

Corners Limited

is the proud sponsor of the
2014 ASAG Workshops



Avian Scientific Advisory Group



EVALUATING AN AVIAN COLLECTION'S BEHAVIORAL RESPONSE TO CONSTRUCTION DISTURBANCES



Gina M. Ferrie, Research Manager
Disney's Animal Kingdom

Prior Research on Noise Impacts

- Prior studies have shown that there can be negative impacts of construction noise on zoo animals
 - Behavioral changes in
 - Giant pandas (Powell et al. 2006)
 - Snow leopards (Sulser et al. 2008)



Prior Research on Noise Impacts

- Prior studies have shown that there can be negative impacts of construction noise on wild animals
 - Wild bird communities (Francis et al. 2009)
 - Reduced nesting species richness
 - Changes avian communities
 - Improved reproductive success in some
 - Disruption on predator-prey interactions
 - Individual species tolerance to human activity
 - Birds distributed near roads (McClure et al. 2013)
 - Decline in bird abundance
 - Avoidance of areas by species

Construction at Disney's Animal Kingdom's Avian Research Center (ARC)



- New addition being built in spring 2011 to ARC
 - Proximate to current building (5m)
- Implemented study to examine noise and visual cues associated with construction

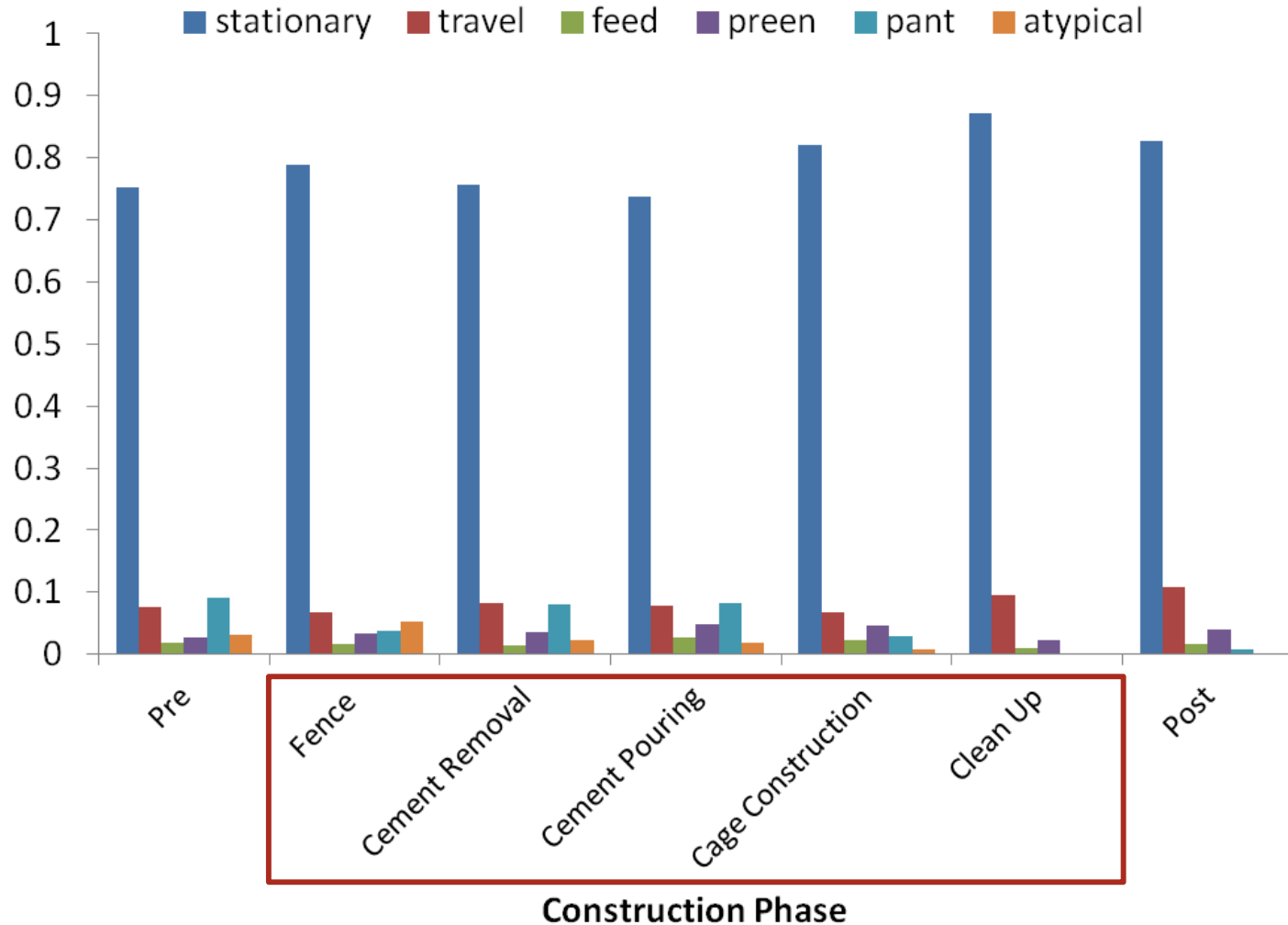
What is the effect of construction noise and activity on our avian collection?

