

Proceedings of the 43rd Annual National Conference of the American Association of Zoo Keepers, Inc.



AAZK 2016

CREATING A HARMONY WITH WILDLIFE

M E M P H I S

September 19th – 23rd

Posters



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Use of the Human-Animal Bond as a Positive Reinforcer in Training of 0.1 Amur Tiger (*Panthera tigris altaica*).



Rachel McKee¹ & Katie Alexander²

¹Mesker Park Zoo and Botanic Garden

²Chattanooga Zoo

Background

In January 2015, 17-year-old 0.1 Amur tiger "Kashka" had a difficult recovery following a veterinary procedure and subsequently went into renal failure. Over the next month she lost food motivation and quickly became inappetent. Keepers spent a lot of time attempting to get her to eat and take medication. It was noticed that even though she was not interested in eating, she would always still approach us and remain at the mesh. We felt that this was largely due to the fact that we had previously spent a lot of time building trust and a positive relationship with this tiger, as she was historically fearful.

In order to provide necessary medical care, keepers and management staff decided to move forward with attempting to finish incomplete behaviors and train several new behaviors using this human-animal bond as a reinforcer.

Methods

Training Status at Time of Illness

Established behaviors

- Sit
- Down
- Target
- Injection - "touch"

Behaviors in progress

- Tail (pulling tail through mesh and holding for blood draw)

Behaviors Introduced

- Needle stick/stay for blood draw
- Sit/stay for SQ fluids
- Stand/stay for X-rays

- Two barrels used to create a "chute" in her den had already been introduced for injection and blood draw training.
- We decided to use the same setup with some modifications for attempting to deliver subcutaneous fluids and obtaining abdominal X-rays.
- Though Kashka was not eating regularly, food items were always brought to the training sessions and offered.



In order to achieve positioning for subcutaneous fluids, we moved the barrels closer together and towards the wall. This created a smaller space in which she would sit allowing us to be able to access multiple points on her body where we could administer the fluids. We used the same verbal command (touch) when administering fluids as used in her injection behavior.

To begin desensitization for abdominal X-rays, a bucket was set outside the mesh to simulate placement of the X-ray machine. To create the set up for X-rays, we used the barrel "chute" she was accustomed to. The barrels were moved closer and a large PVC piece was added to the center to create a flat surface for the X-ray film to be attached. A thin PVC piece was used to stop her in the correct position. This process was completed and X-rays obtained over a 3-day period.



X-rays were used to rule out additional causes of inappetence and constipation.

Outcome

- Successfully trained unfinished/new behaviors utilizing the human-animal bond
- Able to obtain successful veterinary diagnostics in the form of blood work and X-rays
- Able to administer life-saving subcutaneous fluids to support kidneys until appetite returned and consistent oral medication could be delivered
- With supportive care we were able to stabilize renal failure, improving quality of life
- Kashka eventually improved to normal activity levels, exhibit utilization, participation in training sessions, enrichment interaction, and attitude.

Blood value	January (procedure)	February	March	April
BUN	37 mg/dL	51 mg/dL	53 mg/dL	57 mg/dL
Creatinine	3.4 mg/dL	10.6 mg/dL	6.3 mg/dL	4.9 mg/dL
Phosphorus	7.2 mg/dL	8.7 mg/dL	7.4 mg/dL	6.1 mg/dL

Discussion

We feel that the rapid progress we were able to make with medical training in an emergency situation was aided by the established trust and bond we had with this animal. The ability to administer subcutaneous fluids coupled with the appetite stimulant effects of mirtazapine supported her until we were able to stabilize her condition.

- Making the establishment of the human-animal bond a priority with all animals in your care can greatly aid your ability to provide necessary husbandry in dire or abnormal situations
- Keeping the lines of communication open with vet and management staff during routine times can prepare the team for when emergencies arise
- Don't be afraid to think outside of the box in emergency situations and offer suggestions that may go against normal training procedures



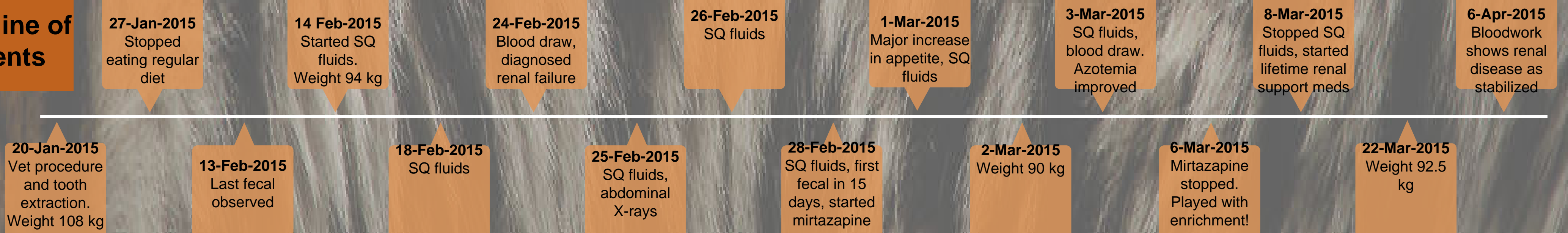
Kashka enjoying her exhibit April 2015

Acknowledgements

We would like to thank Dr. Carrie Ullmer and Kristie VanHoosier for outstanding veterinary care and their flexibility working with keepers. We would also like to thank management at Mesker Park Zoo for their support, along with Mesker Park AAZK and Chattanooga Zoo.



Timeline of Events



WINTER IS COMING! For Toronto Zoo's Southern Ground Hornbills, that's a good thing!



(*Bucovorus leadbeateri*)

Deserrai Burke

Africa Savanna Keeper Gr. 3 ● Toronto Zoo



ONE is Lonely, Two is Company and Three is . . .

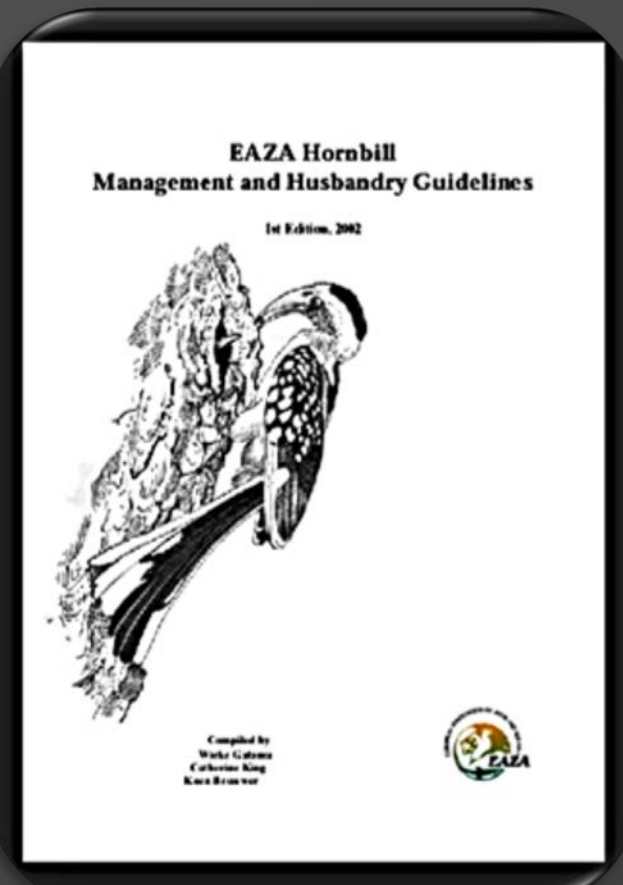
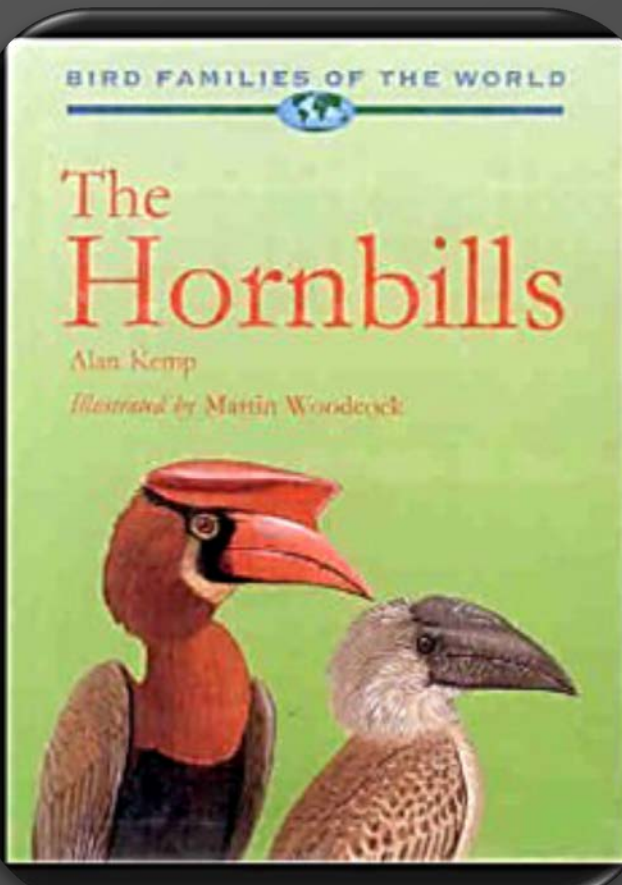
- "Biko", our male Southern Ground Hornbill (*Bucovorus leadbeateri*) and his mate "Catelyn" came to the Toronto Zoo in 1997.
- They have been managed in a mixed species outdoor exhibit from approximately May to October and off exhibit in winter holding from November to April each year.
- The hornbills have shared their space with a variety of animals which currently includes Greater Kudu (*Tragelaphus strepsiceros*), a White Headed Vulture (*Trigonoceps occipitalis*) and a Marabou Stork (*Leptoptilos crumenifer*).



JUST NOT HAPPENING !

- "BIKO" AND "CATELYN" HAVE PRESENTED KEEPERS WITH TWO MAIN CHALLENGES:
- 1) A LACK OF BREEDING SUCCESS
 - 2) FREQUENT ESCAPE ATTEMPTS .
- REPRODUCTIVE ACTIVITIES BEGAN IN 1999 WITH A FEW NOTATIONS SUCH AS EGGSHELLS BEING FOUND IN THE NEST BOX.
 - ESCAPE ATTEMPTS OCCURRED ON MULTIPLE OCCASIONS FROM 2003 – 2011 BEING THE LAST FALL ESCAPE.

WILD THING, YOU MAKE MY HEART SING! Helping our Hornbill Family Grow



Empowering Animals Through Enrichment

Shelly Cook

Cheyenne Mountain Zoo

African Rift Valley

How do you empower animals through enrichment? We have found that being organized and implementing your help to fullest of their abilities, will take even your most “timid” animal to it’s next level of confidence and keep your most confident animals active and “happy”. This is how we do it.

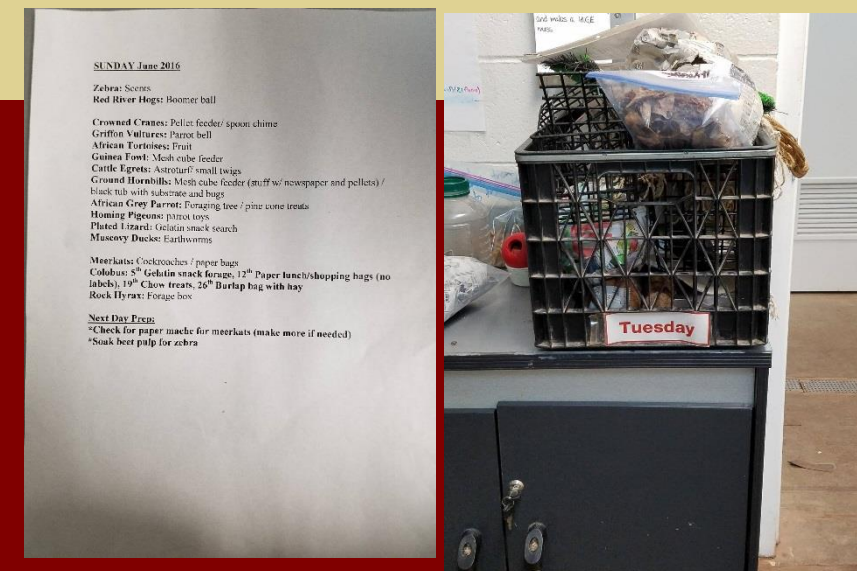


Step 1: Implement an enrichment calendar

A calendar is made for each species. This provides a complete overview of what that species is to receive each day of that month. To ensure the enrichment is successful there is an enrichment scoring system that the zoo implemented. This is found on the calendar too as a guideline. As the enrichment is handed out and observed the calendar is filled out. Enrichment items are changed each month so the animals get a variety. We have found that this system has made it easy to hand out two items a day for many of our species.

Step 2: Make daily enrichment schedule with enrichment bins

So that you do not have to look at the binder with the enrichment calendar all of the time, a bin with a daily overlook at each species and what they get that day can be placed in an area where you make enrichment. In our case it is in the kitchen. Seven bins are made for each day of the week. When the enrichment is handed out, the following days enrichment bin is brought out and enrichment for the next day is prepared. This makes it easy and accessible for the keepers to hand it out. Items that are too large to fit into the bin, are placed in areas keepers can easily find.



Step 3: Take pictures of enrichment items

Pictures say a thousand words. Helpers that may be putting your enrichment together may not know exactly what certain items are. We are very busy and helpers are often left alone to get items ready and this helps them to get the correct item.



Step 4: Keep updated “on hand” enrichment lists

At our institution, enrichment items have to go through an acceptance process. As items get approved they are either put in a binder “to be made” or in our “on hand” binder. Our on hand lists are next to the enrichment calendars in the same binder. This makes them accessible when the new enrichment calendar is made.



As time went on we received more help in the way of volunteers, interns, keeper assistants and junior zookeepers. With the plan implemented in such an organized way, these extra helpers can make the calendar, schedules and bins as well as the enrichment items by themselves. This gives helpers more power in the enrichment process and excitement. They often come up with new ideas for the animals. These helpers often hand out enrichment items themselves.



Through this plan we are well on our way to “free feeding” obsolete. We are able to hand out enrichment two items a day to most of our animals. This program offers more choices of enrichment and in turn this makes animals more curious of new items creating confidence. We have found that when the animals are more confident they train with more confidence too. When the animal shows positive behavior in receiving enrichment before or after a training session it can be used as an antecedent or consequence in training sessions.



Dealing With A Difficult Shifter:

The Trials & Tribulations of Taza

By: Allycia Darst & Jill Dignan
Lincoln Park Zoo, Chicago IL



INTRODUCTION

When our snow leopard (*Panthera uncia*) "Taza" arrived in December of 2014, the keepers had no idea what we were in for. There is always an adjustment period while an animal acclimates to their new surroundings and routine. We had never dealt with such extreme shifting issues. We soon realized that we had to modify our methods to fit his needs. It was a lot of trial and error but over time we built a relationship and Taza is now one of the most reliable shifters.



PROPER PRIOR PLANNING

- History
 - It doesn't matter whether you're dealing with a brand new animal or one that's been there for 10 years
 - Natural history
 - Example: snow leopards are generally shy, elusive animals
 - ADT/Specimen Report
 - Look over any information you can get on the animal before it's arrival and start to plan ahead
 - Keeper contact
 - Talk with the animal's current keeper(s) as well as the quarantine keeper once the animal arrives to gain insight about the animal's behavior
- Communication
 - Important to have a written plan so that things are communicated clearly and everyone is being consistent
 - Protocols should be changed/updated as often as needed; changes should be dependent on the animal's behavior not pre-set time lines
 - Make sure all staff (keepers, managers, etc.) are included when discussing changes to the plan- everyone has different ideas
 - Very important to keep detailed records of progress/setbacks daily, as well as communicating orally and via email
- Flexibility
 - When something's not working, change it
 - You must have this mindset going into the process, so set yourself and the animal up for success
- Remember
 - Shifting is a behavior, so it should be treated like one
 - No two animals are the same; what worked for one may not work for another
 - Things will not change overnight; it will sometimes take a lot of time and commitment up front but there will be extremely valuable long term effects

TAZA'S STORY

- Taza was 1.5 years old when he arrived from Memphis Zoo. He had recently been separated from his mother, so was very naïve and did not have a lot of experience shifting on his own.
- He spent 30 days in quarantine at our hospital, and according to the hospital keepers he was relatively easy to work with. He arrived at Lion House under sedation, so he woke up in a strange new place. There were new people and he could see and hear other cats.
- His living area consists of an indoor den (behind the scenes) and an outdoor habitat. He was kept inside the den the first 2 days, and then given access to his outdoor habitat the 3rd morning. While kept inside he would not approach us, and would not eat.
- We only feed the cats in their dens, so once he was given access outside it was up to him to come back in to be fed. He was used to being fed once a day at Memphis. We feed twice a day so ideally we wanted to get him on that schedule.
- He would not respond to us calling him to come in. We left him with access to the den all day and even left food on the floor for him so that he could come in and explore on his own, but if he happened to be inside and would see or hear us coming he would run out.
- He did not eat for 4 days so we knew we had to do something.

SUCCESS!

Now we can't get him to leave sometimes!

- The 3 C's
 - Communication
 - Consistency
 - Commitment
- When all was said and done, we changed the protocol over 15 times
- From the time he arrived to when he became a solid, reliable shifter took about 10 months (longer than any other cat)
- He has since trained for a successful voluntary hand injection and is currently in training for a voluntary blood draw.



