

# Proceedings of the 45<sup>th</sup> Annual National Conference of the American Association of Zoo Keepers

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Posters

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# TABLE OF CONTENTS

[Click on Title to View Poster](#)

## **Trees for You and Me: 10 Years of Keepers Making a Difference in the Fight on Climate Change**

Meryt Schumacher, Denver Zoo

## **The Influence of a Conservation Zoo Program on the Knowledge, Attitudes, and Perception of the Importance of Conservation by Teenagers for the Endangered Eastern Hellbender of Indiana**

Jill Ohlsen, Castle High School/Mesker Park Zoo

## **Successful Fostering of Ring-Tailed Lemur at Indianapolis Zoo**

Heather Hammond-Wood, Indianapolis Zoo

## **Disc'n for Cheetahs: Driving Discs for Conservation**

Matt Corrie, Dickerson Park Zoo

## **One-Eyed Wonder: Training a Visually-Impaired Harbor Seal (*Phoca vitulina*) on a Cognitive Task**

Lauren Miller, Moody Gardens

## **Blakely's Barnyard Bonanza: How to Build an Interactive Show from Scratch**

Eunice Frahm, Cincinnati Zoo

## **Callitrichidae UV and Heat Sources for Indoor Exhibits**

Chris Caldwell, Indianapolis Zoo

## **Station! Up! Good Stretch! The Keeper's Role in Physical Rehabilitation Therapy Programs**

Diane Abbey, Woodland Park Zoo

## **Into the Darkness: How Light Impacts Nocturnal Animals**

Lindsey Schick, Moody Gardens

## **Zookeepers Benefiting the Community**

Alyssa Deats, Moody Gardens

## **Corks for Conservation**

Emilee Orndorff, Maryland Zoo

## **Living with Wolves: My First Summer Working for a Sustainable Facility in the Mountains of Colorado**

Hailey Adams, Chimp Haven





# TREES FOR YOU AND ME: 10 YEARS OF KEEPERS MAKING A DIFFERENCE IN THE FIGHT ON CLIMATE CHANGE

PRESENTED BY: MERYT SCHUMACHER<sup>1</sup>, CHRISTY MAZRIMAS-OTT<sup>2</sup>, NICOLE PEPO<sup>3</sup>  
<sup>1</sup>DENVER ZOO, <sup>2</sup>BROOKFIELD ZOO, <sup>3</sup>NORTH CAROLINA ZOO

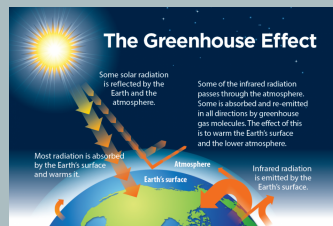


## Background

TFYM started as a keeper driven partnership between AAZK National and Polar Bears International in an effort to combat climate change. Through this partnership, chapters host a variety of fundraisers to raise money for the TFYM grant which provides funds for reforestation projects. Over the past ten years, chapters have raised over \$130,000 which has resulted in over 125,000 trees planted.

### What is Climate Change?

- Climate is the weather in an area over a long period of time whereas weather changes daily.
- Climate change is the change in regional or global climate. While climate can change over time, we are seeing it change quicker and the Earth is warming at a faster rate.
- Climate change occurs due to the burning of fossil fuels, like coal, oil and natural gas. Burning these products releases an excess amount of carbon dioxide. This release creates a blanket like effect which traps heat into the atmosphere and in turn warms up the Earth and changes the climate.



Environmental Protection Agency [www.epa.gov](http://www.epa.gov)

### Why Trees?

- Trees use and store carbon dioxide to grow. It is estimated that forests in the United States absorb and store 750 million metric tons of carbon dioxide each year.
- Not only do trees help with carbon emissions, but planting trees also reforest areas to connect habitats as well as renew previous landscapes that were once forests.
- Urban areas also benefit from trees. Shade from trees reduces energy use for cooling homes and businesses and reduces heat in neighborhoods.
- Neighborhoods can be up to 6–10° F cooler than neighborhoods without trees.