- Observed 9 enclosures –
 - ▣ Contained 10 species at varying distances from construction
 - ▣ 10-minute observations, 4x per week
 - ▣ Recorded range of behaviors
 - ▣ Recorded sound level (dBc)
 - ▣ Noted whether workers were present and if they were visible to the birds

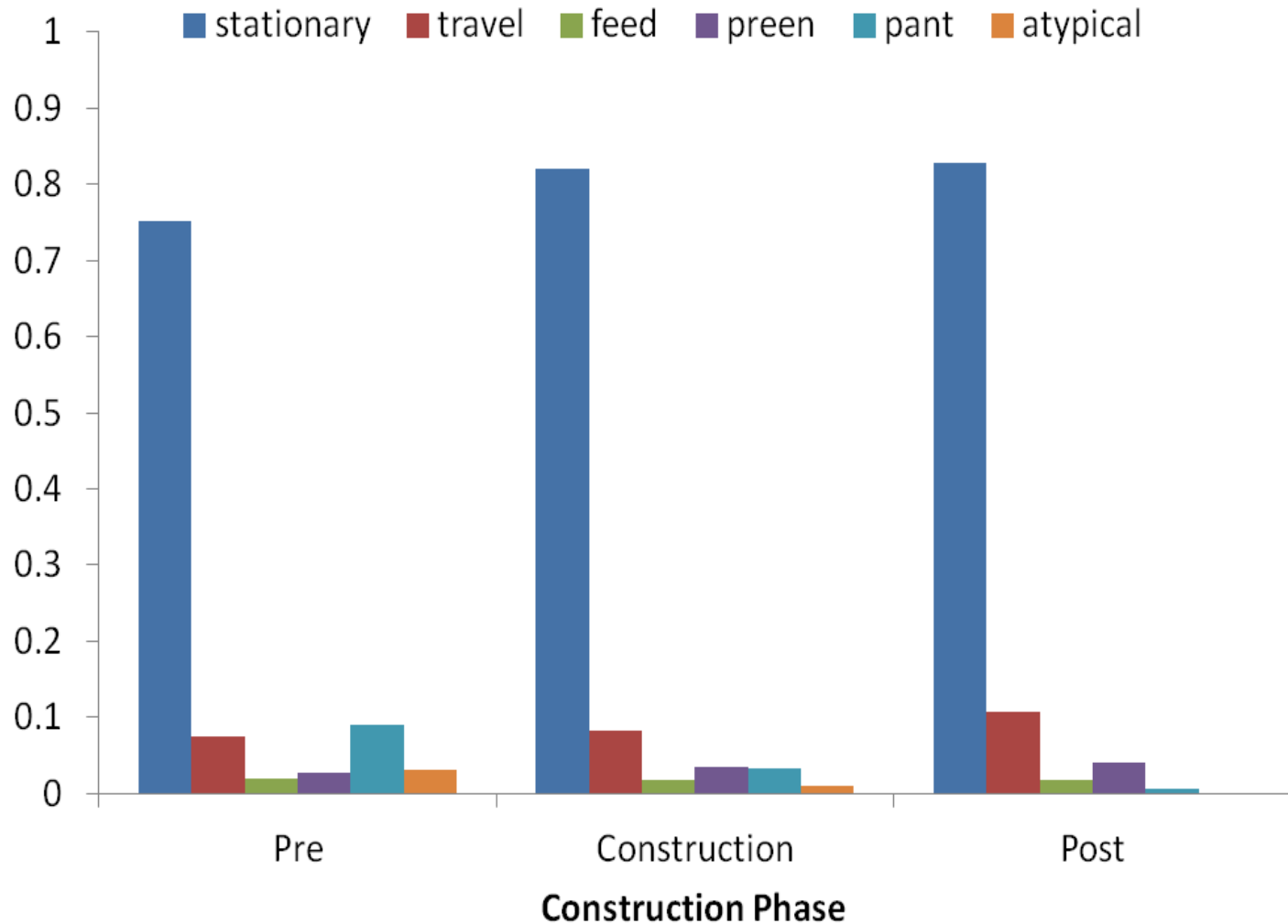


Did we observe change in the birds' behavior during construction?

