

Independent Panel Review of  
Buttonwood Park Zoo Elephant Program  
July 30, 2015

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## I. Introduction

At the request of Keith Lovett, Director of Buttonwood Park Zoo, the above noted panel of independent experts convened to evaluate the elephant program at Buttonwood Park Zoo and offer decisive recommendations for elephants' optimal well-being. The panel thoroughly evaluated the medical and behavioral health, husbandry practices, and welfare status of both elephants at Buttonwood Park Zoo prior to, during, and subsequent to their site visit on June 15 – 17, 2015. In concert with the panels' in-depth, first-hand observations, the consultants were provided unconstrained access to the elephants, facilities, keepers, and records (medical records, daily reports, and video recordings) in order to ensure a comprehensive assessment on which to make their recommendations.

## II. History & Background

### A. Anamnesis (Medical History)

#### 1. Emily

Emily is a 51-year-old female Asian elephant. She arrived at Buttonwood Park Zoo in 1968 at the age of 4 years. She had previously spent 1.5 years at the Baton Rouge Zoo in Louisiana but did not integrate well with their African elephant so she was housed separately. She was housed alone at BPZ until 1986 when Ruth arrived. She has resided at the Buttonwood Park Zoo for 47 years.

Emily's medical records from 9 October 1992 through 8 June 2015 were reviewed.

Emily has experienced common medical problems of elephants over the years. Most of these have been minor and have resolved quickly with treatment. Examples include a cracked tusk, pododermatitis, superficial wounds, small abscesses and colic. She has had four occurrences of vaginitis and several nail abscesses. She has a history of foreign body ingestion and transient swelling after vaccination. She developed recurrent pressure sores on her hip and the side of her face until the substrate in the barn was changed to sand; this is no longer a problem.

Blood has been collected during annual physicals (and at other times if problems were suspected). Hematology and serum chemistry results have been within normal limits (WNL). The most recently collected sample was in January 2015 when the annual examination was performed. Low Vitamin E levels have been noted and Emily is receiving supplemental tocopherol to correct this.

Trunk washes have been performed annually since at least 2000. No pathogenic mycobacteria have been isolated. Blood was collected for TB serology in 2008, 2011, and 2012.

Fecal examinations for parasites have been routinely performed and no parasites have been found (an unidentified parasite was noted in 1996).

Foot radiographs were taken in 2006 and in January, February, and March 2015 (in protected contact). The January radiographs did not show adequate penetration and when Emily became impatient, the procedure was discontinued. The 11 Feb 2015 radiographs were of the hind feet. The right hind foot appeared normal; the radiographs of the left hind foot were of poor quality and will need to be repeated. On 19 February 2015, Fujifilm technicians assisted with the radiographs using a DR plate but the zoo's portable x-ray unit. All four feet were assessed and appeared in good condition and findings were comparable to the 2006 films. Films taken of all

four feet on 3 March 2015 using the zoo's CR equipment were of questionable quality and should be repeated as noted below.

## 2. Ruth

Ruth is a 56-year-old Asian elephant. She was found abandoned in a truck near a dump site and was seized by the United States Department of the Interior Division of Law Enforcement. She arrived at BPZ on 29 October 1986. At that time, Ruth was assessed to be in fair condition but displayed significant muscle atrophy, a partially paralyzed trunk, numerous small abscesses on her hips, and multiple scars. The record describes an abnormal gait ("wide action in rear") and notes that "her left rear leg twisted outwards" and she "tends to throw the leg out to the side when walking." Her personality was described as follows: "Skittish, hyperactive, afraid of hooks. Craves personal attention but responds to commands well. Seems like an intelligent elephant with potential if given proper care and treatment. Extremely afraid first few days. Repeatedly struck out at keepers. Has made introductory advances to interact with Emily."

Upon arrival at BPZ, Ruth joined Emily. She has resided at BPZ for 29 years.

Following is a summary of Ruth's medical history from reviewed records dating 29 October 1986 through 15 June 2015.

Ruth has experienced common medical problems of elephants over the years. These include vaginitis, otitis, small abscesses, minor wounds and abrasions, nail abscesses, swelling related to vaccination, a tusk sulcus infection, left carpal swelling, gingivitis related to shed tooth fragment, and recurrent pressure sores on her hip and the side of her face prior to 2012 at which time the substrate in the barn was changed to sand.

In January 2014, Ruth sustained frostbit injuries to her ears, vulva, and tail and was hypothermic following exposure to a blizzard when a barn door was left open overnight and she failed to return to the barn until the next morning when keepers coaxed her in. Appropriate emergency treatment was administered and normothermia was restored. Affected areas were treated over the course of several months. Devitalized marginal tissue on the ears and vulva sloughed and these lesions healed. The end of her tail became necrotic and a partial caudectomy was performed on 5 November 2014; laser therapy was administered to the incision site and also to the right front elbow due to a reduced range of motion. Emily removed Ruth's tail bandage on 4 December 2014 but did not cause any trauma. The tail continued to heal normally.

Trunk washes have been performed annually since at least 2000. No pathogenic mycobacteria have been isolated. Blood was collected for TB serology in 2008, 2011, and 2012.

Blood has been collected during annual physicals (and at other times if problems were suspected). Hematology and serum chemistry results have been within normal limits (WNL). The most recently collected sample was in January 2015 when the annual examination was performed.

Fecal examinations for parasites have been routinely performed and no parasites have been found.

Foot radiographs were taken in 2006 and in January, February, and March 2015 (in protected contact). Refer to assessment notes in this report.

### III. Assessment

#### A. Medical

##### 1. Emily

- a. Physical Exam Detail  
Please refer to Appendix A.
- b. Body Score  
Please refer to Appendix A.
- c. Locomotion Exam  
Please refer to Appendix A.

##### 2. Ruth

- a. Physical Exam Detail  
Please refer to Appendix B.
- b. Body Score  
Please refer to Appendix B.
- c. Locomotion Exam  
Please refer to Appendix B.

#### B. Veterinary Care

##### 1. Staff

The Buttonwood Park Zoo (BPZ) has one full-time veterinarian, Dr. Elizabeth Arnett-Chinn. She is supported by one veterinary technician. Dr. Arnett-Chinn is on grounds a minimum of 40 hours/week. She is on call 24/7. She lives very close to BPZ and can respond quickly to emergencies. When she is away she arranges for coverage with veterinarians from Roger Williams Park Zoo and others.

Dr. Arnett-Chinn has been at BPZ for approximately one year. Between 2000 and 2014 several veterinarians served BPZ in full-time, part-time, or consulting capacities.

##### 2. Preventive Health Care Program for Elephants

Elephants at the BPZ receive an annual physical examination, vaccinations (tetanus, rabies, EEE/WEE), blood work (CBC and serum chemistries), urinalysis, fecal examination for parasites and trunk wash and serological testing for tuberculosis. These procedures are in accordance with established preventive healthcare guidelines for elephants.

##### 3. Diet

Ruth and Emily are receiving a standard elephant diet composed primarily of hay with supplemental produce and Mazuri Elephant pellets. Each new shipment of hay is submitted for nutritional analysis. Both elephants are receiving an equine glucosamine supplement that is

administered orally. Emily is supplemented with Vitamin E; Ruth's serum vitamin E levels have been WNL without supplementation.

#### 4. Foot Care Program

Routine foot care is managed by the elephant keeper staff under the direction of the veterinarian. Medical problems are examined by the veterinarian and appropriate treatment prescribed.

##### a. Foot Radiographs

Baseline foot radiographs are recommended for captive elephants in the U.S. and annual monitoring is advisable in problem cases. Baseline foot radiographs have been obtained for Emily and Ruth, however, the quality of the films has been limited by the available equipment. See recommendations below.

#### 5. Keeper Health Training

Dr. Arnett-Chinn interacts with the elephant keeper staff on a routine basis to ensure that established bio-safety practices (e.g. wearing gloves and masks during trunk wash collections, routine hand-washing, etc.) are followed. A formal lecture on zoonotic diseases for all keeper staff is scheduled for July 2015.

#### 6. Interaction with Staff and Support of Upper Administration

Dr. Arnett-Chinn has a cooperative relationship with the keepers, general curator, and director. Observed exchanges with staff were respectful and communicative. Discussions with Dr. Arnett-Chinn made it clear that she is a dedicated veterinarian, practicing the highest quality of medicine, with a keen awareness of animal welfare. The upper administration is supportive of the veterinarian's work, grants proper veterinary authority, and is receptive to requests for needed equipment.

### C. Facilities

The elephants are housed free ranging overnight in adjoining, separate bedroom pens with deep sand-soil substrate and direct contact through a gate and pen divider. The elephants remain together in the yard during the day depending upon weather conditions. The existing facilities provide climate controlled, ventilated and illuminated indoor space with the ability to separate the elephants for any reason. The natural sand/soil substrate of the indoor holding area provides cushioning for feet and joints as well as a dry, sanitary environment. The outdoor yard has a natural soil substrate and is appropriately shaded and spacious providing opportunities for swimming in an approximately 100,000 gallon pool.

