Elephant welfare study results: How Elephant Lands enhances welfare

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Animal Based Welfare Assessment

*Animal Welfare* refers to an animal’s collective physical, mental, and emotional states over a period of time and is measured on a continuum from poor to excellent.
Types of Welfare Indicators

Behavior

Behavioral diversity, activity, species-appropriate behaviors, time budgets, etc.

Physiology

Hormone levels, adrenal response, reproduction, nutrition, etc.

Physical Appearance & Health

Body condition, muscle tone, species-specific health parameters, etc.
Evaluating Effectiveness of Elephant Lands

Elephant Lands welfare-based design

Design focused on meeting the elephants’ physiological, psychological and social needs 24 hours a day.

- Encourage activity throughout the entire day
- Promote a diverse range of natural behaviors
- Offer increased opportunities for choice and control
- Provide biologically meaningful challenges

Welfare indicators for evaluation

- Distance walked
- Reproductive and adrenal hormone analysis
- Behavior assessments
Study timeline

Monitored our herd over 4 years (Sept 2012 – end of 2016) through 3 phases of transition to the new habitat

In the old habitat prior to construction (baseline)

During construction

Move to new barn through 1 year after opening
Methods

Distance walked

• Average daily distance was measured using GPS monitoring.
• Multi-institutional study used for distance in former habitat.
• We collected GPS data for two females and two males.
• Elephants wore GPS anklets for 24 hours every 2 weeks.
• Distance calculations included only outside habitats.
Methods

Adrenal & reproductive hormones

- Reproductive hormones in serum are measured for routine management.
- Adrenal hormone metabolites in fecal samples were measured to assess adrenal response to changes.
- Samples were collected weekly for all individuals.

Behavior

- Behavior video on each individual was recorded weekly, morning & afternoon, 2min every 30min – total 8min/wk.
- Video team was 14 Visitor Animal Survey Team (VAST) volunteers.
- Hierarchical list of behaviors.
- Behaviors are coded by observers trained to 85% reliability criteria.
Distance Walked

• In the previous elephant habitat:
  – Chendra averaged 10.7 miles a day.
  – Sung-Surin averaged 4.7 miles a day.

• In Elephant lands:
  – Chendra averages 10.9 miles a day.
  – Sung-Surin averages 9.6 miles a day, doubling her average.
  – Samudra walks at least 6 miles a day.

• Reported average walking distance of wild elephants is 1.9 to 7.5 miles a day under normal environmental conditions.

• Oregon Zoo elephants appear to walk at least as far as, and possibly farther, than their wild counterparts on a daily basis.
Elephants are using the entire habitat and its resources.
They have indoor/outdoor access, and even on cold days individuals spend 4 to 20 hours outdoors.
Movement in Elephant Lands is more self-directed — they have choice and control.
Reproductive Hormones

• Historically, female elephants at Oregon Zoo show normal reproductive cycles, even through major social changes.
• Adult females continued cycling regularly throughout the transition to Elephants Lands, which is one indicator of normal reproductive health for the herd.
Adrenal Hormones

- All individuals exhibited the greatest variability in their adrenal activity during the period of major change, suggesting adaptive and normal adrenal responses to life changes, challenges and excitement.
- Elephants returned to baseline levels in the new habitat, suggesting they adapted well to the new environment.
- Adaptive and normal adrenal responses are an indicator of positive welfare.
Behavior

• In Elephant Lands, the majority of their time is spent socializing and interacting with their environment in a social context (22%), seeking food and feeding (40%), moving and resting (20%).

• The elephants are engaged in a diverse range of natural behaviors and demonstrating social dynamics of a healthy herd.
Behavior

Food-delivery resources designed into Elephant Lands are achieving the goal of providing foraging opportunities.

- Food object interaction increased by 20%.
- Feeding without interaction decreased by 20%.
- Switch from keeper-delivered food to feeding from food objects.
- Increased foraging is further supported by increases in daily walking distance and observed increase in locomotion (7% increase).
Behavior

Findings indicate increased choice and control over whom they spend time with and how they interact socially.

- Time spent engaging in social behaviors has increased (by 4%).
- Time spent in proximity of other elephants decreased (by 24%), reflecting a choice to spend time away from other elephants.
- Natural dynamics of a herd influence proximity with Samudra and Lily.
• Diversity of resources are used by individuals on their own (e.g. in the pool by themselves) in addition to sharing resources in a social context.
• Rare behaviors are important (pushing logs, mud wallows, playing with objects).
Summary

Results show that the zoo has achieved its goals with Elephant Lands.

• The elephants are expressing a diverse range of species-typical behaviors and demonstrating social dynamics of a healthy herd.
• They are walking further and foraging and exploring more.
• They are using the entire habitat and it’s resources.
• They have biologically meaningful challenges, and show adaptive and normal adrenal responses to change & challenge.
• They are exhibiting more choice and self-determination.
Ongoing Monitoring

• Elephants
  - Behavior methods developed for this study are being used in ongoing weekly elephant behavior monitoring.
  - Reproductive hormones are measured for routine management.
  - Adrenal hormones are measured as needed.

• Construction
  - Multiple species (e.g., orangutan, chimp, elephants, giraffes,...)
  - Behavior, physiology, physical condition, keeper notes, noise levels
  - Start in 2018 throughout construction period
  - Graduate Student through our OZ-PSU program
Thank You