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. JOYCE POOLE

1. I am an elephant biologist and ethologist currently residing in Norway. I discuss my qualifications below, and they are more elaborately detailed in my *Curriculum Vitae*, a copy of which is attached hereto as **Exhibit 1**.

2. In this affidavit, I discuss the biology, ecology, socialization and behavior of elephants in general. I also consider these in the context of the conditions in which Lucy, a 34-year old female Asian elephant, is living at the Valley Zoo in Edmonton.

3. I spent several hours observing Lucy in her enclosure and on a walk with her handlers at the Valley Zoo on 16 September 2009. I have also reviewed documents and records related to her, as I discuss below.

Qualifications

4. I have studied elephants, particularly their social behavior and communication, for more than 30 years. I received a Bachelor of Arts with High Honors in the Biological Sciences from Smith College in 1979. I received a Ph.D. in Zoology from the University of Cambridge in 1982. My Ph.D. thesis was on musth and male-male competition in African elephants. I did my

postdoctoral research at Princeton University studying the vocal and olfactory communication of elephants at Amboseli National Park in Kenya. I have also studied the effects of ivory poaching of African elephants on the age structure and social and reproductive patterns of several east African elephant populations, and I have carried out and continue to carry out long-term studies of elephants' social and reproductive behavior with particular emphasis on vocal repertoires, communication, and cognition.

5. I have collaborated on several other elephant studies including genetic paternity, inbreeding avoidance, seismic communication, the long-term effects of trauma, the effects of age and experience, and cognition. I have authored several papers on elephant welfare. As a result of my work at Amboseli and in my role as Research Director of the Amboseli Elephant Research Project, and Member of the Scientific Advisory Committee of the Amboseli Trust for Elephants, I am intimately familiar with the work and findings of my colleagues, which covers a broad scope of elephant behavior, social development, growth, longevity, life history, reproductive behavior and leadership. To date, the research that has been accomplished on the elephants at Amboseli represents the most comprehensive compilation of data on wild elephants and is relied on throughout the world for establishing basic to complex facets of wild elephants and their lives.

6. My own research has included logging thousands of hours in the field observing and studying elephants both African and Asian. Of these hours, many of them have been spent studying the elephants in Kenya at Amboseli National Park. I have also studied African elephants in Laikipia, Mara, and Tsavo, in Kenya, in Queen Elizabeth in Uganda, and in Mikumi and West Kilimanjaro, in Tanzania. I have observed wild African elephants in Kenya, Uganda, Tanzania, Botswana, South Africa, and Zimbabwe. I have also observed wild Asian elephants in Mudumalai National Park, India and in Yala, Uda Walawe, Wasgomuwa and Minneriya National Parks, Sri Lanka. I have collected field recordings from Asian elephants in the last three mentioned locations.

7. I have observed semi-captive orphaned African elephants in Tsavo, Kenya and Asian elephant orphans in Uda Walawe, Sri Lanka; I have made vocal recordings in both locations. I have also made observations of captive elephants in Thailand that were in the process of being released into the wild. I have observed the behavior and a variety of human handling of captive

elephants in Zimbabwe, South Africa, Botswana, and Kenya, as well as in zoos and sanctuaries in the United States. Likewise, I have observed the behavior and human handling of captive Asian elephants in India, Sri Lanka and Thailand, as well as in zoos in the United States and in the circus in Norway.

8. In addition to elephant field research, I have elephant conservation and management experience. Between 1990 and 1994 I headed the Elephant Program for Kenya Wildlife Service under the direction of Dr. Richard Leakey. I was responsible for establishing and then running the conservation and management program for the entire elephant population of Kenya, which then numbered some 25,000 elephants. I was responsible for elephant surveys, the training of Kenyan staff members, setting elephant management policy, making elephant management decisions, and overseeing human-elephant conflict mitigation. I was privy to poaching and ivory trade intelligence, and attended a meeting of the parties to the Convention on International Trade in Endangered Species of Flora and Fauna as a delegate from Kenya. On the basis of this experience and upon spending 35 years in Africa, I have extensive expertise regarding what practices can be considered to benefit the conservation of populations of wild elephants as well as what practices can be considered as being in the interests of individual elephants, both Asian and African.

9. I have carried out observations of semi-captive orphaned African elephants in Tsavo, Kenya and Asian elephant orphans in Uda Walawe, Sri Lanka; I have made vocal recordings at both locations. I have made observations on captive elephants in Thailand that were in the process of being successfully released into the wild. I have observed the behavior and a variety of human handling of captive elephants in Zimbabwe, in South Africa, in Botswana and in Kenya as well as in zoos in the United States. I observed the captured Tuli elephants as well as being an expert witness in a legal proceeding concerning their treatment. I have observed elephants orphaned by culling and released in Pilanesberg and I was an author on two papers regarding their abnormal behavior, which appeared in the journal *Nature*. Likewise, I have observed the behavior and human handling of captive Asian elephants in India, Sri Lanka and Thailand, as well as in zoos in the United States and in the circus in Norway.

10. I am a member of Ethologists for the Ethical Treatment of Animals, which was co-founded by Jane Goodall and Marc Bekoff. During 2004-2006, I served as a member of the

scientific advisory board of the Coalition for Captive Elephant Well-Being, which was comprised of scientists, applied behaviorists, zoo management professionals, protected and free contact elephant handlers, veterinarians, animal welfare advocates, and policy analysts who united in an effort to articulate science-based best practices to improve the care and well-being of captive elephants. The standards are now published in the book, *The Elephant in the Room,* and available online.

11. In addition to two books about elephants, numerous scientific papers, chapters, and popular articles and reports on a range of elephant related topics, I am the lead author on the *Loxodonta africana* profile in the upcoming volumes on Africa mammals edited by Jonathon Kingdon, to be published by University of California Press and A&C Black. I am sub-editor for 11 chapters on elephant cognition and communication and social and reproductive behavior for the book in press entitled, *The Amboseli Elephants: A long-term perspective on a long-lived mammal,* to be published by University of Chicago Press.

12. I am lead author of The Elephant Charter, which provides a set of guiding principles, based on elephant biology, to promote scientifically sound and ethical management and care of all elephants. These principles provide guidance to law and policy makers, enforcement agencies and the courts, organizations, institutions and international bodies, as well as to managers of wild and captive elephants. The Elephant Charter represents a consensus of the nature of elephants by 48 elephant biologists; it is independent of any group or institution. It is available online.

13. I was Research Director of the Amboseli Elephant Research Project of the Amboseli Trust for Elephants in Kenya; I am currently a Trustee of the Amboseli Trust for Elephants and a member of the Scientific Advisory Committee of the Amboseli Elephant Research Project.

14. I am Co-Founder and Co-Director of ElephantVoices, the mission of which is twofold: to further the study of elephant communication and to act as a voice for the interests of elephants. ElephantVoices runs a long-term elephant communication study in Amboseli National Park in Kenya; through publications, the media, our website and blog we share our knowledge of elephants with the public.

15. I have appeared in court as an expert to discuss elephant well-being in three previous cases and have written many affidavits.

16. In 1998, I appeared in a South African court, retained as an expert by South Africa's National Societies for the Prevention of Cruelty to Animals. The case involved 30 elephant calves who had been taken from a reserve in Botswana and trained in South Africa for the zoo, circus and elephant back safari industries. In a protracted case, Riccardo Ghiazza was ultimately found guilty on April 7 2003 of violating the South African *Animals Protection Act*.

17. In 2005, I appeared as an expert (via video conferencing) in *International Fund for Animal Welfare (Australia) Pty Ltd. et al v. Minister for Environment and Heritage et al*., N2005/916 in the Administrative Appeals Tribunal, General Administrative Division, in Australia. Two Australian zoos had applied to import 8 Asian elephants from Thailand. The Appeals Tribunal ultimately ordered that a lengthy list of specific requirements for the elephants' welfare had to be satisfied for the import to be permitted.

18. In 2009, I appeared as an expert witness in the United States District Court, District of Columbia, in *American Society for the Prevention of Cruelty to Animals vs. Feld Entertainment Inc*., CA No. 03-2006. That case concerns Asian elephants in Ringling Bros. and Barnum & Bailey circus, and it alleges that certain practices employed by Ringling Bros. in training and handling the elephants violate the American *Endangered Species Act*. There has not yet been a final decision from the Court.

19. I am currently retained as an expert witness in two other cases, one relating to the welfare of captive elephants in a zoo in the United States and the other related to elephants in a zoo cum circus in South Africa.