### D. Behavioral

#### 1. Behaviors observed

Each member of the advisory team extensively and carefully observed the behavioral repertoire of each elephant during the course of the site of the visit as well as on videos recorded in the past two years. The behaviors exhibited by both Emily and Ruth were noted to be well within the normal ethogram for elephants. Across the full range of social and environmental contexts, no behavioral or physiological signs of stress were evident. Both with Ruth and Emily, the only repetitive behavior noted was occasional, intermittent swaying immediately prior to feeding

times; the degree of variability and frequency were consistent with anticipatory displacement activity and not stereotypic behavior. Both Emily and Ruth were diagnosed as being behaviorally healthy.

## 2. Social behavior

During all interactions with keepers as well as unstructured “elephant time”, no agonistic or aggressive behaviors were observed between Ruth and Emily throughout all hours of observation – directly and on videotape. Likewise, our meticulous review of videos labeled by BPZ critics as evidence of “aggressive” and/or “dominant” behaviors failed to reveal any signs of social conflict and were clearly misinterpretations of benign social signals and interactions. Furthermore, we should note that a number of the videos cited by these critics had apparently been edited from the original videos evaluated by the panel. Concurrently, the panel found that notations in zoo records recited by the same critics did not accurately represent what was documented in the records for the majority of their citations. The number and extent of these misrepresentations of videos and records brings to question the judgment and ethics of said critics toward an agenda of moving one or both elephants elsewhere. Please refer to Appendix C.

The social history of both elephants is similar to many older captive elephants in that Ruth and Emily were not members of a complex herd structure during their formative years. Therefore they may not have developed the wide range of subtle intraspecific communication signals that is evident and necessary in a complex social dynamic. Nonetheless, aggression is a natural response, and part of the behavioral repertoires of all social animals.

Although we did not witness any aggression between Ruth and Emily either on-site or in the videos we reviewed, it is reasonable to presume that social conflicts have occurred, as with other groups of elephants and any social species. We did determine through interviews and a thorough review of documentation that assertive and displacement behaviors by Emily toward Ruth did occur at higher frequencies previously, but has substantively waned in recent years with none observed or noted since February 2013. This is directly attributable to changes made in the elephant program, and perhaps to a lesser degree to habituation as the two elephants are closing in on 30 years of life together.

When examining the social relationship between Emily and Ruth, it is equally important to note that the panel recurrently observed affiliative behaviors between both elephants in a wide variety of social contexts, and we would characterize the relationship between Ruth and Emily as broadly cooperative.

Notably, in several instances, while Ruth engaged her keepers and visitors in interactions, Emily approached and passed closely behind Ruth before stepping alongside her and joining the interaction. In each case, we observed calm behavior from both elephants. Ruth clearly was aware of Emily’s presence, but other than a subtle, brief glance back, Ruth’s calm demeanor did not change as she continued to interact with humans. Such behavior is inconsistent with that of an elephant stressed or intimidated by another.

Likewise, in each instance, Emily approached and assumed a place alongside Ruth without attempting to displace her, despite that (a) Ruth was in a very vulnerable position, and (b) Ruth was engaged with a preferred resource (keepers’ attention, food rewards, visitor interactions). Consistently calm in her demeanor, Emily did not display any postures or signals consistent with assertive or aggressive behaviors.

For her part, Ruth likewise approached Emily, clearly seeking close proximity in these and other context, with both elephants consistently remaining calm. The elephants' behaviors in these and other contexts throughout the course of the panels' visit further evinces their close, cooperative relationship.

### 3. Relationship with Keepers

The Elephant staff have strong relationships with both elephants, which is essential for any type of elephant program to be effective. The affection and dedication that team members have for Ruth and Emily was apparent in both interviews and in observing interactions, and both elephants frequently exhibited attention-seeking behavior, approaching BPZ Elephant team members and soliciting tactile contact from them. In fact, even when the elephants were just-provisioned with fresh hay or browse, Ruth and Emily solicited attention from keepers.

### 4. Conditioning/Training

The elephant team is in the process of transitioning to restricted contact training with the elephants. At the time of the visit they conducted bathing, foot work, and training sessions that were completed with restricted contact. Team members did share space with the elephants per their current protocol for shifting (including placing food and enrichment items), operating doors, exercise/walks, and additional foot work.

## E. Husbandry

### 1. Elephant Program Staff

The BPZ Elephant staff is stable, experienced, and fully supported by Zoo leadership, including the Director and Curator. The Curator is experienced in elephant handling and operant techniques and the Director has had significant exposure to zoo elephant issues even prior to arriving at BPZ. As a result the Elephant team appears to enjoy an excellent rapport and open communication with a Zoo leadership team that is both informed and committed to providing the best welfare possible for Ruth and Emily.

Further, the BPZ Elephant team boasts an impressive combined amount of hands-on experience in both the zoo profession generally, and specifically working closely with elephants. For the size of the zoo and elephant collection, the assigned staffing resources are consistent with other AZA-accredited institutions.

<b>Profile of Current BPZ Elephant Care Team</b>			
	Years Professional Zoo Experience	Years at Buttonwood Park Zoo	Years Elephant Handling Experience
<b>Elephant Manager</b>	24	23	20
<b>Handler 1</b>	17	15	15
<b>Handler 2</b>	14	14	14
<b>Handler 3</b>	7	7	4
<b>Handler 4</b>	6	6	0.5
<b>Total (Avg.)</b>	<b>71 (14.2)</b>	<b>65 (13)</b>	<b>53.5 (10.7)</b>

## 2. Structure of the Day

Ruth and Emily currently receive fairly significant environmental changes throughout the day, depending to a large extent upon the time of year and weather, and engage in multiple interactions with the Elephant team. The interactions include a variety of experiences for them, from extended “walks” on the lawn outside of their habitat which provide exercise and grazing/browsing opportunities to husbandry sessions for physical therapy or veterinary procedures, and frequent provision of enrichment items such as browse, treats, and toys.

Although the Elephant team has scheduled frequent points-of-contact as well as spot checks throughout the day and is seldom away from Ruth and Emily for very long, many of the interactions are apparently impromptu, often elephant-initiated. This is an important element of welfare, the sense of control over their environment that these sorts of interactions reflect.

### F. Behavioral Management

Heretofore, BPZ staff have been handling Ruth and Emily primarily in free-contact (FC), but have begun restricted-contact training in preparation for a complete transition, to be facilitated by modifications and enhancements scheduled for fall 2015 and spring 2016.

Since the arrival of the Director, the training program has improved with increased reliance on positive-reinforcement techniques and the elimination of punishment. As with social aggression between conspecifics, aggression by elephants directed towards staff has decreased greatly, and in fact no such incidents have occurred in recent years.

Because they must still share the same unrestricted space with two large elephants, keepers carry elephant “guides” when in FC, and also utilize verbal “corrections.” Outside scrutiny and perceived time pressure for the elephants to shift back to their habitat after walks on the lawn seemed to create some anxiety in the elephant staff, feeling they would need to use corrections in these scenarios.

However, throughout numerous interactions encompassing many hours during our visit, we observed that the guides were used infrequently, and in those cases, with an apparent light touch. Keepers relied more on verbal corrections and positive-reinforcement techniques, e.g., primary (food rewards) and secondary reinforcers, including praise and tactile stimulation to reward desired responses.

## IV. Recommendations

### A. Medical

#### 1. Emily

Emily is a 51-year-old geriatric elephant. She is in good condition for her age. She is moderately overweight and would probably benefit from a gentle weight loss program combining diet changes and increased exercise. The transition to a larger enclosure that will be completed at the end of this year will facilitate increased exercise, as will modifications to the existing enrichment program (see separate recommendations in this report).

The integument issues that were noted (elbow and stifle calluses) are chronic changes that probably occurred when the elephants were housed on concrete. These lesions are inactive and



are not of medical concern. The substrate in the barn was changed to sand in 2012 that likely prevented any progression.

Emily does have feathering of the cuticles on her front and back feet. Feathering can be indicative of underlying foot pathology, however, no other physical foot abnormalities were noted. No obvious pathology was seen on radiographs taken in early 2015, however the radiographs should be repeated to improve resolution and technique and to insure that each digit is assessed, particularly on the front feet which are more prone to problems. The left carpus has had intermittent problems so carpal radiographs should be obtained. Applying oil (e.g. Emcel applied topically) may help to soften the cuticles.

Uterine pathology is common in older Asian elephants. Emily is currently undergoing training to permit a rectal ultrasound examination to evaluate her reproductive tract. Historically, no medical treatment has been available for geriatric elephants with uterine pathology. However, recently a GnRH vaccine has shown some promise to shrink uterine tumors in elephants that are still cycling. It would therefore be informative to collect samples to determine if Emily is still cycling and to check on the current status of investigations regarding this vaccine. [See: Boedeker, N.C., Hayek, L. C., Murray, S., deAlila, D.M., and Brown, J.L. 2012. Effects of a gonadotropin-releasing hormone vaccine on ovarian cyclicity and uterine morphology of an Asian elephant (*Elephas maximus*). JZAWM 43(3): 603-614.]

