

**Best Practices by the Coalition for Captive  
Elephant Well-Being**

2005

Editors:

Lisa Kane JD

Debra Forthman Ph.D.

David Hancocks

## Introduction

The Coalition for Captive Elephant Well-Being believes that the care and management of elephants in North America is an issue of signal importance. “Best Practices by the Coalition for Captive Elephant Well-Being” sets forth policies and methods founded on scientific literature. A full discussion of the science and policy decisions relevant to this model code is found in our accompanying report entitled “Optimal Conditions for Captive Elephants.” These best practices are intended to serve as a foundation for providing coherent, evidence-based care for captive elephants.

The Coalition is a group of independent welfare-minded zoo professionals, scientists, academics, veterinarians, animal behaviorists, animal law specialists, and animal welfare advocates united in their efforts to articulate science-based best practices to improve the care and well being of captive elephants.

Members of the Coalition are Robert Atkinson, Ph.D., Royal Society for the Prevention of Cruelty to Animals, Richard Farinato, Humane Society of the United States, Debra Forthman, Ph.D., Animal Behavior Consulting, Inc., Jane Garrison, David Hancocks, Lisa Kane, JD, Colleen Kinzley, Oakland Zoo, Gail Laule, M.A., Active Environments, Inc., Ellen Leach, Behavioral Resources, Inc., Dan Maloney, Audubon Nature Institute, Laura Maloney, M.B.A., Louisiana Society for the Prevention of Cruelty to Animals, Anita Schanberger, Margaret Whittaker, Active Environments, Inc., Jeff Williamson, Phoenix Zoo and Sanctuary, Kevin Wright, DVM, Gretchen Wyler, and Steven Zawistowski, Ph.D., American Society for the Prevention of Cruelty to Animals.

Our report entitled “Optimal Conditions for Captive Elephants” and these best practice recommendations are the result of a collaboration initiated in 2003 and concluded in 2006 upon completion of these documents.

## Part 1: Overview

This model code of best practices is divided into discrete chapters addressing key ecological classes of variables relevant to captive elephants. Each section begins with a statement of the objective the proposed best practices are designed to achieve. Cross-references to “The Case for Optimal Care and Well-Being of Captive Elephants” as well as citations to specific articles and treatises relevant to the topic appear throughout these best practices.

Explanatory notes accompany important or sensitive best practices. These notes are intended to explain the basis for the best practice and to direct the reader to additional information available on the topic. For example, explanatory notes accompany the standards on space allowances and the urgent need to establish programming that results in captive elephants walking a minimum of 10 km per day.

## **Part 2: Environmental Best Practices**

David Hancocks, Colleen Kinzley, Lisa Kane, JD, Gail Laule, M.A., Margaret Whittaker, Ellen Leach, Anita Schanberger, and Debra Forthman, Ph.D.

*Objective: The physical environment in which captive elephants are held must account for their welfare by protecting them from physical discomfort, fear and distress, and simultaneously promoting their physical and psychological health and expression of a full range of species-appropriate behaviors.*

### **E 1: Outdoor access**

Elephants must be allowed to stay outdoors as much as possible. Institutions must design exhibits that permit elephants' free access to the outdoors day and night, in the absence of adverse weather, safety or health conditions. It is critical that any new elephant exhibit be constructed only in climates in which elephants can comfortably spend a majority of the time outdoors year round (Clubb and Mason, *in press*; Hancocks 2002; Coe 2003).

Cross-reference: "Optimal Care" **4.8** and **4.11**.

### **E 2: Building design and maintenance**

No physical features of the environment may cause injuries to the elephant. Injuries are defined as any physical trauma or risk of physical trauma, including but not limited to eyes, ears or trunk tip, or damage to tissue severe enough for the formation of granular scar tissue, or injuries requiring surgical intervention, including debriding procedures.

Cross-reference: "Optimal Care" **4.16**.

### **E 3: Limiting use of toxic substances in buildings**

Elephants shall not come into close contact with toxic materials, surfaces or fumes, such as paints, preservatives or disinfectants.

### **E 4: Electrical installations/lighting**

Electrical installations shall be inaccessible to the elephants, well insulated, safeguarded from potential damage, properly grounded, and inspected and tested every six months.

- a. Lighting levels shall be adequate to ensure staff safety.

- b. Full-spectrum lighting of appropriate (tropical) intensity is required in those facilities utilized as winter quarters.
- c. Natural lighting shall also be utilized through skylights with full-spectrum glazing and similar design features (Rosenthal and Xanten 1996).
- d. Artificial lighting in night quarters should employ rheostats to allow gradual introduction of soft, low-level full-spectrum lighting (equivalent to starlight/moonlight) during nighttime.

#### **E 5: Restraint chutes**

Each elephant facility shall be equipped with an elephant restraint device (ERD) subject to routine maintenance, testing and inspection.

- a. The ERD should offer protection from extreme weather conditions such as wind, rain, and temperature fluctuations.
- b. It is recommended that the restraint device open widely enough to allow an elephant to lie down if necessary.
- c. An ERD should be accessible from multiple holding areas, especially quarantine or isolation/sick stalls.

#### **E 6: Keeper/Staff access**

Facilities must be designed to provide safe keeper/staff access to elephants in multiple areas. Access must include direct, tactile access to multiple animals at one time for husbandry and veterinary purposes, and must be appropriate for protected contact training (see, e.g., Rosenthal and Xanten 1996).

- a. Facilities must be designed to provide sufficient, safe, shielded access to elephants in holding and transfer areas and exhibits. Amount, type, and location of shielding should be appropriate to the sex and temperament of the individual animals.
- b. All gates, hydraulic or manual, must be operated from keeper areas with clear sight lines from keeper area to gates.
- c. Facilities must allow for protected keeper access to elephants during the movement of animals between and within enclosures (Rosenthal and Xanten 1996).
- d. Facilities must provide necessary access points to carry out husbandry and veterinary procedures including: holes of different sizes and location to accommodate animals of different sizes and temperament; platforms to allow keepers easy access to elephants' eyes, ear, and back; foot holes that comfortably accommodate an elephant's foot during protracted foot work and allow adequate space for human hands; and save access for health assessment.
- e. Facility design must allow keepers to work and move through the area without being within trunk's reach of elephants. Facilities must allow

keepers to interact with single or multiple elephants at the same time and at one location.

- f. Facilities must allow separation of individuals for training purposes and/or for animal safety or health purposes.
- g. Facilities must have multiple locations where staff may enter the elephants' space once elephants are safely and appropriately restrained for veterinary or emergency purposes. Provision should be made to permit chains on one or all four legs.
- h. Facilities must be designed to have maximum visual access to elephants to monitor behavior.
- i. Holding areas must allow multiple options for separate or group housing to deal with social incompatibilities. Routine and frequent chaining is not an acceptable method for managing social interactions (Brockett, Stoinski, Black, Markowitz and Maple 1999).

#### **E 7: Facilitating introductions**

Appropriate facilities must be available to facilitate all phases of the introduction process of new members to the existing social group. Due to the multiple phases of introduction, including visual and olfactory contact only, to limited tactile contact, to greater tactile contact, to full physical contact with escape areas for animals to retreat to while the relationship is being established, facilities must also allow keeper access to safely intervene to disrupt interactions that may lead to potential injury.

#### **E 8: Space allowances**

- a. Indoor facilities used only for overnight housing shall provide at least 60 sq. m (650 sq. ft.) of space for each female elephant and for any calf.
- b. Indoor facilities used for winter quarters shall provide at least 185 sq. m (2000 sq. ft.) of space for each female elephant and for any calf.
- c. Indoor facilities used only for overnight housing shall provide at least 110 sq. m (1200 sq. ft) of space for each male elephant.
- d. Indoor facilities used for winter quarters shall provide at least 370 sq. m (4000 sq. ft) of space for each male elephant.

*Note: The overnight space of 60 sq. m. was calculated by determining the space necessary for an elephant to sleep without lying in its own waste.*

#### **E 9: Flooring**

- a. Floors shall be made of non-slip material, rubberized material or natural substrate and be maintained to reduce the risk of slipping. Ideally artificial flooring would have a rubberized or other coating providing a degree of flexibility, elasticity and thickness comparable to a natural substrate (Clubb and Mason, *in press*).

- b. Floors may not be so rough as to contribute to foot damage (Clubb and Mason, *in press*).
- c. Smooth concrete floors may be grooved or treated with a non-slip coating.
- d. Waterproof soft coverings or similar temporary floor covers shall be provided to elephants confined to hard indoor surfaces for eight or more hours (e.g. Sommer 1974; Glickman and Caldwell 1994).
- e. At least one-half of the flooring of winter quarters shall be heated during periods of cold weather. Heated flooring shall be accessible to every elephant. Floor temperature shall be moderated to prevent over-drying or burning of feet, nails, body pressure points or other vulnerable part of the elephant's body.
- f. Floors shall be graded to ensure good drainage (Rosenthal and Xanten 1996).
- g. Floors shall be cleaned with sufficient frequency to provide a clean, dry surface for a majority of the time that elephants are confined indoors (Csuti et al. 2001).