## TFYM Grant

Climate change effects us all. While polar bears are the icon of climate change, we all benefit from reducing carbon in the atmosphere. The TFYM grant was created to help conservation organizations with funds to plant trees and ultimately reduce carbon. Grant applications are due by November 15.



Brookfield Zoo



North Carolina Zoo

The following organizations have received funding from the TFYM grant:

- Red Panda Network- Requested funding to plant 10,000 saplings in Nepalese forests and raise awareness about the Red Panda.
- Save the Golden Lion Tamarin – Grant money was requested to plant forest corridors in Brazil to reconnect forests and help increase GLT populations.
- New Jersey Tree Foundation- Asked for funding to plant 40 trees to replace old, damaged or dying trees to restore the tree canopy in Cadwalader Park.
- The Wilds- Used grant money to expand forests at a former mining site. They worked with Healthy Forests, Healthy Wildlife.
- Akron Zoo- Requested funding for materials to raise money for Cans for Corridors. This program plants tree corridors in Brazil to help the Golden Lion Tamarin.
- Lake Louisa State Park Florida – Requested funding to restore an area that was used for pasture to an area that is healthy Sandhill Crane habitat by removing invasive species and planting Sandhill species.



Akron Zoo AAZK Cans for Corridors



## Get Involved

- Over 70 chapters have participated in TFYM activities.
- Chapters can host their own events to raise money for the grant program.
- Fundraising runs from February 1 to November 1.
- Tree blitz runs February 1 to April 1. Chapters that raise the most money receive a \$500 match from PBI.



Columbus Zoo AAZK Pints for Polar Bears



Pittsburg AAZK Plant Swap



Rocky Mountain AAZK Painting for Polar Bears



NC AAZK Brews for Bears

Participate in the TFYM shirt campaign by buying a shirt. Shirt sales run during the Tree Blitz.

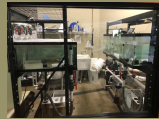
Buy TFYM merchandise.

Get involved in the TFYM Program. Ask a program member how!



Questions? Contact the TFYM program at [TFYM@aazk.org](mailto:TFYM@aazk.org)

References:  
 USDA Forest service Northern Institute of Applied Climate Science  
 Arbor Day Foundation  
 U.S. Forest Service Center for Urban Forest Research



# The Influence of a conservation zoo program on the knowledge, attitudes, and perception of the importance of conservation by teenagers for the endangered eastern hellbender of Indiana

Jill B. Ohlsen, Mesker Park Zoo and Botanic Garden, Castle High School, Earth Expeditions



## Introduction

Established in 1928, Mesker Park Zoo and Botanic Garden (MPZBG) sits on 50 acres of land in Evansville, IN. It houses around 700 animals of 200 different species. One of the newest exhibits highlights an eastern hellbender conservation program brought about as a result of a partnership with Purdue University. Through this program, hellbender eggs are collected by Purdue researchers and reared in captivity until the age of three or four at which point they are released back into their native habitat. This is believed to increase the chance of adult survival as it bypasses the vulnerable juvenile stages. In February of 2015, 20 one year old hellbenders were transferred to MPZBG as part of this program.

Today's zoos aim to not only be a source of entertainment for the over 600 million visitors worldwide, but to also raise awareness for a variety of conservation issues and promote action for these conservation issues. The research on the conservation priorities of children and teens however is quite lacking, even though the notion that future generations deserve to inherit a clean environmental state is often a conservation calling point. Future generations will also be required to make decisions and allocate resources to environmental causes as they become adults. Based on the examination of literature on the role of zoos and education in conservation and the impact of education on an uncharismatic and fairly unknown endangered Indiana species, this study addresses the following research questions and suggests the following hypotheses:

RQ1: Does the knowledge of teenagers about the endangered eastern hellbender and it's extreme decline in Indiana increase after an educational program at MPZBG?

H1: Teenager's basic knowledge of the endangered eastern hellbender and it's extreme decline will increase after a program by zookeeper Brian Plis at MPZBG.

RQ2: Is the attitude of teenagers toward the eastern hellbender impacted with information and familiarity received during an educational program at MPZBG?

H2: The attitude toward the eastern hellbender will be impacted after a program by zookeeper Brian Plis at MPZBG.