## 2. Ruth

Ruth is a 56-year-old geriatric elephant. She is in good condition for her age. She is moderately overweight and would probably benefit from a gentle weight loss program combining diet changes and increased exercise. The transition to a larger enclosure that will be completed at the end of this year will facilitate increased exercise as will modifications to the existing enrichment program (see separate recommendations in this report).

The integument issues that were noted (elbow and stifle calluses) are chronic changes that probably occurred when the elephants were housed on concrete. These lesions are inactive and are not of medical concern. The substrate in the barn was changed to sand in 2012 that has prevented any progression.

Her tail has healed from the amputation that was performed in 2014 following a frostbite injury. Other affected areas (ears and vulva) are also healed.

No obvious pathology was seen on foot radiographs taken in early 2015, however, the radiographs should be repeated to improve resolution and technique and to insure that each digit is assessed, particularly on the front feet that are more prone to problems. Diagnostic radiographs of the carpi should be obtained.

Ruth's gait is reported to be unchanged from when she first arrived at the zoo but according to staff the varus deviation may be more pronounced. Because of the chronic nature of these changes it is questionable whether therapeutic intervention will be beneficial, however, a 2-3 week NSAIDS trial and /or laser therapy could be considered.

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### 3. Additional Notes

Diagnostic foot and carpal radiographs are needed for both elephants. The quality of the films obtained to date may have been limited by the age and type of equipment used. The portable x-ray machine is an older donated unit and computed radiography (CR) rather than direct radiography (DR) technology was used. Ideally, new equipment should be obtained, however, we realize that this is a significant investment and may not be possible at this time. Alternatively, the zoo could seek assistance from near-by veterinary schools or private veterinarians to assist.

### B. Day Length

The panel recommends that BPZ extend the elephants' day by beginning the first interaction of the day earlier throughout the year and also consider the possibility of pushing the last interaction of the day later, when seasonally appropriate. This is largely a staffing issue, and therefore may require adding staff, overtime hours, or other creative scheduling.

### C. Enrichment

Modifications to the implementation of enrichment should be considered. While Ruth and Emily do receive plenty of enrichment items throughout the day, adding one or more daily "enrichment shifts" can increase the return on zoo resources, in several ways. Foremost is a greater positive impact on the behavior of the elephants, by creating opportunities for exercise when staff is no longer doing shared-space "walks" with them. Strategically scheduled, enrichment shifts can also be excellent educational opportunities for BPZ visitors to watch Ruth and Emily when they are most active and to gain a better understanding of the connection between the extraordinary efforts of the Elephant team and the behavioral welfare of the elephants.

Incorporating many enrichment elements, enrichment shifts can create a positive sense of anticipation for the elephants and help motivate them to move or shift reliably, without need for aversives of any kind.

### D. Shift to Restricted Contact

Planned BPZ facilities upgrades will allow the program to transition to protected-contact (PC) training.

*Terminology Note:* According to AZA, "Restricted contact is defined as managing elephants with a primary containment barrier between human and elephant. Tethers may be used and if used must be placed on at least two (2) legs of the elephant (one front and one back). Tethers must be placed on the elephant from outside the primary containment barrier prior to entry into the shared space." (*AZA Standards for Elephant Management and Care*, Rev. April 2012).

So, while AZA occupational safety policies for elephant management use the term "restricted contact," when we refer to PC training, we are referring only to scenarios in which a barrier separates elephant and handler, not those in which the human shares the

same space with a tethered elephant. Because restricted-contact training as defined by AZA encompasses both shared- and non-shared space paradigms and these may be regarded as fundamentally different from an occupational safety standpoint (as well as from an animal behavior and learning standpoint), in our assessment and recommendations, we will refer to either FC or PC.

Additionally, we will also refer to Positive Reinforcement Training (PRT), characterized by its focus on behavior modification without corrections or drawing attention to incorrect responses. Due to the safety considerations, PRT with elephants requires a protected-contact paradigm.

Although the idea of completely transitioning may seem daunting, it has been successfully accomplished at many AZA institutions and as previously noted, the BPZ Elephant team has already succeeded at training some behaviors in PC over the past two years.

a. Planning / Context Shift

With the commitment in-place to upgrade elephant facilities to enable BPZ to meet updated AZA policies, and the transition imminent, several aspects of the move to restricted-contact should be addressed from a strategic perspective to help hone the direction of the program. The transition can be a great opportunity to implement even more positive changes in a way that is more difficult under more established circumstances.

From a learning standpoint, changing facilities both out on the display and inside the barn reduces obstacles to change in both the staff and the elephants. We know that context has a tremendous impact on the learning process. Tangible changes in the physical environment of the elephant area will create an openness to learning through the reduction of familiar, unconditioned stimuli that over the years have been paired-with and strengthened both conditioned and unconditioned stimuli. In learning parlance, the changes represent a *context shift*, and a window of receptivity to learning new habits, etc.

That's why it is advisable to determine and "design" changes to the behavior-management program that BPZ desires prior to the actual physical changes in the plant. The window to make changes is open widest before staff and animals start to become habituated to the new environment. This is a good reason to consider selecting an intentional, context-shift approach to implementing change over gradually changing, which can increase confusion and inconsistency during the transition.

So, we recommend that BPZ consider some specific aspects about the future BPZ Elephant program before that window fully opens.

E. Additional Staff Training

The Elephant team has done excellent work in building relationships and training and maintaining husbandry behaviors with Ruth and Emily, but because of the differences between free-contact training and PRT, consider some instruction in operant conditioning concepts and application. Although staff already use a lot of positive-reinforcement in their routine training, eliminating all aversives (even mild ones) can be accomplished with a modicum of coaching and encouragement.

PRT instruction can increase training effectiveness and enhance relationships by including assistance in implementing a distinct marker or bridging stimulus (e.g., a dog whistle or clicker), increasing clarity in the range and use of secondary reinforcers, and also by adding active desensitization

techniques for husbandry procedures and differential-reinforcement techniques to shape and improve behavior outside of the training paradigm to your behavior-management tool box.

a. Visit an Established Program

Additionally, we recommend that BPZ Elephant team members have the opportunity to visit another AZA facility with an established PC or PRT elephant program to observe training sessions and interact with trainers experienced in PC/PRT concepts and techniques. It should be sufficient to have either the BPZ Elephant Manager or Handler 1 (from chart, above) do a two-to-three day site visit at such an institution. However, the AZA elephant community is helpful and supportive of its members and any BPZ staff traveling to a location near an established PC program should consider arranging a short visit.

F. Future Role of the Guide

BPZ may also wish to consider whether or not to keep the guide in that toolbox. Use of the guide in elephant management is a controversial topic. Many AZA facilities that are compliant with the new policies have retained guides for use in shared-space, tethered scenarios or for “emergency” situations. On the other hand, eliminating guides may encourage an even stronger commitment to exclusively positive-reinforcement techniques, as well as present the zoo with a very positive messaging opportunity.

G. Update Staff Training Protocols

Regardless of the decisions with respect to some of these specific aspects of BPZ’s elephant program, staff training and development protocols (AZA AC-23) should be updated to reflect appropriate proficiencies and knowledge. These should be somewhat different within a restricted-contact paradigm. For example, in PRT (which focuses on modifying behavior by reinforcing desired responses) the concept of behavioral “correction” (which is fundamental to traditional FC handling) and the underlying orientation towards reacting to incorrect behavior is irrelevant.

H. Transfer to Other Facilities

Through the years the Buttonwood Park Zoo animal care and veterinary teams have demonstrated a truly impressive commitment toward the health and well being of both Emily and Ruth. Caring for two aging elephants in the final 5 – 15 years of their lives is clearly a priority of the zoo and all members of the elephant team – keepers, veterinary staff, curator, and zoo director. Based on the long-established bond between the elephants and their caretakers, transfer of one or both elephants at this stage of their lives would expose the elephants to unjustifiable and undue stress. Likewise, with the strength of the affiliative bond evident between Emily and Ruth, transferring one or both to separate facilities would be ill-advised.

Any single facility to which both elephants could be transferred should be thoroughly reviewed with comprehensive on-site visits, including full access to all staff and records, by this or another equally credentialed panel as BPZ has provided.

I. Survival of One Elephant

As noted above, considering the intimate relationship between each of the elephants the elephant team, particularly with the keepers, as well as the cooperative relationship between Emily and Ruth, the death of one elephant will predictably will be stressful for the other. Removing the survivor to another facility would remove them from their only remaining relationships with others, placing

them in even greater stress and at risk for depression. As such, the panel strongly advises that the remaining elephant continued to be cared for at Buttonwood Park Zoo for as long as the institution's commitment to elephants remains strong.

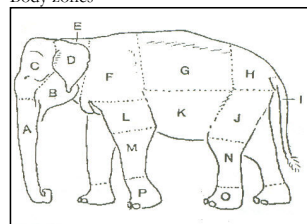
Although Emily and Ruth are currently in good health for their ages, should their health deteriorate, the panel recommends that the elephant team convene to draft (a) criteria to evaluate the quality of life of each elephant, and (b) a proactive strategic plan to optimize the emotional well-being and health of the surviving elephant.