20. My work has focused on wild elephants; however, as I discuss in paragraphs 27 - 30 below, elephants have never been domesticated in an evolutionary sense. Living in captivity, even if born in captivity, does not make an elephant domesticated; this is a process involving many generations of selected breeding, a process which has proved particularly difficult with elephants. Captive elephants are wild elephants; therefore the basic social and environmental needs of the former are not significantly different from the latter.

Background on Elephants – African and Asian

21. The Order Proboscidea consists of 10 families, 45 genera, and 185 species and subspecies. Of this extensive radiation only three species remain, all classified in the family Elephantidae (Shoshani and Tassy, in press a). The living elephants, once widespread across the continents of America, Europe, Asia and Africa, now occur as fragmented remnants in parts of Asia and sub-Saharan Africa (Meredith, 2001). Three species, African savannah and forest elephants, *Loxodonta africana* and *L. cyclotis*, and Asian elephants, *Elephas maximus*, represent the impoverished remains of what was once a rich family tree. The Asian species has been divided into three subspecies which includes: *Elephas maximus maximus* found on Sri Lanka, *Elephas maximus indicus* found on the sub-continent of India and throughout South-East Asia; and *Elephas maximus sumatranus*, the smallest of the three, found on Sumatra and Borneo.

22. The fossil record of the living Asian and African elephants goes back to between 7.3 and 5.4 million years ago (Shoshani and Eisenberg, 1992; Shoshani and Tassy, in press b). The extant elephants are, however, remarkably similar across a broad range of biological, physiological, ecological and behavioral parameters (Payne, 2003; Sukumar, 2003). The most obvious superficial difference between African and Asian elephants is the size of the ears: the African elephant has very large ears, while the Asian elephant has smaller ears. This difference is probably related to the more forest dwelling nature of the Asian elephant. The other obvious superficial difference is that female African elephants have tusks while their Asian counterparts do not. Only male Asian elephants have tusks and not all males even have them. Female Asian elephants can have tushes, which are a much smaller version of tusks.

23. The shape of an African elephant's back is concave while an Asian elephant's is convex. The highest point on an African elephant is its shoulder, while in an Asian elephant the highest point is the top of its head, which, unlike its African cousin is twin-domed. Asian elephants have more body hair than African elephants, perhaps connected to the fact that Asian elephants are more closely related to the woolly mammoths. The African elephant has two finger-like tips to the end of its trunk, while the Asian elephant has only one. The chewing surface of the teeth of the two species is different: the tooth plates of the African elephant are

lozenge-shaped while the plates of the Asian elephants are closed compressed loops. Asian elephants have five toenail like structures on their forefeet while African elephants have four or five (Shoshani, 1992a).

24. There are very few obvious ecological and behavioral differences between African and Asian elephants, and variation between individuals and populations may account for as much disparity as the differences observed between species. In at least one population of each of the three species, the life histories and behaviors of hundreds of individually known animals have been followed for more than a decade: In Amboseli, Kenya, African savannah elephants have been studied by Cynthia Moss and her team for 35 years; in Nouabale-Ndoki National Park, Central African Republic, African forest elephants have been observed by Andrea Turkalo and colleagues for 17 years; and in Mudumalai National Park, India, Raman Sukumar and his team have studied Asian elephants for 25 years.

25. These long-term research projects as well as other studies confirm that the life history and behavior of elephants are fundamentally similar across all three species (Payne 2003). Across a broad range of parameters (e.g. social structure (Sukumar 2003; Moss & Poole, 1983; Wittemyer et al., 2005; Archie et al., 2005), individual relationships (Sukumar 2003; Payne 2003); family size (Sukumar, 2003; Moss & Poole, 1983; Payne 2003), intelligence (e.g. Rench 1956, 1957; Hart et al., 2001; Plotnik et al., 2006; Cozzi et al., 2001; Shoshani et al., 2006; Douglas-Hamilton et al., 2006; Poole & Moss, 2008), diet (Sukumar, 2003), musth (Jainudeen et al., 1972; Poole, 1987; Poole, 1989a), mating behavior (Poole, 1989b), maternal behavior (Payne, 2003; Lee, 1986); communication (Poole et al., 1988; Payne et al., 1986; Poole, in press), age at first reproduction and interbirth interval (Moss, 2001; Sukumar, 2003; Payne, 2003) broad similarities exist.

26. Thus, scientific data from either species are equally applicable when it comes to evaluating the conditions in which Lucy is living. Where there are obvious differences between the two species, I will make clear reference to Asian elephants, otherwise I will treat the two species as similar.

27. One notable characteristic of elephants is that they have never been “domesticated” by humans (see comment by Kurt, 2006, below). In biological terms, domestication refers to

changes in the genetic makeup of a population that affect the physical or behavioral character of individuals, a process that takes many generations of selected breeding.

28. Elephant capture and taming began in the Indus Valley more than 4,000 years ago and Asian elephants have continued to be captured, trained and worked since that time (Hart & Sundar, 2000). Asian elephants are often referred to as a domesticated species, but this is an erroneous use of the term. Historically, elephants have never bred well in captivity (Sukumar, 2003) and, consequently, a continuous supply of elephants captured from the wild was (and continues to be) needed to maintain or increase the captive stocks. The off take of elephants from the wild was historically so great that elephant populations on the subcontinent of India were locally depleted (Sukumar, 2003).

29. In addition, there has been no selection to create domestic "breeds" among Asian elephants. The number of generations of captive-bred elephants is not sufficient for any physical or behavioral adaptations to occur and therefore it is incorrect to refer to them, or think of them, as a "domesticated" species (Csuti, 2006).

30. Groups of elephant specialists have united under the banner of the International Union for the Conservation of Nature (IUCN) - one for Asian elephants and one for African elephants. Neither of these specialist groups recognizes elephants as domesticated. To the contrary, at the Kuala Lumpur meeting of the Asian Elephant Specialist Group (AsESG) in 2006, Fred Kurt a member of the group (2006) remarked, "It is a good sign that the AsESG stopped using the term 'domesticated elephants'" and "that tame elephants are not domesticated animals like cattle, horses or dogs but captive wild animals and should be treated accordingly." Therefore, while elephants may become habituated to, or "tamed" by, human beings, they are still wild animals with the same inherent physical, behavioral, social and emotional characteristics and needs as wild elephants. Evaluating the condition of captive elephants anywhere should be, therefore, based on conclusions from studies of elephants in their natural habitat.

31. Due to the open habitat afforded on the savannahs of Africa, there have been more detailed and long-term studies completed on free-living African savannah elephants than on free-living Asian elephants or African forest elephants. Conversely, because of the long and widespread tradition of capturing and training Asian elephants, more of the captive studies have

been carried out on Asian elephants. Further, until the early 1980s, there were relatively few African elephants in zoos and circuses (compared to the number of Asian elephants in captivity) where many such studies have taken place. While studies undertaken in captivity allow for the collection of data that may be impossible in the wild, viewed out of the context of the wild, these may lead to erroneous judgements about function (e.g., Tisdale, 1989).

32. In addition, the lack of exercise and over nutrition (too much food) experienced by both African and Asian elephants in captivity increases growth rates and may artificially reduce age at first reproduction, onset of musth and other life history parameters. Further, the lack of a natural developmental and social context in captivity induces abnormal behavior, such as early musth and prolonged duration of musth, poor mothering abilities and other anti-social behavior. In my opinion, where data on basic biology, and particularly behavior, is available from both captive and wild situations, data from the wild is more valid, even where it is derived from African elephants, because of distortions introduced by captivity.

Basic Elephant Physiology and Biology

33. Evolutionary trends from the earliest elephant ancestor about 55 millions years ago include increase in tusk size, the development of a trunk, increase in trunk length, a 10-fold increase in encephalization quotient (EQ, a measure of intelligence) and increasing body size (Shoshani & Tassy, in press a & b). Exceedingly large and long-lived, elephants are dependent upon moving over large distances in search of food, water, minerals and social and reproductive partners (Poole & Granli, in press). Physically impressive and vigorous, an adult male African elephant may be 4 m tall (Haynes, 1991) and weigh as much as 6,500 kg (Moss, 1982). No other terrestrial animal alive today weighs half as much (Haynes, 1991). Male Asian elephants are slightly smaller, but may attain a height of 3.5 m and a weight of 5,500 kg (Poole, 1997).

34. With a maximum lifespan in the wild of 65-70 years (Moss, 2001), the extant elephants are unusually long-lived mammals (Eisenberg, 1981) although humans have an enormous negative impact on the life expectancy of wild elephants. In Amboseli, life expectancy for a female is 41 years, but excluding mortality caused by humans it increases to 54 years. Males in the wild suffer higher mortality than females at all ages. Life expectancy for males is 24 years,

but in the absence of human induced mortality it increases to 39. Maximum lifespan for females is greater than 69 years and for males greater than 65 years (AERP databases).