Avg. Proportion of Visible Intervals



Avg. Proportion of Visible Intervals



Did we observe change in the birds' behavior during construction?

It doesn't look like it.

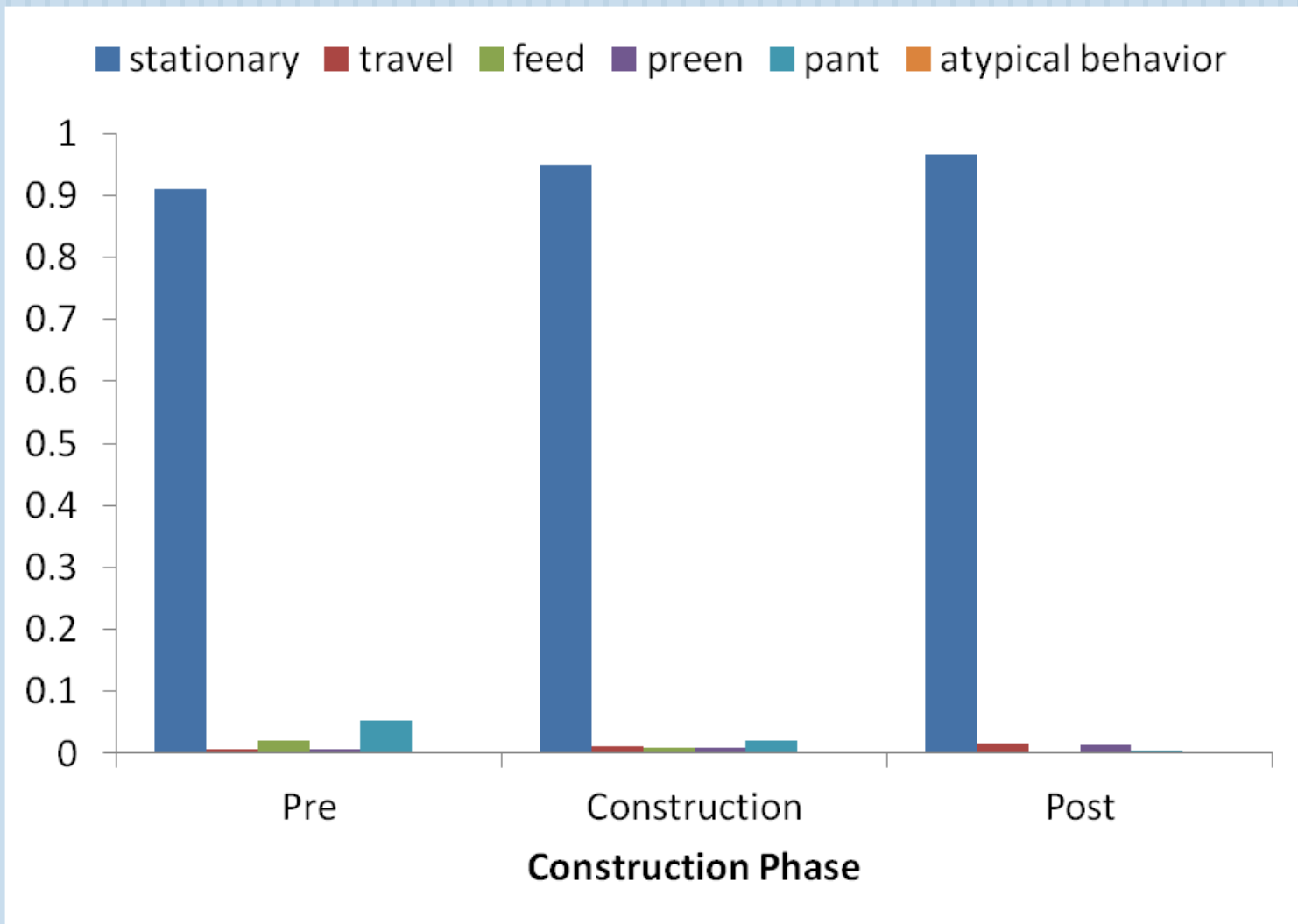
Did the effect of construction vary by species?