## Appendix A: Physical Exam Details – Emily

### Elephant Care International Comprehensive Physical Examination

**Elephant name:** Emily  
**Owner:** Buttonwood Park Zoo  
**Asian** ☒ **African**  
**Origin:** Wild caught ☐ Captive born ☒  
**Sex:** Female ☒ Male  
**Date of birth:** 2 October 1964 **Current age:** 51 years  
**Purpose of exam:** Health assessment  
**Date of exam:** 16 June 2015  
**Examining veterinarian:** Susan K. Mikota DVM

Body zones



### BEHAVIOR / GENERAL Demeanor

Alert ☒ Depressed ☐ Aggressive ☐ Anxious ☐ Fearful ☐ Unresponsive to requests  
 Calm ☒ Friendly ☒ Unpredictable ☐ Nervous ☐ Aggressive ☐ Scared ☐  
 Quiet ☒ Reliable ☒ Agitated ☐ Nervous ☐  
 Aggressive to other elephants: yes ☐ no ☒ not in last 28 months  
 Aggressive to humans: yes ☐ no ☒  
 History of having injured or killed a human: yes ☐ no ☒ injured a maintenance worker in the 1980s

### REPETITIVE BEHAVIOR

Head bobbing: ☐ Weaving: ☐ Trunk swinging: ☐ Swaying: ☒ (1) Other: ☐  
 0 = never exhibits repetitive behavior  
 1 = exhibits limited contextual displacement activity Sways sometimes when anticipating food  
 2 = occasionally exhibits stereotypic behavior  
 3 = often exhibits stereotypic behavior  
 4 = associated signs consistent with obsessive-compulsive disorder

### DIET

AM: 3 lbs Mazuri Elephant Supplement; Ad lib hay throughout day  
 PM: 3 lbs Mazuri Elephant Supplement; 13-15 lbs of produce;  
 40-50 lbs of hay

### APPETITE, FECES, URINE

<b>Appetite</b>	N <input checked="" type="checkbox"/>	Ab	NE					
<b>Feces</b>	N <input checked="" type="checkbox"/>	Ab	NE					
Number of defecation/day:	4/day			per keepers (during daytime observations)				
Number of boli/defecation:	6-8							
<b>Urination</b>	N <input checked="" type="checkbox"/>	Ab	NE	Urination observed: normal flow; no straining;				
Number of urinations/day:	N <input checked="" type="checkbox"/>	Ab	NE	normal color and amount				
Appearance of urine	N <input checked="" type="checkbox"/>	Ab	NE					

### MEDICATIONS AND SUPPLEMENTS

<b>Current medical problems under treatment</b>	Emily is receiving laser therapy q.o.d. for treatment of stiffness of the left carpus.							
<b>Current medications</b>	None							
<b>Current supplements</b>	64 g Glycoflex (glucosamine) BID (twice a day)							
	150 ml Vitamin E (Emcel) q.o.d. (every other day)							

# PHYSICAL EXAMINATION

**Temperature:** 98.5 °F (fecal bolus)    **Pulse:** Veins collapsed; not palpable    **Respiration:** 8  
**Weight:** 3864 kg (13 May 2015)

Face/head:										
Symmetry	N ✓	Ab	NE							
Temporal glands	N ✓	Ab	NE							
Defects/injuries	Yes	No ✓	NE							
Ears (if abnormal, indicate which ear)										
Symmetry	Yes ✓	No	NE	Right ear ragged margin on upper 1/3						
Holes/ragged margins	Yes ✓	No	NE							
Discharge/odor	Yes	No ✓	NE							
Eyes (if abnormal, indicate which eye)										
Eyelids/lashes	N ✓	Ab	NE							
Nictitans (3rd eyelid)	N ✓	Ab	NE	Right ophthalmoscopic exam WNL;						
Conjunctiva	N ✓	Ab	NE	Left ophthalmoscopic exam incomplete due						
Cornea	N ✓	Ab	NE	to movement						
Lacrimation	N ✓	Ab	NE							
Iris	N ✓	Ab	NE							
Anterior chamber	N ✓	Ab	NE							
Lens	N ✓	Ab	NE							
Trunk										
Nares (symmetry, airflow)	N ✓	Ab	NE							
Musculature	N ✓	Ab	NE							
Skin	N ✓	Ab	NE							
Injuries/defects/atrophy	Yes	No ✓	NE							
Score the functionality of the trunk (Describe any abnormal function, e.g. cannot move trunk to one side)										
100% functional ✓ 66% functional 33% functional 0% functional										
Oral cavity										
Will elephant open mouth for teeth inspection?	Yes ✓	No	NE							
Hard palate/buccal mucosa	N ✓	Ab	NE	Upper molars observed. There is a slight						
Tongue	N ✓	Ab	NE	indentation at the proximal edge of the R upper						
Mucous membrane color	N ✓	Ab	NE	molar where a tooth fragment was shed						
Molars upper	N ✓	Ab	NE	recently. Keepers are brushing the area daily to						
Molars lower	N	Ab	NE ✓	keep it clean. Could not see lower molars.						
Tusks/tushes right	N ✓	Ab	NE							
Tusks/tushes left	N ✓	Ab	NE							
General integument (including wounds):										
Head	N ✓	Ab	NE	Depigmented area ~ 6 in in diameter on left side						
Back	N ✓	Ab	NE	of face						
Lateral/ventral thorax	N ✓	Ab	NE	Bilateral elbow calluses. Inactive.						
Lateral/ventral abdomen	N ✓	Ab	NE	There is a small (~ 3 inch diameter) inactive						
Forelimbs, esp. elbows	N	Ab ✓	NE	callus on the lateral aspect of the left tarsus.						
Hindlimbs, esp. stifles	N	Ab ✓	NE	The skin is sagging and there are inactive						
Tail, esp. hair follicles	N	Ab ✓	NE	calluses at both stifles. There is an area						
				of skin depigmentation at the left hip						
				at the junction of zones H and J.						
Cardiovascular system										
Auscultation of heart	N	Ab	NE ✓	Attempted auscultation with electronic						
Arterial pulse (ear)	N	Ab	NE ✓	stethoscope; could not hear heart.						
Visualization of peripheral veins	N ✓	Ab	NE	Ear veins collapsed.						
Respiratory system										
Auscultation of lungs	N ✓	Ab	NE	Normal respiratory excursions observed.						
Discharge from nares	Yes	No ✓	NE							

<b>Abdomen and GI tract</b>								
Ventral edema	Yes	No ✓	NE	Normal GI sounds heard left upper quadrant.				
Symmetrical appearance	Yes ✓	No	NE					
Flank appearance left	N ✓	Ab	NE					
Flank appearance right	N ✓	Ab	NE					
Auscultation of borborygmus	N ✓	Ab	NE					
<b>Genitourinary system</b>								
Mammary glands	N ✓	Ab	NE					
Vulva	N ✓	Ab	NE					
<b>Joints</b> (note any swelling, heat, abscesses, fistulas, deformities)				No abnormalities noted.				
Shoulders R	N ✓	Ab	NE					
Shoulder L	N ✓	Ab	NE					
Elbow R	N ✓	Ab	NE					
Elbow L	N ✓	Ab	NE					
Carpus R	N ✓	Ab	NE					
Carpus L	N ✓	Ab	NE					
Hip R	N ✓	Ab	NE					
Hip L	N ✓	Ab	NE					
Stifle R	N ✓	Ab	NE					
Stifle L	N ✓	Ab	NE					
Tarsus R	N ✓	Ab	NE					
Tarsus L	N ✓	Ab	NE					
<b>Mobility</b> (note stiffness, mechanical limitations, differences in range of motion of limbs)								
Evidence of abnormal weight bearing	Yes	No ✓	NE					
Conformation	N ✓	Ab	NE					
Gait abnormality	Yes	No ✓	NE					
<b>Feet</b>								
<b>Right front</b>								
<b>Nails</b> (note length, cracks, defects, horn growth abnormalities, condition of cuticles)								
Nail 1	N ✓	Ab	NE	General observation: Cuticles on front and back				
Nail 2	N ✓	Ab	NE	nails are hard and feathered.				
Nail 3	N ✓	Ab	NE	The front and back nails have minimal treads				
Nail 4	N ✓	Ab	NE	but appear healthy.				
Nail 5	N ✓	Ab	NE					
<b>Interdigital space</b>								
1 and 2	N ✓	Ab	NE					
2 and 3	N	Ab ✓	NE	Mild cuticle overgrowth invading interdigital area				
3 and 4	N ✓	Ab	NE	2 and 3.				
4 and 5	N ✓	Ab	NE					
<b>Sole (pad)</b>	N ✓	Ab	NE					
overgrown <input type="checkbox"/> smooth <input type="checkbox"/> corrugated surface ✓ discoloration <input type="checkbox"/> discharge <input type="checkbox"/>								
<b>Left front</b>								
<b>Nails</b>								
Nail 1	N ✓	Ab	NE					
Nail 2	N ✓	Ab	NE					
Nail 3	N ✓	Ab	NE					
Nail 4	N ✓	Ab	NE					
Nail 5	N ✓	Ab	NE					
<b>Interdigital space</b>								
1 and 2	N ✓	Ab	NE					
2 and 3	N ✓	Ab	NE					
3 and 4	N	Ab ✓	NE	Mild cuticle overgrowth invading interdigital area				
4 and 5	N ✓	Ab	NE	3 and 4.				
<b>Sole (pad)</b>	N ✓	Ab	NE					
overgrown <input type="checkbox"/> smooth <input type="checkbox"/> corrugated surface ✓ discoloration <input type="checkbox"/> discharge <input type="checkbox"/>								



