants have documented that they clearly have distinct personalities, and that social relationships are complex and vary between individuals on a context-specific basis (Lee & Moss, 2008). Some elephants are more sociable than others, but no female elephants are “loners” or “anti-social”; all show interest in forming relationships with other individuals. These relationships benefit the survival of individuals, as they can co-operate with others in the raising and protection of young or passing on and making use of collective memory of habitat resource locations in a variable environment. Antisocial behaviour in an elephant would reduce its survival chances considerably and would not be a trait favoured by natural selection.

37. The AZA Standards discourage currently existing institutions from keeping female elephants in a group of fewer than three female elephants and require all new exhibits to be able to hold at least three female elephants. This level is considerably lower than is found in the wild, where a mother-calf unit can be just two animals, but family units are typically 6-8 animals and can often number as many as thirty, while larger groupings of associating families are very common (Lee & Moss, 2008). The Valley Zoo is in violation even of the very low AZA Standard.

38. There are anecdotal, but compelling, reports of individual captive elephants being reunited with fellow captives from whom they have been separated for many years showing considerable excitement and apparent affection. At the same time, some elephants when placed in close proximity with others may show marked aggression and dominance interaction, with the subordinate animal thereafter suffering continuous stress. Elephants are very sensitive to the behaviour of other elephants and are accustomed to interacting and responding to other elephants. It is therefore essential that elephants be free to join with or avoid other individual

animals based on their own assessment of compatibility whether or not humans would view their actions as “social” or “antisocial” (Buckley, 2008).

39. The suggestion that human keepers can substitute for the companionship of fellow elephants is unjustified anthropomorphism based on no evidence that has ever been presented in the scientific literature. A solitary elephant may choose to interact with humans simply for some stimulation in the total absence of other elephants, although it has been argued that this “bonding” is analogous to the dependence that develops between human kidnap victims and their captors (Bradshaw, 2009). As noted above, the stereotypical actions of isolated elephants (Lucy being no exception) is likely an expression of their social boredom as well as the lack of stimulation in their physical environment and the deprivation and suffering caused by it. It is abundantly clear that Lucy would benefit greatly from the company of other elephants.

40. However, as noted above, it is important that she is able to make an active choice of that company (Buckley, 2008).

#### **THE NOISE IN LUCY’S PHYSICAL ENCLOSURE**

41. The video clips attached in Exhibits 4 and 5 show the indoor enclosure to be a noisy place, particularly when groups of children come down stairs into the observation area and their loud voices bounce off the bare walls and floor. The fact that elephants have very sensitive hearing (McComb et al. 2000) must add to the distress that Lucy experiences in such an acoustically challenging environment (Kane et al., 2008a).

#### **USE OF THE ANKUS**

42. Elephants are large, powerful animals but are also intelligent and sensitive. Aggressive treatment by other elephants, whether by signals of domination or by the deed of physical punishment, is recognised by the elephant on the receiving end, and creates both fear and stress (Poole & Granli, 2008). The same applies to aggressive treatment by people.

43. Elephants are not domesticated animals, having never been bred for the conditions of captivity (Lair, 1997), and in order for humans to interact with them closely, as they do in so-called “free contact” management, the most common approach is to dominate them. A bullhook or ankus is typically used by people to punish elephants and to reinforce that punishment, by

hitting or jabbing them in areas of soft tissue under their legs, in the genital or anal region, behind ears or around their eyes. This process of domination through negative conditioning is called “training”. Elephants come to associate the ankus with physical punishment and will sensibly try to avoid receiving such treatment; after time, repeated punishment is not necessary and the simple physical presence of the ankus is sufficient threat (Lair 1997). However, since the relationship is based on fear, it is always going to involve stress and psychological damage, and could also build a legacy of anger against the keepers who employ it. If an individual elephant feels this anger, and at any stage has the opportunity to express it, the keeper’s life could be in danger, and so, in response could that of the elephant (Buckley, 2008).