RQ3: Will the perceived need for hellbender conservation by teenagers increase after an educational program at MPZBG?

H3: The perceived need for hellbender conservation by teenagers will increase after an educational program by Brian Plis at MPZBG.

## Methods and Materials

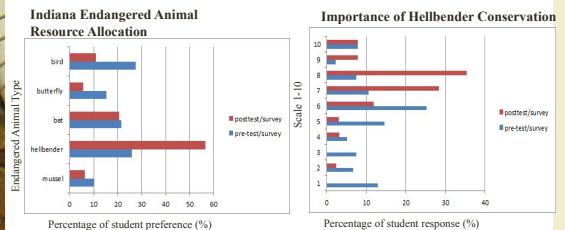
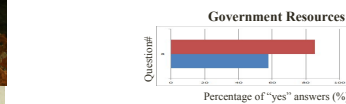
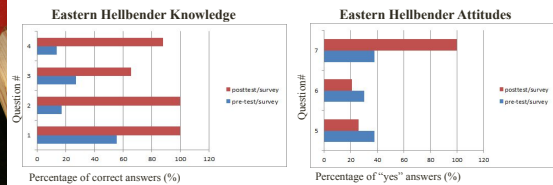
Informed consent was received from 40 students aged 16-18 in two Advanced Placement biology classes at Castle High School in Newburgh, Indiana. The teacher of the two classes and the researcher for this study was Mrs. Jill Ohlsen. On Thursday October 6, 2016 a pre-test/pre-survey was administered to participating students during their regularly scheduled class times. Each student selected a random classroom response clicker so that individual student answers were not tracked. As each powerpoint slide was displayed, the student used the clicker to submit an answer and were given time to change answers. The ten questions were divided into three categories based on the three research questions posed in the introduction. On Friday October 7, 2016 the participants visited Mesker Park Zoo and Botanic Garden and were met by keeper Mr. Brian Plis in front of the hellbender exhibit. This exhibit features a glass wall through which visitors can witness the keepers caring for the hellbenders. Brian spent about 30 minutes detailing the plight of the hellbender in the wild and explaining the intricacies of the program partnership with Purdue. The students were attentive and asked many pertinent questions about hellbenders in general and about the conservation program. Everyone then walked down to the behind the scenes water table, which would eventually house a breeding population of wild caught adult hellbenders. Brian then spent an additional 15 minutes covering this exciting extension of the captive rearing program and outlining all the obstacles faced to make this extension a reality. On Monday October 10, 2016 a posttest/survey was administered to the same students in the same format as the pre-test/survey. For all questions, a modified chi-square analysis was used to assess the statistical significance between the pre and post test/survey answers.

Zoo and school programs can significantly increase the knowledge of, attitude toward, and perceived need for conservation of an uncharismatic endangered species in Indiana teenagers!



## Results

The results for all questions as to whether a zoo program increases teenager knowledge, attitude, and perception toward conservation about the endangered eastern hellbender in Indiana are portrayed in the following bar graphs showing the percentage of students with the correct answer before and after the educational program at MPZBG



## Conclusions

The data presented in this study could be used in a very concrete way to improve the knowledge and perception of the need of conservation for the hellbender salamander of Indiana. After just one high quality conservation program at Mesker Park Zoo and Botanic Garden by hellbender keeper Brian Plis, teenage students from castle High School gained knowledge and more importantly were called to action to help raise awareness for the plight of this uncharismatic salamander. This can further imply that zoo (and possibly even school based) programming can be used to call visitors (and students) to action for many other fairly unknown and uncharismatic endangered species. These teenagers will very shortly inherit the environmental problems currently seen in their state, country and across the globe. It is encouraging that something as simple as passionate zookeeper, docent, zooteen or teacher may guide them as they make future decisions about endangered animals and the ecosystems in which they live.