<b>Right rear</b>								
<b>Nails</b>								
Nail 2	N ✓	Ab	NE					
Nail 3	N ✓	Ab	NE					
Nail 4	N ✓	Ab	NE					
Nail 5	N ✓	Ab	NE					
<b>Interdigital space</b>								
2 and 3	N ✓	Ab	NE					
3 and 4	N ✓	Ab	NE					
4 and 5	N ✓	Ab	NE					
<b>Sole (pad)</b>	N ✓	Ab	NE					
overgrown <input type="checkbox"/> smooth <input type="checkbox"/> corrugated surface ✓ discoloration <input type="checkbox"/> discharge <input type="checkbox"/>								
<b>Left rear</b>								
<b>Nails</b>								
Nail 2	N ✓	Ab	NE					
Nail 3	N ✓	Ab	NE					
Nail 4	N ✓	Ab	NE					
Nail 5	N ✓	Ab	NE					
<b>Interdigital space</b>								
2 and 3	N ✓	Ab	NE					
3 and 4	N ✓	Ab	NE					
4 and 5	N ✓	Ab	NE					
<b>Sole (pad)</b>	N ✓	Ab	NE					
overgrown <input type="checkbox"/> smooth <input type="checkbox"/> corrugated surface ✓ discoloration <input type="checkbox"/> discharge <input type="checkbox"/>								

Elephant Care International Asian Elephant Body Condition Index				
<b>Elephant name:</b> Emily		<b>Owner:</b> Buttonwood Park Zoo		
<b>Observer:</b> Susan K. Mikota DVM		<b>Date:</b> 16 June 2015		
Body area	Observation			Score
1. Head: temporal depression ( <i>view from several angles</i> )	full and convex in outline when viewed from behind, frontal ridge vaguely outlined = 2 points	slightly to moderately concave, frontal ridge defined = 1 point	deeply concave, frontal ridge forms a crater-like rim around the temporal depression = 0 points	2
2. Scapula (shoulder blade) ( <i>view from side</i> )	spinous process not visible, or slightly visible = 2 points	spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula = 1 point	spinous process pronounced and blade line with the acromial process appearing as a knot = 0 points	2
3. Thoracic region (view from side)	ribs not visible, barrel smooth = 2 points	some ribs visible, but the extent and demarcation not pronounced = 1 point	many ribs strongly demarcated with pronounced intercostal depressions = 0 points	2
4. Flank area (immediately in front of pelvis) (view from side and behind)		no depression visible, flank bulges outwards in front of the pelvis = 1 point	depression visible as a sunken area immediately in front of the pelvis = 0 points	1
5. Lumbar vertebrae (behind ribs and in front of pelvis) (view from behind; an elevated vantage point may be necessary)	not visible, lower back smooth and rounded = 2 points	visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae does not exceed width = 1 point	visible as a knife-like blade; sides of the spinal ridge are parallel, and the height exceeds the width = 0 points	2
6. Pelvic bone (external angle of the ilium) and rump (view from several angles)	not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone) = 2 points	visible but not pronounced; the rump is slightly depressed between the ilium and the caudal vertebrae = 1 point	visible but as a jutting bone; rump is a pronounced sunken zone between the ilium and the caudal vertebrae = 0 points	2
7. Axillary fat (immediately behind joint of humerus and scapula)	the SQ contains a thick handful of fat, easily seized = 2 points	the SQ contains some fat = 1 point	the skin thin and little tissue palpable beneath = 0 points	2
8. Brisket fat (between forelegs at base of neck)	sternum well padded with muscle and fat; bone neither visible nor palpable = 2 points	sternum not visible but palpable = 1 point	sternum both visible and palpable = 0 points	2
9. Tail		fat and muscular, not bony feeling = 1 point	thin and bony, feels stringy, individual joints palpable = 0	1
<b>Total score</b>				16
<b>0-5 = emaciated; 6-10 = average condition; 11+ = very good (or fat)</b>				
(Developed by Dr. V. Krishnamurthy, Dr. C. Wemmer, and John Lehnhardt; Adapted from personal communication, Dr. V. Krishnamurthy, India, 2000. A version of this table appears in Das, D. ed. 2003. Healthcare, Breeding and Management of Asian Elephants.				

### Elephant Care International: Locomotion Examination

Elephant name: Emily

Date of exam: 16 June 2015

Does this elephant sleep lying down? Yes often ☒ Yes occasionally ☐ Never ☐

Does this elephant only lie down on one side? Yes ☐ No ☒

If 'Yes', which side?

Emily previously laid only on her left side but since sand was added to the barn 3 years ago she lays on both sides.  
Left ☐ Right ☐

Does standing up and lying down appear easy ☒ slightly difficult ☐ very difficult ☐

Does this elephant ever show temporary periods of apparent stiffness (e.g. when starting to walk about in the mornings)? Yes ☒ No ☐

Intermittent stiffness of left carpus

Was video made of this elephant walking? Yes ☒ No ☐

Assessment of Emily

Normal locomotion

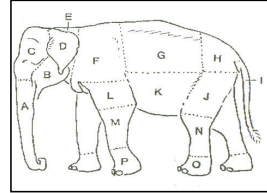
Description	Assessment criteria	Comments
Sound / Normal	<ul style="list-style-type: none"> <li>• Walks without any visible gait abnormalities</li> <li>• Walks with normal rhythm</li> <li>• Accelerates and turns normally</li> <li>• Walks without any hesitation</li> </ul>	
Abnormal locomotion	<ul style="list-style-type: none"> <li>• Shows stiffness of joints with straightened limb / limbs</li> <li>• Shows reduced limb carriage in one or more limbs (height of the step/foot lift is reduced while walking)</li> <li>• May show uneven walking rhythm</li> <li>• Shows visible abnormality of gait with a mild but observable limp</li> </ul>	
Mildly lame	<ul style="list-style-type: none"> <li>• Slight changes in stride length</li> <li>• May show lateral or medial swing (abduction/adduction) of the affected limb</li> <li>• May show uneven walking rhythm</li> <li>• Shows visible signs of lameness</li> <li>• Shortened stride length with visible negative overlap</li> </ul>	
Moderately lame	<ul style="list-style-type: none"> <li>• Shows lateral or medial swing (abduction/adduction) of the affected limb</li> <li>• An arch back posture is evident on turning</li> <li>• Uneven weight bearing on limbs and reluctance to reposition the weight bearing limb while turning</li> <li>• Shows uneven rhythm in walking</li> </ul>	
Severely lame	<ul style="list-style-type: none"> <li>• Arch back posture is evident while turning</li> <li>• Shows great reluctance to walk and to bear weight on the affected limb(s)</li> <li>• Shows exaggerated hanging and nodding movement of the head</li> <li>• Shows uneven rhythm in walking</li> </ul>	

## Appendix B: Physical Exam Details - Ruth

### Elephant Care International Comprehensive Physical Examination

**Elephant name:** Ruth  
**Owner:** Buttonwood Park Zoo  
**Asian** ☒ **African**  
**Origin:** Wild caught ☐ Captive born ☐ unknown  
**Sex:** Female ☒ Male ☐  
**Date of birth:** 1958 (est) **Current age:** 56 years  
**Purpose of exam:** Health assessment  
**Date of exam:** 16 June 2015  
**Examining veterinarian:** Susan K. Mikota DVM

Body zones



#### BEHAVIOR / GENERAL Demeanor

Alert ☒ Depressed ☐ Aggressive ☐ Anxious ☐ Fearful ☐ Unresponsive to requests  
 Calm ☒ Friendly ☒ Unpredictable ☐ Nervous ☐ Aggressive ☐ Scared ☐  
 Quiet ☒ Reliable ☒ Agitated ☐ Nervous ☐  
 Aggressive to other elephants yes ☐ no ☒  
 Aggressive to humans yes ☐ no ☒  
 History of having injured or killed a human yes ☐ no ☒

#### REPETITIVE BEHAVIOR

Head bobbing: ☐ Weaving: ☐ Trunk swinging: ☐ Swaying: ☒ (1) Other: ☐  
 0 = never exhibits repetitive behavior  
 1 = exhibits limited contextual displacement activity  
 2 = occasionally exhibits stereotypic behavior  
 3 = often exhibits stereotypic behavior  
 4 = associated signs consistent with obsessive-compulsive disorder Sways sometimes when anticipating food

#### DIET

AM: 2 lbs Mazuri Elephant Supplement; Ad lib hay throughout day  
 PM: 2 lbs Mazuri Elephant Supplement; 13-15 lbs of produce;  
 30-40 lbs of hay