Species Composition

- Small sample sizes in many species
 - ▣ Black crane: 1.1
 - ▣ Blue-headed dove: 2.2
 - ▣ Black-naped dove: 1.1
 - ▣ Crested coua: 1.1
 - ▣ Collared finch-billed bulbul: 0.1
 - ▣ Green broadbill: 0.1
 - ▣ Indian pygmy goose: 1.0
 - ▣ Micronesian kingfisher: 6.2
 - ▣ White-headed buffalo weaver: 1.0
 - ▣ White-cheeked bulbul: 3.1



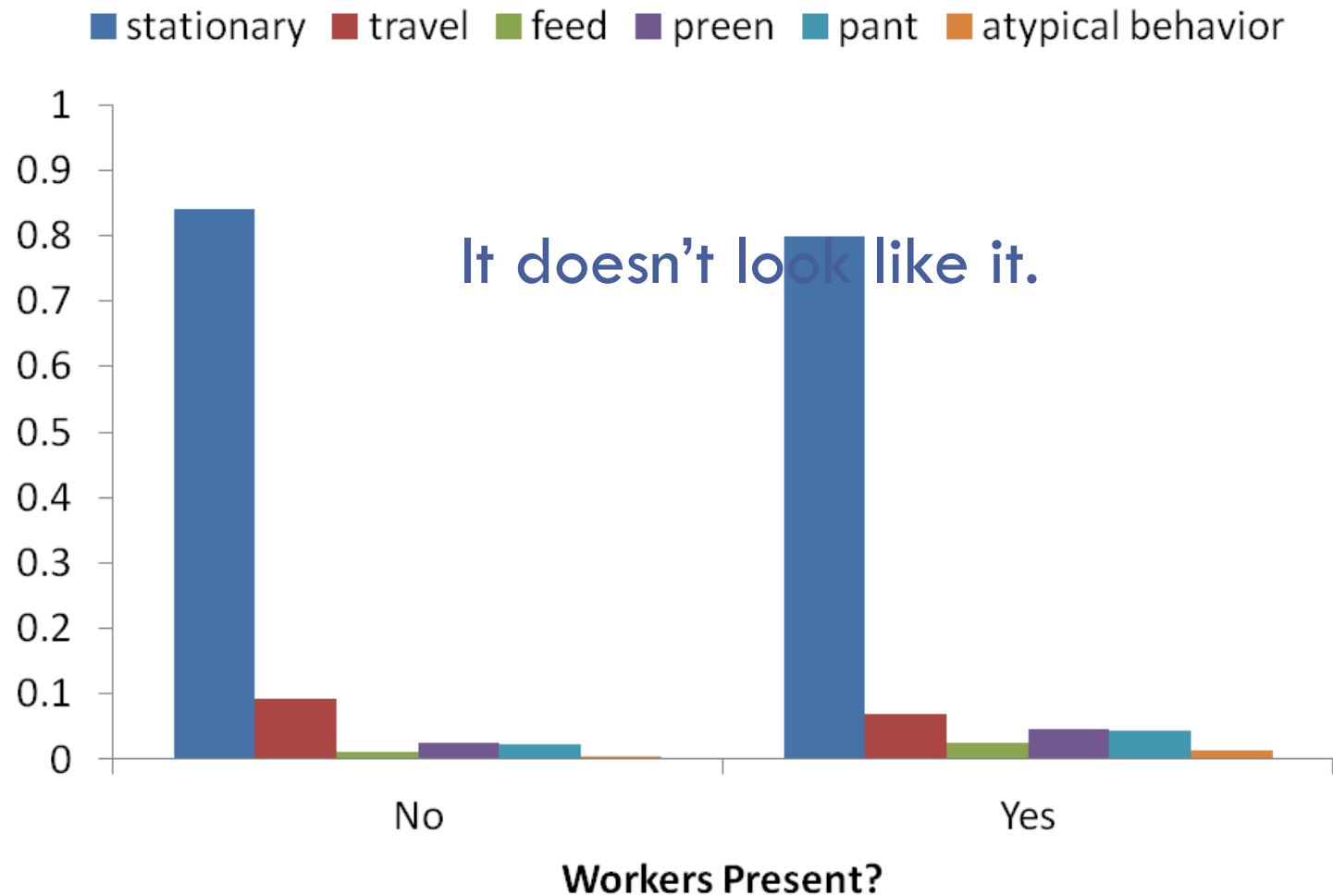
Average Proportion of Visible Intervals: Micronesian Kingfishers