35. To support their great weight and enable them to efficiently walk over long-distances on rough surfaces, elephants have evolved relatively inflexible pillar-like legs and cushioned feet. Elephants exhibit unique morphological peculiarities designed to support their enormous bulk (Weissengruber & Forstenpointner, 2004). The skeleton of the mammoths, mastodonts and modern elephants are all relatively inflexible, characterized by columnular legs, lacking flexed-joints, and a nearly horizontal spine offering support for their heavy bodies. Unlike other animals, the upper and lower portions of the legs are aligned almost vertically when the limbs are extended and the maximum forward and rearward motion of the legs is restricted so that the legs are almost always under the body (Haynes, 1991).

36. The musculoskeletal foot arch is structured so that an elephant stands on an extensive cushion, such that none of the elephant's toes touches the ground. Each toe has separate muscles, indicating that movements of the digits, such as spreading and contracting, are important. The toes of the elephant are then embedded within a common "skin-shoe". Both the musculoskeletal foot arch and its cushioning provide an important shock absorbing function. The proper posture of the foot and its skeletal elements likely plays a key role in supporting the elephant's enormous body weight and in distributing the mass over the entire sole (Ramsay and Henry, 2001) and, aided by elasticity mechanisms minimizes stress and energy consumption during both resting and locomotion (Weissengruber & Forstenpointner, 2004).

37. A pouch for water storage in the elephant's throat allows it to survive long walks without access to water, (Shoshani et al., 1997). To dissipate heat accumulated by their large warm bodies (due to small surface area to body size ratio) elephants evolved large, highly moveable ears with which to fan and cool their bodies. The almost paper-thin skin on the backs of these large fans is supplied with numerous blood vessels designed to cool the elephant's circulating blood, and is very sensitive.

38. The skin of an Asian elephant is smoother than that of an African elephants (Poole, 1997). The skin of an elephant may be as thick as 2.5 cm on its back, head, and on the soles of its feet, while the skin of the anus, around the mouth, inside the ear and the posterior side of the

ear is almost paper-thin (Shoshani, 1992b; Poole, personal observation). Despite the rough appearance of an elephant's skin, it is an extremely sensitive organ containing many nerve centers (pressure points) (Sikes, 1971, Deraniyagala, 1955, Poole, 1997). For example, through the sense of touch, elephants use the very sensitive soles of their hind feet to inspect objects (Poole, personal observation).

39. Elephants are large-brained (Roth, 1999; Cozzi et al., 2001; Shoshani et al., 2006) intelligent (Rench, 1956; Rench, 1957; Hart et al., 2001; Shoshani & Eisenberg, 1992; Poole, 1998; Douglas-Hamilton et al., 2006; Poole & Moss, 2008) and inquisitive animals. We only need watch the tip of an elephant's trunk, the posture of its ears and angle of its head to gain a window into its actively engaged mind.

40. In the wild everything elephants do is an intellectual challenge: locating and manipulating a wide variety of food items; discriminating between the individual scents, voices and appearances of hundreds of familiar and unfamiliar individuals, friends and foes, relatives and non-relatives, higher ranking and lower ranking competitors, friendly and unfriendly people and other animals; remembering the location of water during a drought; searching for potential mates; and deciding where to go, whom to go with, who to join and who to avoid (e.g., McComb et al., 2000; McComb et al., 2001; McComb et al., 2003; Bates et al., 2007a; Bates et al., 2007b; Bates et al. 2008, Mutinda et al., in press).

41. A torrent of recent publications indicates that elephants are capable of recognizing themselves in a mirror, indicating that they are self-aware (Plotnik et al., 2006), and that they exhibit a wide variety of complex cognitive behaviors. For example they have an extensive and complex vocal and gestural repertoire (Poole in press and Poole and Granli, in press) and are capable of: distinguishing between the many voices (McComb et al., 2000) and scents (Bates et al., 2007b) of their relatives, companions and associates; making subtle discriminations between predators including humans representing different levels of threat (Bates et al., 2007a); empathizing with others (Douglas-Hamilton et al., 2006; Bates et al. 2008); recognizing and responding to the bones of their own species (McComb et al., 2006); using and even manufacturing simple tools (Hart et al., 2001), social learning (Lee & Moss, 1999) and vocal imitation (Poole et al., 2005).

Elephant Reproductive Behavior

42. During the mid two to three days of estrus, females are guarded and mated by older musth males (Poole, 1989b) who are responsible for the vast majority of conceptions (Hollister-Smith et al., 2007). Owing to intense competition from older males (Poole, 1989a) and strong female preferences for mature, musth individuals (Moss, 1983; Poole, 1989b), young males have very limited reproductive opportunities. The acquisition of appropriate estrous and consort behavior requires a social context for learning (Poole & Moss, 2008). Both the acquisition of estrous behaviors and the choice of mates appear to be facilitated by the presence and behavior of the mothers of these young females (Poole & Moss, 2008).

43. The birth of a female's first calf is another life event where the presence and behavior of experienced females aids inexperienced mothers. Experienced family members assist young females to cope with the physical demands of birth, including helping a newborn to its feet, with the immediate protection and socialization of the newborn calf (Moss, 1988; Lee and Moss, 1999; Poole, 1999b; Poole, personal observation), and plays an important role in passing on essential behaviors and knowledge from one generation to another (Lee & Moss, 1999; Hart et al., 2001).

44. Male reproductive success is strongly dependent upon longevity; older, larger males in musth are dominant and produce significantly more offspring (Poole, 1989a & b; Hollister et al., 2007). The peak breeding age is between 45-50 years old. To survive to an age when a male can breed successfully requires utilizing skills that he has learned and honed over decades. A male must learn to recognize a large number of individual males by their scent, appearance and voice; remember their strengths relative to his own; keep track of which individuals are in musth, where they are located and what condition they are in; and monitor the changing location of pre-estrous and estrous females. The social life of a wild male elephant is mentally and physically challenging.

45. Asian and African male elephants exhibit highly similar physical and behavioral characteristics of musth (Jainudeen et al., 1972; Poole, 1982; Poole & Moss, 1981; Poole, 1987; Sukumar, 2003). By age 30 most males have experienced their first heightened period of sexual and aggressive activity, or musth (Poole & Moss, 1981; Hall Martin and Van der Wilt,

1984; Jainudeen et al., 1972). The physical and behavioral characteristics of musth exhibited by African and Asian bull elephants are similar in all aspects studied (Sukumar, 2003). Characterized by a distinct posture, swollen and secreting temporal glands, the dribbling of strong smelling urine (Poole & Moss, 1981; Poole, 1987; Jainudeen et al., 1972), and distinctive vocalizations (Poole 1987, 1999a; Poole et al., 1988), musth males experience impressive surges of circulating testosterone (Hall-Martin & Van der Walt, 1984; Poole et al., 1984; Sukumar, 2003; Lincoln, 1996).

46. With the onset of musth, a male's behavior goes through a Dr. Jekyll and Mr. Hyde transformation. A male in musth spends the majority of his time interacting aggressively with other large adult males and enthusiastically searching for receptive females, attempting to gain access to, or guard those in peak estrous (Poole, 1987, 1989a, b; Poole & Moss, 1989). Highly active, musth males may move in pursuit of another male or in search of mates over many kilometers in the space of a few hours. Musth has a pivotal affect on the relative dominance ranks of males (Poole, 1989a); with few exceptions, musth males, whether large or small, rank above non-musth males. The duration of musth is age-related and may be dramatically influenced by the presence or absence of higher-ranking males (Poole, 1989a; Slotow, 2000).

47. In populations without older individuals (Slotow et al., 2000), or in captive situations (Sukumar, 2003), musth starts at a younger age and periods last longer, sometimes up to a year. Traditionally captive Asian bulls may be denied proper feed in order to shorten their musth (Gale, 1974; Sukumar, 2003). Life in captivity for a musth male is tortuous. Chained, restrained, held alone in small enclosures, his sexual drive is not realised and his enormous physical energy and interactive needs have no outlet.

48. The median age of first birth in the wild is 14.1 years old (range 8.9-21.6; Moss, 2001). Female elephants come into estrus for two to six days (Moss, 1983; Poole, 1989b; Sukumar, 2003). In Amboseli, females come into estrus approximately once every 4.5 years (Moss, 2001). The estrous cycle of Asian and African elephants is 14-16 weeks (Plotka et al., 1988). The average age of sexual maturity varies in wild Asian and African populations from 11-14 years of age (Sukumar, 2003).