#### APPETITE, FECES, URINE

<b>Appetite</b>	N <input checked="" type="checkbox"/>	Ab <input type="checkbox"/>	NE <input type="checkbox"/>					
<b>Feces</b>	N <input type="checkbox"/>	Ab <input checked="" type="checkbox"/>	NE <input type="checkbox"/>					
Number of defecation/day:	8/24 h							
Number of boli/defecation:	6-8							
<b>Urination</b>	N <input checked="" type="checkbox"/>	Ab <input type="checkbox"/>	NE <input type="checkbox"/>					
Number of urinations/day: 8/24h	N <input checked="" type="checkbox"/>	Ab <input type="checkbox"/>	NE <input type="checkbox"/>					
Appearance of urine	N <input checked="" type="checkbox"/>	Ab <input type="checkbox"/>	NE <input type="checkbox"/>					
<b>MEDICATIONS AND SUPPLEMENTS</b>								
<b>Current medical problems under treatment</b>	Ruth is receiving laser therapy q.o.d. for treatment of her right elbow. She was swinging her right front leg out laterally but the condition has improved with laser therapy. Laser therapy was started in January 2015.							
<b>Current medications</b>	None							
<b>Current supplements</b>	64 g Glycoflex (glucosamine) BID (twice a day)							

# PHYSICAL EXAMINATION

Temperature: 97.7 °F Pulse: Veins collapsed; not palpable Respiration: 16  
Weight: 3a36 kg (13 May 2015)

Face/head:							
Symmetry	N ✓	Ab	NE				
Temporal glands	N ✓	Ab	NE				
Defects/injuries	Yes	No ✓	NE				
Ears (if abnormal, indicate which ear)							
Symmetry	Yes ✓	No	NE	Right ear irregular shape; left ear has scalloped			
Holes/ragged margins	Yes ✓	No	NE	appearance. History of loss of ear margins due			
Discharge/odor	Yes	No ✓	NE	to frostbite injury.			
Eyes (if abnormal, indicate which eye)							
Eyelids/lashes	N ✓	Ab	NE	There is a 2 mm in diameter, round, corneal scar			
Nictitans (3rd eyelid)	N ✓	Ab	NE	in the center of the right eye. The left cornea has			
Conjunctiva	N ✓	Ab	NE	a diffuse area of cloudiness with a clear center.			
Cornea	N	Ab ✓	NE	These changes are probably due to old corneal			
Lacrimation	N ✓	Ab	NE	ulcers. Ophthalmoscopic examination difficult due			
Iris	N ✓	Ab	NE	to movement but no obvious lesions seen.			
Anterior chamber	N ✓	Ab	NE				
Lens	N ✓	Ab	NE				
Trunk							
Nares (symmetry, airflow)	N ✓	Ab	NE				
Musculature	N ✓	Ab	NE				
Skin	N ✓	Ab	NE				
Injuries/defects/atrophy	Yes	No ✓	NE				
Score the functionality of the trunk (Describe any abnormal function, e.g. cannot move trunk to one side)							
100% functional 66% functional ✓ 33% functional 0% functional				Ruth has a partially paralyzed trunk. She can			
				raise her trunk almost to full height but she has			
				to swing it to do so. There is minimal muscle			
				atrophy.			
Oral cavity							
Will elephant open mouth for teeth inspection?	Yes ✓	No	NE	Unable to see lower molars. Tushes are palpable			
Hard palate/buccal mucosa	N ✓	Ab	NE	below the sulci on both sides.			
Tongue	N ✓	Ab	NE				
Mucous membrane color	N ✓	Ab	NE				
Molars upper	N ✓	Ab	NE				
Molars lower	N	Ab	NE ✓				
Tusks/tushes right	N ✓	Ab	NE				
Tusks/tushes left	N ✓	Ab	NE				
General integument (including wounds):							
Head	N ✓	Ab	NE	Bilateral elbow calluses. Inactive.			
Back	N ✓	Ab	NE	Small, 3 inch diameter inactive callus lateral			
Lateral/ventral thorax	N ✓	Ab	NE	aspect of left stifle.			
Lateral/ventral abdomen	N ✓	Ab	NE	No tail hairs; tail has been partially amputated			
Forelimbs, esp. elbows	N	Ab ✓	NE	and is ~ half of the normal length.			
Hindlimbs, esp. stifles	N	Ab ✓	NE	There is an irregularly shaped area of			
Tail, esp. hair follicles	N	Ab ✓	NE	depigmentation ~ 5 in x 12 in in the lower left flank			
Cardiovascular system							
Auscultation of heart	N	Ab	NE ✓	Attempted auscultation with electronic			
Arterial pulse (ear)	N	Ab	NE ✓	stethoscope; could not hear heart.			
Visualization of peripheral veins	N ✓	Ab	NE	Ear veins collapsed.			
Respiratory system							
Auscultation of lungs	N ✓	Ab	NE	Normal respiratory excursions observed.			
Discharge from nares	Yes	No ✓	NE	Unable to hear lung sounds on auscultation.			
Abdomen and GI tract							
Ventral edema	Yes	No ✓	NE	Slightly bloated appearance on left side.			
Symmetrical appearance	Yes	No ✓	NE	Could not hear GI sounds.			
Flank appearance left	N	Ab ✓	NE				
Flank appearance right	N ✓	Ab	NE				
Auscultation of borborygmus	N ✓	Ab	NE				

<b>Genitourinary system</b>									
Mammary glands	N ✓	Ab	NE						
Vulva	N ✓	Ab	NE						
<b>Joints</b> (note any swelling, heat, abscesses, fistulas, deformities)									
<b>Shoulders R</b>	N ✓	Ab	NE						
Shoulder L	N ✓	Ab	NE						
<b>Elbow R</b>	N ✓	Ab	NE						
Elbow L	N ✓	Ab	NE						
<b>Carpus R</b>	N ✓	Ab	NE						
Carpus L	N ✓	Ab	NE						
Hip R	N ✓	Ab	NE						
Hip L	N ✓	Ab	NE						
Stifle R	N ✓	Ab	NE						
Stifle L	N ✓	Ab	NE						
Tarsus R	N ✓	Ab	NE						
Tarsus L	N ✓	Ab	NE						
<b>Mobility</b> (note stiffness, mechanical limitations, differences in range of motion of limbs)									
Evidence of abnormal weight bearing	Yes	No ✓	NE	Ruth has a bilateral varus deformity in her front limbs. Her left carpus flexes minimally; her right carpus does not flex. She walks very straight-legged.					
Conformation	N	Ab ✓	NE						
Gait abnormality	Yes ✓	No	NE						
<b>Feet</b>									
<b>Right front</b>									
<b>Nails</b> (note length, cracks, defects, horn growth abnormalities, condition of cuticles)									
Nail 1	N ✓	Ab	NE	Ruth's cuticles are very slightly feathered.					
Nail 2	N ✓	Ab	NE	Her nails look good. She has some treads but for the most part her pads are smooth.					
Nail 3	N ✓	Ab	NE	The surface of nail 3 on the right has a rounded appearance.					
Nail 4	N ✓	Ab	NE						
Nail 5	N ✓	Ab	NE						
<b>Interdigital space</b>									
1 and 2	N ✓	Ab	NE						
2 and 3	N ✓	Ab	NE						
3 and 4	N ✓	Ab	NE						
4 and 5	N ✓	Ab	NE						
<b>Sole (pad)</b>									
overgrown <input type="checkbox"/> smooth <input checked="" type="checkbox"/> corrugated surface <input type="checkbox"/> discoloration <input type="checkbox"/> discharge <input type="checkbox"/>									
<b>Left front</b>									
<b>Nails</b>									
Nail 1	N ✓	Ab	NE						
Nail 2	N ✓	Ab	NE						
Nail 3	N ✓	Ab	NE						
Nail 4	N ✓	Ab	NE						
Nail 5	N ✓	Ab	NE						
<b>Interdigital space</b>									
1 and 2	N ✓	Ab	NE						
2 and 3	N ✓	Ab	NE						
3 and 4	N ✓	Ab	NE						
4 and 5	N ✓	Ab	NE						
<b>Sole (pad)</b>									
overgrown <input type="checkbox"/> smooth <input checked="" type="checkbox"/> corrugated surface <input type="checkbox"/> discoloration <input type="checkbox"/> discharge <input type="checkbox"/>									
<b>Right rear</b>									
<b>Nails</b>									
Nail 2	N ✓	Ab	NE						
Nail 3	N ✓	Ab	NE						
Nail 4	N ✓	Ab	NE						
Nail 5	N ✓	Ab	NE						
<b>Interdigital space</b>									
2 and 3	N ✓	Ab	NE						
3 and 4	N ✓	Ab	NE						
4 and 5	N ✓	Ab	NE						
<b>Sole (pad)</b>									
overgrown <input type="checkbox"/> smooth <input checked="" type="checkbox"/> corrugated surface <input type="checkbox"/> discoloration <input type="checkbox"/> discharge <input type="checkbox"/>									