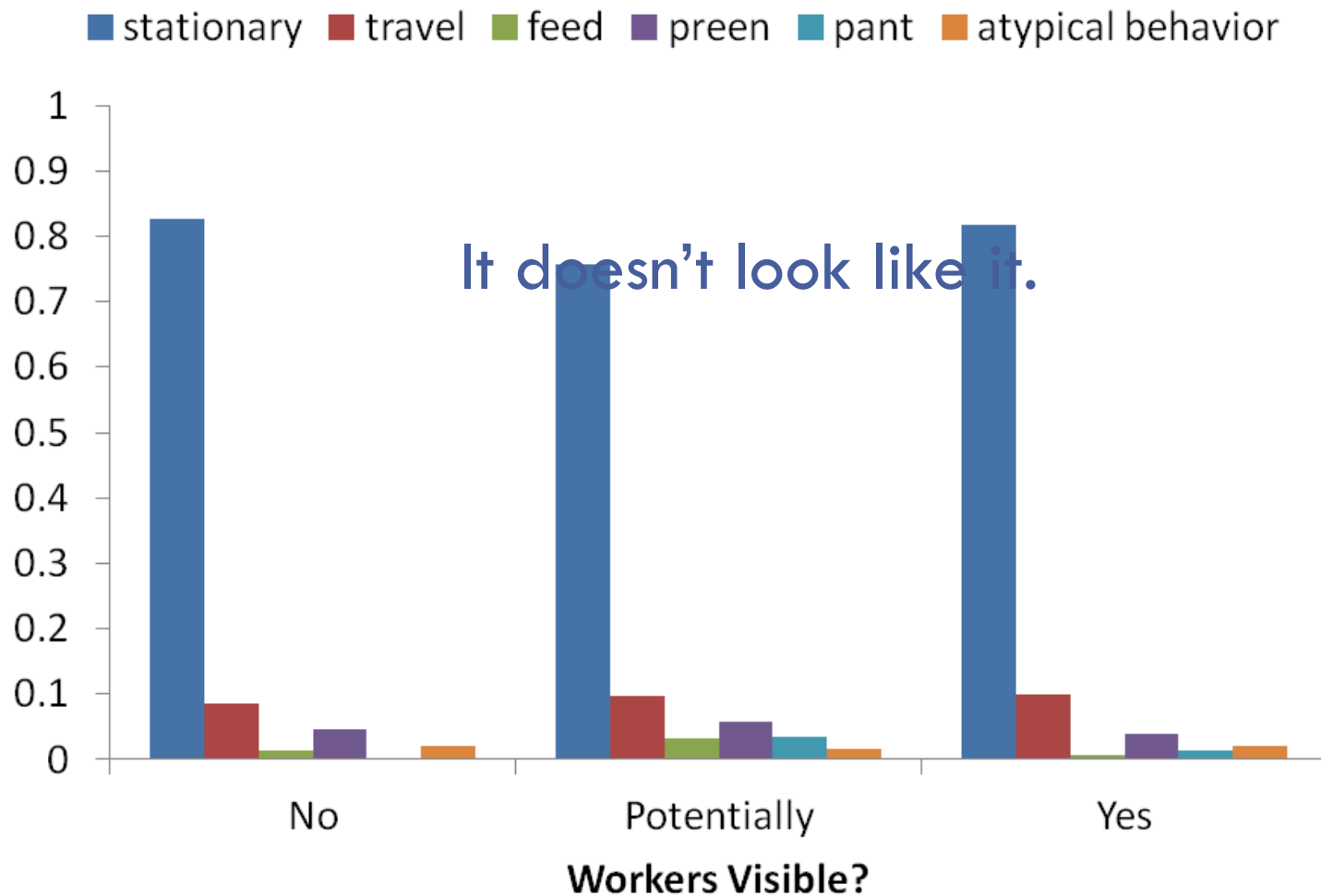
Did the effect of construction vary by species?

It doesn't look like it.

Did the effect of construction vary by worker presence?