#### **E 10: Special holding areas**

Each housing unit shall include an isolation/quarantine area for sick or injured animals of sufficient size to permit the safe and effective delivery of veterinary care (Rosenthal and Xanten 1996) and the removal of the animal to a remote necropsy site should it die.

An area for loading and unloading elephants must be designed. This area should readily accommodate the loading and unloading of a crate, and a rear or side-loading trailer. This loading area should be accessible to the quarantine or isolation stalls.

#### **E 11: Freedom of movement**

The interior shall be designed to promote freedom of contact between established group members. Interiors must be designed in a manner that provides a continual flow of movement or "free flow" with no dead ends (Glickman and Caldwell 1994; Forthman, McManamon, Levi and Bruner 1995). Design flexibility should include options allowing elephants to choose physical and visual privacy and barriers to meet their social needs.

#### **E 12: Confinement**

The interior shall be designed to permit the option of confining an individual, pair or grouping to a particular space without preventing movement of the other elephants in and out of the barn. Overnight chaining of elephants is prohibited. There shall be areas where elephants can be temporarily and safely chained for veterinary procedures and in emergency situations when movement is not an option.

Cross-reference: "Optimal Care" 4.23.

*Note: The deleterious effects on elephants subject to overnight chaining are well documented (Lehnhardt 1984; Brockett et al. 1999; Gruber, Friend, Gardner, Packard, Beaver, and Bushong 2000; Clubb and Mason in press). Of developmental concern, controlled experiments with small mammals have demonstrated that the sensory feedback accompanying movement plays a vital role in perceptual development (Leach, 1995).*

### **E 13: Thermal conditions**

- a. During winter months, indoor ambient temperatures shall be maintained at no less than 16 C (60 F) unless the elephant's behavior indicates a lower temperature is appropriate.
- b. Isolation/quarantine holding areas intended for veterinary use (see E 7) shall be capable of being heated to 21C (70 F).
- c. During warm weather, indoor ambient temperatures may not exceed 23.5C (74 F). If ambient temperatures exceed 23.5C (74 F), then access to alternatives like an outdoor night corral or pool must be provided (Langman 1990, 1996; Sampson 1999).
- d. When temperatures fall below 4.5C (40F), elephants given access to the outside must be provided simultaneous indoor access or access to an outdoor area heated above 4.5C (40F).

*Note: Kinzley (Pers. comm.) advises that captive elephants display discomfort with ambient air temperatures that are too high by throwing feces on themselves when confined. Different animals prefer different minimum indoor temperatures. For example, at the Oakland Zoo one elephant prefers an air temperature inside the barn from 5.5 C to 7C (45F to 50 F), while another prefers 15 C to 17.5C (55F to 65F). The Oakland Zoo accommodates these preferences by individualizing the air temperature in each stall. It has also been observed that elephants may throw water on themselves when ambient air temperatures are too high.*

### **E 14: Ventilation**

Effective ventilation of all indoor spaces, defined as four air changes per hour, shall be provided. Air movement shall be at low velocity to avoid drafts and shall exclude ingress of rain or snow.

### **E 15: Space allowances, design and maintenance**

Outdoor exhibit space must be of sufficient size and complexity to achieve the following performance goals:

- a. Healthy elephants shall have sufficient space to travel a minimum of 10 km (7 miles) on a daily basis while engaged in natural behaviors like foraging, feeding, exploring, socializing and the like (Seidensticker and Doherty 1996; Hancocks 1996, 2002; Coe 2003). All elephants shall have access to useable pasture year round and grassy pasture 6 months out of every 12.

*Note: Elephants are physically vigorous, non-territorial animals that move almost continuously for 20 out of every 24 hours (Moss 1988). Sukumar (2003) calculates that elephants range 10 to 20 km (7 to 13 miles) per day without regard to species type. It follows that elephants must be given a space sufficient to meet their exercise needs, minimize competition for resources, maximize opportunities for socializing or refuge from socializing and maximize flexibility for caregivers to provide enrichment.*

*See "Improvement in Elephant Management at the Oakland Zoo," for a pragmatic discussion of the use of browse, training opportunities, exhibit configuration and nighttime outdoor access to create conditions in which three (3) captive adult elephants walked 3.2 km (2 miles) a day in an enclosure totaling only 6,000 sq. m (1.5 acres). Using pasture rotation techniques, Oakland Zoo's staff provides their elephants ongoing access to significant grassy pasture year round. After the exercise and enrichment program was put into place, Oakland's elephants each lost between 500 and 700 pounds.*

- a. Elephants must have access to their outdoor holding/exhibit areas with natural substrates 24 hours a day, in the absence of temporary adverse weather, safety or health conditions (Seidensticker and Doherty 1996).
- b. A variety of substrates and substrate types shall be provided (Seidensticker and Doherty 1996; Baer 1998, 282-283) including different types of clean dirt, mulch, sand, well-established grasses and sedges, etc. (Forthman et al. 1995).
- c. Outdoor space shall be graded for effective drainage (AZA 2003).
- d. Outdoor holding/exhibit spaces shall include multiple dry areas capable of routine cleaning on which feed, minerals, etc., may be placed.
- e. Outdoor exhibit space must include a variety of slopes and terrain sufficient to allow and encourage significant muscular activity. Slopes and terrain must be of sufficient height to provide viewing vistas for the elephants (Clubb and Mason in press; Hancocks, pers. comm.).
- f. Configuration of the exhibit area must include destinations, like quiet pools, trees, rock features, and options for the elephants to socialize or to avoid socializing (Seidensticker and Forthman 1998; Baer 1998; Coe 2003).
- g. Outdoor space shall be cleaned daily or more often of solid waste unless the space is large enough to allow pasture rotation (AZA 2003).
- h. Outdoor exhibit/holding areas shall provide space to separate an individual to address behavioral issues or to provide safe and effective veterinary care (Baer 1998).
- i. Outdoor exhibit/holding areas shall provide multiple sites for wet (mud) and dry (dust) wallows (Forthman et al. 1995).



*Note: The most useful shape for zoo paddocks is typically elongated, so that the length is greater than the depth. This creates the best viewing opportunities for visitors and allows for the introduction of pockets of vegetation along the viewing edge to enliven the viewing sequence and to create openings for sheltered and discrete viewing bays. More importantly, it encourages the animals to circulate and explore. This benefit is enhanced if islands of vegetation and other environmental features are included within the paddock, so that the animal space is not simply one empty and undefined space. If the vegetation in these paddock islands is sufficiently dense and tall, this will provide shade to the interior of the paddock, and will also define specific spaces to increase spatial cognition and to enhance visual interest by alternately revealing and hiding views. There should be no angles less than 90 degrees for any part of the perimeter of the main enclosure, to avoid animals getting trapped. The topography should be varied and, especially for elephants, should present sufficient variation to ensure some challenges for them to exercise their muscles in regular daily activities (Hancocks, personal comm.).*

#### **E 16: Fencing**

- a. Fencing shall be maintained in good condition and must be capable of withstanding an elephant's physical strength and curiosity. Pipe and cable fencing is recommended for adult cows and calves. Bull fencing should withstand the force a 7-ton animal can exert (Hancocks 1996).
- b. Doors and gates shall be configured to prevent elephant escapes and to protect staff.
- c. All fencing or other containment systems must prevent contact between elephants and the public.
- d. Doors and gates must be designed to withstand the force of an adult elephant. Back-up generators must be on line to operate hydraulic or electrically powered doors or gates (AZA 2003).
- e. Ha-ha moat systems, with a perpendicular face on the public side and a 30-degree or less slope on the animal side, are acceptable. Other dry-moat containment systems are prohibited as they pose a substantial threat to elephants; deep, narrow-sided and hard surfaced moats are particularly dangerous (Hancocks 1996; AZA 2003).

*Note: Rhino Ark reports that the Aberdare fence "is a flagship operation in terms of quality construction/longevity of materials in Kenya." It is not purely an elephant fence but is designed to protect farmers from all types of marauding animals. Core details include: high tensile wire used throughout, fence is seven feet above ground and three below and contains six high tensile wire strands in the four feet above three feet of tight lock wire mesh, 10-foot plastic posts are sunk three feet, electrification is 5,000 to 7,000 volts (Church, C. pers. comm.).*

**E 17: Limiting use of toxic substances in outdoor holding/exhibit areas**

Elephants shall not come into close contact with toxins or fumes while in outdoor holding and exhibit areas.

**E 18: Thermoregulation**

Outdoor holding and exhibit areas shall provide elephants a variety of options for thermoregulation to allow the elephant to maintain an appropriate core temperature (Langman et al. 1996; Rees 2002).

Cross-reference: "Optimal Care" **4.11**.

**E 19: Windbreaks**

Windbreaks of sufficient height and density to be effective may include buildings, manmade shelters, natural shelters like tree belts, or natural geographic features.

**E 20: Sun/Shade**

Shade from the sun, with wind and without wind, shall be available whenever an elephant is on exhibit or in an outdoor-holding area (Langman 1985, 1990, 1996, 1997; Forthman et al. 1995).

Cross-reference: "Optimal Care" **4.11**.