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# Successful Fostering of a Ring-tailed Lemur

Heather Hammond-Wood<sup>1</sup> & Shannon McElmeel<sup>2</sup>  
Indianapolis Zoo



## Background

- 3.4 individuals in the group - all 4 adult females were pregnant for the 2018 season.
- First time mother Teagan gave birth to twins, Nora and Meera, on 3/6/18. She rejected them and staff hand-reared both individuals.
- Introductions were attempted with Teagan alone for the first several days following birth. Those introductions were unsuccessful, so it was decided to hand-rear Nora and Meera at the vet hospital until 3/29/18.
- On 3/29/18 Nora and Meera were moved back to lemur holding and lived in a small bird cage with visual access to the group. Introductions began on 3/30/18 and on 4/11/18 we lost Meera due to an incident during one of the group introductions. After the incident, group introductions were halted until we could come up with a new plan.
- First time mother Reilly gave birth to a stillborn on 4/12/18. She showed interest in Nora once the stillborn was removed. At this point staff discussed integrating Nora with Reilly.

## Methods & Results

4/25/18

First physical intro with Nora and Reilly. Nora was brought into the room on a stuffed animal. They groomed each other, but Nora did not want to cling to Reilly.



4/28/18

Nora jumped on Reilly for the first time. Reilly was surprised and unsure what to do. A stuffed animal was held up and Nora jumped off.



5/3/18

Began mesh introductions with adult female Sheridan. Sheridan groomed Nora through the mesh for about 10-15 minutes.



4/30/18

Reilly roamed around the room with Nora on her back. Nora left her stuffed animal more and was seen interacting with enrichment.

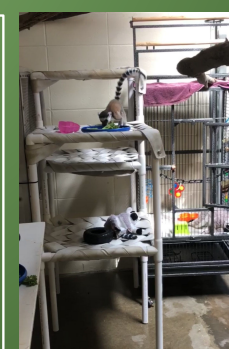


5/9/18

First introduction with both Reilly and Sheridan in the same room. Nora was very active and there was a lot of grooming seen by both adult females.



5/14/18 Reilly, Nora and Sheridan sharing a room together. Nora still sleeping on stuffed animals either in the bird cage or next to Reilly. At the end of May, Nora started nursing from Reilly and we stopped supplementing from a bottle.



## Conclusion

Nora is now fully integrated with Sheridan, Sheridan's daughter Gwen, and Reilly who she now relies on as her mother.

## Acknowledgments

Thank you to all primate and zoo staff for your help and support!





## Disc'n for Cheetahs: Driving Discs For Conservation

By Matt Corrie  
Dickerson Park Zoo



### How to Start

Before starting a disc golf fundraiser, it is important to determine if disc golf is popular in your area. Disc golf baskets tend to stand out in parks, so checking your local ones is a good way to start. Once you find your local course(s), ask people you see playing what their favorite courses are in the area and if there are any tournaments coming up. Using a course in the area that locals prefer will help bring people to the tournament. Online resources that can also help you find courses and tournaments are [discgolfcoursereview.com](http://discgolfcoursereview.com) and [pdga.com](http://pdga.com).

Many areas have local disc golf clubs or promoters that might be interested in helping with a charity event. Finding a person or group that has experience in running tournaments or tours is very helpful because they will already have a following of people who typically attend their events. Once you have become familiarized and introduced in your local disc golf community, you can begin thinking about what size and type of tournament to organize.

### Types of Tournaments

**Sanctioned Tournament**- a sanctioned tournament means that it is registered with the Professional Disc Golf Association (PDGA) and must follow PDGA guidelines. You will draw a larger turnout from local PDGA members if you hold a sanctioned tournament, but there are fees associated with the sanctioning process. With approval, most of the fees are waived for a 501(c)(3) non-profit organization such as AAZK. You will also need a certified PDGA Tournament Director (TD) to hold this type of tournament which is why partnering with someone local is very important. There are three different tiers of sanctioned tournaments you can host.

**C Tier**- This tier requires the least amount of money to host as there is no requirement to add money to the pay out to the professional players' for this tournament. Usually this tier will max out around 90 participants and only have two rounds at one course. This is a good tier to start with to determine the interest in your area.

**B Tier**- This tier requires \$750.00 to be added to the professional players' payouts. This tier can have one to two courses. If you do two rounds at one course, you will max out at around 90 people but using two courses increases that to around 140. Since this tier requires more start-up money it makes more sense to use two courses when possible.