Elephant Ecology

49. In the wild, elephants are rarely still; some portion of their body, legs, ears, eyes, trunk, or tail, is always in motion. Despite their great size, elephants are vigorous animals, perpetually active in mind and body. For even when a wild elephant is still the tip of its trunk is moving and scenting – monitoring the movements, locations and behavior of other elephants and activities in their complex social and ecological environment.

50. The movement of an elephant's trunk and the positioning of the ears and head are good predictors of what he or she may do next; as well as being indicators of an active thinking, anticipating mind. Apart from the two to four hours of a 24-hour day when wild elephants may stand or lie down to sleep, they are searching over large areas for food, water, companions and mates, or they are actively engaged in preparing a food item for ingestion, interacting with a conspecific (one's own species) or another species, or occupied in some frivolity. Their movements may be deceptively slow, allometrically befitting of such an enormous animal, but even when their bodies are at rest, their minds are active.

51. Free-living Asian and African elephants are on the move 20 out of every 24 hours, actively engaged in foraging, exploring, socializing and searching for conspecifics. Activity patterns of wild elephants vary depending upon the age, sex, reproductive state and population of an individual. In Amboseli, elephants spend somewhere between 35-55% of daylight hours feeding (low: musth males; high: non-musth males), 5-15% walking while feeding (high: elephants in family groups), 20-45% walking (high: males in musth), 3-25% interacting (low: non-musth sexually inactive males; high: musth males), 5-15% resting (high: sexually inactive males), 1-5% standing, 1-3% comfort activities, and <1% drinking. While adults usually rest standing during the day, they frequently sleep lying down for a couple of hours at night.

52. Elephants continue to grow throughout most of their lives due to delayed epiphyseal fusion of the long bones (Haynes, 1991). Owing to their large size, indeterminate growth, life-long reproductive activity and digestive system specialized for rapid throughput of coarse vegetation, elephants are adapted to a lifetime of foraging (Lindsay, 1994). Elephants only use approximately 47% of the nutrient content they consume. Each day an adult eats 150-350 kg, or

4-6% of their body weight, and drinks 160 liters of water and forages for up to 60% of every 24 hours.

53. Effective foraging is achieved through constant movement, including seasonal migrations, daily movement through a variety of habitats, walking from one food item to another, as well as the coordinated movement of feet, tusks and dexterous trunk to select individual items of fruit, tug up tufts of grass, open heart of palm, flatten the hard thorns of an acacia branch or strip bark off trees. The physical activity and mental stimulation involved in the search for food items (walking, reaching and smelling with the trunk), their manipulation (digging, kicking, stabilizing with the feet; prying, digging, levering and breaking with the tusks; pulling, ripping, breaking, defoliating, cleaning with the trunk), their ingestion (trunk and tongue) and mastication constitutes the very core of an elephant's interest and survival.

54. Modern elephants exist across a broad range of habitat types from deserts to swamps, lowland rainforests, gallery and montane forests, upland moors, floodplains, savannas, and woodland. Ranging from sea level to as high as 4,875 m (Grimshaw et al., 1995), elephants can survive extreme temperatures for short periods, yet they thrive between 15–35°C, typically seeking shade or water above 30°C.

Across these habitats the home ranges of individual male and family groups vary tremendously from close to 100 to ~11,000 km^2. In Kruger N.P., South Africa, for example, the ranges of adult females vary in size from 86-2,776 km^2, with a mean of 880 km^2 (Whyte, 2001b). In Northern Botswana home range size averages 1,091 km^2, varying from 447-3,309 km^2 with some groups travelling up to 200 km in search of dry season water (Verlinden & Gavor, 1998). In the semi-arid savannah of the Samburu-Laikipia region of Kenya, elephant ranges vary from 102-5,527km^2 (Thouless, 1996), while in the more arid environments of Namibia, ranges may vary between 2,136-10,738 km^2, with a mean of 5,860km^2 (Lindeque & Lindeque, 1991).

55. Asian elephants, a typically forest dwelling species, and African forest elephants generally have smaller home ranges than African savannah elephants. The home ranges of Asian elephants vary between 34-800 km^2 for females (Sukumar, 2003) and 200-235 km^2 for males (Sukumar, 2003), though some home ranges appear to cover thousands of square kilometers (Sukumar, 2003). Elephant family groups are known to have a high fidelity to their home ranges (Vidya and Sukumar, 2005). Elephants living in harsh desert conditions

characteristically have the largest home ranges. In the best-studied desert population in northwest Namibia, elephants survive seasonally scarce water and forage by moving over vast areas of up to 12,600km^2 (Leggett, 2005a; Leggett et al., 2003; Lindeque and Lindeque, 1991; Viljoen, 1987; 1989; Viljoen and Bothma, 1990).

56. To a large extent, the variation in home range can be explained by habitat type, though home range also varies considerably within populations and individual preference, tradition, inter-family relationships and sex, all play a role in determining home range size (AERP unpubl.). Despite the fact that the elephant's energetic cost of walking is the lowest recorded for any living land animal (per gram of tissue 1/40 the rate of a mouse; Langman et al., 1995), elephants still behave in ways to conserve energy (Wall et al., 2006). Consequently, smaller home ranges generally reflect higher habitat quality and *vice versa*. Nevertheless, as discussed more fully below, it is a fallacy to suggest (as some have) that when captive elephants are provided with sufficient food by their keepers, they do not need the opportunity to roam, explore their surroundings, and have some choice in the food they consume.

Elephant Socialization and Behavior

57. The social organization of Asian elephants has been studied in less detail than among African elephants, but observations show that, like African elephants, they can be categorised into families, bond groups and clans (McKay, 1973; Kurt, 1974; Sukumar, 2003; Vidya and Sukumar, 2005). Where wild Asian and African elephants have been closely studied, they live in complex societies where mothers and daughters and granddaughters, sisters and female cousins retain close relationships for life (Vidya & Sukumar, 2005; Moss, 1988). Mothers and daughters are rarely apart. Elephant relationships radiate out from the mother-offspring bond through family (or "family unit"), bond group, clan, sub-population, independent adult males and even beyond the population to strangers (Moss, 1988; Payne, 2003).

58. The following diagram from Sukumar, 2003 helps illustrate these relationships using an example of a family that has been among the elephants I have focused on my communication study at Amboseli National Park. A family is defined as one or more adult females and their calves who exhibit a high frequency of association over time, who act in a coordinated manner and exhibit affiliative behavior, or positive and friendly gestures, toward one another (Moss

and Poole, 1983). This term does not exclude two or more adult females without offspring, or a single adult female and one or more juveniles who are not her immediate offspring, making up a family. A bond group is two or more family units who associate with one another at high frequency relative to their associations with other family units in the population and whose members display affiliative behavior towards one another (Moss and Poole, 1983).

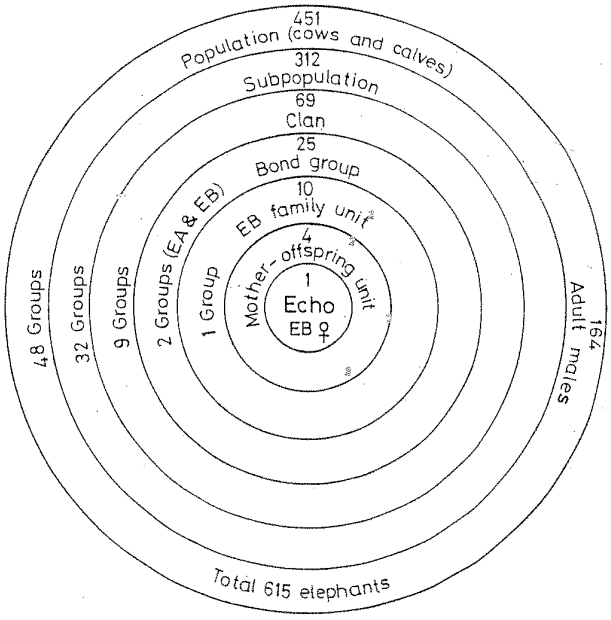

Figure 4.20
Levels of social organization in African elephants at Amboseli, Kenya, depicted through a multitier network of relationships for the adult female Echo. (From Moss and Poole 1983. Reproduced with the permission of Blackwell Publishers Ltd., U.K.)

59. Over the course of hours or days, family groupings may temporarily separate and reunite, or they may mingle with other social groups to form larger social units or aggregations. Such groupings may be predicated on close social bonds, home range and season (Douglas-Hamilton, 1972; Moss and Poole, 1983; Sukumar, 2003; Wittemyer et al., 2005; Archie et al., 2005; Moss & Lee, in press).