**E 21: Water features**

- a. All outdoor exhibit areas shall provide access to one or more deep pools that provide graduated increasing depths to allow several adult elephants to submerge simultaneously (Seidensticker and Doherty 1996; Markowitz and Aday 1998).
- b. All outdoor pools shall be equipped with high-volume filtration system or other system ensuring sufficient water exchange to avoid build-up of waste materials.
- c. Pools should have multiple entry points to prevent one elephant trapping another in the pool.
- d. Entry into the pools should be gradually stepped or sloped to allow elephants easy access, and should be surfaced to allow good footing while preventing foot or skin abrasions (Forthman et al. 1995).
- e. It is recommended that pools be located to permit staff reasonable proximity to it for training purposes.

**E 22: Tactile**

- a. Varied rubbing surfaces at varied heights shall be installed in both indoor and outdoor exhibit areas. These are particularly useful if near a pool (Forthman et al. 1995).

- b. Both wet and dry wallows (see E 12 j) shall be provided in indoor and outdoor exhibit areas.

### **E 23: Auditory**

Non-species-specific noise (i.e. from ventilation fans, blowers and other mechanical systems, and traffic and amusement rides) shall be kept to an absolute minimum in both indoor exhibit space and outdoor exhibit areas (Peterson 1980; Stoskopf 1983; Krause 1989; Gold and Odgen 1991; Forthman et al. 1995; Forthman 1998). Special attention must be paid to minimizing low frequency noise, including seismic noise, due to elephants' sensitivity to these sounds.

Cross-reference: "Optimal Care" **4.13**.

## **Part 3: Enrichment Best Practices**

Lisa Kane, JD, David Hancocks, Gail Laule, M.A., Ellen Leach and Debra Forthman, Ph.D.

*Objective. Planned, systematic enrichment strategies based on a thorough knowledge of elephant species' natural history are critical to promote an individual elephant's behavioral competence and to preserve the range of species-typical behaviors.*

### **EN 1: Design features/outdoor exhibit space**

- a. Exhibit layout shall provide multiple opportunities for socializing and refuge from other elephants and the public's view (Seidensticker and Doherty 1996; Seidensticker and Forthman 1998; Schulte 2000).
- b. Exhibit layout shall provide features permitting novel and variable placement of sensory-stimulating scents, objects, minerals or forage (Seidensticker and Doherty 1996; Markowitz and Aday 1998).
- c. Exhibit spaces shall afford a diversity of both long and short views within and outside of the enclosure.
- d. Varied rubbing surfaces, whether rocks, tree stumps or other large sturdy objects, at differing heights, shall be installed (Forthman 1998; AZA 2003).
- e. Easy and ready access for vehicles such as cranes, trucks and bobcats must be provided.
- f. Large trees or shade devices must be included in the design so as to cast shade over at least 33% of the exhibit space and 66% of any individual holding space at any time of day during warm weather (Hancocks pers. comm.).

Cross-reference: "Optimal Care" **4.15-4.18**.

## **EN 2: Building design features**

- a. Indoor holding and exhibit areas shall be designed to promote opportunities for elephants to socialize freely with companions with which they are fully integrated. Areas of refuge shall also be provided (Seidensticker and Forthman 1998; Schulte 2000; Coe 2003).
- b. Indoor exhibit areas shall be designed to provide novel and varied locations of scent, minerals, or other stimulating objects (Shepherdson 1998).
- c. Indoor winter quarters shall provide indoor wet (mud) and dry (dust) wallows (Seidensticker and Doherty 1996; Clubb and Mason *in press*).
- d. Indoor areas should be designed to provide varied locations and methods to offer daily browse, feed and hay (Seidensticker and Doherty 1996).
- e. Indoor winter quarters shall be designed to maximize utilization of natural sunlight. Broad-spectrum lighting fixtures shall be placed to maximize benefit to the elephants.
- f. Indoor holding and exhibit areas shall include varied rubbing surfaces at varied heights.

## **EN 3: Exhibit furniture**

- a. Outdoor areas: Staff shall rotate appropriate exhibit furniture (e.g., street sweeper brushes, large tires, climbing rocks, scratching posts, sticks, logs, root balls, and sunken trees) in and out of the exhibit areas on a sufficiently regular basis to maximize physical and mental stimulation (Shepherdson 1998; Poole 1998).
- b. Indoor areas: Staff shall provide and rotate appropriate exhibit furniture in and out of the exhibit areas on a sufficiently regular basis to maximize physical and mental stimulation and minimize habituation (Shepherdson 1998; Poole 1998; Hancocks pers. comm.).

## **EN 4: Food**

Fresh browse and other edible plant material shall be provided on a daily basis (Baer 1998, 285-87), and be introduced into the exhibit with temporal and spatial variability (Seidensticker and Doherty 1996; Kreger et al. 1998, 69; Clubb and Mason *in press*; Baer 1998, 288-89) permitting each elephant approximately 16 hours of browsing, foraging or feeding each day (Seidensticker and Doherty 1996; Lindburg 1998, 266-68; Club and Mason *in press*) whether outdoors or indoors.

Cross-reference: "The Case for Optimal Care" **4.15** and **4.18**

*Note: "Activities concerned with food-getting and food consumption offer excellent opportunities for enriching captive animals" (Lindburg 1998, 264). Given the central importance of foraging and feeding to elephant's habitat use and activity budget, the provision of foraging activities is important to the well-being of captive elephants.*

## **EN 5: Water Features**

- a. The elephants shall have free access to water features whenever they are in the outdoor exhibit (Seidensticker and Forthman 1998).
- b. Multiple wet (mud) and dry (dust) wallows shall be available (Seidensticker and Forthman 1998).
- c. Indoor holding/exhibit areas utilized as winter quarters shall provide one deep pool in which three elephants may submerge simultaneously (Seidensticker and Doherty 1996).
- d. Indoor holding/exhibit areas shall provide one shallow pool or sprinkler system.
- e. Indoor holding/exhibit areas shall provide at least one wet (mud) wallow and one dry (dust) wallow (Seidensticker and Doherty 1996).

## **EN 6: Olfactory**

Enrichment shall include olfactory stimulation through novel and varied placement of scents.

Cross-reference: "Optimal Care" **4.13**.

## **EN 7: Planning and implementation**

- a. Effective, systematic enrichment aimed at enhancing species-appropriate behavior results from careful planning. Accordingly, the competence of each elephant shall be assessed in terms of its species' natural history and its individual competence and a program developed to ameliorate deficiencies and support strengths (Swaisgood, Ellis, Forthman and Shepherdson 2003; Laule and Desmond 1998).
- b. Enrichment should be scheduled on a daily, weekly, or monthly basis in order to insure variability. Success of enrichment shall be regularly and systematically assessed.

*Note: The practice of confining elephants to indoor quarters for the duration of winter should be abolished. Elephants should be able to comfortably, routinely spend the majority of time year round outdoors. Shorter periods of confinement during inclement weather may be inevitable, but must be addressed by providing stimulating options and behavioral alternatives to maintain and promote exercise and mental acuity. Reasonably adequate enrichment under these trying circumstances results only from careful planning. Accordingly, daily plans addressing the full range of issues, including exercise, bathing, foraging, socializing and training must be developed, implemented, evaluated and redesigned as needed (Shepherdson 1998; Laule and Desmond 1998; Swaisgood, et al. 2003).*

*See Enrichment Guidelines, AZA Elephant Management Standards (2003) and "Improvement in elephant management at the Oakland Zoo" (Kinzley 2001) for discussion of enrichment strategies that also encourage exercise for captive elephants.*

## Part 4: Occupational Best Practices

Lisa Kane, JD, Colleen Kinzley, Debra Forthman, Ph.D., and Gail Laule, M.A.

*Objective: Elephant species' activity cycles and use of habitat are keys to their success in the wild and welfare in captivity. The provision of ample space and opportunity for movement and foraging are vital to ensure captive elephants' welfare.*

### O 1: Exercise

Large exhibits or habitats are essential to permit the placement of varied resources in multiple sites to promote exercise (Hancocks 1996; Seidensticker and Doherty 1996; Coe 2003). It is recommended that a healthy captive elephant walk a minimum of 10 kilometers (7 miles) a day. A full range of exercise should be encouraged and designed for, including: walking, running, turning, reaching, stretching, climbing, bending, digging, pushing, pulling, and lifting.

Cross-reference: "Optimal Care" **4.8, 4.11** and **4.12**.

*Note: Elephants are physically vigorous, non-territorial animals who move almost continuously for 20 out of 24 hours (Moss 1988). African elephant ranges can be thousands of square kilometers. For a brief description see Shoshani (1992, 141-143). Asian elephants may also range over thousands of square kilometers (Sukumar 2003). African elephants may travel approximately 500 to 650 km (300 to 400 miles) during seasonal migrations (Langman 1995, 629). During migration, African elephants in Namibia may even travel 90 to 180 kilometers per day (Sukumar 2003). Elephants range daily over significant distances to exploit resources. Shoshani calculates 30-60 kilometers (19-37 miles) per day for African elephants (1992). Sukumar (2003) calculates 10-20 kilometers (7 to 13 miles) per day for elephants without regard to species. See "Improvement in elephant management at the Oakland Zoo," for a pragmatic discussion of the use of browse, training opportunities, exhibit configuration and nighttime access to the outdoors to create the conditions in which captive elephants walk a minimum of 3.2 km (2 miles) per day in exhibit space equaling 6,000 sq m (1.5 acres).*

### O 2: Foraging

Food or browse shall be distributed in a manner that permits and encourages significant, sustained foraging behavior for at least 16 hours each day (Seidensticker and Doherty 1996; Lindberg 1998; Clubb and Mason in press). A variety of enrichment and environmental features should be provided that require animals to work for their food, such as devices that must be opened,

are almost out of reach, include multiple steps, ration the amount of food, are triggered by behavioral responses and the like.