WHERE TO BEGIN

Goal: shift inside within a few minutes when called and be comfortable being secured in the den.

- Had to lower our expectations at the start
 - Start with one feed per day
 - No sense trying for 2 feeds if he's not even coming in for 1
 - Call him at a specific time of day
 - Had to change the time based on what he was showing us
 - Only call him if awake and alert
 - Don't call him if sleeping, just desensitizes him to being called
 - No visual of him in the yard from behind the scenes, so we had a spotter to watch him and let us know if he was responding
 - Call him by name and give a start of session signal (triple whistle blow) so he learns that this is when food is available
 - 20 minute time frame to shift, and a 2nd opportunity later if he did not come in the 1st time; gradually decrease the over time
- Trust
 - It was clear that it was us that he was uncomfortable with
 - Decided to try feeding him outside at the front of the habitat to build a relationship, and after 2 days of success went back to steps above
 - Started with food on the floor close to the shift door, and gradually moved it closer to keeper until coming directly from keeper's hand
 - Started training program immediately (bridging, targeting, basic follows)
 - No door movement until we all felt he was ready
 - Very important to have managers on board, as no door movement meant no cleaning the yard
 - Small approximations until door could be closed all the way
 - Verbal cue before door movement, and only moved it while he was actively eating; if he reacted we would stop and resume once he started eating again
 - Gradually increase duration of time the door is closed
 - Once ready to clean the yard, be as quick as possible
 - There is bound to be a setback that first time, so build behavior back up before locking in again
 - Variability with yard cleaning (time of day, how often per week)
- Consequences
 - Very important- he had to learn that food was only available at certain times, and that he would not get food if he did not show up
- Challenges
 - Coming to door when called but not shifting in
 - Motivation (bone days, warmer weather)
 - Only shifting for certain keepers
 - Cross trainers

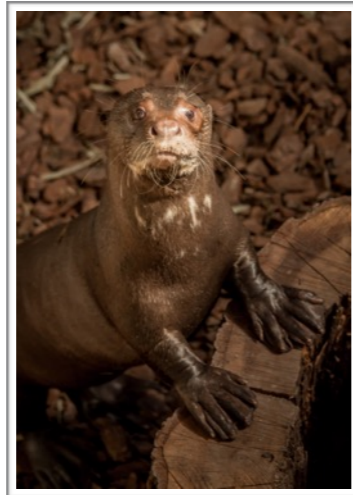
GIANT OTTER TRAINING: ACTIVE PARTICIPATION IN CAPTIVE HEALTHCARE

DANE JORGENSEN, LEAD KEEPER OF PRIMATES, BIRMINGHAM ZOO

Introduction: Animal care staff at the Birmingham Zoo implemented a proactive giant otter training plan in order to assist species' husbandry, management, and medical needs. Guided by a few priority veterinary goals, the training developed into a comprehensive program that aids in overall welfare through voluntary participation. The resulting successes highlight and support training as an essential component of captive otter care.

Methods:

- Core routine of behaviors
- Communicate effectively
- Innovative applications
- Train to think calmly
- Extend durations
- Create distance
- Test behaviors
- Relationship
- Confidence
- Equipment



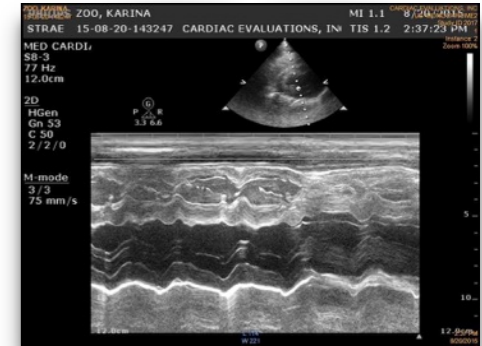
Results:



Chute Port/Window



Ultrasound



Echocardiogram



Injection



Blood draw



Open



Body presentations



Radiograph



Weights

Discussion:

- Behavioral management
- Elevate captive healthcare
- Proactive program / prepared
- Reduce stress / improve welfare
- Minimize medical immobilizations / risks
- AZA Otter Training Recommendations future

Acknowledgements:

Bridget Weidner & vet staff; Dr Straeter; Pat Flora; BZI management, animal department staff, and maintenance crew.



Successful Assisted-rearing and Reintroduction of African Painted Dogs (*Lycaon pictus*)

Michelle Kuchle

Cincinnati Zoo and Botanical Garden



The Beginning:

Imara 0.1+ Brahma 1.0



Solution #2:

At 26 days- pulled 5.1 pups (leaving dam with 1.3 to continue nursing stimulation). Brought to nursery and fed Clinicare™ milk replacer then Milk Matrix™ formula mixed with some 10% fat Nebraska Feline Diet ~ every 3 hours.

The Problem:

A litter of 6.4 pups continually nursing resulted in nipple irritation and dam began to refuse nursing attempts at 23 days post-partum.

Extra TLC:

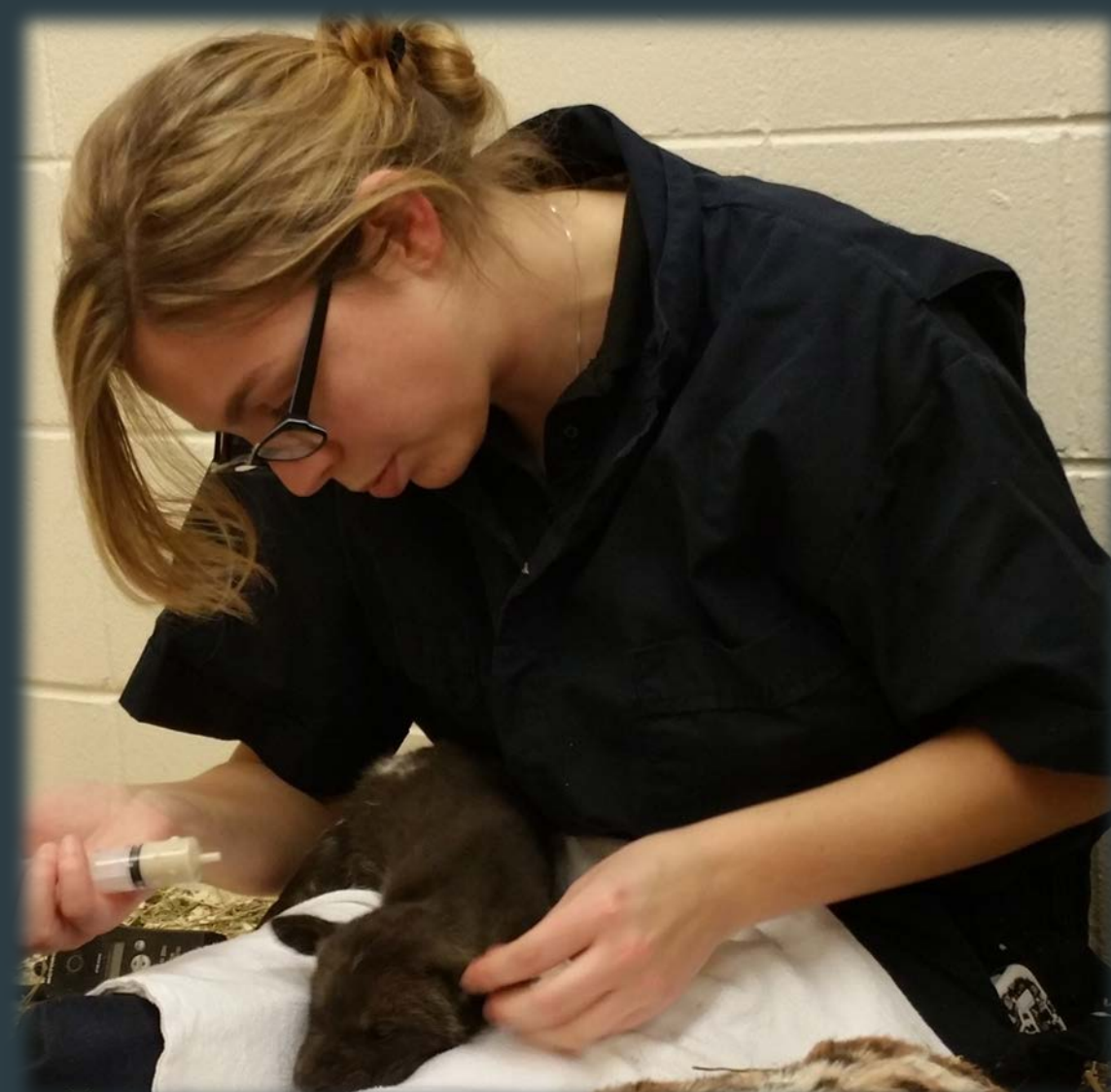
1st given formula out of syringe, then out of bowl, then added meat- all to initiate weaning process. Given subcutaneous fluids 2x/day for 1st four days to reverse their dehydration. Given pedialyte™ and probiotic supplement.

Solution #1:

At 25 days- pups were given ~25cc subcutaneous fluids and 3 supplemental feedings (milk and meat) throughout day in birthing box. However, hydration and energy levels in pups significantly dropped, requiring a new plan.

The End:

After 7 days of assistance, 3 of the pups were placed back with the dam. The remaining 3 pups were put back 3 days later. Prior to introduction, entire litter was rubbed with adult fecal material so that the entire litter would appear similar. Imara and Brahma were released back inside and a big, happy family reunion occurred! As pups were mostly weaned at this point, sire then helped by regurgitating for pups.



A special thanks to Dawn Strasser, Dana Burke, Ellie Tighe, and Mike Dulaney!

Keeper In Disguise: Costume Rearing A Hooded Crane Chick (Grus monacha)

Angela Martell, Aviculturist/San Antonio Zoo

Introduction

The San Antonio Zoo is home to many species of cranes. One of these are a pair of Hooded Cranes (*Grus monacha*). The San Antonio Zoo has costume reared cranes in the past, namely Whooping Cranes (*Grus americanus*). The opportunity still remained for the other crane species housed at the San Antonio Zoo. That opportunity arose in 2015 when a Hooded Crane egg, fertilized by artificial insemination, hatched. One of only two in 2015. Due to threats from predators out in exhibit, the decision was made to costume rear the chick. The final decision is always based on what is best chance for a chick's survival.



Hooded Crane (*Grus monacha*) pair
Photo taken by Angela Martell



Chick hatching
Photo taken by Angela Martell



Chick encouraged to eat during the first days
Photo taken by Anita Vincent



Keeping track of weight
Photo taken by Becky Hardin

Raising A Healthy Chick

Like all long legged birds, a crane's legs need to be strong and sturdy. Daily exercise sessions are performed several times a day to strengthen growing legs. Walking the chick or dips in a "pool" are part of the daily exercise routine. Being so young, chicks can tire easily. Sessions can last 15 -40 minutes depending on how well a chick is handling the session and how much weight is gained.

Weights are taken daily until about day 23. Through a simple calculation, the percentage of weight gained or loss is determined. After day 23, weights are taken every other day. Weight loss is normal on day 1, the day after hatch. Average weight gain is 10%.

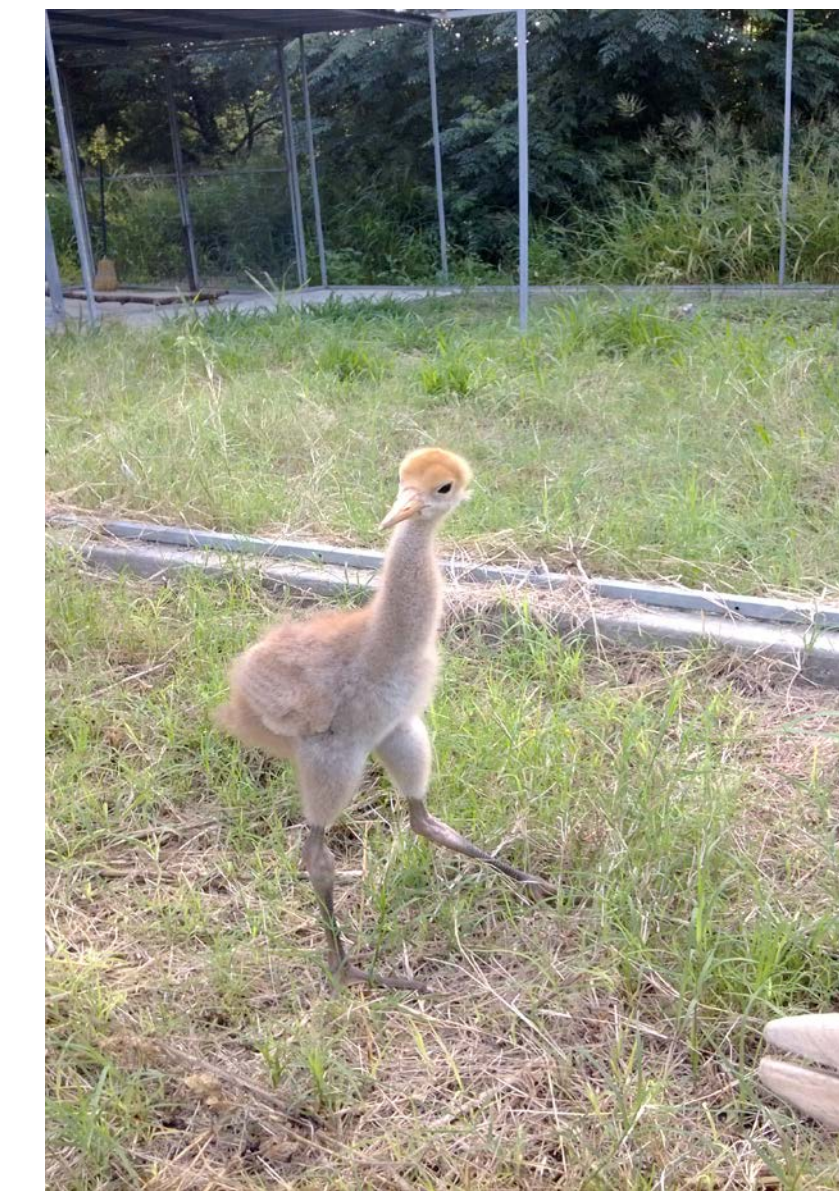
$$\begin{aligned} \text{Today's Weight (120.0g)} - \text{Yesterday's Weight (109.5g)} &= 10.5\text{g} \\ 10.5\text{g} \div \text{yesterday's weight (109.5g)} &= 9.6\% \text{ gain} \end{aligned}$$



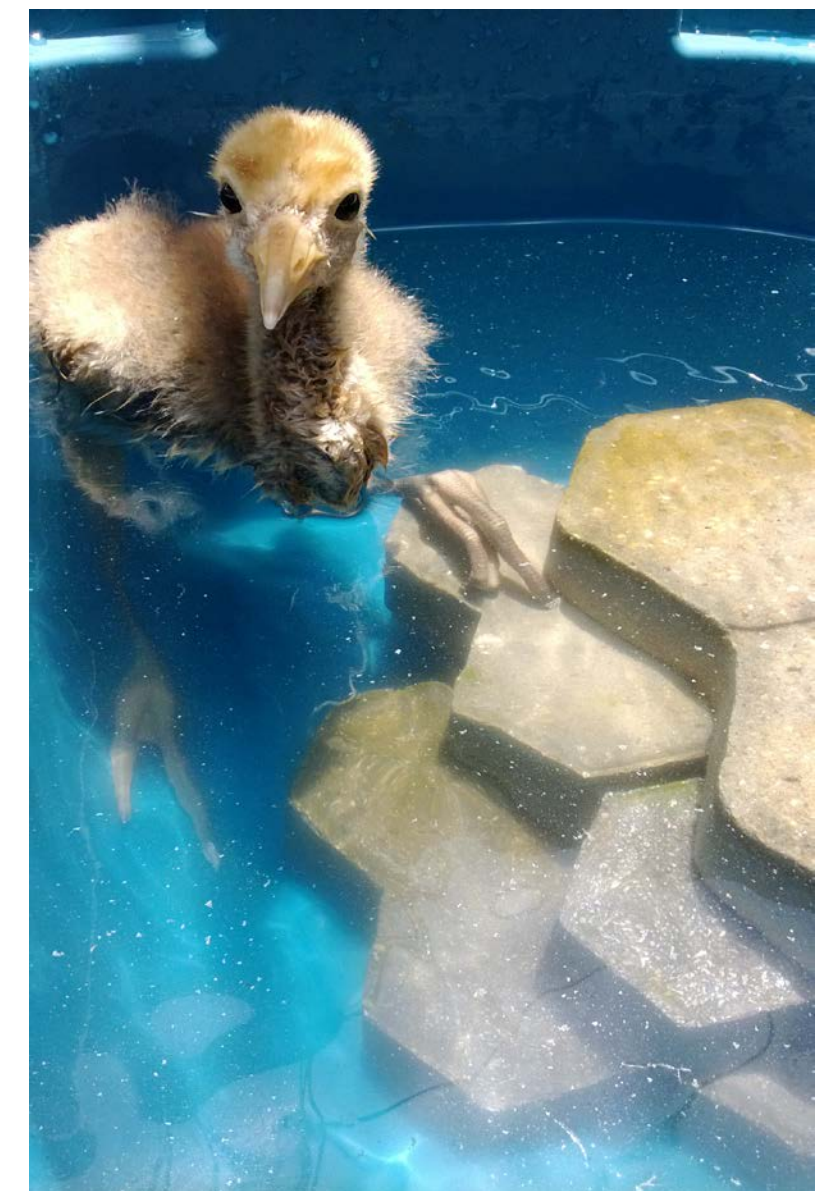
Photo taken by Angela Martell



Photo taken by Anita Vincent



Photos taken by Angela Martell



Assuming Your Secret Identity

The ultimate goal is to not only raise a healthy chick, but to also prevent imprinting on humans. The chicks raised will be eventually paired up once grown. Being "ambassadors" for their species, chicks need to know they are cranes. Changing into a costume to conceal your identity while being raised off exhibit accomplishes this goal.