60. The combination of social qualities observed in elephants – close and lasting cooperative social relationships, and fission-fusion sociality – exists in only a small number of cooperatively hunting carnivores (e.g., hyenas, lions, and sperm whales) and also a few primates (e.g., chimpanzees and humans; Archie et al., 2005). In reference to elephants, the term fission-fusion sociality refers to both the slow changes in the structure of families or bond

groups that occur over the course of years or decades, as well as the very rapid changes that occur in social group composition over the course of hours (Moss & Lee, in press).

61. Within this social arena, the lives of adult female and male elephants differ radically (Poole, 1994). An intricate network of bonds between individuals and families typifies the lives of females and their offspring, while fluctuating sexual states distinguish the dynamic activities, associations and relationships of adult males (Moss and Poole, 1983). In other words, female elephants remain with their families for life, while male elephants leave their natal families around puberty, at which point they enter the socio-sexual world of adult males.

62. The cohesiveness of families varies depending upon factors such as habitat type, season, relatedness, personality traits, tradition, deaths of influential members, and the strength of the matriarch's leadership (Moss & Lee, in press). In general, elephant families are smaller in forest habitats and larger in mixed savannah habitats. Over time, families may split to form bond groups (Douglas-Hamilton, 1972; Moss and Poole, 1983; Wittemyer et al., 2005) or, sometimes, fuse to form new families (Moss & Lee, in press).

63. Members of a family and bond group may be distinguished by long-term association patterns, greeting behavior, coordinated movement, strong affiliative and protective behavior toward one another and cooperative anti-predator behavior, resource acquisition, offspring care, and decision-making (Douglas-Hamilton, 1972; Dublin, 1983; Moss and Poole, 1983; Lee, 1987; Moss, 1988; Poole, 1998; Payne, 2003). Individuals, who through chance demographic events have no close relatives within their family, still benefit from the same cooperative behavior (Archie et al., 2005). Interactions between members of a family or bond group are generally highly cooperative and even those between non-relatives are seldom unfriendly.

64. The relative level of agonistic versus affiliative behavior, however, varies from one population to the next depending upon the availability of resources. In areas where water, minerals or high quality food are limited or unevenly distributed, agonistic behavior in elephants is more common (Poole, personal observation). The close and lasting social relationships formed by female elephants are remarkable in the context of their fluid social system (Archie et al., 2005).

65. Young male elephants grow up in the tightly bonded society of females, maintaining close relationships with their relatives and participating in social events affecting their family, albeit at a lower intensity than their female age-mates (Lee & Moss, 1999; Poole, in press). By age 9 they begin to spend time away from their families and by around 14 years old they have usually departed (Lee & Moss, 1999; Vidya & Sukumar, 2005). Newly independent males must acquire fresh skills to adapt to the society of males where body size and fluctuating sexual state determine interactions and relationships (Poole, 1989a). This transition happens over a period of years (Lee et al., in press) during which young males' social activities center around getting to know age-mates, and sparring and playing with novel partners from outside the natal family (Lee, 1986). In this way males gather information crucial to longevity and reproductive success (Poole, 1989a, 1989b; Poole et al., in press; Lee et al., in press). Adult male interactions fluctuate between periods of sexual activity and inactivity (Poole, 1982, 1987, 1989b). Among sexually inactive males relationships are "courteous", while interactions between sexually active males, particularly between those in the heightened sexual period of musth, become combative and highly aggressive (Poole, 1982, 1987).

66. The social relationships of elephants are particularly complex because individuals interact with many elephants from different social units across a population, and cooperative social partners may not always be together in the same group. Members of the same family are often many kilometers apart and much of a female elephant's daily activity may be focused on approaching close associates or circumventing individuals they wish to avoid (Douglas-Hamilton et al, 2005; Charif et al., 2005). This pattern of attraction and evasion can be clearly seen from the patterns of simultaneously radio-tracked individuals (Douglas-Hamilton et al., 2005; Charif et al., 2005).

67. Although the Amboseli elephant population is relatively small (numbering 1,517 at the end of 2006) compared to many elephant populations, it is, nevertheless, a big society. A female elephant in Amboseli may seek the company and/or purposefully encounter literally hundreds of other individuals in the course of her daily range (Poole & Moss, 2008). Searching from group to group for receptive females, sexually active males may also interact with hundreds of different individuals, both male and female, in the course of a 24-hour day (Poole & Moss, 1989). The sheer number of elephants involved in an individual's social network, and

the hierarchical character of the formation and dissolution of aggregations, make elephants remarkable.

68. The ability of elephants to distinguish genuine strangers from a wide range of more regular associates through recognition of voices (McComb, 2000) and scents (Bates et al., 2007b) may in part explain the extremely large and convoluted temporal lobes of the elephant's brain (Shoshani, 1998, 2006).

69. Social learning and behavioral innovation are essential elements of individual development and are the very fabric of elephant society, tradition and culture (Lee & Moss, 1999; Poole & Moss, 2008). Many of the techniques used by wild elephants to locate, select and extract food must be learned, either through experience or by watching others, and social learning plays a critical role in calves' acquisition of foraging knowledge and techniques of manipulating food items (Lee & Moss, 1999; Hart et al., 2001). Social learning via allo-mothering (assisting a mother with care of a calf) provides young females with an array of care-taking experiences and skills that persist until they give birth to their own first calf. This transfer of social knowledge is vital for successful mothering behavior.

70. For example, first-born infants still have higher mortality rates than infants born to experienced mothers (Moss, 2001), indicating that even by the age of first parturition (14-15 years) female elephants still have much to learn about mothering. The calves of inexperienced mothers show higher levels of distress than do calves born to experienced mothers, who appear to be more responsive to calf demands for food and protection, with obvious consequences for calf growth and survival (Lee & Moss, 1999). Distinguishing between friends and foes, learning where to go to find water during droughts, and where to find particular food items or minerals is learned from others and through experience and is passed on from mother to daughter (McComb et al., 2003). Interaction with other elephants and the transmission of social and ecological knowledge is a key to an elephant's survival (McComb et al., 2003), and the motivation it demands is necessary for an elephant to thrive.

71. Young male elephants, too, benefit from social learning and are often observed to follow older musth males, testing the same urine spots and the same females as they do (Poole

& Moss, 2008). Musth males are extremely tolerant of these youngsters, allowing them to stand less than a meter from an estrous female while older males are kept at long distances (Poole, 1982). Successful mounting and intromission requires considerable skill and experience which may, in part, be gained by watching the behavior of older, more experienced males. Experience from southern Africa also highlights the importance of social learning in the acquisition of appropriate male reproductive behavior (Slotow et al., 2000). Juvenile male elephants that experienced their families killed in a culling operation and were then introduced to areas without adult role models exhibited abnormal reproductive behavior as young adults, including the mounting, tusking and killing of black rhinos. It is likely that the absence of adult male role models contributed to the inappropriate sexual reaction of these young males (Slotow et al., 2000).

72. Over millions of years, as large-bodied animals, the elephants have evolved a range of specialized physical and behavioral adaptations to allow them to cover long distances so as to meet their ecological, social and reproductive requirements. For example, to defend themselves and their offspring from large carnivores and human hunters, elephants evolved a tight-knit, highly cooperative society and elaborate behaviors, which ensure the maintenance of close social bonds.

73. The extraordinary bonding behavior in which elephants appear to delight in one another's company has a good evolutionary explanation: Feelings of well-being guide a response that is necessary for their survival. We know from our Amboseli records that calves born into large, closely-knit families have a better chance of survival. We also know that strong and positive emotional responses between two adult females can build and reinforce the bond between them. Intense greetings are among the many ways in which elephants express their friendship and loyalty toward one another and renew the support network that is so important to their survival (Poole, 2000).

74. Elephants are *adapted* for "long-distance living," just as polar bears are adapted for arctic climates. The evolution of a number of specialized traits has allowed elephants to adapt to a life where close companions and potential mates may be separated by many kilometers. Elephants have the ability to produce and receive acoustic and seismic signals very large tympanic membrane allowing the high signal-to-noise ratios so important at very low

frequencies (Nummela, 1995); massive ossicles assist in receiving acoustic information through bodily vibrations (Reuter & Nummela, 1998); and a reptilian-like cochlear structure (Fischer, 1990) that facilitates a keen sensitivity to vibrations (O'Connell et al., 1998).

75. Via acoustic signals elephants can recognize the individual voices of other elephants at distances of up to 2 km (McComb et al., 2003). Detection of the calls of conspecifics has been estimated to vary from 2.2 km during daytime to 9.9 km at night (or over an area of 15-300 km^2) depending upon atmospheric condition (Garstang, 1994). And, when an elephant vocalizes with a low frequency rumble an exact replica of this signal propagates separately through the ground, and elephants respond to this signal component (O'Connell et al., 1998; O'Connell et al., 2005; O'Connell et al., 2007).