**A Tier**- This tier requires \$3000.00 to be added cash to the professional players' payouts. This tier normally uses multiple courses over multiple days. This type of tournament may not be feasible for a first-year tournament due to work and monetary requirements.

**Non-sanctioned Tournament**- a non-sanctioned tournament means that it is not registered with the PDGA and does not have to follow any guidelines for their tournaments. Usually non-sanctioned tournaments are around the size of a C Tier and may be challenging to draw maximum turnouts until the event is more established.



### Costs/Earnings

Every tournament will have costs associated with it, with the main cost being the merchandise the players receive for registering (players pack). The players pack generally includes items equal in value to the registration fees. It is required that a PDGA C Tier player pack include at least a disc and the B Tier pack include at least a disc and t-shirt. A Tiers require a disc, t-shirt and several additional items to compensate for the large registration fee.

The costs of discs can vary from \$5 to \$15 each depending on brand and type but partnering with local TDs will sometimes get you a better deal if they have agreements with certain companies. Examples of major disc companies are Innova, Discraft, Gateway, and Dynamic Discs. Starting on the cheaper side is usually recommended for the first tournament. T-shirt costs will depend on companies in your area but have averaged us around \$8 a shirt.

This is an all-day event so providing food or having food options close is important. For the second and third tournaments, I had food trucks set up in the parking lot for people to buy food from during the lunch break. I have found some food trucks require a minimum guaranteed sale to attend an event, but luckily found vendors who instead donated a portion of their sales back to the event.

Providing free food is another option and could be good way to bring people back for following years. Most tournaments do not do this so it's a good way to stand out. I had members of my chapter cook burgers and hot dogs for the lunch break this last year. The players also received chips, a cookie, and a drink. The drinks were donated to the event. Total cost to feed around 120 people was around \$230.00 and our chapter covered the lunch expenses.

The only other costs for the tournaments were making trophies. The cost to make ours was just 20 dollars. It can be as simple as wood planks with cheetah footprints on them (see picture below).

Now the important part—how to bring in additional money for the charity. Raffles have been a large part of our success. We have brought in between \$750 and \$1,400 from the raffle depending on the number of participants for the tournament. Another way to earn money is getting a kick back from the entry fees. We usually do \$5 per person, which equates to larger tournament = more people = more money. Last tournament we made over \$500 from this. Finally, as stated earlier, once sponsorships have reached the level to cover tournament costs, you have a great opportunity with additional supporting or hole sponsors to add to your money raised. Due to our large presenting sponsor this last year, we were able to \$950 directly from sponsorships. (See chart for cost to earnings comparison.)

### Sponsorships

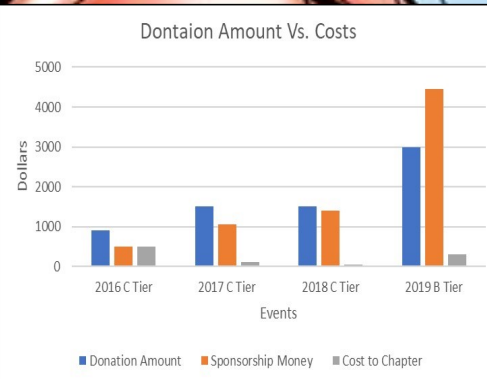
As with many fundraisers, sponsorships are very important to lowering the cost of the tournament to your chapter and can vary in amount depending on how you decide to set up the tournament. These are the sponsorships levels that I have used in the past tournaments:

**Presenting Sponsor**: I usually try to get the presenting sponsor to cover the costs of all the merchandise that will be handed out to players when they sign up and the cost of the added cash to the professional players payouts if required. For example, our last presenting sponsor donated \$3000.00. This sponsorship gets their logo featured on the disc and t-shirt (B Tier) as well as the most recognition the day of the tournament. I generally place their business' banners by the check in area if they have any to utilize.

**Supporting Sponsor**: This sponsorship level has been for businesses donating \$200.00 and above. They also get their logo on the t-shirt (B Tier) or the disc and have had banners placed near the check in area when available.

**Hole Sponsor**: This sponsorship level is \$50.00 per hole. This level has seen both businesses and private individuals and they have their logo, business info or names printed and hung below the tee signs on the holes. I usually just laminate a standard piece of paper for these signs. If a presenting sponsor covers your costs, this money can largely increase what goes to the charity.