There are a few basic rules while in costume. Once you change into your costume, without a chick seeing, you are no longer human. You are a crane parent to the chick. Important skills, like foraging are taught. This means no talking or radios allowed. The only noise should be vocalizations you make to the chick. This is usually a series of purrs of various pitches that puts the chick at ease.

Also, you are covered head to toe, including hands. The average temperature in Texas during this time is 100 degrees with high humidity. The heat index averages 106 degrees.

Conclusion

By day 55, our growing boy "graduated" to his very own exhibit. Here he gained his independence while we waited for a mate to be available. On August, 2015, he was sent to Oklahoma City Zoo. to be paired with a female.

On June 9, 2016 and June 11, 2016, two male chicks hatched and are being costume reared at the San Antonio Zoo. Being brothers, there is the added task of sibling rivalry. This has involved slow supervised introductions in addition to the before mentioned tasks.

Contact

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Acknowledgements: Thanks to Anita Vincent for passing on her knowledge and Travis Koones for giving me the opportunity.

Management of Stereotypic Behavior in Polar Bear

(*Ursus maritimus*)

Nicole Pepo

Rocky Coast Mammal Team

North Carolina Zoo

Asheboro, North Carolina

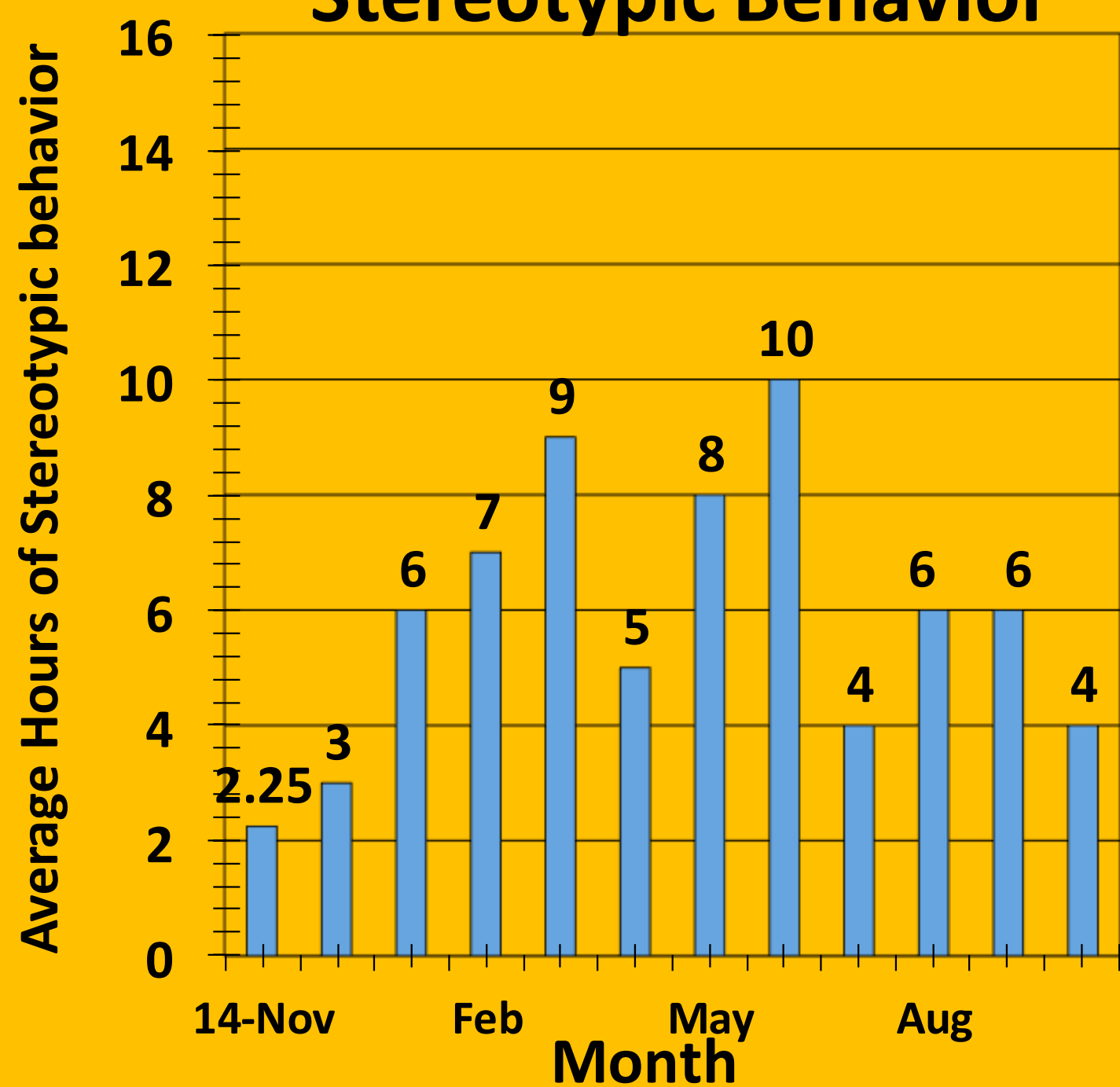


Background

- A female Polar Bear, “Anana”, arrived at the North Carolina Zoo from the Lincoln Park Zoo in September of 2014.
- Anana immediately began exhibiting stereotypic behaviors
- Maximum time spent exhibiting stereotypic behavior reached 16hrs per day.
- Through a collaborative effort between keeper staff, Veterinary staff, and the Zoo’s training consultant, it was decided to put heavy resources into addressing this behavior in hopes of increasing Anana’s quality of life.



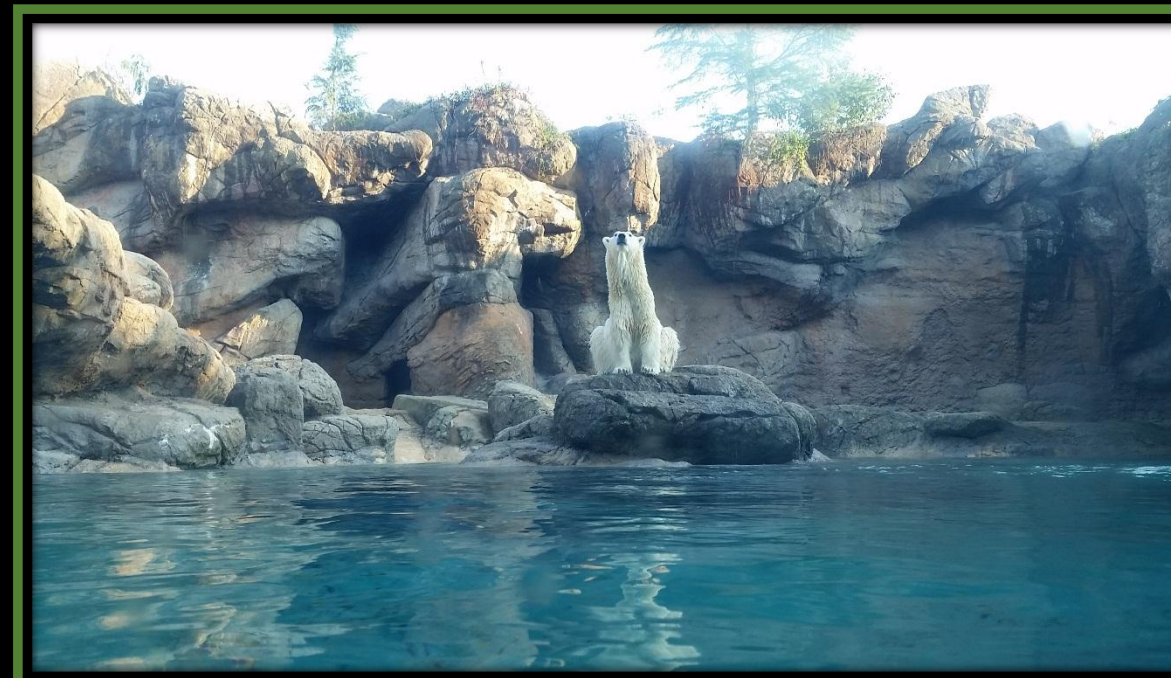
Stereotypic Behavior



This graph depicts the average amount of hours per day for every month that Anana exhibited SB.

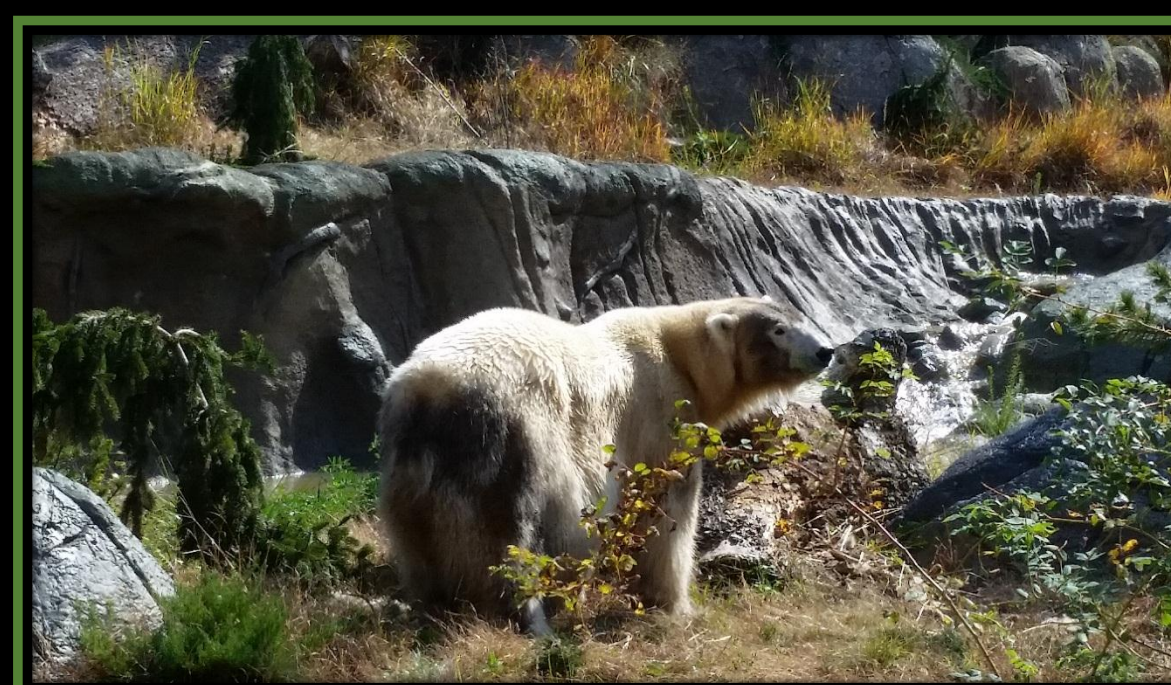
SB maxed out at 16.08 hours on June 16th 2015. Other days within that month were around 13+ hours per day.

SB decreased to cessation in mid October 2015.



Old Exhibit

Anana’s most common stereotypic behavior was a pace in what we call the “back aisle” in the holding area of our old Polar Bear exhibit. She chose a secondary area on the old exhibit if denied access to the back aisle.



New Exhibit

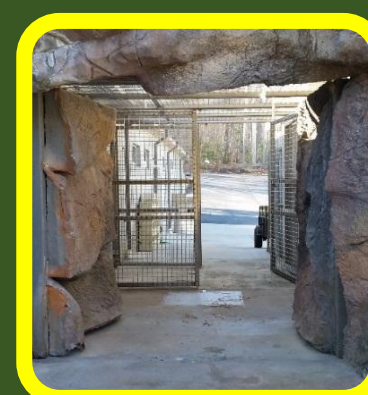
The new exhibit offers many more options for reinforcement areas. We powered up this area with enrichment and denied access to her SB areas for random portions of time.



Medical Evaluation

- Scombroid poisoning from mackerel- March 2015
- Potential seasonal allergies

- Mackerel was removed from Anana’s diet (April 2015), and within 24 hours she began to show improvement.
- Allergy medicine trials were started with no success confirmed (Benadryl, Claritin, Allegra)
- Trial of prednisone given with no success.
- She was prescribed Atopica- an immune suppressant- to help relieve the symptoms of her potential seasonal allergies. The Atopica did well, but a reaction between it and Allegra allergy medicine was suspected. Spike in SB observed from the drug interaction.



Habitat Modification

- Giving/denying access to certain areas of exhibits and holding areas throughout the day.
- Creating and utilizing new areas to reinforce desired behavior.

- An area that was originally used as an exhibit to exhibit transfer was modified to be an easily accessible reinforcement/training area.
- We also utilized many other areas surrounding both exhibits to make easy opportunities for reinforcement.



Operant Conditioning

- Using positive reinforcement when Anana was offering desired behavior.
- Location training associated with positive reinforcement.
- “Zen” sessions since attention from people seemed to be reinforcing

- We utilized enrichment items, food, access to new areas, training sessions, and keeper attention as reinforcers.
- We conditioned her to respond to sounds paired with locations. Reinforcement awaited her in each location.
- We also spent quiet time sitting with her when the opportunity was available.



To be continued...



Conclusion

- Anana’s stereotypic behavior peaked during March 2015 and again in June 2015.
- It decreased to cessation in October 2015.
- She is yet to exhibit any severe allergy symptoms since ending her Atopica treatment in mid June 2015.
- Qualities about our old exhibit appear to increase Anana’s SB, while the design of the new exhibit seemed to encourage more natural behaviors.
- The addition of our male “Nikita” has added extra factors to our data collection.
- Since Nikita’s arrival, and the separation of the bears after breeding season, Anana’s SB has returned on a mild level located in our new holding space.
- We are continuing to work on ways to manage both bears in a way that reduces or eliminates SB.

Acknowledgements:

Many thanks to the amazing Rocky Coast mammal team, Supervisors, Curators, and Veterinary staff at the North Carolina Zoo. I’d also like to thank the Zoo’s training consultant, Phung Luu, for all of his patience and guidance. Most of all, thank you to Anana and Nikita for being awesome.

Wildlife Monitoring in the Okavango Delta, Botswana

Becca Phillips

Roger Williams Park Zoo : Providence, Rhode Island

The Okavango Delta is located in the northwest corner of Botswana and is the largest inland river delta in the world. It is home to a vast variety of animal and plant species who flourish under the annual flooding of the delta. This ecosystem is crucial to the survival of many species, which is why it is being researched and protected.

In 2012 The South African Regional Environmental Program (SAREP) and the Department of National Wildlife Parks (DWNP) decided there was a need for a standardized monitoring protocol for the Okavango Delta in Botswana. Aerial surveys were unable to give an accurate depiction of wildlife in the delta; data collection in the following categories was needed:

- Rainfall, Flood Levels, & Fire Occurrence
- Predator Sightings & ID
- Mortality: Poaching, Natural, & Predation
- Human-Wildlife Conflict
- Monitoring Threatened or Indicator Species

This information is collected through continuous monitoring and bi-annual surveys.