44. In the case of Lucy, the video clip of her being taken on a walk (attached as Exhibit 6) clearly shows the keepers each carrying an ankus in plain view so that she can see it. I have not observed the keepers striking Lucy, but the fact that the ankus is present and on display to Lucy does indicate that it is being used as an instrument of coercive power.

45. “Passive control” where elephants are encouraged by positive reinforcement (Buckley, 2008) and “protected contact”, where elephants are always separated from people by barriers (Whittaker & Laule, 2008), are much more sensible alternative approaches for close interaction with elephants, from the viewpoints of both human safety and elephant wellbeing. The use of the ankus to maintain control over elephant behaviour in domination approaches inevitably requires coercion and causes suffering.

#### **PROJECTED OUTCOME OF A MOVE TO A SANCTUARY**

46. I am advised by Ms Woodyer and I do verily believe, that if Lucy is released from the Valley Zoo that she will be transferred to one of two American elephant sanctuaries in the United States: Performing Animal Welfare Society (“PAWS”) in California or The Elephant Sanctuary (“TES”) in Tennessee.

47. A move to one of these elephant sanctuaries would be of considerable positive benefit to Lucy. It is to be expected that she would experience both physical and social benefits, and a positive transformation in her overall health.

### **The Physical Benefits**

48. The warm weather and very large areas (tens to hundreds of acres) available to an elephant at either PAWS in California (Derby, 2008) or TES in Tennessee (Buckley, 2008) would allow her to enjoy the following benefits:

- a. Spending the majority of the year outdoors, with opportunity for exercise of limbs, heart and body on a daily and continuous basis, with long walks and challenging terrain;
- b. Mental stimulation afforded by a complex environment;
- c. Autonomy of movement choices, with the elephant able to choose where and when it wants to spend its time, on her own terms;
- d. An improved diet, with a predominance of grasses and woody vegetation in addition to the food provided by the staff;
- e. Improved overall physical health, as a combined result of the factors listed above.

### **The Social Benefits**

49. With such a large area and the presence of several other animals, an elephant at a sanctuary can experience the following social benefits:

- a. Company of other elephants, chosen or avoided on a voluntary basis;
- b. Ability to maintain long-term relationships with one or more of those other animals;
- c. Freedom from coercive treatment by humans;
- d. Confidence and autonomy, and reduced stress levels;
- e. Improved psychological health, as a combined result of these factors.

50. I am aware that PAWS and TES have excellent veterinarians and attentive staff available to assess and treat the health issues that develop with the animals in their care. However, as a result of the improved living conditions at a sanctuary, many of the health problems that are seen

at zoos occur at much lower frequency, if at all. Thus, the better conditions are a form of positive preventative medicine, and much less direct interventive treatment by staff is required.

51. The movement of Lucy from Edmonton to a sanctuary need not be a highly stressful, and thus risky, process. Sanctuary staff are extremely experienced in the transportation of elephants from zoos all over North America (Buckley, 2008; Derby, 2008), and are well able to minimize the health risks to the animal involved.

52. There are no cases of elephants dying as a result of the process of moving to a sanctuary from a zoo or circus.

53. My understanding of elephant biology makes it clear that a move from Valley Zoo to an elephant sanctuary would be of enormous value to the quality of Lucy's life in both physical and psychological terms. It would provide an end to the privation and suffering she is currently experiencing in Edmonton. By sending Lucy to a sanctuary, the Valley Zoo would join the growing number of zoos around North America that are taking positive steps towards identifying the strengths and limitations of their institutions, their role in both conservation and public education, and their recognition of legitimate concerns over the well-being of the wild animals they hold captive.

## REFERENCES

Anon. 2009. Lucy the elephant losing weight, recovering health, vet says. *The Globe and Mail*. December 9, 2009. Online edition.

<http://www.theglobeandmail.com/news/national/lucy-the-elephant-losing-weight-recovering-health-vet-says/article1395130/>, accessed 10 December, 2009.

AZA Standards. *Standards for elephant management and care. Adopted 21 March 2001, Updated 5 May 2003* Silver Spring, MD: Association of Zoos and Aquariums.