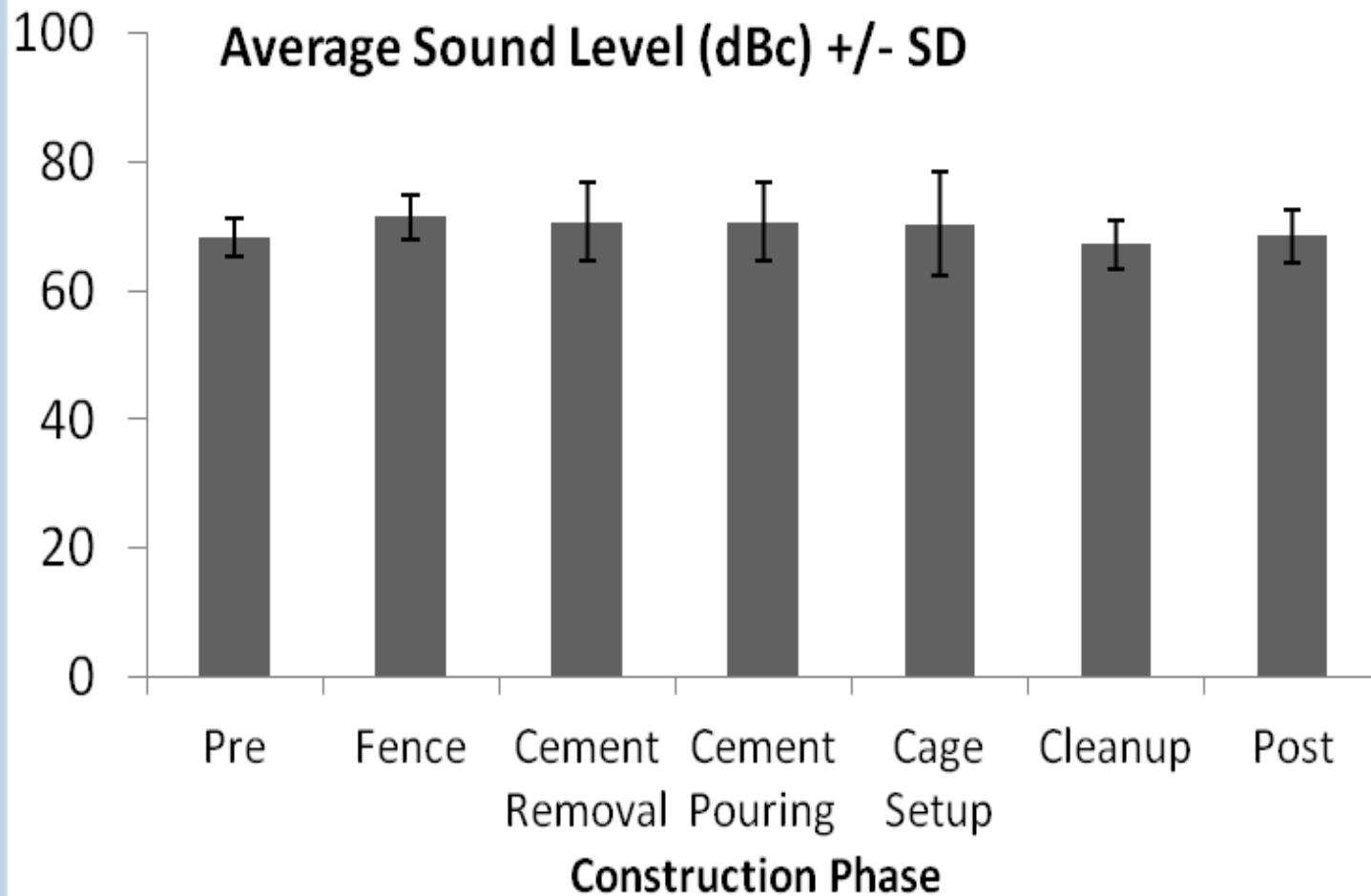


Did the effect of construction vary by worker visibility?