Photo Credit: <http://www.safarionline.co.za/>

Scientific Name	Common Name	Conservation Status	Population Trend
<i>Ceratotherium simum</i>	White Rhinoceros	Near Threatened	Increasing
<i>Diceros bicornis</i>	Black Rhinoceros	Critically Endangered	Increasing
<i>Felis nigripes</i>	Black-footed Cat	Vulnerable	Declining
<i>Hippotragus equinus</i>	Roan Antelope	Least Concern	Declining
<i>Kobus vardonii</i>	Puku	Near Threatened	Declining
<i>Hippotragus niger</i>	Sable Antelope	Least Concern	Declining
<i>Tragelaphus speki</i>	Sitatunga	Least Concern	Declining
<i>Smutsia temminckii</i>	Pangolin	Least Concern	Unknown
<i>Damaliscus lunatus</i>	Tsessebe	Least Concern	Declining

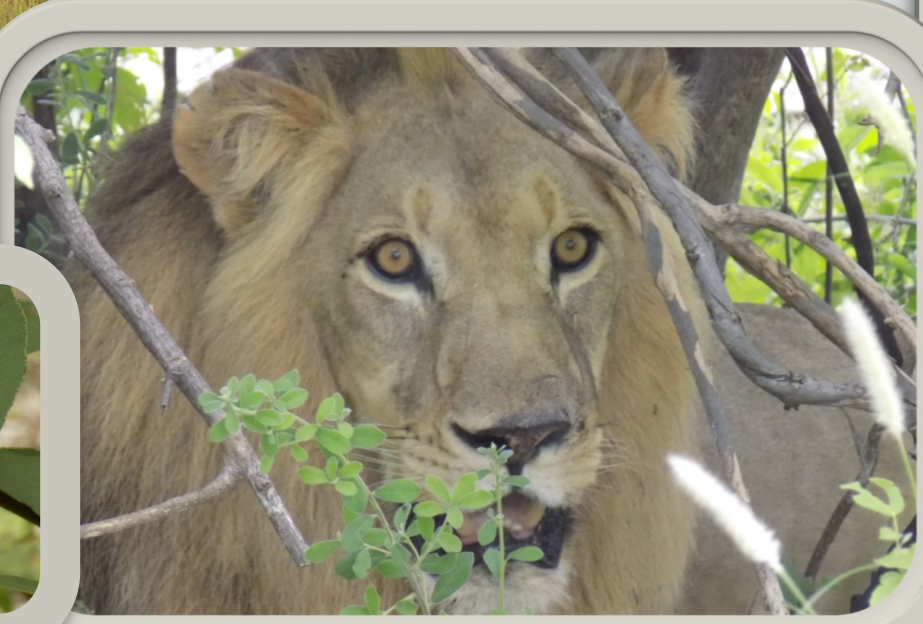
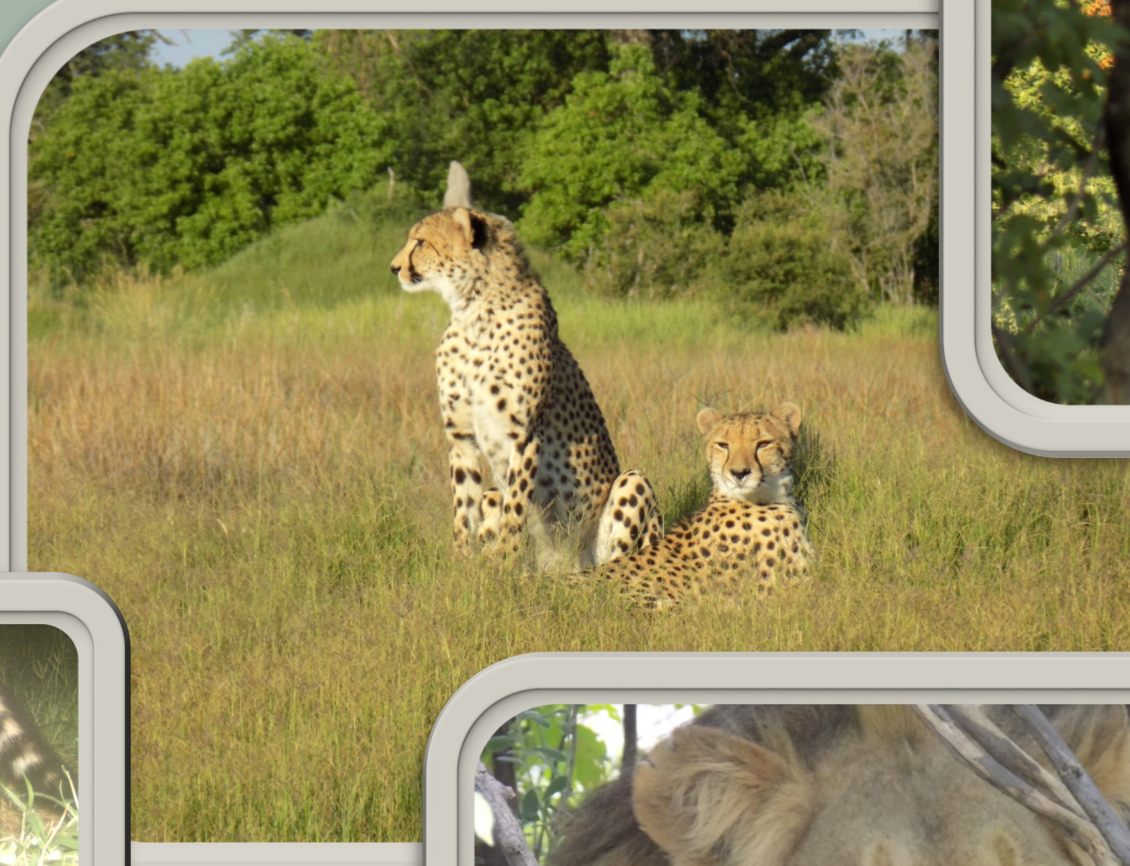


Table 12. Rare/Endangered animal sightings (refer to list of rare/endangered animals)

Date	Species	Count	Adults	Sub-Adults	Juveniles	Calves/ Foals	Undetermined	Grid	Vegetation	Notes	Recorded by
			M F ?	M F ?	M F ?						

Table 14. Bi-annual herbivore count spreadsheet

Bi-Annual Wildlife Count		Transect		Year		Odometer reading			
Start Odometer	End Odometer	Month	Driver	Start time	End time				
Date	Habitat	Species	Adult	Sub-Adult	Juvenile	Calves	Undetermined	Perpendicular distance (Impala)	Grid



Table 15. Voluntary bi-annual Bird life Botswana datasheet

Name of compiler	Number of observers									
Site name/Habitat type	Number of others involved in count									
Quarter degree square (eg 232443)										
Coordinates of the start point										
Coordinates of the end point										
Wind class (0-10)	Cloud	Wind	Visibility	Temp	Humidity					
Time each point count started (24h clock)										
Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11
Species name										
Number of individuals at each point										
Total count										
What threats to or problems at this site are the cause of?										
Use your local knowledge of the site (i.e. not just that observed on the day of the count) to provide the following information on the state of the landscape around your transect. Please use codes as described in the instruction to assess 'Trends, Scope & Severity'										
Threat		Habitat and/or population affected		Timing		Scope		Severity		

Continuous monitoring was performed on daily drives. Observing bird of prey activity was able to lead us to predators and carcasses, alarm calls of birds alerted us to possible predators near by, and drives in open areas and random open point counts almost always offered us a variety of herbivores. Camera traps were also an integral part of data collection. They were used at known crossings and watering holes.

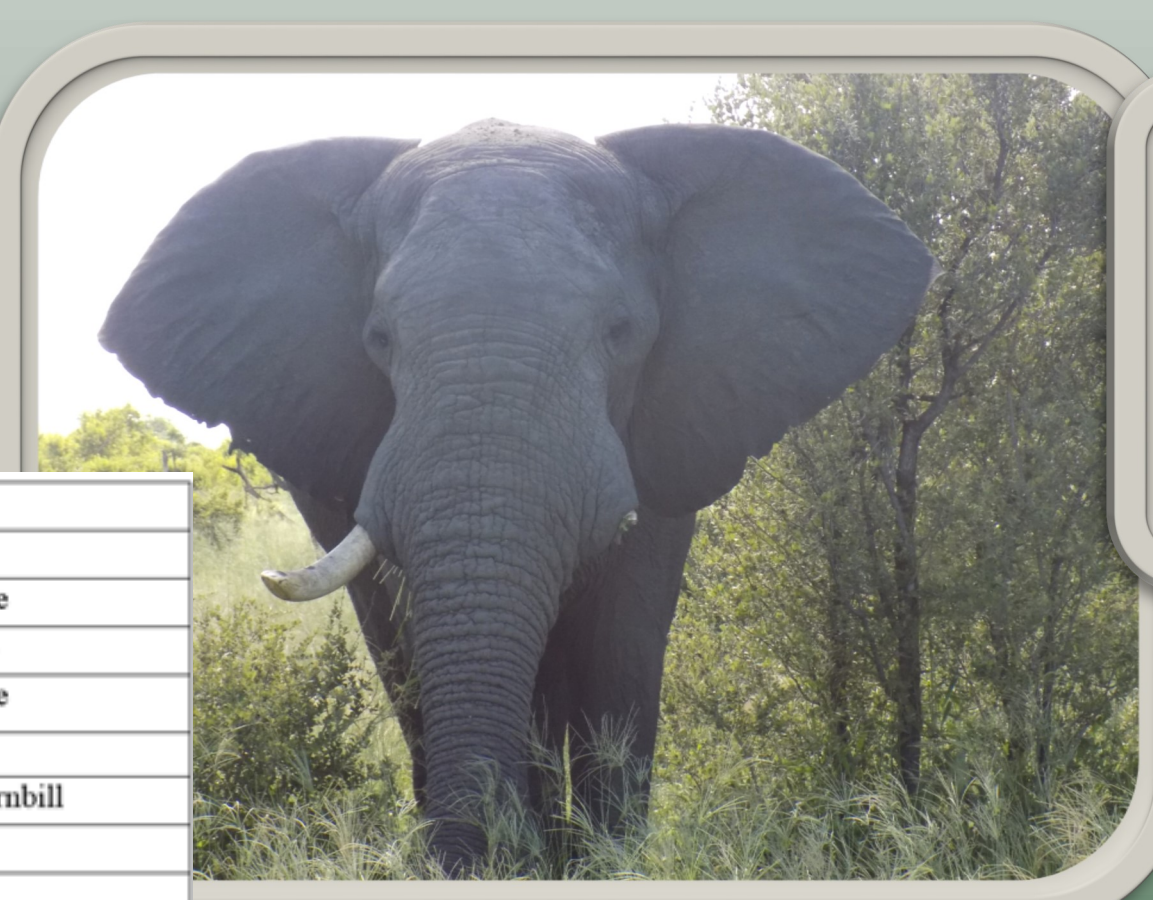
Many of the bi-annual surveys were performed in March—the end of the rainy season. They included: Bird Counts, Herbivore Transects, and Spoor Transects.

- **Bird Counts** are performed at sunrise along pre-determined sections of road, every 3 days for 3 consecutive counts. They consist of a total of 11 points along the pre-determined road, each 200 meters apart. At each point the GPS coordinates are recorded and a timer is set for 5 minutes. In that 5 minutes every individual bird identified by sight or sound is recorded on the sheet (Table 15 to the left). They are used to determine trends of population, area usage, and seasonality for each area.
- **Herbivore Transects** are also performed first thing in the morning along a pre-determined section of road. They are performed by driving a 15kilometer distance at a rate of 10km/hour and recording each individual herbivore encountered. The GPS coordinates, odometer reading, and distance perpendicular to the road are all recorded as well as number of individuals, breakdown of males vs females vs age (adult, sub-adult, juvenile), what type of habitat they are in, and their current activity (standing, feeding, running, etc).
- **Spoor Transects** are often performed in conjunction with the herbivore transects but are separately recorded to keep track of species of predator (hyena, wild dog, lion, leopard, cheetah), number of individuals if identifiable, direction, and age of spoor in 6 hour increments (6, 12, 18, 24 hours)
- **Camera Traps** are set at regular known locations to catch glimpses of more evasive species, as well as nocturnal species. They are set 2 across from each other to ensure both sides of an animals flank is photographed to allow for proper individual identification .
- **7 Watering Holes** are monitored every 3 days to record water size (depth and circumference) and rainfall, as well as dung and spoor counts of both herbivores and predators to get an idea of who has been in the area in the past 24 to 36 hours.



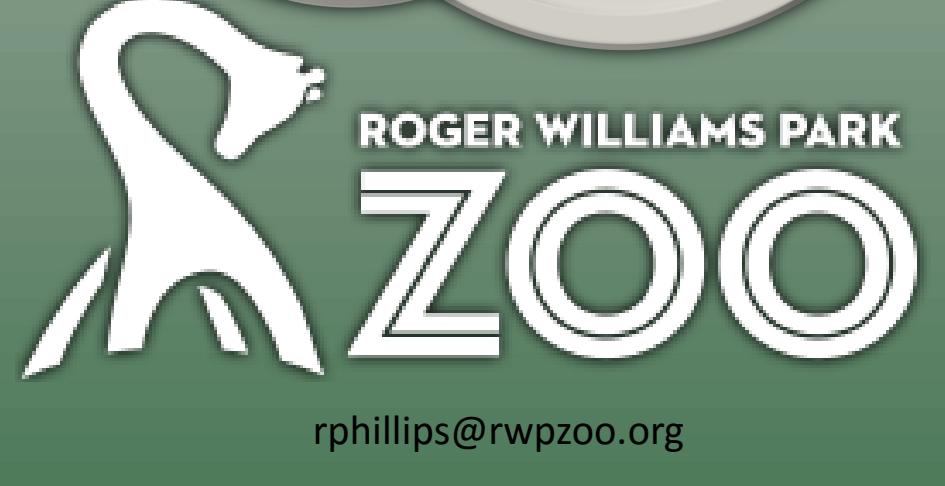
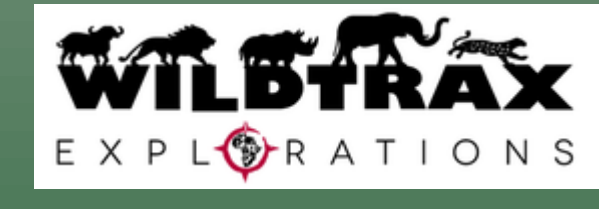
Birds of Concern

<i>Gyps coprotheres</i>	Cape Vulture
<i>Necrosyrtes monachus</i>	Hooded Vulture
<i>Trigonoceps occipitalis</i>	White-headed Vulture
<i>Torgos tracheliotos</i>	Lappet-faced Vulture
<i>Gyps africanus</i>	White-backed Vulture
<i>Rhynchops flavirostris</i>	African Skimmer
<i>Bucorvus leadbeateri</i>	Southern Ground-Hornbill
<i>Bugeramus carunculatus</i>	Wattled Crane
<i>Ephippiorhynchus senegalensis</i>	Saddle-Billed Stork
<i>Egretta vinaceigula</i>	Slaty Egret



In conclusion, there is currently no one in place to analyze the data being collected, but the collection is still vital. At some point, all of the information will be instrumental in making conservation decisions and changes. Volunteers and funding are desperately needed to continue this program.

You can help by spreading awareness, funding a research project for a species in need, experiencing it yourself, or making a financial donation to the project. \$200 can purchase a camera trap, batteries, SD card, and tree mounted security box.

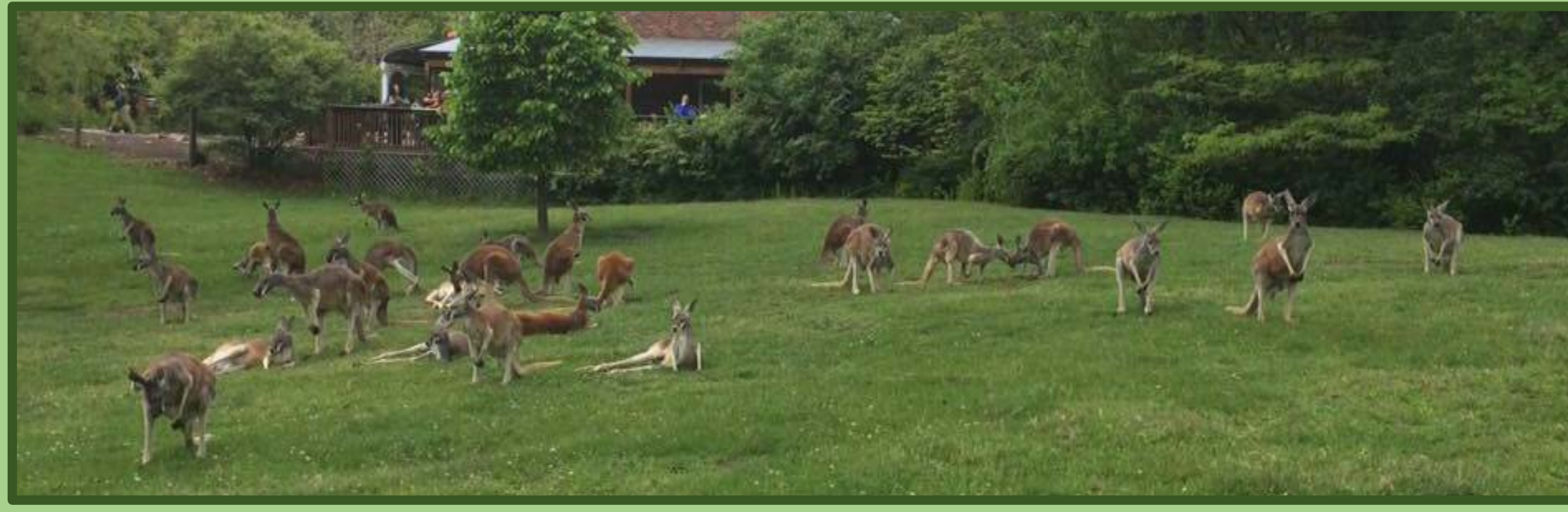


ACKNOWLEDGEMENTS

Jordana Meyer; Founder, Wildtrax Explorations
 Robyn Hartley; Co-Founder, WildlifeACT Botswana
 Simon Morgan; Co-Founder, WildlifeACT Botswana