76. The fluid nature of elephant society, in which closely bonded individuals may be many kilometers apart, has enabled the evolution of a complex communication system combining multifaceted short and long-distance signalling. A combination of trunk, ear, limb and body postures and movements signal a broad range of agonistic, defensive and affiliative gestures and complex emotional responses (Kahl, 2000; Poole & Granli, 2003; Poole & Granli, 2004; Poole & Granli, in press). Chemical signals including saliva, mucus secretions from the eyes, fluids from the ano-genital tracts, temporal glands, ears and interdigital glands, also play an essential role in elephant social and reproductive communication (Rassmussen et al., 1996; Rassmussen & Schmidt, 1998; Rassmussen & Krishnamurthy, 2000; Rassmussen & Wittemyer, 2002).

77. Elephant acoustic communication includes a broad variety of sounds (with components ranging from 5Hz to over 9,000Hz; Poole, in press). Calls include very low frequency rumbles and higher frequency trumpets, snorts, roars, screams, barks, cries, chirps, croaking and other idiosyncratic sounds (McKay, 1973; Berg, 1983; Poole et al., 1988; Poole, 1994; Langbauer, 2000; Soltis et al., 2005 a & b; Leong et al., 2003; Stoeger-Horwath et al., 2007; Poole, in press). Elephants use acoustic signals to communicate complex messages of agonistic, defensive, affiliative, parental care, mating, and social natures. Elephants are able to coordinate their movements by communicating with powerful, very low frequency sounds (Payne et al., 1986; Poole et al., 1988; Langbauer et al., 1991; Garstang et al., 1995; Larom et al., 1997; McComb et al., 2000).

78. The acoustic repertoire of elephants is complex: their calls are graded carrying information about individual identity (McComb et al., 2003), emotion (Soltis et al., 2005 b), and context (Poole, in press). They are able to combine different call types to utter more complex calls and they are capable of imitating or learning new vocalizations (Poole et al., 2005). Poole et al. (2005) posit that this rare talent may have evolved to facilitate social bonding and cohesion in the elephants' highly dynamic fission-fusion society. Social learning thus plays a role in acoustic acquisition, too (Wemmer & Mishra, 1982, 1985; Poole et al., 2005). Imitation and the recombination of acoustic units into larger utterances are the building blocks of human language.

Lucy

79. Lucy is a 34-year old Asian elephant. Zoo records indicate that she was born in Sri Lanka in 1975, captured in 1976 and living at the Valley Zoo in Edmonton by mid-1977. She lived alone in her enclosure for 12 years. In 1989, Samantha, an African elephant from Zimbabwe, was brought to the zoo. Lucy and Samantha lived together for 18 years, until Samantha was sent to North Carolina on an extended breeding loan in 2007. Since that time, Lucy has been the lone elephant at the Valley Zoo.

80. Julie Woodyer of ZooCheck Canada has provided to me the following documents, which I have reviewed. She advises me and I verily believe that they are:

- Sketch maps, with measurements, of Lucy's indoor and outdoor enclosures, a copy of which is attached hereto as **Exhibit 2.**
- A spreadsheet in which Ms. Woodyer has summarized information contained in the elephant keepers' daily log in 2008 and from March 1 – July 21, 2009. The spreadsheet shows the duration and number of walks Lucy had in this period as well as some of the keepers' comments. A copy of that spreadsheet is attached hereto as **Exhibit 3**

Lucy's Living Conditions – Is She in Distress?

81. You have asked me to consider the conditions in which Lucy is living and to consider whether, in my opinion, she is in distress. You have referred me to section 2 (2) of the *Animal Protection Act* which defines "distress" as being:

a) deprived of adequate shelter, ventilation, space, food, water or veterinary care of reasonable protection from injurious heat or cold;
b) injured, sick, in pain or suffering, or;
c) abused or subjected to undue hardship, privation or neglect.

82. I understand "suffering" and "privation" to include:

i. lack of the basic necessities or comforts of life;
ii. the condition resulting from such lack; and
iii. an act, condition, or result of deprivation or loss.

83. *The Shorter Oxford English Dictionary on Historical Principles, 1973,* defines "privation" as: The action of depriving or taking away; the fact or condition of being deprived of or cut off from something; deprivation. The condition of being without some attribute formerly or properly possessed, the loss or loosely the mere absence of a quality or negative quality. The want of the usual comforts or esp of the necessities of life. All general privations are great because they are all terrible. Vacuity, Darkness, Solitude and Silence.

84. It defines "suffering" as: That endures patiently; inured to suffering; submissive. That suffers, or is characterized by the suffering of pain, affliction or distress.

85. The *Animal Protection Act Regulation* refers to the *Government of Alberta Standards for Zoos in Alberta* (GASZA Standards), which in tern refers to the *American Zoos and Aquarium Standards for Elephant Management* (AZA Standards). I have reviewed these as well.

Lucy's Physical Enclosures

86. The GASZA Standards state that their purpose is to ensure the needs of the animals in the zoo are met. More specifically, they state "All animal exhibits must be of a size and complexity sufficient to provide for the animal's physical and social needs as species typical behaviors and movements." Based on what we know about the natural behavior and movement of elephants (some of which I have summarized in the sections above) I have come to the clear conclusion that the Valley Zoo does not come close to meeting Lucy's physical and social needs as she does not show anything but the most basic of species typical behaviors and movements (see Poole and Granli 2009 online database (*http://www.elephantvoices.org/multimedia-resources/elephantvoices-gestures-database.html*). Indeed even when Lucy has the opportunity to walk she is prevented from exploring her surrounding (personal observation) by handlers who control her every movement.

87. While the GASZA Standards do not provide guidance on exactly how to interpret the above standard, the AZA Standards do provide some guidelines on "space":

- Indoor space must provide adequate room for animals to move about and lie down without restriction. A minimum of 400 sq. ft (37.2 sq. m) is required for a single animal, approximately 800 sq. ft (74.3 sq. m) for two animals, and so on (AZA 1997). Because of their size and space requirements, bulls or cows with calves must have a minimum of at least 600 sq. ft (55.7 sq. m) (AZA 1997).

- Outdoor yards must have at least 1,800 sq. ft (167.2 sq. m) for a single adult individual and an additional 900 sq. ft (83.6 sq. m) must be added for each additional animal (AZA 1997). If this space is the only location for exercise, then it is recommended that the space per elephant should be even greater.

88. While Lucy's space indoor and outdoor space (I am advised by Julie Woodyer and verily believe these to be approximately 2000 square feet divided into 3 sections, and 8900 square feet divided into 2 sections, respectively) exceeds that of AZA standards, it should be noted that the AZA regulations also caution that,

"Context is particularly important. For example, it may not be a problem that the indoor space requirements are under the standard by a small amount if a zoo is located in a warmer climate and the animals are outside most of the time. If, however, 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."

89. In Britain, a country with a mild winter, the BIAZA standards are considerably higher requiring 2,160 square feet indoors and 3,600 square feet outdoors.

90. In my opinion, based on my observations of elephant in the wild, on observing the behavior (or lack of it) in traditional zoos and on the reproductive, health and mortality data coming out of zoos (e.g. Clubb et al., 2008), the GASZA standards are not sufficient to meet the needs of elephants. (I will not elaborate on this opinion in this context, beyond the general observation that life in a zoo where there is nowhere to go, no one to meet, and little to do, compromises an elephant's physical and mental well-being and therefore standards for captivity should better reflect established knowledge about their needs.) Lucy's situation is further compromised due to the fact that she lives in such a cold climate and must be indoors, on concrete, much of her life. Having said that, as I describe further, even these insufficient standards are not satisfied by Lucy's living conditions.

91. An elephant's flexible, padded foot is designed for walking long distances on rough, uneven surfaces, not for standing for long hours, days, weeks, months and years on concrete. Regular walking keeps the pads of the foot healthy and free from over growth. In captivity, and especially standing on concrete, the pads are worn unevenly and insufficiently, causing fissures to develop in the skin. Elephants defecate up to 17 times per 24 hours and they urinate almost as frequently, therefore captive elephants are often left standing in their own waste – something they would never do in the wild.

92. Lucy would be left inside the small barn standing on concrete unattended from the time her handlers go home until they come back in the morning. Standing in their own urine and feces, bacteria may become trapped in the fissures of an elephant's foot leading to infections, which may lead to all sorts of complications. Any elephant handler or elephant veterinarian can attest to the myriad foot problems that captive elephants suffer from. Added to these problems is arthritis. Lucy has suffered chronically from both and these cause her privation and suffering. The addition of rubber mats cannot be expected to make much of an improvement in this regard.