Cross-reference: "Optimal Care" **4.15-4.18**.

*Note: Because elephants are adapted for feeding on plant material with relatively low nutrient content, feeding occupies about 70 to 80 percent of their waking hours (Eisenberg 1981). Elephants spend approximately 16 to 18 hours a day browsing, grazing and foraging. Given the importance of foraging and feeding to elephants' habitat use, including ranging patterns and occupational activities, activities concerned with food getting and food consumption are critical. Elephants must be offered basic occupational options that include adequate room to roam on a variety of substrates with access to appropriate plant material for near continuous feeding (Moss 1988; Eisenberg 1981; Estes 1999).*

*Institutions must develop feeding strategies that are constantly challenging for the elephants. For example, rather than placing hay on barn floors, some zoos place hay nets and specially designed hay containers at varying elevations that require the elephants to reach up and over certain structures (like walls) to retrieve the hay. Some placements require the elephants to kneel down and stretch their trunks under a containment fence to pull hay out of a hay container secured outside the exhibit (Schanberger person. comm.).*

### **O 3: Bathing**

Access to wet and dry bathing areas shall be provided at least 12 hours each day.

*Note: Elephants bathe or dust themselves daily by choice (Moss 1988; Estes 1991; Sukumar 2003). Eisenberg reports that Asian elephants are never far from water (1981). Access to water, mud and dust wallows is, therefore, critical to captive elephants.*

### **O 4: Socializing**

Elephants shall enjoy self-directed social access to each other a majority of the time, in the absence of health, safety or behavioral constraints or training sessions (Rees 2001; AZA EMS 2003). Self-directed social access means unrestricted (e.g. no chains and no barriers) physical contact for socially integrated animals. Enrichment and environmental features should be provided to encourage social behavior (Schulte 2000) that is cooperative as well as competitive, such as feeding devices that require two animals working together to access food, play devices that allow tug-of-war types of interactions, and the like.

Cross-reference: "Optimal Care" **4.7, 4.19 and 4.20**.

*Note: Elephants are socially gregarious, intelligent animals, whose herd life is marked by routine periods of intense socializing apparently aimed at herd cohesion.*

*“Elephants are very much contact animals. Family members often stand touching while resting or drinking. They lean and rub their bodies together, and often touch one another with their trunks in various contexts” (Estes 1991, 262). Herd members engage in greeting ceremonies, play, play fighting, and synchronized moving, bathing and resting (Moss 1988; Douglas-Hamilton 1975; Sukumar 2003). Accordingly, it is important that elephant managers maximize opportunities for elephants, particularly females, to engage freely in natural social behaviors in order to promote socially competent animals (Rees 2001; Coe 2003).*

## **Part 5: Social Best Practices**

Lisa Kane, JD, Debra Forthman, Ph.D., Colleen Kinzley, Gail Laule, M.A., Margaret Whittaker, Ellen Leach, and Anita Schanberger.

***Objective. Elephants are highly social animals that live in a matriarchal society with two distinct social organizations (males and cow-calf or breeding herds) with separate behavioral traits. Protection and promotion of elephants’ matriarchal clan society is essential to their welfare in captivity.***

### **S 1: Conspecific herds**

Elephants shall be held in social groups of conspecifics (Asians with Asians and Africans with Africans; Clubb and Mason *in press*). Acceptable exceptions are those elephants that are not conspecifics but have formed strong bonds with one another. Bonded animals demonstrate a high level of affiliative behavior such as seeking close physical contact and/or proximity to another on a regular basis and simultaneously demonstrate low levels of agonistic behavior to the other (Seidensticker and Doherty 1996).

Cross-reference: “Optimal Care” **4.7, 4.19** and **4.20**.

*Note: Wild elephants live in a non-territorial matriarchal clan society (Estes 1999, 225; Eisenberg 1981, 185-86). Social relationships are central to elephant life and it is, therefore, important to house elephants together so that confined individuals may communicate and socialize with their herd partners (Moss 1988; Sukumar 2003). Irreversible damage such as imprinting (species identity confusion)(Lorenz 1937) and profound neurological disturbances such as sleep cycle disruptions and altered galvanic skin responses have been documented in some species lacking the presence of conspecifics during development (Overall 1997).*

### **S 2: Minimum cow/calf herd size**

Females, including female adults or females and calves, shall be held in stable social groups. African savanna elephants shall be held in groups no smaller than 10 (ten) adults; African woodland and Asian elephants shall be held in groups no smaller than 5 (five adults).



Cross-reference: “Optimal Care” 4.7, 4.19 and 4.20.

*Note: Data collected on both continents suggest that matriarchal group size is positively correlated with habitat features, resource availability, and human predation (Sukumar 2003). African savanna populations congregate in the largest groups observed. “Mean group sizes of over 10 individuals have been recorded commonly in several populations” (2003, 172). Fifty percent of the groups observed contained from 10 to 30 individuals. Elephant groups in African woodland habitats and Asian dry forests typically range from 5-10 individuals. Smaller mean group sizes of 2 to 3 were observed in African rain forests (Sukumar 2003). Elephants on both continents periodically gather into congregations composed of several groups in response to social needs, including “networking among individuals or groups, reinforcing bonds between related members, [and] mating opportunities,” and resource acquisition (Sukumar 2003, 174).*

*Captive elephants cannot respond to environmental factors that would otherwise influence their herd size. At the same time, captive elephants’ need for social connection, complexity and support, for example in raising calves, is assumed to be constant, irrespective of environmental factors. It is also true that while congregations of large number of individuals are common experiences for elephants in the wild, captive elephants will never experience the networking, bonding or mating opportunities these congregations offer. Further complicating the question is the limited nature of the data available (Sukumar 2003). We elect, therefore, to rely on the most frequently observed group size closest to the mean of the whole population subject to the studies reported. In the case of African savanna elephants, the most frequently observed group size was 10 to 24 individuals. The most frequently observed groups in Asian dry forests ranged from 5 to 7 individuals. The most commonly observed groups of African rain forest elephants were 2 to 3 individuals. Because no elephant holding facilities exist or are expected that could in any appreciable manner meet the environmental complexity of a rain forest, these best practices do not address African rain forest elephants separately from African woodland elephants.*

### **S 3: Cow/calf herd stability**

- a. Female calves may never be separated from their mothers, absent extraordinary cause (Estes 1991, 260-261; Estes 1999, 225-227; Moss 1988, *passim*; Taylor and Poole 1998).
- b. Related females may never be separated from each other, absent extraordinary cause (IUCN Guidelines 2001 Draft, 17-18).
- c. Male calves shall not be separated from their mothers before reaching sexual maturity unless the calf exhibits behavior, whether play-fighting or other form of aggression that risks injury to its mother or other herd members (Estes 1991, 261; Moss 1988, 101).

Cross-reference: “The Case for Optimal Care” 4.7, 4.19 and 4.20.

*Note: The role of the family and herd is the core social experience of all elephants. Even a cursory review of elephant species' natural history furnishes ample evidence that the integrity of the social herd is the single most important element of an elephant's life (Moss 1988, passim; Douglas-Hamilton 1975, passim; Estes 1991, 259-267; Estes 1999, 225-227; Eisenberg 1981; Sukumar 2003). It is the herd that creates "a social milieu in which the young elephant can mature and learn its role in adult life" (Eisenberg 1981, 183). Given the powerful role of social relationships in the health of the individual and the herd, it is imperative that captive female elephants intended for breeding be given an appropriate social context in which to undertake the task of delivering and raising a calf. Accordingly, elephant management decisions must protect and promote the integrity and stability of the cow-calf herd (IUCN Guidelines 2001 Draft, 16-18, 23-24).*

*As Ian Whyte, Senior Scientist, Large Herbivores, Kruger Park, wrote, "...it would be inhumane to remove juveniles from their families at any time or for any reason. Elephants have very strong social bonds. Daughters stay with their mothers for as long as they are both alive, even after the daughter has achieved sexual maturity and has young of her own.... I believe that to knowingly separate juveniles from their mothers is inhumane" (Whyte 2003).*

#### **S 4: Bonded individuals**

Bonded individuals, conspecific or non-conspecific, shall not be separated from each other, absent extraordinary cause.

*Note: see S 1 for definition of bonded individuals and note to S 3: Cow/calf herd stability*

#### **S 5: Sub-adult males and adult males**

Those institutions electing to hold both bulls and cows shall provide separate facilities, including separate night quarters and yards for bull elephants, as well as the option of common housing and yards for bulls and cows.