**Raffle Sponsor**: This sponsorship level is used to cover the cost of the raffle items. Luckily, our zoo donates \$500.00 a year to cover raffle expenses and I have included their logo on the B tier shirts, hung zoo banners at the raffle tables and recognized them when speaking at the event.



# One-eyed Wonder: Training a Visually-impaired Harbor Seal (*Phoca vitulina*) on a Cognitive Task



Lauren E. Miller

The Aquarium at Moody Gardens, 1 Hope Blvd, Galveston, TX 77554



## CONCEPT FORMATION IN ANIMALS

- Concept formation helps animals navigate their environment and facilitates decisions utilizing adaptive solutions to novel problems that help them to survive (Cook 2002, Mauck & Denhardt 2005, Shettleworth 2001), including:
  - \* Navigation
  - \* Predator avoidance
  - \* Hunting
  - \* Recognition of partners
- Studies can provide valuable insight into the psychological processes that animals have developed to survive in their environments



## TRAINING CHALLENGES

### One eye!

- Minimal to no depth perception
  - \* 2D vs 3D stimuli
- How does color contrast influence his vision?
- Will he develop a side-bias that favors his eye?

### The anti-harbor seal

- Over 80 behaviors! Loves to learn and gets bored easily
- Eager to participate and show off what he knows
- Not easily spooked or neophobic

### A "dense" pinniped?

- Typically a species supposed to be incapable of advanced cognitive functions
  - \* Mauck & Denhardt 2005: first evidence of abstract concept formation in a harbor seal - discrimination on the basis of the relationship between objects
- 19 years old: learning to think vs learning to perform a behavior

## COGNITIVE STUDIES PROMOTE MORE IMPACTFUL CONSERVATION MESSAGES

- The primary purpose of zoos and aquariums is to promote and advance animal conservation by educating and inspiring visitors
- Learning about the cognitive abilities of an animal can greatly increase visitors' interest in and positive affect towards that animal, as well as increase their motivation to contribute to its conservation efforts (Highfill et al 2019)
- When a researcher is present and actively conducting cognitive research, visitors
  - \* approach an exhibit more often
  - \* report a greater awareness of the animals, including conservation
  - \* report a greater perceived learning (Waller et al 2010)

## THE IMPORTANCE OF COGNITIVE CHALLENGES AS WELFARE AND ENRICHMENT

- The ability to respond to and cope with environmental challenges is an important part of welfare (Wechsler 1995, Wemelsfelder & Birke 1997)
- Animals' cognitive skills aren't challenged at a high level by merely placing objects in their habitats (Clark 2013)
- Cognitive research provides enrichment and promotes welfare by providing:
  - \* Mental stimulation (Clark 2013, MacDonald & Rivto 2016, Mason et al 2007, Puppe et al 2007)
  - \* Reduced stress and anxiety (Clark 2013, MacDonald & Rivto 2016, Mason et al 2007, Meehan & Mench 2007)
  - \* Control over the environment (Clark 2013, Langbein et al 2009, Meehan & Mench 2007)
- Animals can benefit from their own learning success over time! (Hagan & Broom 2004)
  - \* Dwarf goats continue to solve a previously learned cognitive problem without an external reward (Langbein et al 2009)
- Practical applications include behavioral management, preference assessment, and exhibit design (MacDonald & Rivto 2016)

## TRAINING STIMULI







## How to Create an Interactive Show from Scratch

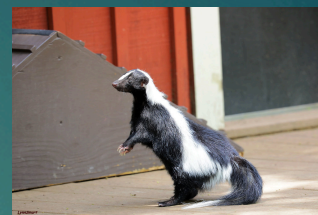
Eunice Frahm Cincinnati Zoo and Botanical Garden  
Goal: To create an interactive experience between guests and barn yard animals with behaviors highlighting the animals natural abilities.



Beginning: Started by training in the guest pathway. This allowed us to get instant feedback on behaviors guests enjoyed seeing. First summer it was an informal demo showing goat and chicken agility.