93. I know of no place where wild elephants live in cold climates. The range of African elephants includes only a few places where temperatures may dip below freezing (such as on the East African mountains or in the deserts of Mali or the Namib). Asian elephants, too, are adapted for living in warm climates. In most places where Asian elephants live, daytime temperatures range from 20 to 35 degrees Celsius.

94. In accordance, the AZA standards provide that elephants must be kept outside on natural substrates as much as possible and they encourage institutions to consider designing exhibits that allow elephants outdoor access twenty-four hours a day – when weather, health, and safety permit. The AZA further states that elephants can tolerate *moderate* temperature extremes but they must be monitored frequently at temperatures below 4.4 degrees C – presumably because elephant are at risk at these temperatures.

95. It is my understanding that in Edmonton the average daily temperature is below freezing for 5 months of the year (November – March).[1] As a result, Lucy is required to spend much of her life inside. Even though I am not aware of the specific number of hours which Lucy spends indoors, I can say, based on average weather conditions alone, that it is too much for an elephant. There is normally snow on the ground or icy conditions for close to half the year, which means that Lucy is confined to her small barn or taken out for controlled, cold and slippery walks for that same amount of time.

96. Based on her daily log for 2008, Lucy spent some 7.5% of her time on walks under the control of keepers carrying bullhooks, also known as ankuses. While I have no reason to doubt the intentions of her keepers, and while the exercise is good for her, having spent several hours observing Lucy, I can say that these walks offer her no autonomy whatsoever. Every movement of hers is controlled. This causes her privation and suffering.

97. Due to the cold and to keepers' schedules, the vast majority of Lucy's life has been spent inside her small barn. On at least 25 days of the year, the daily log or maximum temperatures indicate that Lucy did not go out of the barn at all. The result is that Lucy has

[1] For example, http://www.myforecast.com/bin/climate.m?city=54149&metric=false.

spent much of her life standing on concrete in a small barn and doing very little of what an elephant needs do to maintain good physical health and mental well being. The consequence is that she is a young elephant in an old body. This causes her real privation and suffering.

98. Her physical health problems are exacerbated by her weight. Lucy is obese, a condition that is caused by and made worse by her sedentary life. In the wild an African elephant of her age would be unlikely to weigh more than 5,000 lbs (Laws, 1966). I have never observed an obese elephant in the wild. Asian elephants are smaller than African elephants, yet Lucy weighs in at approximately 9,000 lbs. It is fair to point out that most zoo elephants are generally taller and heavier than their wild counterparts. Yet, Lucy *appears* massively over-weight. Attached hereto collectively as **Exhibit 4** are two photographs which show Lucy (A) and a typical wild female Asian elephant (B).

99. While I am not a veterinarian, I can say based on my experience with the literature and discussions with experts that the list of her ailments is typical of sedentary elephants raised in out-dated zoos (e.g. small enclosures, concrete floors, use of chaining) in cold climates (where elephants must spent much of their time inside in small spaces and on concrete). The daily log just for 2008 indicates an elephant that is in pain (e.g. the numerous mention of pain killers and comments by her keepers like, "she is not feeling well") and is suffering from a litany of problems ranging from stiffness to arthritis to foot abscesses (see **Exhibit 3).** The daily log's regular reference to the administration of painkillers indicates that her caregivers and veterinarians believe that Lucy is in pain.

100. The keepers also mentioned her mental health in the daily log, often referring to her as showing anxiety, loss of appetite, being lethargic, impatient, not interested, very tired, wanting attention, very cranky, depressed, very needy. While more positive adjectives were also used (e.g. in good mood, more energy, silly) the list was overwhelmingly negative.

101. It is clear to me from this 2008 list of mental and physical ailments, that Lucy's exhibit enclosures (indoor and outdoor space combined) are not of a sufficient size and complexity to provide for Lucy's physical and social needs and that over her 32 years at the Edmonton Valley Zoo Lucy:

- has been deprived of what is considered by elephant experts as an appropriate and adequate climate (shelter and reasonable protection from cold) and space for an elephant;
- that, as a consequence, she has been required to spend too much time standing on concrete in a very small barn and by this has been injured, is now sick, in pain and is suffering; and
- that, in this climate, she has been subjected to undue hardship, privation and neglect.

102. When I use the word "neglect" I make no inference as to whether that neglect was intentional or not. Rather, I mean to say that the clearly established and well-known needs of this elephant have been neglected, whether by anybody's specific intention, institutional capacity or any other factor.

103. Lucy has been and is now deprived of a normal elephant life, which at its very essence should include some semblance of autonomy and the freedom to roam. It is my conclusion, therefore, that she has lacked, and continues to lack, the basic necessities and comforts of life, and that her poor health is a condition resulting from this lack. I have no reservations in concluding that she is currently subjected to undue hardship, privation and neglect.

104. Nor do I have any reservations in concluding that Lucy is in distress as a result of the fact that she is, and has been, suffering and subjected to undue hardship, privation and neglect for many years.

105. In making this assessment, I am cognizant of the fact that the captivity industry itself has begun to realize that it is very difficult to meet the needs of elephants. For example, among many more, the San Francisco Zoo closed its elephant exhibit and sent their two remaining elephants to PAWS, an elephant sanctuary in California; the Detroit Zoo closed its elephant exhibit for good and sent their elephants to PAWS after determining that elephants' needs cannot be met in captivity; the Bronx Zoo has announced that when two of its three elephants pass away, the remaining one will be sent to another zoo and the exhibit will close. And, Indian authorities recently passed a law prohibiting zoos or circuses from keeping elephants, citing the trauma and stress that is caused to them by their confinement.

Lack of an elephant companion

106. In paragraphs 21 – 78 (particularly 57-78) above, I have described in detail the social organization and intricate relationships of elephants. Elephants are considered to be one of the most social of all mammals. Indeed, next to human beings they have the largest social network yet recorded (McComb et al, 2000). Because elephants, like people, are such highly social animals, to hold them in a small space, on a solitary basis, is injurious to their mental and physical well being.

107. This is not only my opinion; it is also the opinion of other elephant experts as well as the captivity industry itself. The AZA and GASZA standards confirm that keeping an elephant alone is a not a reasonable and generally accepted practice of elephant care, management and husbandry.

108. AZA Standard, 2.2.4 states that, "Institutions must provide an opportunity for each elephant to exercise and interact socially with other elephants".

109. AZA Standard 2.3.1 states that, "Zoos should make every effort to maintain elephants in social groupings. It is inappropriate to keep highly social female elephants singly. Institutions should strive to hold no less than three female elephants wherever possible. All new exhibits and major renovations must have the capacity to hold three or more female elephants".

110. In the previous section of this affidavit, I have expressed doubt that the relevant standards reflect current knowledge about the social needs of elephants. However, even those standards are very clear about the need for social groups, stating clearly that: "It is *inappropriate* [my emphasis] to keep highly social female elephants singly." These standards are contravened by Lucy's solitary living conditions. She has been housed alone for over a third of her life, and she is currently alone after the only companion she has ever had was removed.

111. Housing Lucy alone also fails to meet GASZA Standards which state that, "all animals must be maintained in numbers sufficient to meet their social and physical needs." Although the standards do not give any guidelines as to what this might be, a brief examination of

elephants in the wild shows that keeping an elephant alone is extremely rare and highly abnormal. It is my view, based on my experience and expertise and the authorities I reference above, that a number sufficient to meet a female elephant's social and physical needs is undoubtedly a number greater than one.

112. I have looked at the data on elephant group sizes collected in Amboseli over 35 years. As I noted above, although elephants live in family groups, individuals come and go from those groups in a fluid way, in what is referred to as a fission-fusion sociality. Families temporarily split and rejoin, or unite with other families forming larger groups or aggregations. Any number of elephants, including lone elephants, are by definition referred to as a "group."

113. Over the course of three and a half decades the composition of many thousands of elephant groups has been recorded. During this period, females were observed in 27,707 cow/calf (those including only females and their calves) and mixed (cows, calves and associating males) groups of which only 137 (0.5%) were composed of lone females. In Amboseli, a female may temporarily be found alone during severe droughts, when she is sick or injured, when she becomes separated from her family following an estrous period or because she has lagged behind her own group to feed or perhaps socialize temporarily with other elephants. The state of being alone would be unlikely to last longer than a number of hours. The average cow/calf group size was 13.5 individuals with a median of 10 (range 1-420 individuals; N=15,341) while mixed groups ranged from 2 (usually a female and a musth male in consort) to 550, averaging 33.4 individuals (N=12,366;median 20).