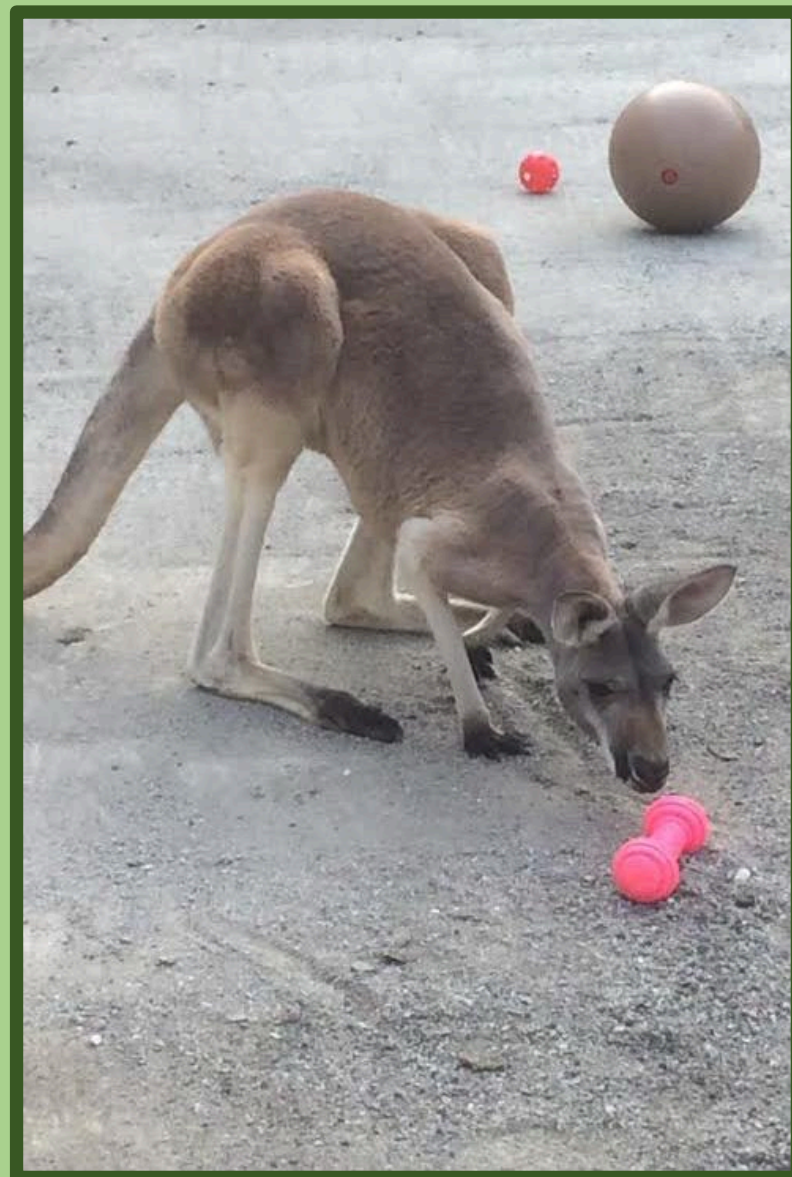
Scale Training a Mob of Over Thirty Red Kangaroos

Amy Sarno
Zookeeper II



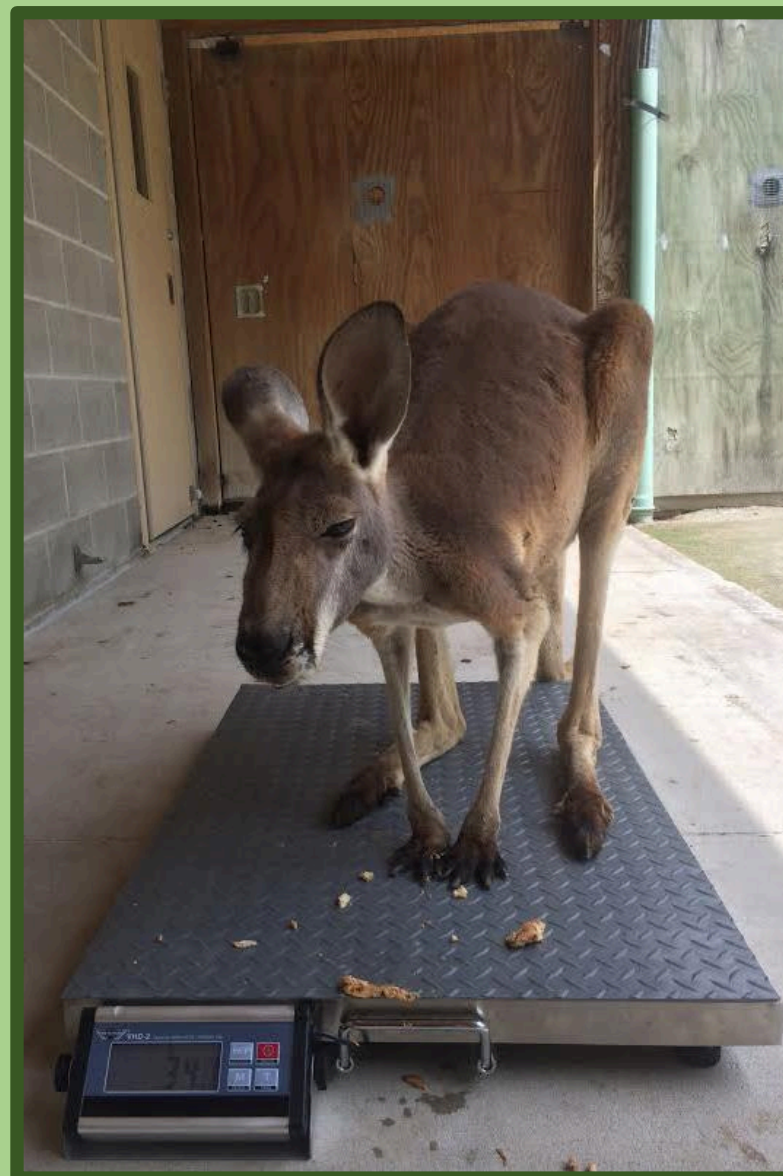
Background

The Kansas City Zoo has a 3-acre kangaroo exhibit and a spacious barn that allows for the holding of a large mob of red kangaroos (*Macropus rufus*). Over the years, the mob size has averaged around 35 individuals, often including joeys, adults and elderly individuals. Historically, weights were only able to be obtained opportunistically during physical examinations or restraints. Using positive reinforcement, I have been able to train 32 kangaroos to date, for routine voluntary weights. The current mob includes 15 adults and 6 juveniles who are scale trained as well as 11 juveniles in various stages of learning the behavior.



First Things First.... Desensitization!

- ✦ Kangaroos are cautious and often very skittish around new things or changes in their environment.
- ✦ Desensitization phase of the training took the longest.
- ✦ Increased amount and frequency of enrichment items presented to build confidence around novel items.
- ✦ Left scale's rubber mat in with kangaroos for brief periods without my presence.

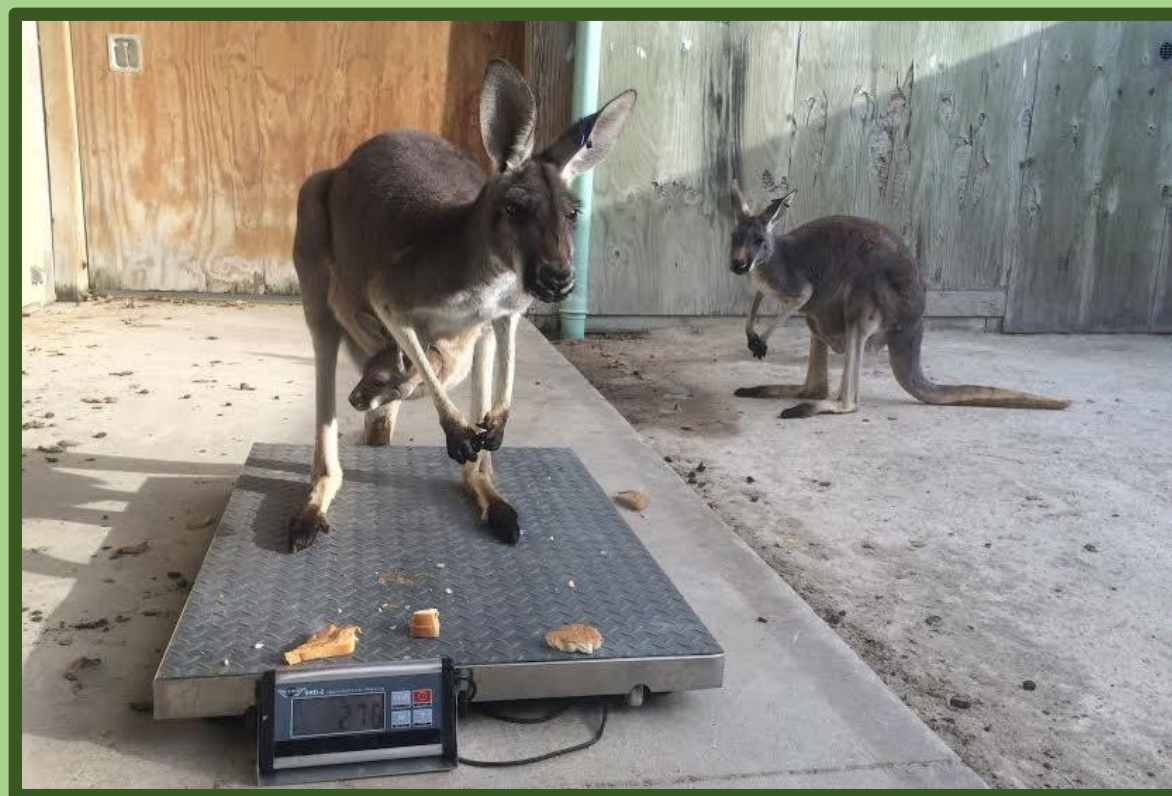


Voluntary Weigh Session

Selecting A Training Approach

With a mob of over 30 kangaroos that needed to be trained and limited available time to do so, I needed the most time efficient approach to obtain regular, voluntary weights. I opted to initially use baiting to get the kangaroos comfortable stepping onto the scale (as opposed to a more structured training program involving establishing a bridge and target behavior). Once an individual was consistently getting onto the scale voluntarily they would no longer be baited on, but rather required to get on before receiving reinforcement. Baiting is often frowned upon as a training technique, but in this situation it proved to be the most time efficient method to achieve voluntary weights for a large number of animals, which was the ultimate goal.

Enrichment As Training Tool



Observational Learning

Catering The Training Approach To Each Individual

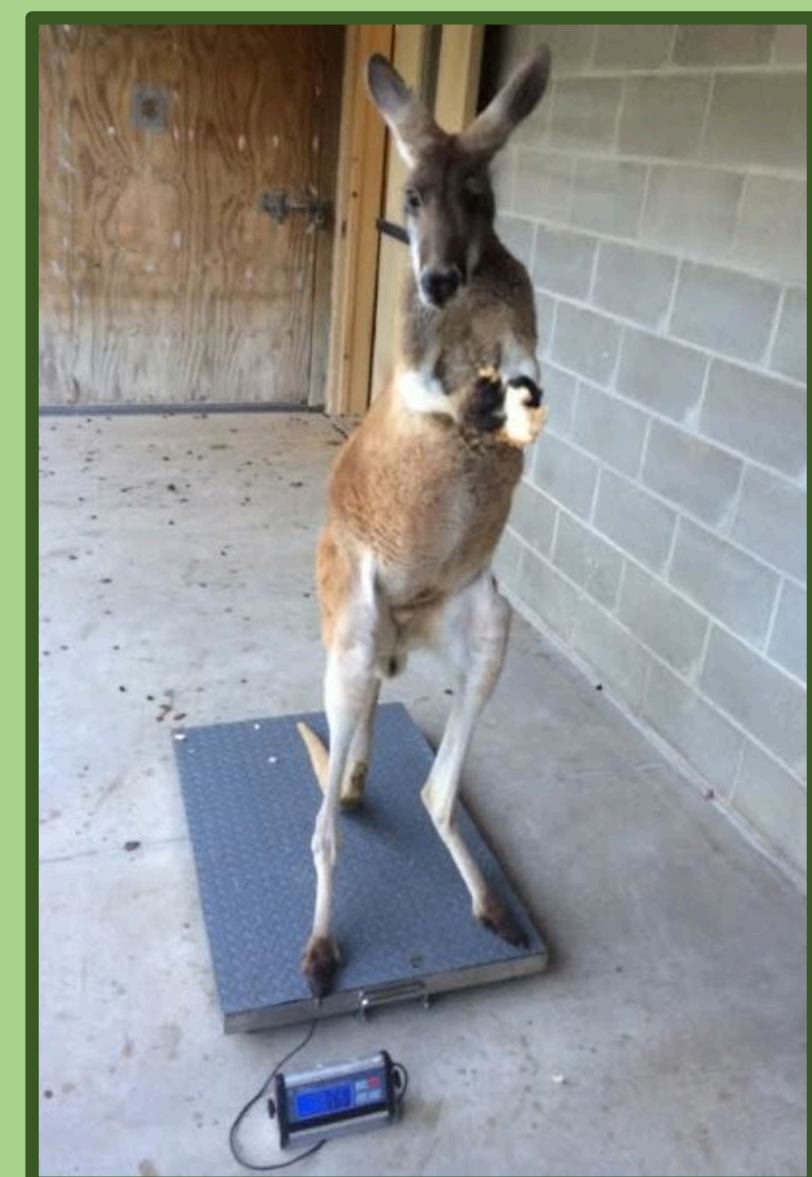
- ✦ For more confident and tractable individuals I would require them to eat from my hand and position myself where I wanted them to move to.
- ✦ For kangaroos that were more skittish, I would toss the food where I wanted them to go and keep my distance from them and the scale.
- ✦ Used already trained kangaroos for observational learning with some of the joeys and the more skittish adults.
 - ✦ While weighing an already trained kangaroo, I would toss the new kangaroo reinforcement for calm behavior and any movement toward the scale. Once they were routinely exhibiting calmness around the scale with another kangaroo in the yard I would start doing training sessions with them on their own.



Weighing Indoors

Things Learned Along The Way

- ✦ Velcroed the mat the scale to prevent it from sliding and scaring the kangaroos.
- ✦ Ensured that the barn will be quiet during training and no loud noises will startle the kangaroos.
- ✦ For kangaroos who I couldn't hand feed, I placed a log next to the scale, and the scale against the wall, so that they had to step onto the weigh board to acquire the reinforcement.
- ✦ Scale is too short for the larger kangaroos to get their whole tails on the board. To get an accurate weight I had to get them to either stand up tall, or to stretch out and take the weight off their tail. (Stand tall for hand feed animals, stretch for those tossing food to).
- ✦ Importance of training for consecutive days to allow for advancement and prevent regression.
- ✦ Attempting to weigh kangaroos in high temperatures was often unsuccessful, as they were not motivated. On days when it was too hot to weigh them outside I would set up the scale inside the barn. For many of the kangaroos this resulted in regression and required additional training.



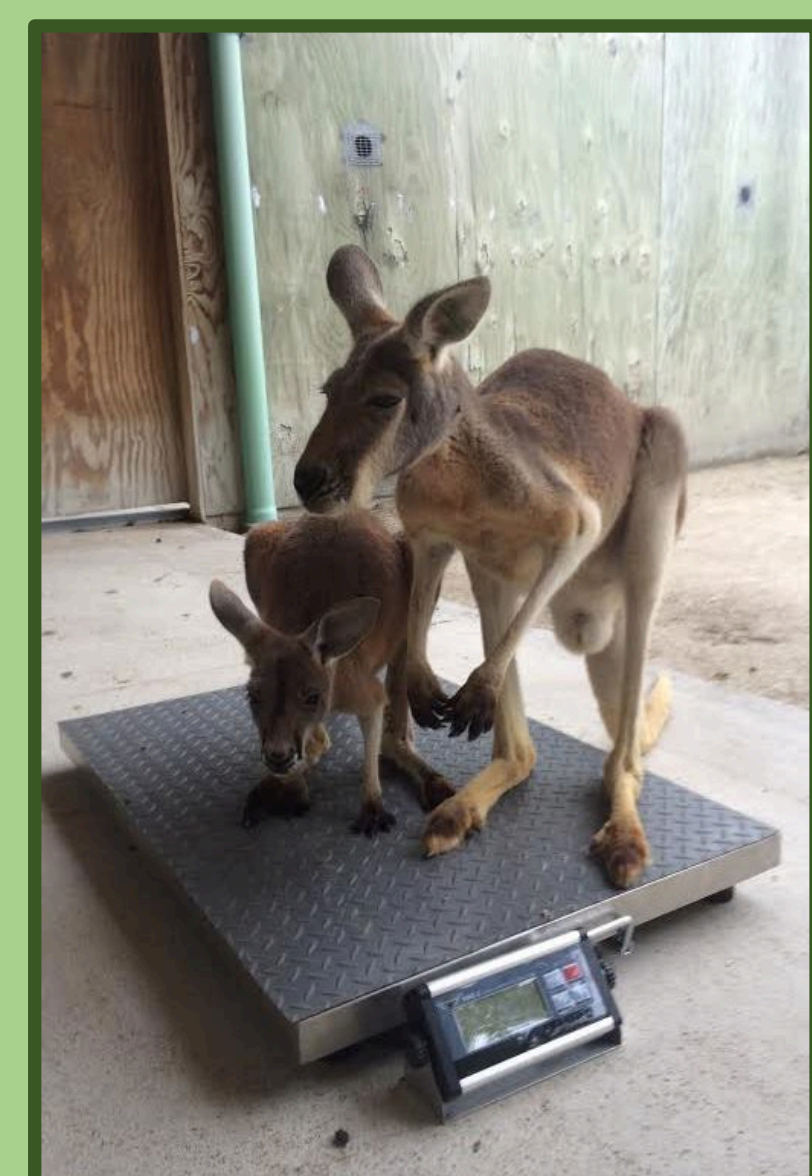
Large Male Standing Up For An Accurate Weight



Parma Wallaby On Scale

Weighing The Wallabies

- ✦ Bennett's (*Macropus rufogriseus*) and parma (*Macropus parma*) wallabies are housed together. They are only isolated for catch ups or veterinary procedures, so I decided not to try and separate them for scale training.
- ✦ The wallabies are fairly skittish, so I used the approach I did with the less tractable kangaroos where I sat far away from the scale and tossed the reinforcement where I wanted them to go.
- ✦ Observational learning definitely play a role in building confidence.
- ✦ Once they were all comfortable getting onto the scale, I would have to strategically toss food to keep only one animal on the scale at once.