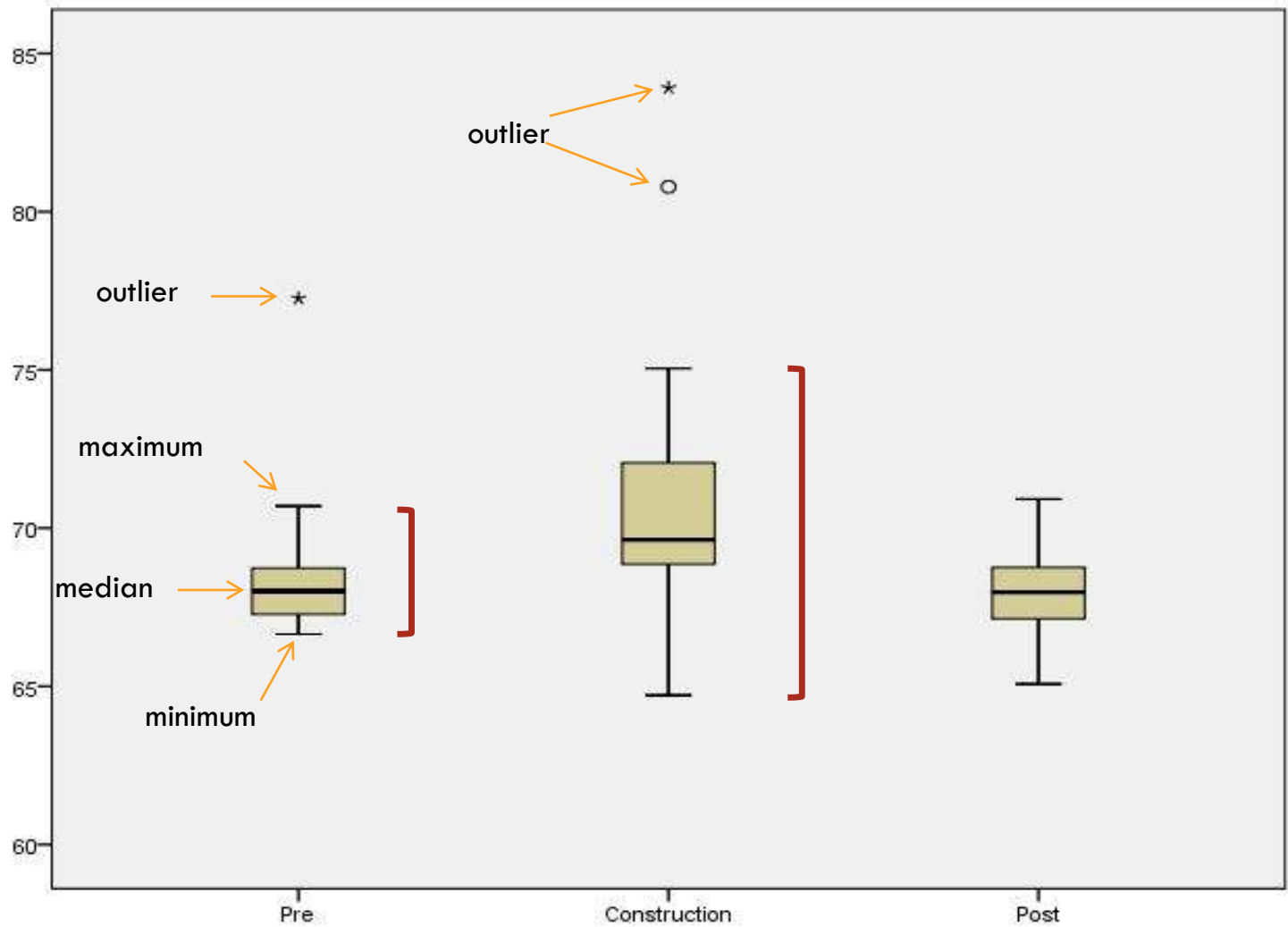


Did construction make the birds'
environment louder?

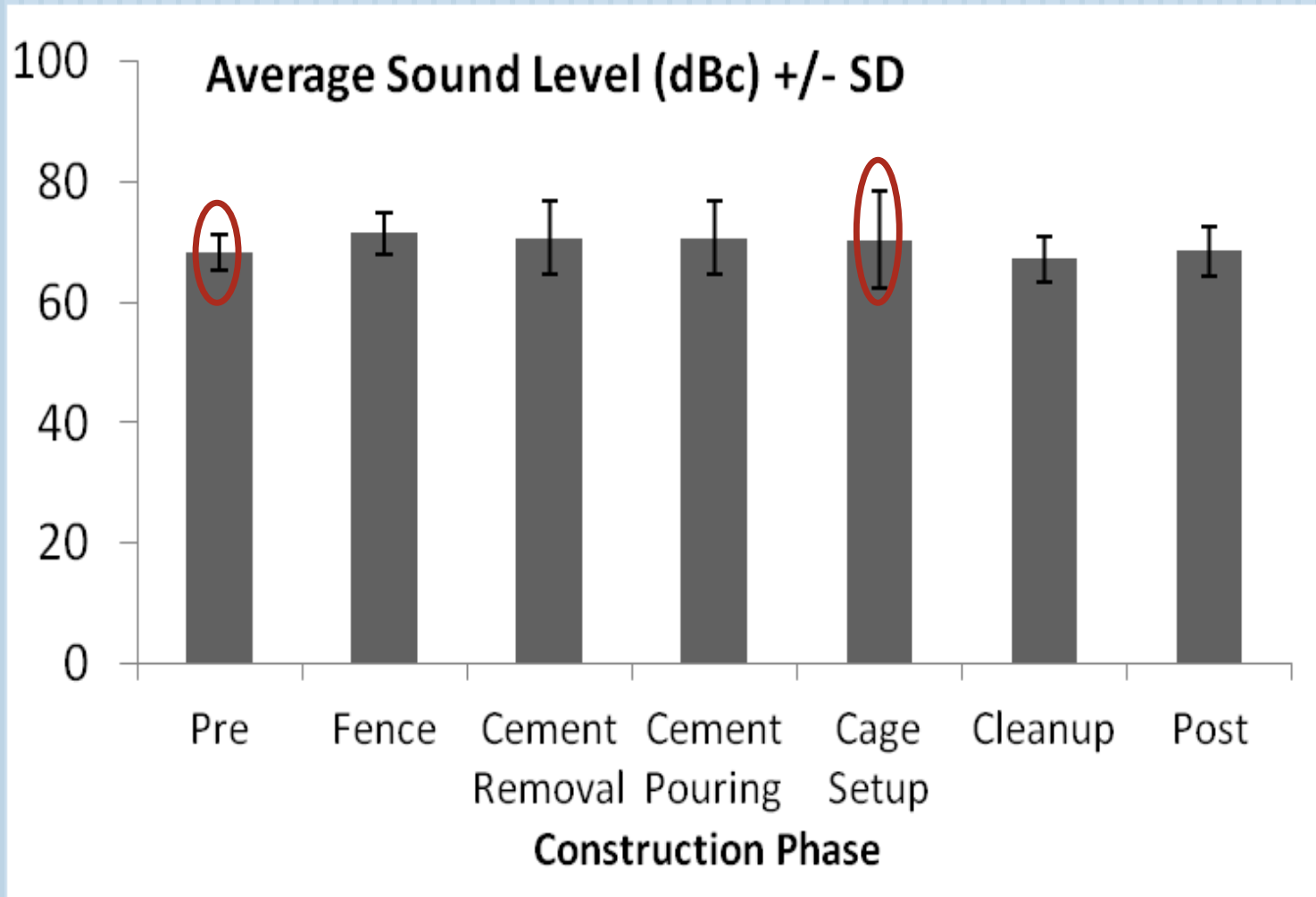
Did construction make the birds' environment louder?