Benedict, F.G. 1936. *The Physiology of the Elephant*. Washington: Carnegie Institution of Washington, Publication no. 474.

Bradshaw, G.A. 2009. *Elephants on the Edge. What Animals Teach Us about Humanity*. New Haven: Yale University Press.

Buckley, C. 2008. *Sanctuary: A Fundamental Requirement of Wildlife Management*. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and Well-Being of Elephants in Captivity*. pp: 191-197, North Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy.

Clubb, R. & Mason, G. 2002. *A Review of the Welfare of Zoo Elephants in Europe*. Horsham, UK: RSPCA.

Derby, P. 2008. Changes in Social and Biophysical Environment Yield Improved Physical and Psychological Health for Captive Elephants. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and Well-Being of Elephants in Captivity*. pp: 198-207. North Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy.

Doyle, C. & Roy, S. 2006. *Comments of In Defense of Animals on USDA Docket No. APHIS-2006-0044 "Captive Elephant Welfare"*. San Rafael, CA: In Defense of Animals.

Government of Alberta Standards for Zoos in Alberta September 30, 2005. Prepared by the Alberta Zoo Standards Committee of Alberta Sustainable Resource Development and Alberta Agriculture, Food and Rural Development

Kane, L.F., Forthman, D.L. & Hancocks, D. 2008a. Appendix I. Optimal Conditions for Captive Elephants 2005. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and Well-Being of Elephants in Captivity*. pp: 246-282, North Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy.

Kane, L.F., Forthman, D.L. & Hancocks, D. 2008b. Appendix II. Best Practices by the Coalition for Captive Elephant Well-Being 2005. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and*

*Well-Being of Elephants in Captivity*. pp: 283-315, North Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy.

Kiiru, W. 2007. *The Sad State of Captive Elephants in Canada*. Toronto: Zoocheck Canada.

Kingdon, J. 1979. *East African Mammals. An Atlas of Evolution in Africa. Volume III Part B (Large Mammals)*. Chicago: University of Chicago Press.

Lair, R.C. 1997. *Gone Astray. The Care and Management of the Asian Elephant in Domesticity*. Rome: Food and Agriculture Organization.

Lee, P.C. & Moss, C.J. 2008. Welfare and Well-Being of Captive Elephants: Perspectives from Wild Elephant Life Histories. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and Well-Being of Elephants in Captivity*. pp: 22-38. North Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy.

McComb K., Moss C., Sayialel S, & Baker L. 2000. Unusually extensive networks of vocal recognition in African elephants. *Animal Behavior*, 59:1103-1109.

Poole, J and Granli, P. 2008. Mind and Movement: Meeting the Interests of Elephants. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and Well-Being of Elephants in Captivity*. pp: 3-21. North Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy.

Sukumar, R. (2003) *The Living Elephants. Evolutionary Ecology, Behavior and Conservation*. Oxford: Oxford University Press.

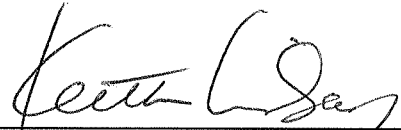
Whittaker, M. & Laule, G. 2008. Protected Contact and Elephant Welfare. in: D.L. Forthman, L. F. Kane, D. Hancocks & P.F. Waldau (eds.) *An Elephant In The Room: The Science and Well-Being of Elephants in Captivity*. pp: 181-188. North



Grafton MA: Tufts University Cummings School of Veterinary Medicine's Center  
for Animals and Public Policy.

SWORN BEFORE ME in Oxford )  
the City of Oxford , this day of 18th )  
December 2009. )

  
\_\_\_\_\_  
Notary Public

  
\_\_\_\_\_  
**DR. WILLIAM KEITH LINDSAY**

Marty Burn, Notary Public  
7200 The Quorum  
Oxford Business Park North, Oxford, OX4 2JZ  
01865 487136 [martyburn@oxemplaw.co.uk](mailto:martyburn@oxemplaw.co.uk)