114. Lucy is living in an abnormal social setting. In the entire period of her captivity at the Valley Zoo, she has never been with another member of her species (Samantha was an African elephant) and, furthermore, she has never been permitted any social grouping remotely typical for an elephant. A typical family group would consist of several adult females and their calves and captive settings should strive for this number at the very least.

115. Ms. Woodyer has advised me and I verily believe that the Valley Zoo takes the position that Lucy is an anti-social elephant. While elephants do have personalities (Lee, in press), with some being more gregarious than others, I have never observed a wild female elephant who could be defined as anti-social. In captivity, where elephants are typically (and Lucy

specifically) deprived of mothering, socialization, social learning, forming normally functioning social relationships, and the space and autonomy within which to form and develop those relationships, they may develop anti-social tendencies and pathological behavior. This, however, does not make Lucy an "anti-social elephant". Rather, it means that she has been deprived of an environment within which to experience and develop her social skills. Denying Lucy the possibility of developing relationships with her own kind has itself caused her suffering and privation.

116. These tendencies and behaviours are not permanent. In different conditions, such as if Lucy were to be moved to an elephant sanctuary where she could live in a large space with other elephants, as I discuss in the section below, it is my expectation that Lucy would be positively transformed.

117. It is my opinion that Lucy's solitude at the Valley Zoo has caused her to undergo clear privations. By keeping her alone for over so much of her life, by keeping her with only one other individual and by breaking the bond that she had with this only other companion, the Valley Zoo deprives Lucy of forming normally functioning social relationships, and by keeping her in a small space in a cold climate it deprives her of the space and autonomy within which to form and develop such relationships.

118. I am advised by Ms. Woodyer and verily believe that the Valley Zoo takes the position that Lucy is not alone because she has a human family. However good those companions may be, humans cannot meet her social needs, they cannot replace or be compared to the type of relationships Lucy can form with a member of her own kind. Preventing her from doing so is denying her a chance to be an elephant. It is ensuring that she is, and remains, in privation and suffering.

119. Zoo officials are also making false claims about Lucy's stereotypic behavior. The zoo website claims,

"Some who do not know Lucy have said she demonstrates "stereotypic" behaviour, in other words, behaviour indicating she is lethargic or stressed. This is not correct. This misperception stems from zoo visitors seeing Lucy for only a snapshot in time. This behaviour

is actually “anticipatory” behaviour. This means that Lucy will get excited and sway or stomp her feet when she is anticipating a favourite event or visitor.”

120. Stereotypic behavior is the frequent, almost mechanical, repetition of the same posture, movement or utterance. It is abnormal behavior that is seen in captive animals, particularly those held in small enclosures with little opportunity to engage in normal behavior. Many elephants held captive in confined spaces exhibit stereotypes, typically swaying or rocking from side to side, stepping from back and forth, bobbing their heads up and down or repetitively pulling on a nipple. I have never observed wild elephant engaging in stereotypic behavior. Calling stereotypic behavior “anticipatory” is a misleading description which would seem to suggest to the public that what they are observing is normal. It is not. Lucy may engage in more stereotypic behavior when she is waiting for something to happen but it is an expression of frustration caused ultimately by her artificial environment that does not allow her to satisfy her normal behavioral needs.

121. In my opinion Lucy is in distress now because she is suffering undue hardship as well as privation and neglect in the manners I have above described. Not only is she alone now but she has spent so much of her life alone and without the opportunity to form normal elephant relationships and these factors have cumulatively led to her present state.

Projected Outcome if Lucy is moved to a Sanctuary

122. I am advised by Julie Woodyer and verily believe that the Valley Zoo takes the position that that after years of captivity Lucy is an anti-social elephant and she would not adjust well if moved to a sanctuary and could not benefit from elephant companionship. It seems odd to me that the fact that Lucy has been deprived of her social needs for so long should be used to justify her continued deprivation. In any event, I totally disagree.

123. Based on my knowledge of elephant social behavior and communication, I project that Lucy would be positively transformed by a move to PAWS, the facility which I understand has offered her sanctuary. PAWS is a 2300-acre captive wildlife sanctuary in California where abused, abandoned and retired zoo animals live in large, natural habitats. I have been to PAWS on five occasions.

124. There are four Asian female elephants currently at PAWS. They have access to a very large barn with a natural earth floor, a large yard (about the size of Lucy's current outside area) where the elephants are given routine husbandry and free access to an exceptionally large (by captive standards) habitat of beautiful rolling hills, a variety of vegetation and a large pond.

125. The key to the space at PAWS is that it is large and there are other elephants in it. Large space is important because it allows for individual, pairs or groups of elephants to come and go as they please – making their own decisions and allowing for variety in social context – thus mimicking their natural sociality.

126. Since wild elephants live in a fission-fusion society, much of their natural behavior revolves around the coming and going of individuals. Although elephants live in families, extended families and clans in social networks comprised of many hundreds of individuals, closely bonded elephants are not always together. Rather, like people, they come and go as they see fit. In doing so, elephants are able to keep mentally and physically active – and this is essential to their well-being. In such an environment elephants can make full use of their sense of hearing, of sight and of smell to stay in touch with, relocate the animals they want to be with.

127. At PAWS, as ex-zoo and ex-circus elephants gradually develop a sense of their own autonomy, their natural behavior begins to emerge and over time I have personally observed the transformation of several elephants there including Wanda, Lulu and Maggie. Maggie, for example, is an African elephant who was captured in Zimbabwe and lived most of her life at the Anchorage Zoo. For many of those years she was alone. In 2007, she retired from the Anchorage Zoo to PAWS. The Zoo had been reluctant to release Maggie for similar reasons to those I understand to be expressed by the Valley Zoo, including specifically that Maggie was anti-social and too unwell to travel.

128. The transformation in Maggie's physical and emotional well being at PAWS has been nothing short of beautiful. She arrived thin and weak, her skin showing the discoloration I have so often seen among elephants in poor physical and emotional health. With great care, Maggie was slowly introduced to the African females already at PAWS. Today (I spent a day observing her in October) she is fit and healthy. She is an integrated member of the group, pampered and

fussed over by the others as if she were a baby. The other elephants reach out and touch her, draping their trunks over her head and touching her in a protective way. Just like wild elephants, the group of four gather together when greeting or when faced with any external event which causes excitement. With their heads raised and ears flapping, they rumble and trumpet as they reach out and touch one another, while simultaneously urinating and secreting from their temporal glands– behavior indicative of very normal and psychologically healthy elephants.

129. The elephants at PAWS simply delight in meeting one another after shorter or longer separations – a characteristic that is an essential part of elephant behavior. Coming together in the wild elephants vocalize and touch one another. These behaviors are indicative of great excitement and likely they are also indicative of the release of endorphins and oxytocin, as well as positive emotions and feelings. Body contact and vocalizing – or as I colloquially call it – "touch and talk" is an elephant's way of bonding. People, particularly women, also use touch and talk (or "tend and befriend", Taylor et al. 2000) to form and maintain social bonds and oxytocin and the good feeling associated with its release are key to maintaining our behavior (Taylor et al 2000).

130. I am further advised by Ms. Woodyer and verily believe that zoo officials have also stated that it is not possible to generalize about elephants since they are all individuals and Lucy has her own individual needs. They claim that Lucy is imprinted on people, and that she gets her emotional support from people, not other elephants. They maintain that if Lucy were moved, she would miss her zoo family and this distress could affect her health and well-being. While it is true that elephants are individuals and they undoubtedly express individual personalities (Lee, in press), it is not accurate to say that Lucy has imprinted on people. Given the opportunity to bond with members of her own kind in a setting that helps her gives her autonomy and helps her to develop her social skills Lucy would surely thrive. Furthermore, I have discussed Lucy with Pat Derby and Ed Stewart, the Directors of PAWS. They told me and I verily believe that they would welcome Lucy's human friends to spend time with her while she adapts to her new companions.

131. With all the deprivation and suffering that Lucy has already endured in her life, the last thing I would do is recommend a move if I thought it would be detrimental to her physical or

psychological well-being. With all I know about elephants generally, about Lucy in particular, and about the experience of other former zoo and circus elephants who suffered similar problems to Lucy before being successfully integrated among their own kind at a sanctuary, I am confident in my expectation that Lucy would be positively transformed if she were permitted to live out the rest of her life in a sanctuary with other elephants.

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SWORN BEFORE ME in the City of , this day of December 2009.

Commissioner for Taking Affidavits

Dr. Joyce Poole

I hereby certify that this document is signed by:

JOYCE HATHEWAY POOLE

NOTARIUS PUBLICUS, SANDEFJORD, NORWAY

on this 07 th. day of desember 20 09

Liliana Valjan

Liliana Valjan
Notarius Publicus

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