Joey Learning With His Surrogate Mother



Bennett's Wallaby On Scale

Final Thoughts And Thanks

It was highly rewarding to work with animals that had no previous training, and some who were assumed to be incapable of a voluntary weight. Some individuals required daily sessions for over a month before getting their first weight, but once they learned it was very rewarding to see them participating in their own healthcare. This is an example of how regardless of an animal's species, history, reputation or disposition any animal can be trained if given a chance. Finally, a huge thanks to my supervisors for their support in allowing me to keep certain individuals off exhibit for training, and to my co-workers who helped me move kangaroos around daily to accommodate training sessions. THANK YOU!!!

Saving the Guam Rail; One Bird at a Time (*Rallus owstoni*)

Beth Schille
Disney's Animal Kingdom

Introduction

The Guam rail (native Chamorro name is Koko) is a small, flightless bird which was indigenous to the island of Guam. During WWII, the brown tree snake (*Boiga irregularis*) was accidentally introduced to the island from its native land of Papua New Guinea. Due to the lack of natural predators on the island, the brown tree snake's population grew exponentially. Ralls nest on the ground which makes the eggs an easy meal for the snakes. By the late 1980's, the rail was extirpated from the island. Scientists captured less than 20 birds before they completely disappeared from the wild. The Division of Aquatic and Wildlife Resources on Guam along with select mainland AZA institutions are currently breeding rails in efforts to re-establish wild populations.



Method

Disney's Animal Kingdom (DAK) is one of two facilities that have been designated as U.S. quarantine sites for Guam rails. DAK provides health assessments as part of the pre-release protocol to prepare the birds for transport to Guam. These exams consist of blood & culture collection, physical, and radiographs. The holding areas have to follow strict guidelines which includes a mosquito proof environment with artificial substrate. The birds are monitored closely to make sure they are maintaining weight. Once all required testing has been completed and the health certificates are validated, the rails are cleared to be shipped to Guam.



Results

The birds are transported to Guam in mosquito proof crates. They will acclimate in an outdoor holding area while in the care of the Guam Department of Agriculture. These birds are genetically important in creating a diverse wild population. They will either be bred to help increase the genetics in the captive group or be released to nearby islands to help inhabit the wild.



Discussion

Disney's Animal Kingdom continues its efforts by partnering with Mariana Avifauna Conservation (MAC). Long-term conservation and education programs have been created and implemented to help save the species



Voluntary Vulture

By: Ashley Slack-Butler
Keeper Grade 2
Toronto Zoo



INTRODUCTION

Upon observation of our 1.0 white-headed vulture "Lloyd", some of his stress behaviours were consistent with birds high in weight. Our goal was to decrease his stress, increase his motivation, and to improve his quality of life. This was achieved by: implementing a behavioural management strategy; a training program to monitor his food intake/refusal; and daily records of behavioural changes. This also allowed Keepers to build and strengthen their relationship with Lloyd, thus enabling us to reach our goal.

"Lloyd" 1.0 white-headed vulture (*Trigonoceps occipitalis*)

- 30 Years old
- Exhibited with greater kudu, marabou storks, and southern ground hornbills from May-October (in a large outdoor/open exhibit)
- Housed individually for the colder season (indoors)
- Previously managed by providing a free choice diet (consisting mainly of rats)

FIRST THINGS FIRST

Before we could implement a behavioural management strategy, there were many things to consider and several steps to take.

Here are the steps that we took:

1. Consult with the supervisor of the area
2. Address concerns/observations/ideas with co-workers
3. Explain and discuss observations and future goals with Veterinary staff and the Nutrition department
4. Devise a shaping plan to outline steps required to achieve end goals

PAPER WORK!

A 'Food Intake Form' was implemented to ensure consistent feedings. This form was used to record:

- Interest level in the food
- Daily food item and quantity offered
 - +/- any food refused from the previous day
- Internal/external barn temperatures (weather)
 - +/- access to outside yard

DATE		ANIMAL WEIGHT	WEATHER	OUTSIDE ACCESS Y/N	FOOD OFFERED	FOOD LEFT OVER	FOOD ATE	OTHER/COMMENTS	INITIAL
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

WHATS NEW ON THE MENU?

The quantity of food offered was changed bi-weekly to ensure that his weight decreased slowly. To determine the quantity of food required per day, we weighed Lloyd multiple times each week and recorded our findings.

Our goal was to decrease his weight slowly in order to maintain a healthy weight decline. Initially, we decreased his daily portion by 10% and used our Food Intake Form to project further food requirements. In addition to his previous diet, various lean food items were introduced:

- Quail
- Day-old chicks
- Whole rabbit
- Mice
- Ground horse meat
- Variety of bones



Image on the right:
First weight on exhibit
August 13th 2014 = 4.0kg (8.8lbs)

LET THE TRAINING BEGIN...



Above image:
First voluntary weight
March 27th 2014 = 5.4kg (11.88lbs)

Training began very slowly, as Lloyd was getting used to his diet changes. It took 1 month to attain his first weight.

Here are the steps that were taken to accomplish his first voluntary weight:

1. A black bowl was introduced for daily feedings (with the intention of becoming a 'station')
2. A scale was placed in his enclosure ~2 weeks after his initial diet changes were made
 - He only had access to the scale under supervision
3. Once comfortable with the presence of the scale, the scale was placed under the bowl to attain a weight

In order to determine a healthy weight for Lloyd, we researched recorded captive and wild white headed vulture weights. It was found that an average male weighs ~4.0kg (8.8lbs). We used this as a guideline and set our goal weight range to 4.3kg (9.46lbs) - 4.5kg (9.9lbs). We used behavioural and visual observations, as well as bi-yearly physical examinations (performed by veterinary staff), to continue to monitor Lloyd. It took nearly 6 months to decrease/maintain his weight in our desired range.

NEW EXHIBIT, NEW CHALLENGES

From May-October, Lloyd is moved into a large outdoor exhibit. This change came with training challenges that we needed to overcome, in order to continue decreasing/monitoring his weight. These obstacles included the following:

- Outdoor exhibit inhabited by multiple species and local wildlife
- A large exhibit with uneven terrain that was not ideal for the scale
- Potential for stealing/sharing food with other birds in the exhibit
- Reduced amount of available training time due to the nature of being on display

THE RESULTS ARE IN

Over the winter of 2015, while continuing with our original goal, we noticed several positive behavioural changes. We were excited and surprised by the number of positive behavioural changes, and by the fact that we had reached and surpassed our goal of improving his overall quality of life.

These changes comprised of:

- Increased motivation
- Increased keeper trust
- Increased display of natural behaviours
- Increased physical activity level
- Increased interest in enrichment
- Reduced stress
- An overall calmer demeanor



AN UNFORESEEN BENEFIT!

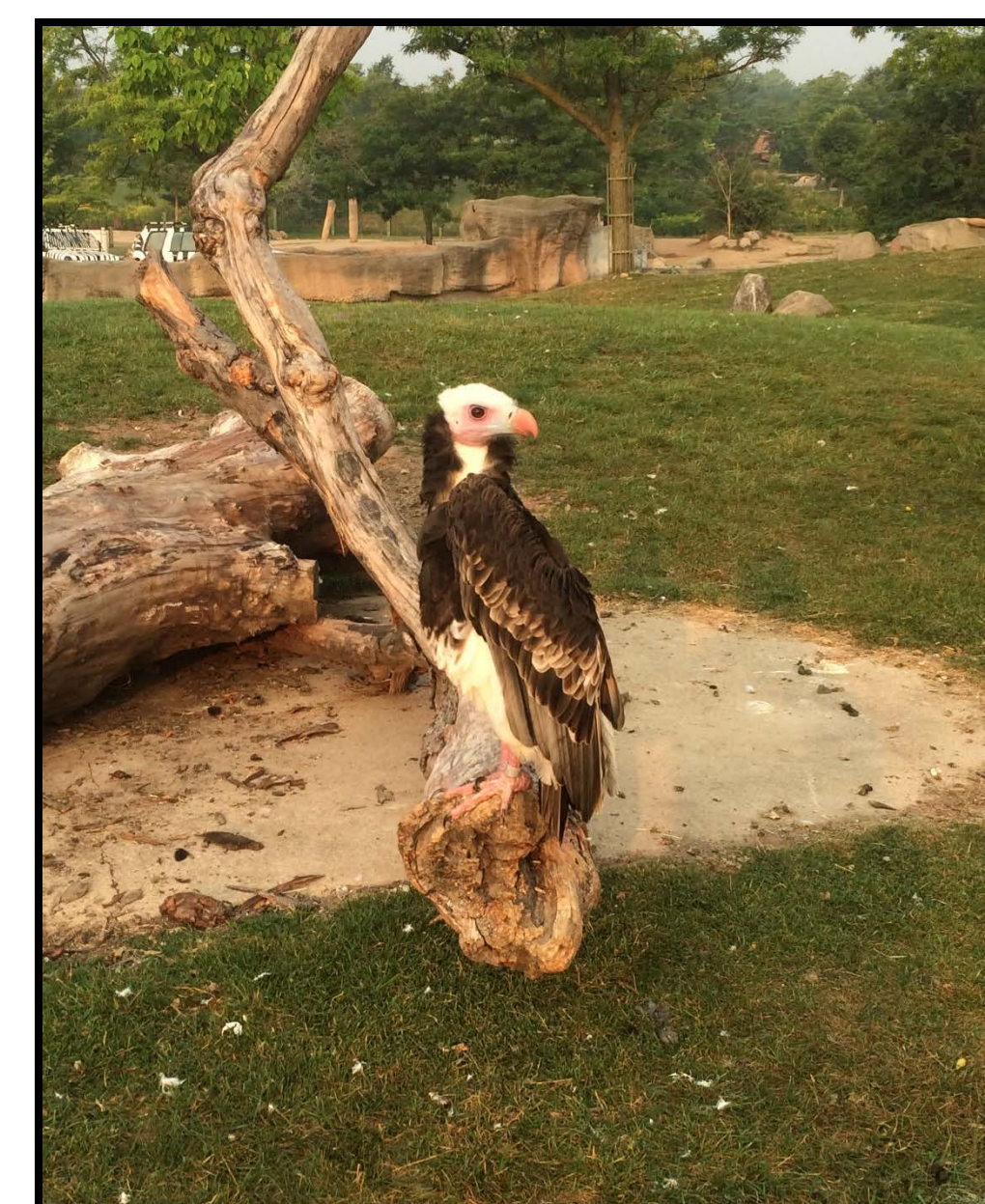
An unforeseen benefit of Lloyd's increased motivation, was the opportunity to take on a larger training project. Using the same feeding strategy and newly built keeper trust, we were able to successfully and voluntarily transfer him to his winter holding - without the use of catch up or restraint. This was accomplished by slowly moving his bowl towards his winter holding area.



WHERE IS HE NOW?

- Lloyd is currently living in the greater kudu exhibit, along with other species for the summer. We plan to transfer him voluntarily to his winter holding this year
- At his last veterinary check up (May 2016) he was at his ideal body weight of 4.3kg (9.46lbs), and his overall body condition was 'great'
- His facial colours have intensified and his feather condition is 'ideal'
- His weight loss has increased his activity level which has helped subside previous health concerns

This program has far exceeded our goals and has allowed us to immensely improve Lloyd's overall quality of life!



Breeding Bleeding Heart Doves

at the Saint Louis Zoo

Rick Smith , Zookeeper Bird Department smith@stlzoo.org



General Husbandry

The bleeding heart dove is named for the crimson red spot on its chest. These fairly mellow birds make a great addition to most aviaries and are often kept in mixed species exhibits. They are an easy to keep and breed dove species that can adapt to most tropical aviaries.

At the Saint Louis Zoo's Bird House, we bred our pair of

bleeding heart doves in a 5.5 x 4.5 X 2.9 meter (18 x 15 x 9.3 feet) planted tropical aviary with a shallow pool.

Our bleeding heart doves' diets consists of: fresh fruit/vegetable mix, Purina Nutriblend Gold® pellets and chopped greens. We supplement their diet with tossed mealworms and crickets twice a day. Calcium powder is sprinkled on top of their diets during nesting season. The diets are offered once daily and increased to twice daily during breeding season.

They breed year-round, building simple platform nests that are constructed of brome hay and small leaf stems or sticks. The nests are built approximately 1-2 meters (3.3-6.6 feet) off the ground in trees or tropical plants. Our pair showed preference to building on top of cane plants (*Dracaena* spp.), but they have also built nests on wire platforms placed in small trees. They typically lay one to two cream/white colored eggs. The eggs hatch in 13-14 days. Both the male and female participate in incubation and chick rearing.



Breeding Plans Change

In spring 2015, the Saint Louis Zoo's Bird Department breeding recommendations did not include this species. We experienced some difficulty stopping our dove pair from egg-laying. The doves would not accept the wooden "dummy" eggs that we normally use to replace their eggs. Instead, the female continued to lay eggs next to the wooden egg or would dump her eggs on the exhibit floor. This problem was remedied by blowing out some of the eggs that she dumped, and then filling them with plaster of Paris. The pair accepted the more natural "dummy" egg. They went back to incubating the new "dummy" eggs and there were no more dump eggs.



2015-2016 Nesting

Our breeding plans changed in late summer when we decided to allow our dove pair to produce chicks. Unfortunately, the pair was not having any success. They were laying fertile eggs; however, their incubation duties were sporadic or absent all together. We determined that their choice of nest location, in a cane plant, was too close to the public and they were being disturbed. There were also other limitations in this habitat, so it was decided that we would relocate them to a more secluded exhibit.



On August 31, 2016, the pair was moved to a newly renovated exhibit. The pair adjusted to the new habitat and finally was able to nest undisturbed. Finally, after a few more nesting attempts, they were successful. On December 10 and December 11, 2016, two eggs were laid in a wire-platform nest that was concealed in a Ficus tree (*Ficus benjamina*). The eggs hatched 15 days later (December 25 and December 26).

Chick raising

Luzon bleeding heart doves hatch altricial and the chicks depend on the care of their parents. Our chicks grew quickly, and in about 11 days (January 5, 2016) they had fledged from their nest. At this time, we began tossing wax worms, small mealworms and other small food items towards the chicks. Both parents continued to care for the chicks after fledging. Eventually, the chicks started to peck at the tossed food items. On January 16, 2016, both chicks were feeding from their diet plates and eating the tossed insects. The chicks were kept with their parents until signs of aggression occurred. (This is usually when the male is preparing to re-nest). On January 27, 2016, the male was observed chasing the chicks, so both chicks were moved off exhibit and raised until adulthood.



Conclusion

The Luzon bleeding heart dove is not a difficult species to exhibit and breed; however, each husbandry situation for any species has its challenges. Ours was preventing the birds from breeding. In addition, once we stopped them from breeding, the pair took a while to successfully return to raising chicks.

The bleeding heart dove is a great addition to any aviary collection. Their striking feather markings always attract our guests to take a closer look at the "bleeding" bird.

Product mentioned Purina Nutriblend Gold® pellets
Purina Animal Nutrition
100 Danforth Drive Gray Summit, MO 63039

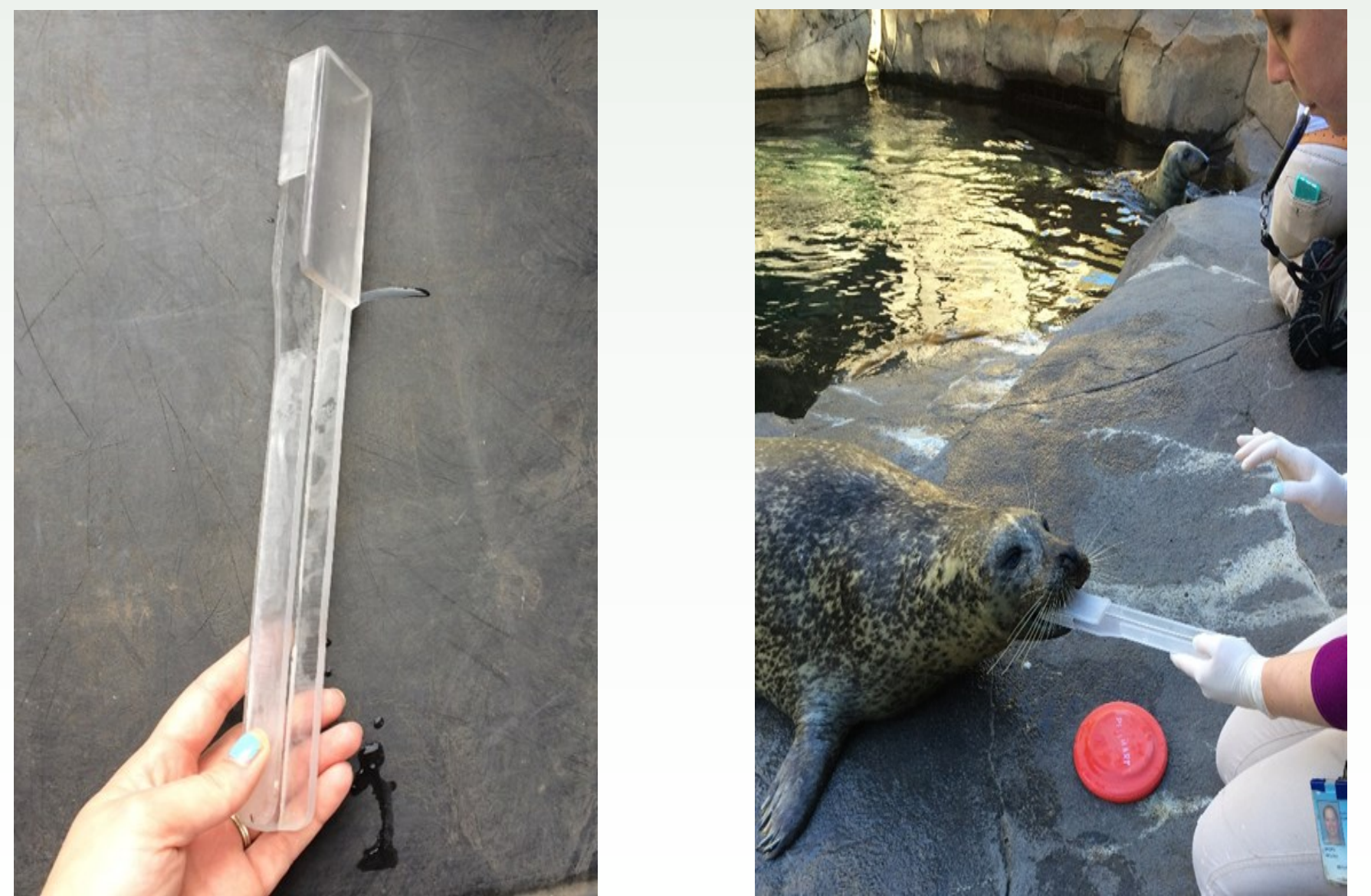
Training a Harbor Seal (*Phoca vitulina*) for Voluntary Dental Radiographs

Jackie Spicer, Animal Keeper—American Trail
Smithsonian's National Zoological Park

Squeegee, a 29 year old Harbor Seal, presented with a bloody gum pocket during a training session in January 2015. Veterinarians at NZP requested dental radiographs to diagnose the cause and severity of the bloody gums.