*Note: Males in the wild have been observed to develop strong associations (Moss and Poole 1983; IUCN Draft 2000, 23). African males are also often observed in proximity to female herds, well within a distance permitting olfactory, visual and auditory communication (Moss 1988, passim; Payne 1998, passim). Asian bull elephants in the wild have social contact with cow/calf herds and other bulls throughout their lives (Sukumar 2003). Bull elephants, cows and calves can all benefit from significant social interaction together. Therefore, it is important to plan for and provide opportunities maximizing bulls' socialization with females and calves. At the same time, experience and common sense may dictate that certain bulls are not good candidates for a social grouping that includes cows and calves. Males are much larger than females and, as is common in the captive setting, both adult and young males may attempt to engage the females in sparring contests. In the wild, females typically are not faced with this type of interaction and would not face such an interaction without the assistance of other herd members. These unnatural contests and interactions can result in injury to the females. Males who engage*

*dominant females may be repressed from normal sexual and behavioral development, resulting in reduced reproductive potential. It follows that institutions holding both bulls and cows must approach their housing and social management with flexibility and must design their physical facilities to address contingencies and provide options (Whittaker pers. comm.).*

#### **S 6: Socially integrated context**

Elephants must be maintained in a socially integrated context where they share the same physical space a majority of the time.

## **Part 6: Nutrition and Water Best Practices**

Lisa Kane, JD, Debra Forthman, Ph.D., and Ellen Leach

*Objective. Elephants shall have access to clean, fresh water and a diet designed to maintain health and promote a positive state of well being. Feed and browse must be distributed in a way that promotes full employment of each herd member's appetitive foraging behavior. Free access to water for consumption and bathing is also essential.*

### **A. Nutrition**

#### **N 1: Feeds**

Elephants shall be provided a wholesome, nutritionally complete and balanced diet composed of concentrated feeds (grain and vegetables), grass hays, pasture and living and cut browse (Clubb and Mason, in press; Oftedal, Baer and Allen 1996).

*Note: For additional discussion, see "Elephants: nutrition and dietary husbandry." Nutrition Advisory Handbook, AZA Fact sheet 004, September 1997.*

#### **N 2: Free access to feed or browse**

Hays and fresh browse shall be provided in a manner calculated to permit each herd member to engage in non-competitive, appetitive foraging behavior for at least 16 hours each day (Clubb and Mason in press; Forthman et al. 1995).

Cross-reference: "Optimal Care" **4.15** through **4.18**.

#### **N 3: Nutrients/minerals**

Managers shall be aware of mineral deficiencies and excesses in the elephants' diet and shall correct them as appropriate (Oftedal, Baer and Allen 1996). Other nutrient imbalances may occur in the elephants' diet (such as protein or vitamin E) and shall be corrected. As more nutrition information becomes available for elephants, managers shall adjust the elephants' diets accordingly and in a timely manner.

*Note: Vitamins in excess can be toxic. Other nutrient imbalances, such as excessive amounts of protein, may also cause serious health problems.*

## B. Water

### **N 4: Water supply**

1. Clean, fresh water must be freely available at all times.
2. Water troughs and shallow pools shall be kept clean and free of contamination.
3. Free, continuous access to water shall be provided, whether elephants are indoors or outdoors.
4. Watering equipment must be designed, constructed, placed and maintained to minimize contamination.
5. Placement of water troughs shall not result in wetting/fouling of bedding or resting areas.

### **N 5: Emergency water supply**

A generator or other backup energy source shall be in place to ensure an alternative supply of suitable drinking water is available in case normal supplies fail (e.g. power blackout). Alternatively, there must be a backup plan in place for obtaining water in case of emergency.

## **Part 7: Training Best Practices**

Gail Laule, M.A., and Margaret Whittaker

*Objective: The humane and effective management of elephants in captivity is an expensive and complex challenge that requires ongoing institutional commitment. Elephants are highly intelligent, long-lived animals capable of learning a large repertoire of behaviors. Positive reinforcement based training is critical to provide them with mental and physical stimulation, gain their voluntary cooperation in husbandry and veterinary procedures, and promote their autonomy. Staff having contact with elephants must have strong skills in positive reinforcement training, operant conditioning and problem solving.*

## A. Management system options

### **T 1: Protected contact: definition**

Protected contact is a system for managing elephants that uses positive reinforcement training as the primary method to modify behavior and gain the voluntary cooperation of the animal; physical punishment is prohibited. Directing the positioning and movement of the elephant is achieved through the use of successive approximation (shaping) or targets or both. Keeper safety is achieved by elephant and keeper positioning relative to each other and to a barrier that typically separates human and animal spaces. Trainers intentionally function outside the elephant social hierarchy and do not attempt to establish a position of social dominance (Desmond and Laule 1991; Laule and Whittaker 2000).

### **T 2: Protected contact: implementation**

Captive elephants shall be managed under a protected contact management system as defined in T 1.

Cross-reference: “The Case for Optimal Care” 4.21, 4.22 and 4.24.

*Note: Protected contact relies primarily on positive reinforcement and the use of targets to shape behaviors. Methodical, skillful use of positive reinforcement coupled with knowledge of the species as well as the individual animal is effective in gaining the cooperation of the animal, shaping its behavior, and simultaneously limiting danger to keepers. Positive reinforcement and principles of protected contact promote the animal’s control over its environment, thus reducing its experience of stress (Desmond and Laule 1998).*

### **T 3: Free contact: definition**

Free contact is a system for managing elephants that uses negative and positive reinforcement, and physical punishment to modify behavior. Directing the positioning and movement of the elephant is achieved primarily through the use of the ankus. Trainers and elephants share the same physical space. Trainers intentionally function in a position of social dominance within the elephant social hierarchy.

### **T 4: Free contact: a prohibited management system**

Captive elephants shall not be managed under free contact management as defined in T 3.

Cross-reference: “Optimal Care” 4.22 and 4.23.

*Note: We recognize that sound implementation of any training system depends upon the skill, temperament, education and judgment of each handler. Although free contact can include regular use of positive reinforcement, Leach writes, “It does not meet the criteria of a Best Practice because of its basic reliance on techniques such as*

*punishment and negative reinforcement. For best results, these aversive techniques are contra-indicated in the sciences of animal learning and motivation (Bolles 1975), behavior management (Baldwin and Baldwin 1986) and aggression management (Leach 1992). The variable and sometimes paradoxical effects of punishment have been documented by behavior scientists in a huge body of work beginning with Thorndike's (1932) seminal work. A few of the many documented side effects associated with negative reinforcement and physical punishment are increased aggression, anxiety, and distress." Both techniques are subject to misuse and potential abuse, whether in frequency or intensity.*

## B. Operant conditioning options

### **T 5: Positive reinforcement: definition and example**

**Definition:** Positive reinforcement works to increase the probability of a behavior recurring by presenting the animal with a desired stimulus following performance of a correct behavioral response. A desirable stimulus includes but is not limited to food, praise, tactile contact, play, favorite toy, or release to a favored place.

**Example:** An elephant responds to a signal correctly by lifting his front foot, and is rewarded with tactile praise and a handful of carrots.

Cross-reference: "Optimal Care" **4.24.**

### **T 6: Positive reinforcement: implementation**

Positive reinforcement shall be the primary basis for all captive elephant training and management.

Cross-reference: "Optimal Care" **4.24.**

*Note: Positive reinforcement allows the animal to cooperate voluntarily. An animal trained exclusively with positive reinforcement will not experience anxiety or fear associated with the training and is more likely to try new behaviors (Pryor 1985; Martin 1996). Positive reinforcement training affords additional benefits to the subject animal. Several benefits of positive reinforcement have been noted in the literature, including: increased mental stimulation, an opportunity to work for food, and greater choice and control over daily events (Laule and Desmond 1998). All of these factors have been associated with enhanced psychological well being (Hanson, Larson and Snowdon 1976; Markowitz 1982; Mineka, Gunnar and Champoux 1986). It may also improve the relationship between people and the animals in their care (Bloomsmith, Lambeth, Stone and Laule 1997; Segerson and Laule 1995). Documented results with chimpanzees have shown: reduced self-directed behaviors, increased activity, and enhanced social interactions (Bloomsmith 1992).*

#### **T 7: Negative reinforcement: definition and example**

*Definition:* Negative reinforcement increases the probability of a behavior recurring by removing an aversive or unpleasant stimulus; this is also known as escape or avoidance training. Negative reinforcers are any undesirable event or stimulus, no matter how mild, that the subject wants to avoid. An undesirable stimulus or event may include a loud buzzer, spray from a hose, or use of an ankus.

*Example:* When a keeper cues an elephant under its leg with an ankus, the elephant learns to lift its foot up promptly to escape or avoid the discomfort of the ankus point.

Cross-reference: "Optimal Care" 4.23.

#### **T 8: Negative reinforcement: implementation**

Negative reinforcement shall be used at a minimum and only after all positive reinforcement alternatives have been exhausted.

Cross-reference: "Optimal Care" 4.23.

*Note: Negative reinforcement is subject to misuse, either in frequency or intensity of its application (Pryor 1985; Chance 1994). Because negative reinforcement necessarily involves the infliction of discomfort or pain on the animal, it is inconsistent with a trusting and respectful relationship between keeper and animal. Pain and discomfort are associated with stress, which "is undesirable because it has a potential harmful impact on all aspects of animal health" (Baer 1998, 279).*

#### **T 9: Physical punishment: definition and example**

*Definition:* Physical punishment is the instrumental application of pain or other physical discomfort intended to reduce the occurrence of a behavior.