Today: A collection of animals is now dedicated to the show and includes pigs, goats, ducks, a rabbit and a skunk. Guests are offered multiple opportunities to volunteer to be part of the show and interact with the animals.



Behaviors: We trained behaviors based on natural history. Behaviors demonstrated the animals agility, intelligence and charisma.



Special thanks to all the CZ staff for allowing me the time to train the animals and for always being willing to be a part of each show.





# Callitrichidae UV and Heat Sources for Indoor Exhibits

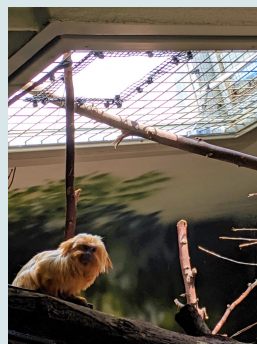
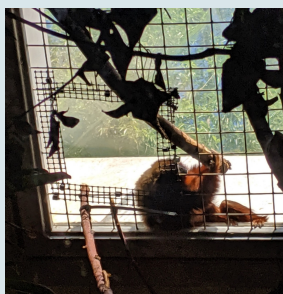
CHRIS CALDWELL<sup>1</sup>; SAM HENGGE<sup>2</sup>

<sup>1</sup> Primate Keeper, Indianapolis Zoo; <sup>2</sup> Primate Keeper, Denver Zoo



## Introduction

- All the callitrichidae exhibits at Denver Zoo do not have outdoor access and we wanted to provide the most natural exhibits possible. It is a priority to offer UV and heat sources on and off exhibit. We made it a goal to provide more effective, more budget friendly and better accessible UV and heat sources.



## Methodology

- Created multiple types of housing methods some of which are unable to be seen by guests.
  - Limited options based on dated building and differences in exhibit and holding areas.
  - Able to modify previous fixtures
- Developed protocols for frequency of offering UV and Heat.
  - Based UV and heat on recreating natural environment.
- Provided perching within UV and heat affected areas.



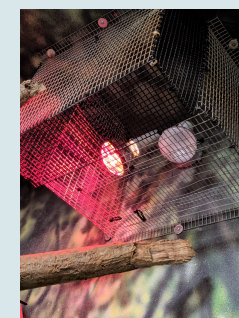
## Results

- Throughout these process we have begun to seen a color change in our Golden Lion Tamarins from the increased accessibility and the new UV protocols and housing methods
- Seen animals seeking UV and heat more regularly.
- More cost effective bulbs help budgeting.



## Conclusion

- By evolving our UV and heat housings, changing our bulbs, and offering better accessibility to UV and heat we have created indoor areas that offer a more natural environment that is also more budget friendly. We have been able to have more open discussions with guests about how our indoor exhibits provide more than meets the eye.



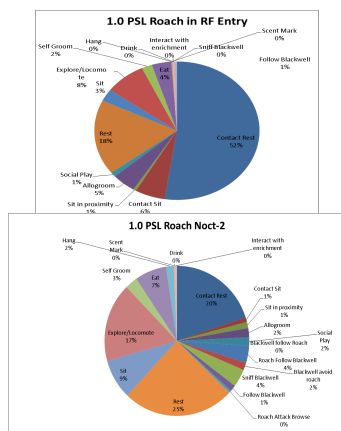
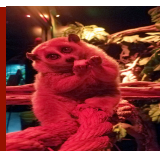
## Acknowledgements

We could not have done this without Keith Callaghan, Denver Zoo Swing Keeper. Thank you for making our building dreams come true. Thank you for all the support from the Denver Primate Team.



## Into the Darkness: How Light Affects Nocturnal Animals

Lindsey Schick, Rainforest Biologist, Nichole Ott, Rainforest Biologist  
Moody Gardens, Galveston County AAZK



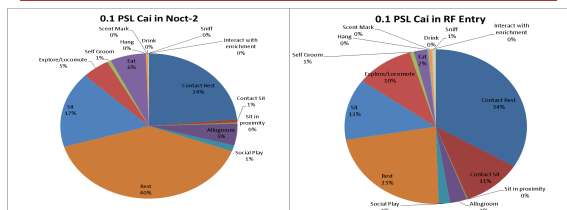
## Pygmy Slow Loris

-1.1 Pygmy Slow Loris (PSL) and 0.2 PSL were housed in two different locations. 1.1 in Rainforest Entry Exhibit (RF- Entry) and 0.2 in Nocturnal 2 Exhibit (Noct-2).