Began working with vet staff to determine what tools would be used for procedure. Based off their needs, a training plan was created to prepare Squeegee for the radiographs. The vet staff worked with a carpenter at NZP to create an acrylic arm to use for the procedure.



Squeegee had a previously learned behavior of holding objects in his mouth. Worked off this behavior and offered random objects before moving to the custom acrylic arm. Worked on holding the acrylic arm in his mouth for long periods of time.



Visiting dentist came out at the end of March, giving 2 months to work the behavior with Squeegee.



Acknowledgements: Thank you to the American Trail team at Smithsonian's National Zoo (Christina Castiglione, Sara Colandera, Chelsea Grubb, Lee Jackson, and Rebecca Sturinolo), the staff at NZP Wildlife Health Sciences, Dr. Barron Hall, and our carpentershop. Also, thank you to NCAAZK for providing funding to travel and present this poster!





Cans for Corridors: Connecting people to Conservation



Lauren Starkey¹; Dominic Wormell²
¹The Akron Zoological Park, ²Durrell Wildlife Park

INTRODUCTION

- Cans for Corridors was started by Durrell Wildlife Park in 2002.
- It is a recycling-based conservation campaign with money from recycled aluminum cans being used to plant tree corridors in Brazil.
- The Atlantic Rainforest in Brazil is only 7% of its original size and what remains is broken up into small patches.
- The corridors that are being built are aimed at helping the isolated populations of the Black Lion Tamarin (*Leontopithecus chrysopygus*).

How it works

- Durrell collects aluminum cans in their parking lot, at schools, and local events and then they are recycled for money.
- The money is sent to Brazil where they have 11 agroforestry nurseries growing specific species of trees for the corridors.
- These nurseries are run by local Brazilian people which is getting them involved in the conservation of their own country.
- Over 500 families have made space for trees on their own land and planted them near the primary forest protecting its edge.
- Cans for Corridors has teamed up with IPE (Instituto de Pesquisas Ecológicas) and the Black Lion Tamarin Project in Brazil to complete the corridors.



Figure 1. Example of one of the agroforestry nurseries in Brazil

Why it is important

- Approximately only 1,200 Black Lion Tamarins are left in the wild making them listed as endangered on the IUCN's Red List of Threatened Species.
- 80% of the total population belongs to one subpopulation at Morro do Diabo State Park which is the only one viable in the long-term.
- Other subpopulations are distributed in less than 20 fragments which have a high extinction risk.
- The population of Black Lion Tamarins in zoos is not stable either, with only a few individuals in European zoos.
- Corridors are also helping other native species including; jaguars, ocelots, tapirs, and blue and yellow macaws.
- IPE is getting local people involved with caring for and planting the corridors.
- Cans for Corridors gives people the chance to make a contribution to conservation from their own homes by just recycling.
- It only costs \$0.75 to plant one tree which is about 45 aluminum cans, so every little bit goes a long way.
- Cans for Corridors has planted 90,000 trees by just recycling aluminum cans and IPE has planted 1.5 million trees total so far.



Figure 2. Corridor in Pontal



Figure 3. Corridor in Pontal formado.

Getting Started

- The Akron Zoo Chapter of AAZK was the first organization to start Cans for Corridors in the United States in 2014.
- Began collecting both mixed and aluminum cans from staff and volunteers only in 2014.
- In 2015 we held can drives every few months for the public and raised \$723.05, recycled 1,398 lbs of aluminum cans and 597 lbs of mixed metal, and planted 964 trees.
- In 2016 we are holding monthly can drives for the public and are working on funding for a permanent can drop-off site on zoo grounds.
- So far in 2016 we have raised \$543, recycled 972 lbs of aluminum, 487 lbs of mixed metal, and planted 724 trees.
- We now have a local school and several businesses collecting cans for us!

Acknowledgements

The Akron Zoo Chapter of AAZK, The Akron Zoological Park, The Durrell Wildlife Park, Shane Good, Instituto de Pesquisas Ecológicas, Laury Cullen

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Unlikely Duo: Handrearing Takin Calf using Domestic Dog as Companion Animal (*Budorcas taxicolor/ Canis lupus familiaris*)

Ellie Tighe

The Cincinnati Zoo and Botanical Gardens

- June of 2015- 1.0 Sichuan takin “Dale” was born to a 1st time dam. Dam initiated aggressive actions towards him and after several un-successful attempts at re-introduction, and the detection of several medical issues, the decision was made to hand raise the calf at the Nursery.
- With no comparable mammalian species to co-habitat with the calf, he was paired with our Nursery companion canine “Blakely”.
- This pairing provided for the development of the calf’s social behavior, confidence, mental development, and physical exercise.



- At 14 weeks “Dale” was returned to Wildlife Canyon where re-introductions with dam resumed and accomplished at 18 weeks.



- At 52 weeks “Dale” was introduced to sire. Dam, sire and calf have been reunited and living successfully together at 53 weeks.



Thank you to Dawn Strasser, Michelle Kuchle, and Wildlife Canyon Department.



FROM THE GROUND UP: DESIGNING AND EVALUATING ENVIRONMENTAL ENRICHMENT FOR ALLEN'S SWAMP MONKEYS AND SCHMIDT'S RED-TAILED MONKEYS IN A RENOVATED ZOO EXHIBIT

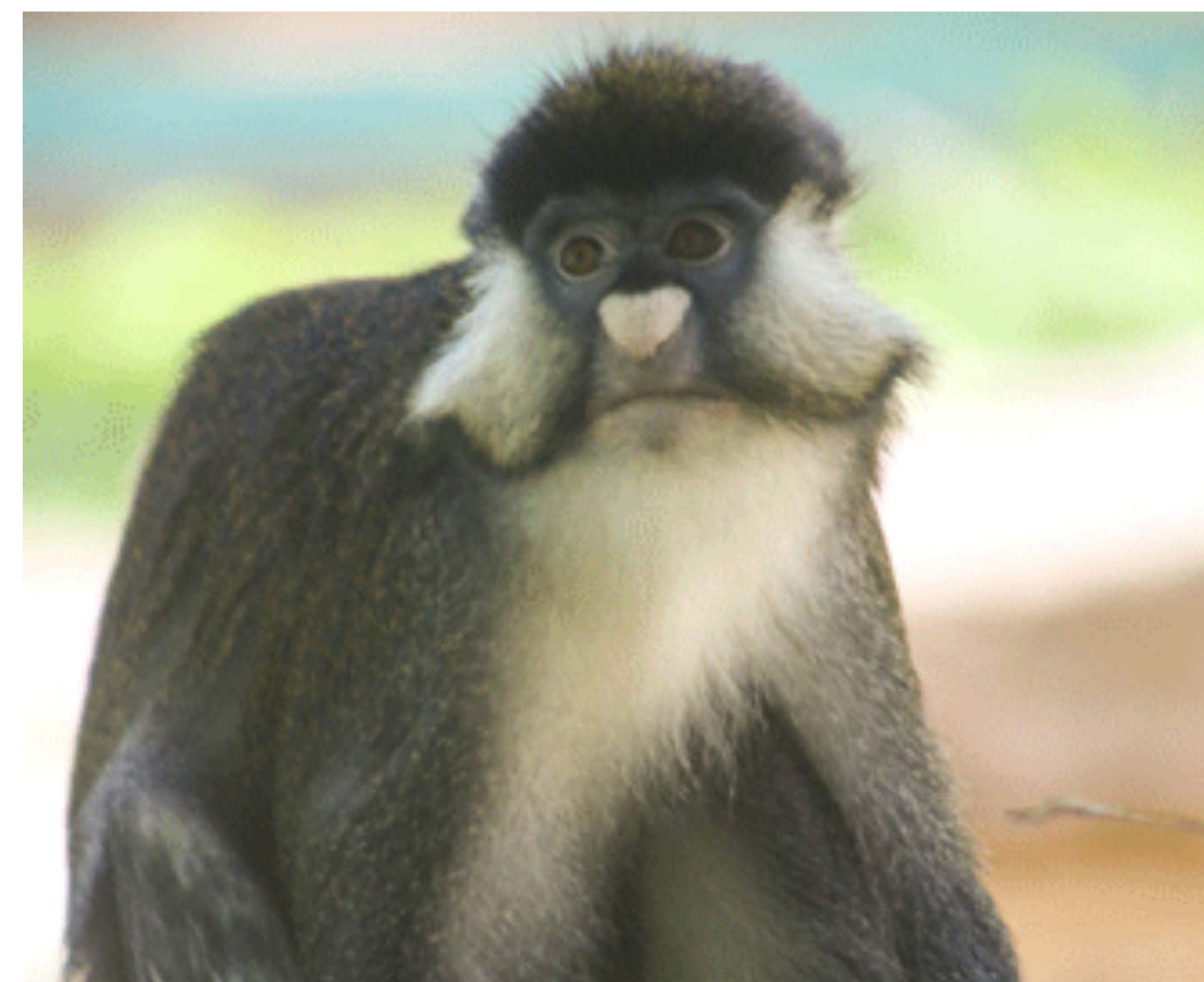


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¹Virginia Commonwealth University, ²The George Washington University, ³Smithsonian's National Zoological Park

Introduction

In 2015, the Smithsonian's National Zoological Park (NZN) acquired four Allen's swamp monkeys (*Allenopithecus nigroviridis*; 1:3) and three Schmidt's red-tailed monkeys (*Cercopithecus ascanius schmidtj*; 1:2) from the San Diego Zoo. Neither species had been housed previously at NZN. Enclosures formerly inhabited by geriatric monkeys required redesigning to provide species-appropriate elements. The natural history of each species, knowledge of experienced zoo professionals, and animal welfare needs were all considered in the development of structural design and environmental enrichment.



This project focused on building and assessing an environment suitable for two primate species that naturally inhabit different parts of the canopy.

Methods

- Enclosure design recommendations obtained from European and AZA-accredited zoos that currently house either one or both species.
- Structural items built and installed by NZN's wood, metal, or exhibits shops.
- Enrichment items built by interns or ordered from zoo enrichment companies.
- 30-minute focal follows recording:
 - Most-prolonged location and behavior at 1-minute intervals.
 - All enrichment items used during the minute.
 - Use of enrichment items by non-focals in view.
- Aggression and social grooming (SG) as trump behaviors. Aggression trumped SG.
 - Location of the aggression or SG also became that of the whole minute.
- 122 analyzable follows, 18 per Schmidt's red-tailed monkey and 17 per Allen's swamp monkey.
 - Dropped follows had 3 or more minutes (>10%) of focals out of view.

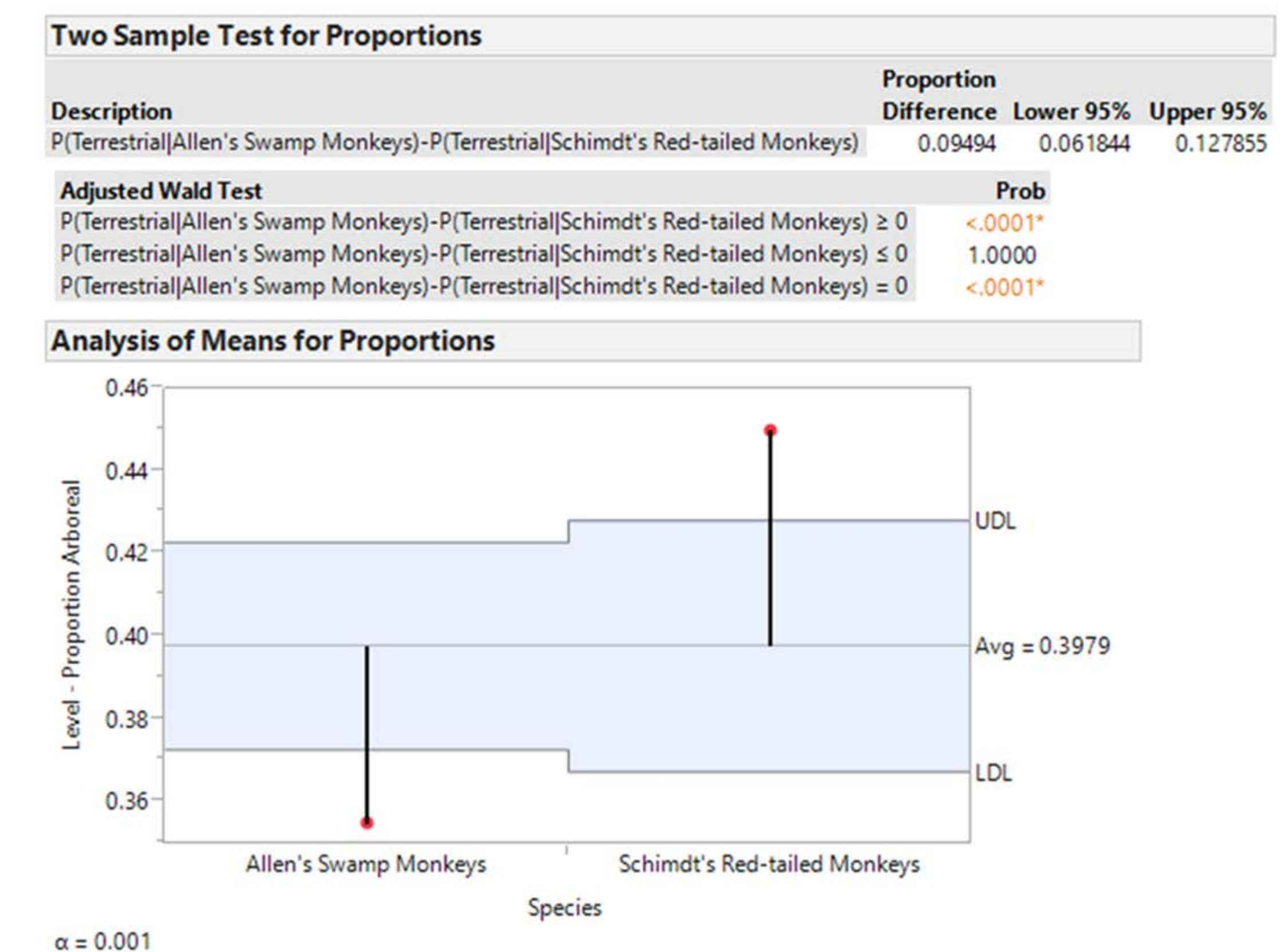
Ethogram	
Behavior	Definition
Contact aggression	Involved in bite, hit, push, grab, physical contact when chasing, or other aggressive behaviors that require touching
Noncontact aggression	Involved in chase (without catching), head bob, open mouth stare, threat vocalization, displacement
Social grooming	Grooming, being groomed, or mutually grooming with conspecific(s)
Social play	Playing with a conspecific, such as wrestling
Sexual behavior	Copulations, sexual inspections, soliciting, masturbation, etc.
Vigilance	Watching someone/something or visually inspecting something
Forage	Actively looking for food, with or without eating, including digging
Feed	Eating and drinking
Swim	In the water, either stationary or actively swimming
Travel	Walking, running, swinging, climbing, jumping, pacing, etc.
Rest	Passive, stationary behaviors like sitting, laying, standing, etc.
Manipulate	Handling (e.g., rubbing/rolling) an item (e.g., food, enrichment, substrate)
Self-directed behavior	Scratching, grooming self, shaking, licking self, etc.
Lone play	Playing alone or with enrichment
Other	Any behavior that does not fall into the above categories
Unknown	Recorded when focals or what they are doing is not clearly visible