*Example:* An elephant reaches her trunk through the cables towards the keeper and is hit with an ankus at which time she withdraws her trunk. Another form of physical punishment is the withholding of food or water for the purpose of managing behavior.

#### **T 10: Physical punishment: a prohibited method**

Physical punishment is prohibited in protected contact. Withholding food or water is prohibited in any management system.

Cross-reference: "Optimal Care" 4.23.

*Note: The instrumental application of punishment may, paradoxically, strengthen the behavior the trainer seeks to reduce. Physical punishment of animals is linked to a variety of undesirable consequences such as escalating aggression against other animals or the trainer (Chance 1994). Other examples of undesirable effects are as follows: the animal ceases the undesired behavior but replaces it with another potentially undesirable behavior; the animal learns not to perform the behavior in the presence of the trainer (Pryor 1985), or the subject tries to avoid the training/learning session itself (Baldwin and Baldwin 1986). A side effect to staff can be desensitization to punishment procedures as well, resulting in tolerance to cruelty (Leach 1992).*

### **T 11: Time-outs: definition and example**

**Definition:** A time out is a form of non-physical punishment in which positive reinforcement and/or the opportunity for positive reinforcement is withheld for a brief period of time immediately following an inappropriate or undesirable response.

**Example:** During a training session the elephant continues to break from position. Upon the third occurrence, the trainer immediately picks up the bucket of treats and walks a short distance away, stopping with his/her back toward the elephant. After a minute or two and when the elephant is back in position and waiting, the trainer returns and begins the session again.

### **T 12: Time-outs: implementation**

When used appropriately and in moderation, a time-out is an acceptable form of punishment for use in elephant training and management (Desmond and Laule 1991).

*Note: A time-out is distinct from physical punishment in its form, duration, and impact on the animal. It is an action taken by the trainer that is designed to 1) signal that the elephant's behavior is inappropriate; 2) regain the elephant's attention and cooperation; and 3) give the trainer time to determine why the animal is misbehaving and adjust the technique to optimize success. Duration of a time-out is flexible, but must be short enough (such as 10 minutes at most) to maintain, and ideally heighten, the animals' interest in returning to the training process. A time-out is finite in that once ended, the training session resumes with no further repercussions to the elephant, such as withholding normal food rewards. A time-out is not a form of food deprivation, nor does it inflict pain or physical discomfort on the animal (Laule pers. comm.).*



## C. Protected contact: training tools and techniques

### T 13: Tools

- a. Trainers shall use targets of varying lengths to shape new behavior, position the elephant, move the elephant, and station the elephant. Targets are defined as a point of reference that the animal moves towards; targets may be moveable or stationary.
- b. Trainers shall use a conditioned reinforcement, or bridge, such as a whistle or clicker in the training and routine management of the elephants to reinforce behavior, provide information about an acceptable response, to maintain the quality of behavioral responses, and to implement other techniques such as desensitization.
- c. Primary reinforcement in the form of behavioral opportunities or food such as fruits, vegetables, chows, grains, pellets, hay, etc., shall be provided to the elephant during training sessions and to reinforce cooperation in daily management activities. Food utilized as reinforcement can be part of the daily diet, extra treats, and/or enrichment items.

### T 14: Prohibited Tools

- a. The following tools are prohibited for use in a protected contact training system: the ankus, hotshots, and any other objects used to hit, poke, prod, or coerce the elephant.
- b. Food or water deprivation is prohibited as a means to increase motivation of the elephant.

Cross-reference: "Optimal Care" **4.22-4.23**.

### T 15: Training Methods

- a. Trainers and managers shall be familiar with operant conditioning terms and techniques, and shall be capable of skillfully implementing recognized training techniques that are appropriate to a positive reinforcement-based system, including, but not limited to: successive approximation or shaping; desensitization; habituation; capturing behavior; selective reinforcement, etc.
- b. Trainers and managers shall be familiar with and capable of skillfully implementing the following techniques for addressing misbehavior, and reducing or eliminating unwanted or inappropriate behavior: time out; extinction; and/or incompatible behavior, each in combination with selective reinforcement.

## **T 16: Prohibited Training Methods**

*The following methods are prohibited in a protected contact training system:*

- a. Use of physical punishment;
- b. Food or water deprivation;
- c. Instrumental use of electricity;
- d. Use of any objects to hit, poke, prod, or coerce the elephant; or
- e. Dependence upon or regular use of negative reinforcement.

Cross-reference: "Optimal Care" 4.21-4.24.

## **T 17: Training Facilities**

The implementation of protected contact requires facilities that provide adequate and appropriate access to all elephants at all times. Facilities must provide safe access to all parts of an elephant's body for husbandry and veterinary purposes. See **Part 2, E 6: Keeper/staff access**.

# **Part 8: Best Practices for Institutional Program Protocols**

Gail Laule, M.A., Margaret Whittaker and Anita Schanberger

## **A. Elephant management program requirements**

### **IP 1: Husbandry training**

All elephants must be trained to voluntarily cooperate in the following procedures:

- a. Overall body exam including eyes, ears, mouth, trunk, teeth, tusks, legs, feet, sides, back, abdomen, tail, genitals, and rectum;
- b. Skin care, inspection, cleaning, and maintenance;
- c. Foot care, inspection, cleaning, trimming, maintenance, radiographs, and other necessary treatments;
- d. Collection of blood, urine, feces, saliva, and temporal gland secretion;
- e. Injections, oral medications, trunk wash, ultrasound, insertion of catheters, urogenital exams, and other medical procedures that are not too invasive or painful as to preclude voluntary cooperation; and
- f. Collection of morphometric data including weight, height, and length.

### **IP 2: Restraint**

The ability to restrain an elephant in certain situations is an integral part of appropriate care and management. Acceptable restraint methods for

elephants are: short term chaining of one to four legs, and the use of a restraint chute or Elephant Restraint Device (ERD).

- a. Elephants shall be trained to enter a restraint chute calmly, and remain there voluntarily and reliably, so that husbandry, veterinary and other procedures may be conducted in a safe and efficient manner.
- b. Chaining is acceptable only as a method of temporary restraint – e.g. one hour (Fowler 1995).
- c. Elephants shall be trained to cooperate voluntarily in chaining of one to four legs so that veterinary and other procedures may be conducted in a safe and efficient manner.
- d. Prolonged chaining (i.e. overnight chaining) must not be used to address facility limitations, conduct routine husbandry behaviors, implement social management, introductions of adults, behavior modification, or as a form of punishment.

### **IP 3: Social management and introductions**

Elephants live in complex social structures and exhibit a broad range of socially driven behaviors and interactions. Therefore, it is the responsibility of any elephant management system to insure that all members of the group are able to live within the social structure while insuring that their physical and psychological needs are met.

- a. Elephant staff must have the experience and expertise necessary to manage elephants successfully in existing social groups.
- b. Elephant staff must have the experience and expertise necessary to implement introductions and carry out social integration.
- c. Experience and expertise includes but is not limited to: ability to assess existing and potential compatibility of elephants; ability to intervene and address social problems such as excessive dominance-based aggression; and ability to implement progressive training techniques, rather than rely on physical restraint or separation to manage social behavior and implement the introduction process.

*Note: Integration is defined as the process of implementing formal introductions of an unfamiliar animal or animals to one or more animals in an existing social unit. The process continues until a reasonably stable social hierarchy is established and all animals in the newly formed social unit display an acceptable and appropriate range of species-typical social behaviors, including both affiliative and agonistic behaviors.*

## B. Staff training and expertise

### IP 4: Elephant manager

- a. Every elephant program must have a qualified elephant manager with at least 5 years experience working with elephants. This individual is responsible for: 1) staff training, 2) oversight of animal training, 3) insuring program adherence to Best Practices as defined herein, and 4) oversight of development and implementation of the overall elephant management program.
- b. The elephant manager shall be familiar with the guidelines set forth in these Best Practices.
- c. The elephant manager shall be familiar with (if still in a free contact program) or experienced in protected contact elephant management as defined in **Part 8, T 1**.
- d. The elephant manager shall be responsible for the development of written protocols for the training, implementation, and maintenance of husbandry and veterinary behaviors and restraint, including chaining and use of the ERD; the manager shall also be responsible for the social management of the existing group and for the introduction and integration process of new elephants to the existing group.
- e. The elephant manager shall be responsible for insuring that staff adheres to the rules of keeper safety.
- f. The elephant manager shall insure that all documentation and record keeping is current and complies with the requirements of **Part 8, C**.

### IP 5: Keeper staff

- a. The number of keeper staff shall be sufficient to insure that there are always 2 keepers present when any activities are being conducted with an elephant.
- b. Keeper staff shall be familiar with the guidelines set forth in these model best practices.
- c. Keeper staff shall be provided appropriate training in elephant management techniques to insure their development as competent trainers and handlers.
- d. Keeper staff shall be provided all written protocols defined in **Part 8, IP 4(d)** and shall become familiar with and have full understanding of these protocols.
- e. Keeper staff shall be provided with written protocols for keeper safety and shall become familiar with, have full understanding of, and be capable and responsible for adhering to these protocols.