<b>Left rear</b>								
<b>Nails</b>								
Nail 2	N ✓	Ab	NE					
Nail 3	N ✓	Ab	NE					
Nail 4	N ✓	Ab	NE					
Nail 5	N ✓	Ab	NE					
<b>Interdigital space</b>								
2 and 3	N ✓	Ab	NE					
3 and 4	N ✓	Ab	NE					
4 and 5	N ✓	Ab	NE					
<b>Sole (pad)</b>	N ✓	Ab	NE					
overgrown <input type="checkbox"/> smooth <input checked="" type="checkbox"/> corrugated surface    discoloration <input type="checkbox"/> discharge <input type="checkbox"/>								

Elephant Care International Asian Elephant Body Condition Index				
Elephant name: Ruth		Owner: Buttonwood Park Zoo		
Observer: Susan K. Mikota DVM		Date: 16 June 2015		
Body area	Observation			Score
1.Head: temporal depression ( <i>view from several angles</i> )	full and convex in outline when viewed from behind, frontal ridge vaguely outlined = 2 points	slightly to moderately concave, frontal ridge defined = 1 point	deeply concave, frontal ridge forms a crater-like rim around the temporal depression = 0 points	1
2.Scapula (shoulder blade) ( <i>view from side</i> )	spinous process not visible, or slightly visible = 2 points	spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula = 1 point	spinous process pronounced and bladeline with the acromial process appearing as a knot = 0 points	2
3.Thoracic region (view from side)	ribs not visible, barrel smooth = 2 points	some ribs visible, but the extent and demarcation not pronounced = 1 point	many ribs strongly demarcated with pronounced intercostal depressions = 0 points	2
4. Flank area (immediately in front of pelvis) (view from side and behind)		no depression visible, flank bulges outwards in front of the pelvis = 1 point	depression visible as a sunken area immediately in front of the pelvis = 0 points	1
5. Lumbar vertebrae (behind ribs and in front of pelvis) (view from behind; an elevated vantage point may be necessary)	not visible, lower back smooth and rounded = 2 points	visible as a ridge; skin slopes away from the top of the ridge; height of the vertebrae does not exceed width = 1 point	visible as a knife-like blade; sides of the spinal ridge are parallel, and the height exceeds the width = 0 points	2
6.Pelvic bone (external angle of the ilium) and rump (view from several angles)	not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone) = 2 points	visible but not pronounced; the rump is slightly depressed between the ilium and the caudal vertebrae = 1 point	visible but as a jutting bone; rump is a pronounced sunken zone between the ilium and the caudal vertebrae = 0 points	2
7.Axillary fat (immediately behind joint of humerus and scapula)	the SQ contains a thick handful of fat, easily seized = 2 points	the SQ contains some fat = 1 point	the skin thin and little tissue palpable beneath = 0 points	2
8. Brisket fat (between forelegs at base of neck)	sternum well padded with muscle and fat; bone neither visible nor palpable = 2 points	sternum not visible but palpable = 1 point	sternum both visible and palpable = 0 points	1
9.Tail		fat and muscular, not bony feeling = 1 point	thin and bony, feels stringy, individual joints palpable = 0	1
Total score				14
0-5 = emaciated; 6-10 = average condition; 11+ = very good (or fat)				
(Developed by Dr. V. Krishnamurthy, Dr. C. Wemmer, and John Lehnardt; Adapted from personal communication, Dr. V. Krishnamurthy, India, 2000. A version of this table appears in Das, D. ed. 2003. Healthcare, Breeding and Management of Asian Elephants.				



Elephant Care International: Locomotion Examination

Elephant name: Ruth

Date of exam: 16 June 2015

Does this elephant sleep lying down? Yes often ☒ Yes occasionally ☐ Never ☐

Does this elephant only lie down on one side? Yes ☐ No ☒

If 'Yes', which side?

Left ☐ Right ☐

Does standing up and lying down appear easy ☒ slightly difficult ☐ very difficult ☐

Does this elephant ever show temporary periods of apparent stiffness (e.g. when starting to walk about in the mornings)?

Yes ☒ No ☐

see below

Was video made of this elephant walking?

Yes ☒ No ☐

Assessment of Emily

Abnormal locomotion

Description	Assessment criteria	Comments	
Sound / Normal	<ul style="list-style-type: none"> <li>Walks without any visible gait abnormalities</li> <li>Walks with normal rhythm</li> <li>Accelerates and turns normally</li> <li>Walks without any hesitation</li> </ul>		
Abnormal locomotion	<ul style="list-style-type: none"> <li>Shows stiffness of joints with straightened limb / limbs</li> <li>Shows reduced limb carriage in one or more limbs (height of the step/foot lift is reduced while walking)</li> <li>May show uneven walking rhythm</li> <li>Shows visible abnormality of gait with a mild but observable limp</li> </ul>	Ruth is very stiff-legged in her front limbs. She has a stilted gait and a short stride. When walking she can flex her left carpus minimally; her right carpus does not appear to flex at all.	
Mildly lame	<ul style="list-style-type: none"> <li>Slight changes in stride length</li> <li>May show lateral or medial swing (abduction/adduction) of the affected limb</li> <li>May show uneven walking rhythm</li> <li>Shows visible signs of lameness</li> <li>Shortened stride length with visible negative overlap</li> </ul>		
Moderately lame	<ul style="list-style-type: none"> <li>Shows lateral or medial swing (abduction/adduction) of the affected limb</li> <li>An arch back posture is evident on turning</li> <li>Uneven weight bearing on limbs and reluctance to reposition the weight bearing limb while turning</li> <li>Shows uneven rhythm in walking</li> </ul>		
Severely lame	<ul style="list-style-type: none"> <li>Arch back posture is evident while turning</li> <li>Shows great reluctance to walk and to bear weight on the affected limb(s)</li> <li>Shows exaggerated hanging and nodding movement of the head</li> <li>Shows uneven rhythm in walking</li> </ul>		

Appendix C: Historical records of 29+ attack citations noted by In Defense of Animals (IDA)  
in USDA complaint Re: Elephant Welfare at Buttonwood Park Zoo

	Date	Complaint	BPZ <i>Daily / Medical Record</i> Entry	TD <sub>x</sub> <sup>i</sup> / DD <sub>x</sub> <sup>ii</sup> Consultants' Assessment
1	12/4/14	"Ruth was attacked yet again; The veterinarian noted that the 'conspecific' bit Ruth's tail again, removing a bandage that was in place.	<i>Medical Record:</i> Checked bandage this morning. Bandage was removed by conspecific at 1 pm.	<p>TD<sub>x</sub>: Object play; object-directed exploratory behavior.</p> <p>Bandage removal by Emily directed toward bandage, not Ruth. Subsequent to bandage removal, Emily focused on bandage, not Ruth, with continued object manipulation.</p> <p>Ruth did not display signs of pain, fear, anxiety, or avoidance and continued eating subsequent to bandage removal.</p> <p>No evidence to suggest or support aggression.</p>
2	11/9/14	"Ruth was attacked on November 9, as reflected in the veterinarian's notes."	<p><i>Daily Record:</i> "In the pm, Ruth was eating hay in the exhibit. Emily approached and began to examine bandage on her tail. Ruth 'blew' and extended tail toward Emily. Emily then began an exploration of the tail starting at the top of the bandage. As she approached the midline, Ruth vocalized one with a loud 'trumpet'. [Keeper] called Emily's name and she immediately moved her trunk away and then turned and walked over to [keeper] at the side of the exhibit. Ruth then resumed eating hay. Bandage remained intact."</p>	<p>TD<sub>x</sub>: Object play; object-directed exploratory behavior.</p> <p>Emily's behavior consistent with exploratory behavior and not suggestive of aggressive behavior or arousal.</p> <p>Ruth's single vocalization and lack of avoidance response coupled with resuming eating hay do not suggest anxiety, fear, or distress.</p>

<sup>i</sup> Tentative Diagnosis

<sup>ii</sup> Differential Diagnosis

3	10/24/13	"Scuff marks in sand. Elephants look guilty."	Cannot locate any similar comment in medical or daily record.	<p>DDx: Scuff marks in environment with open etiology.</p> <p>No such behavior substantiated in record. Presumed outside observer interpretation.</p> <p>Subjective interpretation of elephants looking "guilty" does not clarify which elephant, context, or even speculate on any specific behavior. Even if accurate, not suggestive of aggression or aggressor.</p>
4	6/12/13	"Scuff marks in sand; abrasion in middle of Ruth's tail."	<p><i>Daily Record:</i></p> <p>"Very small abrasion in on the middle of [Emily's] tail. Around 2:00 [pm], they were both on the south side of the barn on exhibit. When they saw [keeper], they looked as though they were doing something they shouldn't. Some scuff marks in sand. Not sure what they were doing."</p>	<p>TDx: Superficial abrasion with open etiology.</p> <p>Subjective interpretation of both elephants appearing as if doing something they "shouldn't" does not speculate on any specific behavior or context. Even if accurate, not suggestive of aggression or aggressor.</p>
5	4/22/13	"Scratches at base of tail – 4 lacerations."	<p><i>Medical Record:</i></p> <p>"Four superficial lacerations are present at the base of the tail which occurred a few days ago and appear to be healing with no evidence of infection at this time. A small amount of serous fluid is noted in the largest of the four."</p>	<p>TDx: Superficial laceration with open etiology.</p> <p>Physical findings with no clear etiology – could be secondary to environment (e.g., tree branch, browse, enrichment devices, gate latch, door hinges, shade structure) or social etiology.</p> <p>No compelling evidence to support aggression.</p>
6	2/14/13	"Emily hit Ruth on left side of upper hip leaving a 4" laceration."	<p><i>Daily Record:</i></p> <p>"Emily hit Ruth on left side, upper hip area, leaving a 4" abrasion."</p>	<p>TDx: Abrasion 2° to assertive behavior.</p> <p>"Abrasion" misrepresented as "laceration".</p>