Results

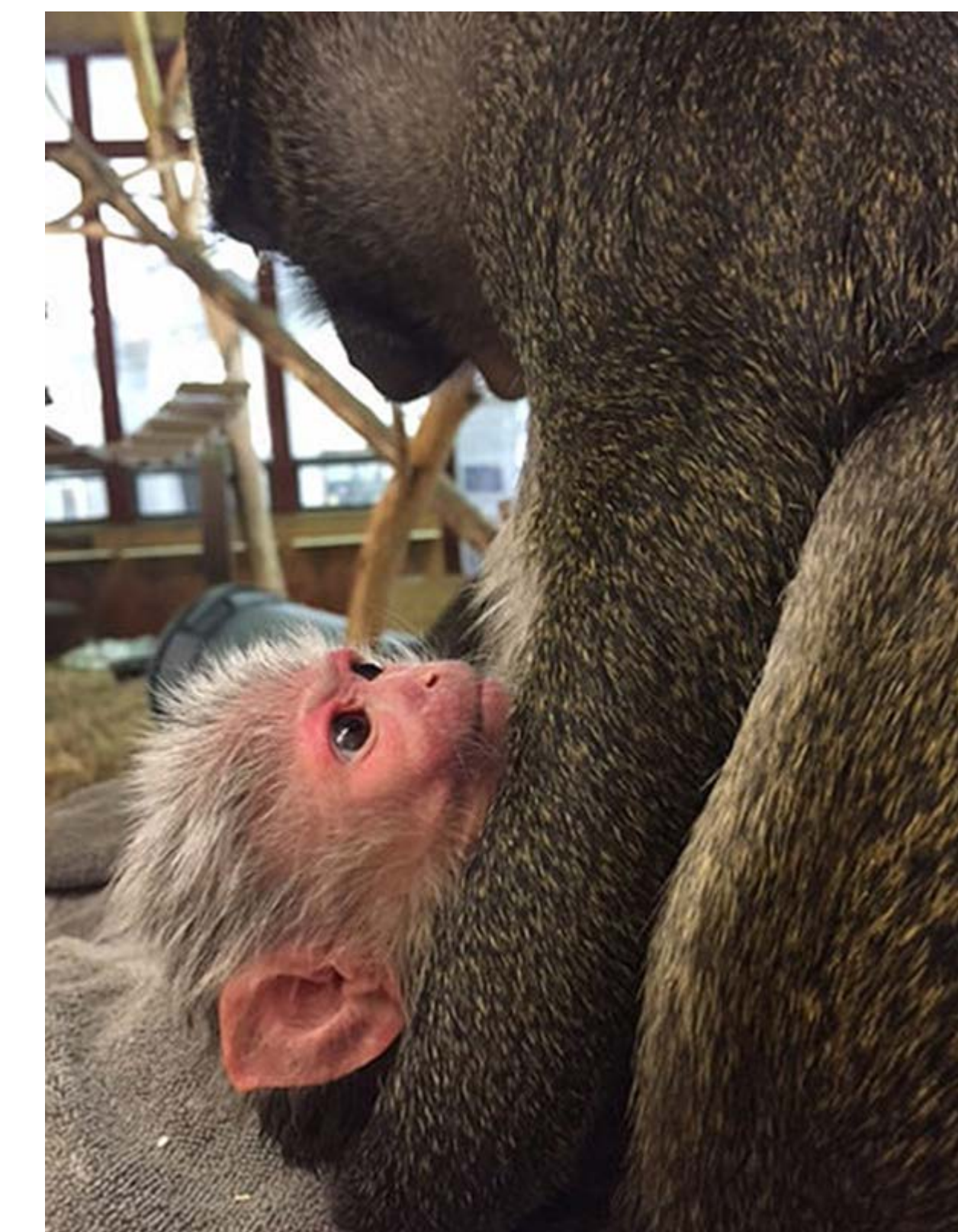
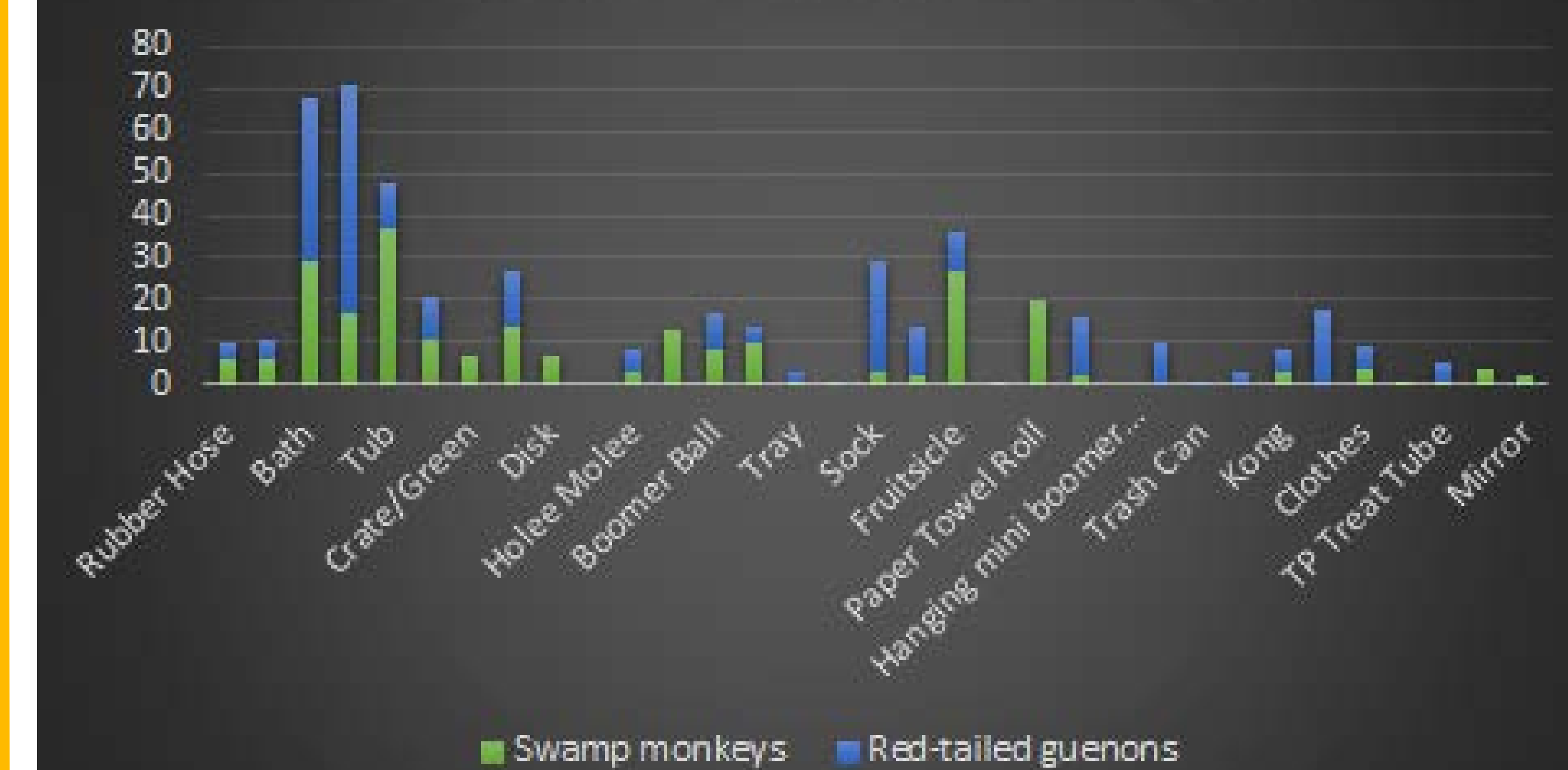
Behavior

Both species were observed before and after introductions of the two groups. When introduced, little aggression was observed, other than interactions between the lowest-ranking female of each species. The lowest-ranking Schmidt's red-tailed monkey would chase the lowest-ranking swamp monkey. Occasionally, other members of both species would intervene. Grooming, particularly post-conflict, was common for the female Schmidt's red-tailed monkeys.

Space Use



Prevalence of Enrichment Used



Discussion

- A two sample t-test ($p < 0.0001$) demonstrated that Allen's swamp monkeys spent more time on the ground and that Schmidt's red-tailed monkeys spent more time on perched higher levels. This finding aligned with expectations based on naturalistic observations.
- While Allen's swamp monkeys preferred enrichment set at terrestrial levels, such as the forage box or the food in tubs, Schmidt's red-tailed monkeys did not discriminate enrichment use based on enrichment item level ($p < 0.0001$).
- Recommendations based on observations:
 - Encourage natural swimming behavior in pool, including fish forage and floating objects.
 - Add duplicates of frequently used structures, such as the shaded, wooden hut.
 - Repurpose, alter, or take down rarely used structures, such as hanging vines, shaky PVC logs, and rock wall.

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Acknowledgements

We would like to thank the Primate Unit at the Smithsonian's National Zoological Park in DC and Virginia Commonwealth University's Department of Biology.

No Ifs, Ands, or Dirty Butts: Voluntary Cleaning of a Cheetah's (*Acinonyx jubatus*) Ano-Genital Area

Heather Ward, Saint Louis Zoo

Background

In 2007 a female cheetah, Sadie, was found to have abnormal thoracic and lumbar vertebrae during a quarantine examination. In August 2015 veterinary staff ascertained these lesions were decreasing her flexibility, leading to an inability to groom the rear half of her body and affecting her ability to posture normally while defecating and urinating. This flexibility issue led to urine scald and fecal build up inside the animal's thighs and around her ano-genital area, leading to severe perineal dermatitis. To be able to control the dermatitis without the need for frequent anesthesia, veterinary staff requested the carnivore unit attempt to develop and implement a training plan to voluntarily clean her ano-genital area.



Materials

The chute is made of wood and is attached to the fence using zip ties. Dimensions are 4' long, 3' tall, and 10" deep. 18" bamboo backscratcher was used for desensitization, and 12" metal tongs with gauze for cleaning.



Methods

Due to the severity of the medical condition, it was imperative for Sadie to allow cleaning of her ano-genital area as quickly as possible. For this reason a standard operant conditioning plan was waived in lieu of a progressive step desensitization plan. The desensitization plan for Sadie to transfer into a smaller yard, enter an open-ended feed chute from either direction, and eat freely while allowing the trainer to progress from light hip contact to full scrubbing of ano-genital area with wet gauze worked without difficulty. The verbal cue "touch" was used to communicate to Sadie that contact was coming from the keeper. Keeper safety involved keeping the hand a minimum of 6 inches from the mesh which was achieved by wrapping a zip tie around the metal tweezers. This kept the tweezers closed around the gauze without the keeper needing to apply pressure by moving her hand forward. Also, keepers always worked through mesh with Sadie during all steps of the desensitization plan.



Conclusion

Choosing desensitization in lieu of a formal shaping plan facilitated Sadie to be comfortable with voluntary, unrestrained, ano-genital cleanings in a matter of weeks. Also, this method allows a complex interaction to be done by a solo keeper, which is another advantage of forgoing more formalized operant scenario. Prior to this training plan, Sadie had not participated in any type of formalized training. This success also provides a foundation for future training plans involving voluntary injections and x-rays. Animal health staff have routinely been present for these training sessions. They have also been able to manipulate Sadie's tail with a 18 inch long bamboo backscratcher to visually examine her ano-genital area. Sadie is not bothered by multiple people being present during the session, nor various keepers performing the behavior. Three keepers in the unit are currently trained on the behavior, and others will be trained in the future.

A lengthy progression to cohesion

Rolling Hills Zoo's introduction of one sterile female to two intact male African Painted Dogs

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Introduction

In February 2015 Rolling Hills Zoo began the introduction of one sterile African Painted Dog named Sissy to two intact sibling males named Bruce Lee, the alpha dog, and Chuck Norris. Bruce and Chuck had been at Rolling Hills Zoo for two years and had been housed with two other siblings that had been recently transferred to the Denver Zoo. Sissy was the alpha female and housed with two other dogs at the Henry Doorly Zoo. The dogs were all four years old at the time of the introduction. As the staff had little experience with introducing this species, information to prepare for the introduction was obtained from communication with the SSP Coordinator and reading the AZA Large Canids Animal Care Manual. From this an initial plan was formulated. The staff had not heard of other facilities attempting to introduce a sterile female to two sibling males but believed it should go well if husbandry guidelines were followed. It was predicted that some initial aggression would be seen but would decrease within a few weeks and positive behaviors would then increase between Bruce and Sissy. The introduction did not go as expected and there was concerning aggression directed at Sissy. After communicating with the Brookfield Zoo, it was decided to take their advice on how to proceed further and a new introduction plan was executed.

Methods

- **Formulated plan:** Allow Sissy access to catch pen and half of building. Allow Bruce and Chuck half of building and yard. Dogs allowed mesh to mesh contact. Separate in the evening until comfortable with interactions.
- **February 10th-18th:** Dogs given mesh to mesh contact.
- **February 18th-19th:** Dogs given full access to enclosure and separated at night.
- **February 20th-25th:** Separated Sissy, allowed only mesh to mesh contact due to injuries and limited staff.
- **Changed plan:** No longer separate the dogs unless a life threatening injury occurred. Only intervened if two on one or life threatening fighting occurred.
- **February 24th-25th:** 24 hours without physical contact between Sissy and the brothers.
- **February 25th:** Started implementing second plan. Began with Sissy and Bruce together in the yard for 20 minutes and then allowed Chuck access to the yard. Monitored interactions between all three dogs for the following months. Offered feeding opportunities and additional food enrichment that encouraged dogs to work together.
- **July:** Scent enrichment as new focus.
- **August 13th-24th:** Sissy separated due to surgery from external hernia which was not the result of aggression. Rotated who had access to yard.
- **August 24th:** Sissy allowed access to full enclosure with Bruce and Chuck.

Results

- Initially, with the first plan, severe aggression was observed towards Sissy as well as between Bruce and Chuck.
- Immediately after implementing the second plan intense aggression was seen only directed at Sissy. The following three days both aggressive and positive interactions were seen.
- **March:** Aggressive and positive interactions were seen in almost equal amounts.
- **April:** It appeared that when Sissy was injured and spent more time lying around, Bruce and Chuck were indifferent or more accepting of her. As she was healing she would pace and whine and Bruce and Chuck would become more aggressive. Overall, through April, we saw nearly equal positive and negative interactions, with several days having no interactions.
- **May and June:** Interactions were minimal and were mostly negative.
- **July:** Bruce began to act as a mate to Sissy.
- **August 21:** Last fight.
- **August 24:** Sissy placed back with males after surgery recovery and was immediately accepted.
- **September:** Bruce and Sissy spending more than half of each day together.
- **October 1:** First time all three of the dogs were seen lying in a pile.

Discussion

- The introduction took seven months, a lot of time and patience.
- Seeing the dogs fighting was difficult, but trusting them and allowing them the space and time to form their pack without intervention is the best thing.
- It is important to know the behavioral history of each dog before introducing them. For example, Sissy has never shown any interest in any whole prey or carcasses. Therefore, the group and carcass feedings did not seem to bond the dogs even though it typically works and is highly recommended enrichment for introducing this species. Once scent enrichment was utilized, bonds began to form.
- Keep in mind that every situation is different.
- Talk to multiple facilities and gather as much information as possible.
- Set clear guidelines about what specific behaviors and fighting will be considered acceptable, and make more than one plan from the start.
- Time is key.

Thank you for advice and support from: Peter Burvenich, Brenda Gunder, Vickie Musselman, Danelle Okeson, Christina Gorsuch, Mike Quick, Karen Vacco, Cynthia Woodard, and Krysten Hayden-Ortega.



Yard: 6588 Square Feet

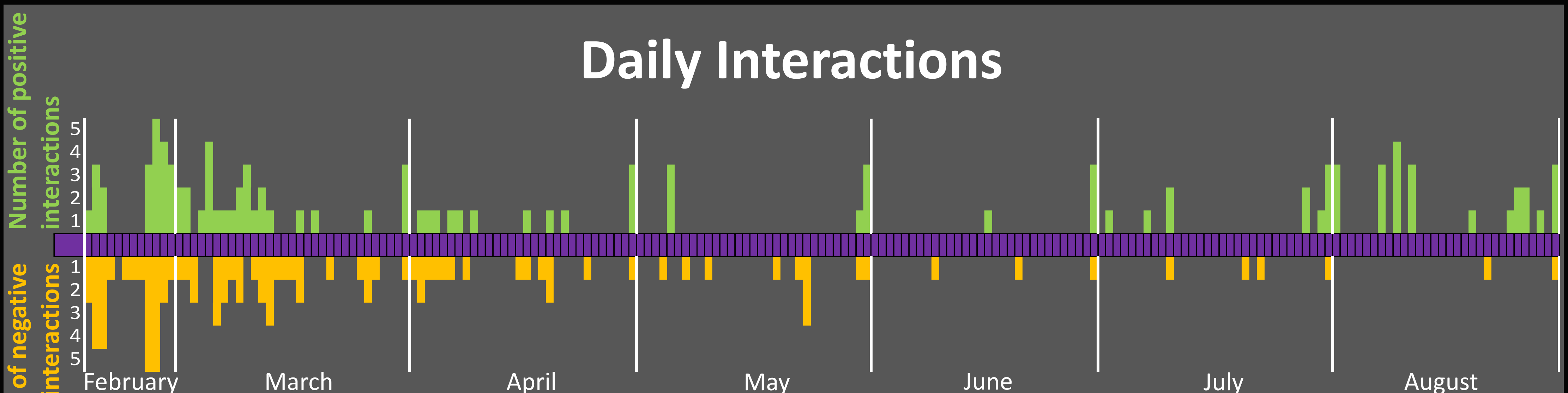


Building: 324 Square Feet



Left to Right: Chuck, Bruce, Sissy

Daily Interactions



Positive interactions were defined as nosing, wheel barrowing, lying near each other or interacting during feeding or enrichment.
Negative interactions were defined as physical fighting between the dogs.