- f. Keeper staff shall keep accurate documentation and records on all elephants, in compliance with the requirements of **Part 8, C**.

## C. Documentation and record keeping

### **IP 6: Record-keeping**

Every elephant program must maintain the following written protocols, documentation and records:

- a. Programmatic policies for elephant training and management;
- b. Written behavioral profile for each elephant that is updated annually (AZA 2003);
- c. Written protocols for behaviors defined in **Part 8, IP 4(d)**;
- d. Written protocols for keeper safety;
- e. Emergency response protocol;
- f. Written daily exercise program for each individual animal (AZA 2003);
- g. Written environmental enrichment plan, schedule for enrichment (weekly or monthly), and assessment of enrichment activities;
- h. Incident reports of any cases in which elephants show aggression towards keepers or the public, regardless if any injury actually results (AZA 2003);
- i. Daily training records for each elephant;
- j. Temporary records and/or charts to track specific behavioral problems or issues; and
- k. Daily behavioral, physiological, and health records including, but not limited to musth data, reproductive behavior and developmental behaviors.

## D. Safety

### **IP 7: Elephant rides prohibited**

Offering elephant rides to the public is prohibited.

## References

- AZA 2003. *Standards for elephant management and care*. Silver Spring, MD: American Zoo and Aquarium Association.
- Baer, J. 1998. A veterinary perspective of potential risk factors in environmental enrichment. In *Second nature: Environmental enrichment for captive animals*, ed. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Baldwin, J.D. and J.I. Baldwin. 1986. *Behavior principles in everyday life*. Englewood Cliffs, NJ: Prentice Hall.
- Bloomsmith M. 1992. Chimpanzee training and behavioral research: A symbiotic relationship. In *Proceedings of the annual meeting of the American Association of Zoological Parks and Aquariums* 403-410. Silver Spring, MD: American Association of Zoological Parks and Aquariums.
- Bloomsmith M, S. Lambeth, A. Stone and G. Laule. 1997. Comparing two types of human interaction as enrichment for chimpanzees. *American Journal of Primatology* 42: 96 (Abstract).
- Bolles, R.C. 1975. *Theory of motivation*. New York: Harper and Row.
- Brockett, R.C., T.S. Stoinski, J. Black, T. Markowitz and T. Maple. 1999. Nocturnal behavior in a group of unchained female African elephants. *Zoo Biology* 18:101--109.
- Chance, P. 1994. *Learning and behavior*. Third ed. Pacific Grove, CA: Brooks/Cole Publishing Company.
- Church, C. Personal comm. 18 Feb. 2005.
- Clubb, R. and G. Mason. In press. *A review of the welfare of zoo elephants in Europe*. In *Elephants in captivity*, ed. R. Clubb and G. Mason. Washington, DC: Humane Society Press.
- Clubb, R. and G. Mason. 2003. Animal welfare: Captivity effects on wide-ranging carnivores. *Nature* 425:473-474.
- Coe, J. 2003. Steering the ark toward Eden: Design for animal well-being. *Journal of the American Veterinary Medical Association* 223 (7): 977-980.
- Csuti, B., E.L. Sargent and U.S. Bechert, eds. 2001. *The elephant's foot*. Ames IA: Iowa State University Press.
- Desmond, T. J. and G. Laule. 1991. Protected contact elephant training. In *Proceedings of the annual meeting of the American Association of Zoological Parks and Aquariums*,

- 606-613. Silver Spring, MD: American Association of Zoological Parks and Aquariums.
- Douglas-Hamilton, I. and O. Douglas-Hamilton. 1975. *Among the elephants*. New York: The Viking Press.
- Douglas-Hamilton I. and O. Douglas-Hamilton. 1995. *Among the elephants*. London: Collins. p. 285.
- Eisenberg, J.F. 1981. *The mammalian radiations: An analysis of trends in evolution, adaptation, and behavior*. Chicago, IL: University of Chicago Press.
- Eltringham, S.K. 1982. *Elephants*. Dorset, England: Blandford Press. p 262.
- Estes, R.D. 1991. *The behavior guide to African mammals*. London: University of California Press, Ltd.
- Estes, R.D. 1999. *The safari companion: a guide to watching African mammals*. White River Junction, VT: Chelsea Green Publishing Co.
- Field, C.R. and I.C. Ross. 1976. The savanna ecology of Kidepo Valley National Park. II. Feeding ecology of elephant and giraffe. *East Africa Wildlife Journal* 14: 1-15.
- Forthman, D.L. 1998. Toward optimal care for confined ungulates. In *Second nature: Environmental enrichment for captive animals*, ed. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Forthman, D.L., R. McManamon, U.A. Levi and G.Y. Bruner. 1995. Interdisciplinary issues in the design of mammal exhibits (excluding marine mammals and primates). In *Captive conservation of endangered species*, ed. E. F. Gibbons, Jr., J. Demarest and B. Durrant, 377-399. Albany, NY: State University of New York Press.
- Fowler, M.E. 2001. An overview of foot condition in Asian and African elephants. In *The elephant's foot*, ed. B. Csuti, E.L. Sargent and U.S. Bechert, 3-7. Ames, IA: Iowa State University Press.
- Galloway, M. 1991. Update on 1990 chaining survey. In *Proceedings of the 12<sup>th</sup> elephant managers workshop*. Syracuse, NY, October 1991. Pp. 63-64.
- Gershoff, E. 1997. *The short- and long-term effects of corporal punishment on children: A meta-analytic review*. Austin, TX: University of Texas.
- Glickman, S.E. and G.S. Caldwell. 1994. Studying natural behaviors in artificial environments: The problem of "salient" dimensions. In *Naturalistic environments in captivity for animal behavior research*, ed. E.F. Gibbons, Jr., E.J. Wyers, E.J. Waters and E.W. Menzel Jr., 207-226. Albany, NY: State University of New York Press.
- Gold, K.C. and J.J. Ogden. 1991. Effects of construction noise on captive lowland gorillas (*Gorilla gorilla gorilla*) [abstract]. *American Journal of Primatology* 24: 104.
- Gruber, T.M., T.H. Friend, J.M. Gardner, J.M. Packard, B. Beaver and D. Bushong. 2000. Variation in stereotypic behavior related to restraint in circus elephants. *Zoo Biology* 19: 209-221.
- Hackler, C. In press. Browse is Beautiful. *Journal of the Elephant Managers Association*.
- Hancocks, D. 1996. The design and use of moats and barriers. In *Wild mammals in captivity: Principles and techniques*, ed. D.G. Kleiman, M.E. Allen, K.V. Thompson and S. Lumpkin, 191-203. Chicago, IL: University of Chicago Press.
- Hancocks, D. 2002. *A different nature: The paradoxical world of zoos and their uncertain future*. Berkeley CA: University of California Press.
- Hancocks, D. Personal comm. 18 Feb. 2005.

- Hanks, J. 1979. *The struggle for survival: The elephant problem*. New York: Mayflower Books. p.176.
- Hanson, J.P., M.E. Larson and C.T. Snowdon. 1976. The effects of control over high intensity noise on plasma cortisol levels in rhesus monkeys. *Behavioral Biology* 16: 333-340.
- IUCN. 2001. *Guidelines for African elephant re-introduction and translocation*. Draft.
- Keiper, R.R. 1969. Causal factors of stereotypes in caged birds. *Animal Behavior* 17: 114-119.
- Kinzely, C. Personal comm. 12 Feb. 2005.
- Kinzley, C. 2001. Improvement in elephant management at the Oakland Zoo. Paper presented at the Elephant Managers Conference. Orlando, Florida.
- Krause, B.L. 1989. Habitat ambient sound as a function of transformation for resident animals and visitors at zoos, aquaria, and theme parks: A hypothesis. *Proceedings of the American Association of Zoological Parks and Aquariums*, 415-419. Wheeling, WV: AAZPA.
- Kreger, M., M. Hutchins and N. Fascione. 1998. Context, ethics, and environmental enrichment in zoos and aquariums. In *Second nature: Environmental enrichment for captive animals*, eds. D.J. Shepherdson, J.D. Mellen, and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Langman, V.A. 1985. Heat balance in the black rhinoceros (*Diceros bicornis*). *National Geographic Research Reports* 21: 251-254.
- Langman, V.A. 1990. Thermal profile of the African elephant enclosure at Zoo Atlanta. Report to Zoo Atlanta, Atlanta, GA.
- Langman, V.A., T.J. Roberts, J. Black, G.M.O. Maloiy, N.C. Heglund, J.M. Weber, R. Kram and C.R. Taylor. 1995. Moving cheaply: Energetics of walking in the African elephant. *The Journal of Experimental Biology* 198: 692--632.
- Langman, V.A., M. Rowe, D. Forthman, B. Whitton, N. Langman, T. Roberts, K. Hutson, C. Boling and D. Maloney. 1996. Thermal assessment of zoological exhibits I: Sea lion enclosure at the Audubon Zoo. *Zoo Biology* 15: 403-411.
- Langman, V.A., M. Rowe, D. Forthman, N. Langman, J. Black and T. Walker. 2003. Quantifying shade using a standard environment. *Zoo Biology* 22:253-260.
- Laule, G. 2003. Positive reinforcement training and environmental enrichment: Enhancing animal well-being. *Journal of the American Veterinary Medical Association* 223 (7): 969-973.
- Laule, G. 1993. The use of behavioral techniques to reduce or eliminate abnormal behavior. *Animal Welfare Information Center Newsletter* Vol. 4 No.4: 1-11.
- Laule, G. and T. Desmond. 1998. Positive reinforcement training as an enrichment strategy. In *Second nature: Environmental enrichment for captive animals*, eds. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 302-313. Washington DC: Smithsonian Institution Press.
- Laule, G.E. and M.A. Whittaker. 1998. The use of positive reinforcement techniques in the medical management of captive animals. In *Proceedings of the joint conference of the American Association of Zoo Veterinarians and the American Association of Wildlife Veterinarians*, 383-387. Wheeling, WV: AZA.
- Laule, G.E. and M.A. Whittaker. 2001. Protected contact – beyond the barrier. In *Proceedings of the annual conference of the American Zoo and Aquarium Association*. Silver Spring, MD: AZA.