7	1/2/13	"Ruth vocalizing."	"[Ruth] very vocal in pm."	DDx: Nonspecific vocalization with open etiology.  Vocal behavior not characterized specifically; no suggested etiology or context. No association with Emily noted.  Not suggestive of aggression.
8	12/31/12	"Emily hit Ruth on right side of hind end."	<i>Daily Record:</i> "Emily hit Ruth" on right side of hind end when dumpster truck was coming back."	TDx: Assertive behavior  Identified context of dumpster truck approach.  Historically dumpster truck as potentially provocative.
9	5/16/12	"Emily attacked Ruth twice, had a 'timeout' in the stall."	<i>Daily Record:</i> "Emily hit Ruth with Tush 2 times (2 separate incidents). Put into timeout in her stall second time."	TDx: Assertive behavior.  "Hit" misrepresented at "attack".
10	4/2/12	"Heard vocalization by Ruth but didn't see any marks on her."	<i>Daily Record:</i> "Heard vocalization by Ruth but didn't see any marks on her."	DDx: Nonspecific vocalization with open etiology.  Vocal behavior not characterized; no suggested etiology or context. No association with Emily noted.
11	3/4/12	"Evidence that Emily hit Ruth on back end."	<i>Daily Record:</i> "Evidence that Emily hit Ruth on back end."	TDx: Presumed abrasion.  No observed behavior or context.

12	10/5/11	"Emily pushed Ruth."	<i>Daily Record:</i> "Emily pushed Ruth."	DDx: Displacement behavior with open etiology.  Push could have been in assertive context or avoidance of aversive stimulus.
13	5/9/11	"Scratches back left hind."	<i>Daily Record:</i> "Keeper reported Ruth trumpeting. Keepers went to exhibit, both elephants seemed fine. When hosing Ruth in pm, noticed she had a mark on her back left hind, skin was broken."	DDx: Superficial laceration with open etiology.  Physical findings with no clear etiology – could be secondary to environment (e.g., tree branch, browse, enrichment devices, gate latch, door hinges, shade structure) or social etiology.  No compelling evidence to support aggression.
14	5/7/11	"Scratches near tail, volunteer saw Emily attack Ruth."	<i>Daily Record:</i> "Emily hit Ruth (seen by volunteer), small mark (scratch) above Ruth's tail."	"Hit" misrepresented at "attack".  TDx: Head butt. Assertive behavior.
15	3/1/11	"Appears' Emily hit Ruth: three scratches on Ruth."	<i>Daily Record:</i> "After being out all day, it appears that Emily might [have] hit Ruth, 3 white marks on the right side of back."	TDx: Abrasions with open etiology.  Physical findings with no clear etiology – could be secondary to environment (e.g., tree branch, browse, enrichment devices, gate latch, door hinges, shade structure) or social etiology.

16	1/26/11	“Ruth sustained abrasions. Keepers didn’t see but heard her vocalize.”	<i>Daily Record:</i> “Keepers noticed Emily seemed to be a little irritated in the am. Gave them access to outside. Gave Ruth hay outside. Emily wanted to be inside, so gave her hay inside. Keepers left the barn and about 5 minutes later, Ruth let out two alarming vocalizations. Keepers went back to the barn to assess the behavior. It appeared that Emily had hit Ruth four times on Ruth’s right back end.”	DDx: Assertive or aggressive behavior.
17	1/25/11	“Two marks on Ruth’s side ‘might be from Emily’s tusks.’”	<i>Daily Record:</i> “Two marks on left side of Ruth’s abdomen, looks like they may be from Emily.”	TDx: Abrasions with open etiology.  Physical findings with no clear etiology – could be secondary to environment (e.g., tree branch, browse, enrichment devices, gate latch, door hinges, shade structure) or social etiology.
18	10/26/10	“Abrasion on Ruth’s back, keepers say it was most likely by Emily.”	<i>Daily Record:</i> “Quarter sized abrasion seen on back in pm. Did hear her vocalize during the day and Emily was near her. Appeared fine to keeper at the time.”	TDx: Abrasion with open etiology.  Vocalization in proximity of other elephants occurs in many different contexts. No evidence to suggest aggressive behavior.

19	11/2/09	"Emily grabbed Ruth's tail and pushed on Ruth's hind end."	<p><i>Daily Record:</i></p> <p>"Keepers heard high pitched trumpets from the elephant exhibit. Keepers responded quietly to see what the girls were doing. When [keeper] came around to the front of the exhibit, Emily had Ruth's tail in her trunk and she was push[ing] Ruth's rear end with her head. Keeper called out to Emily with a firm 'no'. Emily backed away from Ruth.</p>	DDx: Assertive or aggressive behavior. Readily redirected.
20	1/30/07	"Swung head at Ruth. Keeper told her no."	<p><i>Daily Record:</i></p> <p>"While keeper was working with Ruth, Emily took a step forward and swung her head at Ruth. Emily was backed up and remained with keeper.</p>	DDx: normal signaling, frustration, conflict, distraction, avoidance, or assertive behavior. May have be gestural/postural. No evidence to suggest aggressive behavior.
21	1/28/07	"Emily grabbing Ruth's tail and shoving her. They were separated."	<p><i>Daily Record:</i></p> <p>"Emily ram[med] Ruth very hard. She also grab[bed] Ruth's tail. Emily rammed Ruth a second time and Ruth fell to her knees."</p>	TDx: Aggressive behavior.
22	1/27/07	"Tire taken down due to two incidents of aggression, on videotape by BPZ."	<p><i>Daily Record:</i></p> <p>"2 incidents in afternoon. Emily grabbed Ruth by tail and pushed her down; both times Emily went back to barrel where we had put treats in for enrichment. Took down barrel due to aggression over it."</p>	TDx: Aggressive behavior.

23	1/10/07	“Emily grabbed Ruth’s tail and shoved her, on videotape by BPZ.”	<i>Daily Record: [recorded on overnight videotape]</i> “In am, Emily brushed up against Ruth then grabbed her tail and pulled while keepers were not there.	TDx: Aggressive behavior.
24	7/18/06	“Emily shoving Ruth”	<i>Daily Record:</i> “Emily was pushing Ruth around.”	DDx: Displacement or assertive behavior.
25	7/6/06	Ruth kept inside because of ‘displacement aggression’ by Emily.”	<i>Daily Record:</i> Ruth kept inside from 8 – 12:30 to let meds work.”  Emily trumpeting, squealing, mock charging, banging on gate, throwing tire/tossing tractor tire around. Reason – Whaling City Festival has 12 tigers + 1 lion [in] cages in park 50 feet away from perimeter fence on elephant side. Small superficial abrasions on trunk, legs, and neck.”	TDx Ruth: Decision to keep inside for medical care.  TDx Emily: Abrasions resulting from anxiety, stress 2 to proximity of provocative stimuli (tigers, lion). Possible alarm-defensive signaling. No behavior directed toward Ruth.
26	7/1/06	“Emily rammed Ruth.”	<i>Daily Record:</i> “Emily rammed Ruth.”	DDx: Aggressive or assertive behavior.
27	6/14/06	“Emily bit 6½ inches off Ruth’s tail.”	<i>Daily Record:</i> “Emily attacked Ruth, biting off 6½ inches of tail.”	TDx: Aggressive behavior.



28	1/6/06	"Emily rammed Ruth twice."	<p><i>Daily Record:</i></p> <p>"While bringing Emily over to continue with footwork, Emily was told to back up and she decided to displace Ruth by pushing her into the corner.</p> <p>"Temporal gland right side swollen."</p>	DDx: Aggressive, assertive, or displacement behavior (possibly 2° to discomfort from temporal gland enlargement). In estrus.
29	9/30/05	"Emily rammed Ruth pushing her back end down."	<p><i>Daily Record:</i></p> <p>"Emily rammed Ruth on exhibit. Heard Ruth making noise. Emily pushing Ruth down. Ruth[s] back legs were all the way down. Told Emily to stop – she did. Called [keeper] over so we could [examine] Ruth."</p>	DDx: Aggressive or assertive behavior.
30	2/25/05	"Emily rammed Ruth."	<p><i>Daily Record:</i></p> <p>"While [keeper] was working [with] Emily, she turned to Ruth and butted her against bars, hitting Ruth on her left side. Ruth screamed. [Keeper] yelled no to Emily. She stopped."</p>	DDx: Aggressive or assertive behavior.