Sound Level (dBc)



Did construction make the birds' environment louder?



Did construction make the birds' environment louder?

Rare occurrences – but in general no.

What did we actually find?

- Overall, no evidence that birds' behavior was significantly altered by construction
 - High background noise levels and the routine presence of unfamiliar people prior to construction → mimicked the potential stressors associated with the construction site

What did we actually find?

- Conclusions are restricted by:
 - Low sample sizes within each species, many study species
 - Continuously changing social environment and seasonal changes
 - Birds come and go from enclosures for social and management needs
 - Study began in spring and ended in fall
 - Limited measure of construction noise
 - Only measured loudness
 - What about tone, pitch, frequency?

What could be improved for future studies to consider avian welfare?

- Results were not informative for management alterations or generalizable beyond the scope of the current study
 - Recommend this as pilot study that can be useful in guiding future work
- Gave insight to prior noise and activity levels
 - Subsequent construction projects
 - Increased tour activity

What could be improved for future studies?

- Future studies should include:
 - Stable social environment
 - More precise sound measurement
 - Include frequency, variation
 - Different measure of stress eg. corticosterone
 - This requires knowledge of molt and feather growth patterns and much longer baseline period
 - Longitudinal parameters from management
 - Weights
 - Egg production
 - Reproductive data (nests, behavior)

Conclusions – Final Learnings

- Evaluating avian welfare during construction not as simplistic as we thought
 - Many additional parameters and confounds than noise and activity from construction
- Conducting planned observations increased our awareness of activity around building/enclosures
- Study set precedent for large scale welfare assessment being implemented as Disney's Animal Kingdom undergoes construction in next 5 years

Acknowledgements

- Thanks to members of the Science Operations Team: Annie Valuska, Justin Bohling, Julia Hartert, Morgan Mingle, Alison Grand, and Katie Leighty
- Thanks to ARC keepers and Aviary Team Management: Chelle Plasse, Paul Schutz, James Mejeur, Sue Maher, Christy Sky, Glori Quinones, Shawnlei Breeding, Brent Nelson
- References:
 - Francis C, Ortega C, Cruz A. 2009. Noise pollution changes avian communities and species interactions. *Current Biology* 19:1415-1419.
 - Powell D, Carlstead K, Tarou L, Brown J, Monfort S. 2006. Effects of construction noise on behavior and cortisol levels in a pair of captive pandas (*Ailuropoda melanoleuca*). *Zoo Biology* 25:1-18.
 - Sulser C, Steck B, Baur B. 2008. Effects of construction noise on behavior of and exhibit use by snow leopards *Uncia uncia* at the Basel Zoo. *International Zoo Yearbook* 42:199-205.



Questions or Thoughts?

Corners Limited

is the proud sponsor of the
2014 ASAG Workshops



Avian Scientific Advisory Group