- Leach, E.L. 1992. Understanding aggression. Behavior Skills Co., Seattle, WA and Dept. of Psychology, University of Washington, Seattle WA. Poster presented at AZA Annual Conference.
- Leach, E.L. 1993. Aggression: Animal-staff interactions. Poster presented at American Association of Zoological Parks and Aquariums Annual Conference.
- Leach, E.L. 1995. A top-side down view of enrichment: elephant model. In Proceedings of the Annual Meeting of the American Zoo and Aquarium Association. Silver Spring, MD: American zoo and Aquarium Association.
- Lenhardt, J. 1984. A new approach to chaining elephants at Calgary Zoo. Paper presented at the elephant workshop, New Orleans, LA. December.
- Lindburg, D.S. 1998. Enrichment of captive mammals through provisioning. In *Second nature: Environmental enrichment for captive animals*, eds. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Lorenz, K. 1937. The companion in the bird's world. *Auk* 54:245-273
- Markowitz H. 1982. *Behavioral enrichment in the zoo*. New York: Van Nostrand Reinhold Co.
- Markowitz, H. and S.W. Line. 1989. Primate research models and environmental enrichment. In *Housing, care, and psychological well-being for laboratory primates*, ed. E. Segal, 203-212. Park Ridge, NJ: Noyes Publications.
- Markowitz, H. and C. Aday. 1998. Power for captive animals. In *Second nature: Environmental enrichment for captive animals*, eds. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Martin P. and P. Bateson. 1987. *Measuring behavior: An introductory guide*. Cambridge: Cambridge University Press. p. 48.
- Martin S. 1996. Training as enrichment. In *Proceedings of the Regional Conference of the American Association of Zoological Parks and Aquariums*, 139-143. Wheeling, WV: AAZPA.
- Minetka S., M. Gunnar and M. Champoux. 1986. The effects of control in the early social and emotional development of rhesus monkeys. *Child Development* 57:1241-1256.
- Moberg, G.P. 1985. Influence of stress on reproductive measure of well-being. In *Animal stress*, ed. G.P. Moberg, 245-268. Bethesda, MD: American Physiological Society.
- McKay, G.M. 1973. Behavior and ecology of the Asiatic elephant in southeast Ceylon. *Smithsonian Contributions to Zoology* 101:1-118.
- Moss, C.J. 1998. *Elephant memories: Thirteen years in the life of an elephant family*. New York: William Morrow. p. 196.
- Moss, C. 1988. *Elephant memories*. New York: William Morrow.
- Moss, C. and J. Poole. 1983. Relationships and social structure of African elephants. In *Primate social relationships: An integrated approach*, ed. R. A. Hinde, 315-325 Oxford: Oxford Blackwell Scientific.
- Oftedal, O.T., D.J. Baer and M.E. Allen. 1996. The feeding and nutrition of herbivores. In *Wild mammals in captivity: principles and techniques*, eds. D.G. Kleiman, M.E. Allen, K.V. Thompson and S. Lumpkin, 334-343. Chicago, IL: University of Chicago Press.
- Overall, K.L. 1997. *Clinical behavioral medicine for small animals*. St. Louis, MO: Mosby-Year Book, Inc.
- Peterson, E.A. 1980. Noise and laboratory animals. *Laboratory Animal Science* 30:422-439.

- Poole, J. 2004. "Why elephants communicate" (On-line), Elephant voices, Copyright © 2004. Accessed 25 August 2004 at [http://www.elephantvoices.org/how\\_comm/main\\_how\\_comm.html](http://www.elephantvoices.org/how_comm/main_how_comm.html).
- Poole, T. 1998. Meeting a mammal's psychological needs: Basic principles. In *Second nature: Environmental enrichment for captive animals*, eds D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Pryor, K. 1985. *Don't shoot the dog*. New York: Simon and Schuster, Inc.
- Rees, P. 2001. Captive breeding of Asian elephants (*Elephas maximus*): The importance of producing socially competent animals. In *Trends in Wildlife Biodiversity, Conservation and Management*, eds. B.B. Hosetti and M. Venkateshwarlu. Delhi: Deya Publishing House.
- Rees, P. 2002. Asian elephants (*Elephas maximus*) dust bathe in response to an increase in environmental temperature. *Journal of Thermal Biology* 27: 353-358.
- Rosenthal, M. and W.A. Xanten. 1996. Structural and keeper considerations in exhibit design. In *Wild mammals in captivity: principles and techniques*, eds. D.G. Kleiman, M.E. Allen, K.V. Thompson and S. Lumpkin, 334-343. Chicago, IL: University of Chicago Press.
- Sampson, E. 1999. Fourth elephant research symposium. *Journal of the Elephant Managers Association* 10: 111-117.
- Schanberger, A. Personal comm. 28 Feb. 2005.
- Schulte, B.A. 2000. Social structure and helping behavior in captive elephants. *Zoo Biology* 19: 447-459.
- Schmid, J. 1995. Keeping circus elephants temporarily in paddocks: The effects on their behavior. *Animal Welfare* 4:87-101.
- Segerson L. and G.E. Laule. 1995. Initiating a training program with gorillas at the North Carolina Zoological Park. In *Proceedings of the 22nd national conference of the American Association of Zoo Keepers*, Denver, CO.
- Seidensticker, J. and J.G. Doherty. 1996. Integrating animal behavior and exhibit design. In *Wild mammals in captivity: Principles and techniques*, eds D.G. Kleiman, M.E. Allen, K.V. Thompson and S. Lumpkin, 180-190. Chicago, IL: University of Chicago Press.
- Seidensticker, J. and D.L. Forthman. 1998. Evolution, ecology, and enrichment: Basic considerations for wild animals in zoos. In *Second nature: Environmental enrichment for captive animals*, eds. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Shepherdson, D.J. 1998. Preface. In *Second nature: Environmental enrichment for captive animals*, eds. D.J. Shepherdson, J.D. Mellen and M. Hutchins, 277-301. Washington DC: Smithsonian Institution Press.
- Shoshani, J. 1992. Elephant migration. In *Elephants: Majestic creatures of the wild*, 141-143. New York: Checkmark Books.
- Shoshani, J. 1997. Last of a noble line. In *Elephants, the deciding decade*, ed. R. Orenstein, 41-49. Buffalo, NY: Key Porter Book Limited; International Wildlife Coalition.
- Sommer, R. 1974. *Tight spaces: Hard architecture and how to humanize it*. Englewood, New Jersey: Prentice Hall.
- Stoskopf, M.K. 1983. The physiological effects of psychological stress. *Zoo Biology* 2:179-190.
- Sukumar. R. 2003. *The living elephants*. New York: Oxford University Press.

- Sukumar, R. 1989. Ecology of the Asian elephant in southern India II. Feeding habits and crop raiding patterns. *Journal of Tropical Ecology* 5.
- Swaisgood, D.R., S. Ellis, D.L. Forthman and D.J. Shepherdson. 2003. Commentary: Improving well-being for captive giant pandas: Theoretical and practical issues. *Zoo Biology* 22:347-354.
- Taylor, V.J. and T.B. Poole. 1998. Captive breeding and infant mortality in Asian elephants: A comparison between twenty western zoos and three eastern centers. *Zoo Biology* 17: 311-332.
- Thorndike, E.L. 1932. *The fundamentals of learning*. New York: Columbia University Press.
- Weiss, J.M. 1968. Effects of coping responses on stress. *Journal of Comparative Physiology and Psychology* 65:251-260.
- Whittaker, M. Personal comm. 8 Dec. 2004.
- Whittaker, M. 1997. Medical management of Asian elephants at the Houston Zoological Gardens In *Proceedings of the annual conference of the American Zoo and Aquarium Association*, 5-8. Wheeling, WV: AZA.
- Wyatt, J.R. and S.K. Eltringham. 1974. The daily activity of the elephant in the Rwensori National Park, Uganda. *East African Wildlife Journal* 12:273-289.
- Whyte, I. May 9, 2003 correspondence to Michael Kreger, United States Department of the Interior, Fish and Wildlife Service.