-A Continuous Sampling Ethogram was used during this study, which noted each change in an animals behavior. They were performed between 7am-4pm daily.

-Several different behaviors were observed including: resting, contact resting, eating, locomotion/explore, grooming, and interacting with enrichment.

-The ethograms were performed for two weeks to get baseline data. After that, the two pairs swapped exhibits and another 4 weeks of ethograms were performed.



## Contact

Lindsey Schick  
Moody Gardens  
Email: [lindseym.schick@gmail.com](mailto:lindseym.schick@gmail.com)

## Why?

Nocturnal animals in zoos and aquarium are typically kept on a reverse light cycle so they are more active during times guests would be present. This includes a red light during the day and a white light at night. The red light doesn't affect the circadian cycle of the animals, but the brightness could affect the activity of the animals. A light study was performed on two of our nocturnal species to see if we needed to change their light to increase animal activity and welfare. Ethograms were used to collect data.

**-Pygmy Slow Loris (*Nycticebus pygmaeus*):** This study was done to see if the light and noise in one of our exhibits affects the activity and breeding of a 1.1 pair.

**-Egyptian Fruit Bat (*Rousettus aegyptiacus*):** This study was done to see if changing the lighting arrangement could increase animal activity and have them be more visible to guests

## Results

### Pygmy Slow Loris:

-0.2 Pygmy Slow Lorises that were moved into the RF-Entry exhibit showed an increase in resting and contact resting behaviors

-1.1 Pygmy Slow Lorises that were moved into Noct-2 exhibit showed an decrease in resting and contact resting and an increase in exploratory behaviors.

-Since being moved into Noct-2 from RF- Entry, the 1.1 pair have exhibited breeding behaviors.

### Egyptian Fruit Bat:

-In the beginning of the study, with both sets of lights on, the bats spent 69% of the time in the back of the exhibit. In the lighting arrangement we choose for the exhibit, the bats spent around 56% of their time in the back. That's a 13% increase in animal activity and guest visibility

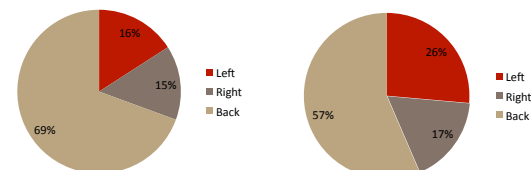
-The best light configuration was actually "Left Side Lights Off", at 19% increase in animal activity. But with the design of the exhibit, from entrance of the "bat cave", the exhibit appeared to be completely dark and many guests thought the exhibit was empty.

## Moving Forward

Through the light studies we've done, we were successful in increasing animal activity and welfare by decreasing the brightness of the red lights on exhibit.

**Vampire Bats:** By covering up some of the lights, the bats were utilizing more of the exhibit more often, rather than spending most of their time in the darkest corner of their exhibit.

Prehensile Tail Porcupine: We covered up 1/3<sup>rd</sup> of the lights of the exhibit. After the 0.2 porcupines adjusted to returning to a reverse light cycle after being in a normal light cycle, they were more active. There is an increase in play behaviors between the 2 porcupines and a previously uninterested porcupine has increasingly participated in training sessions.



**Chart 1.** Baseline: Lights on both sides of the exhibit are On

**Chart 2.** Lights on Right Side of exhibit are Off.

## Egyptian Fruit Bat Study

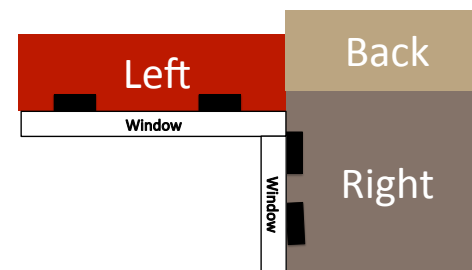
-The Egyptian Fruit Exhibit houses 13.0 Fruit Bat and was divided into 3 sections: Left, Right, Back.

-Scan Sampling Ethograms were used to determine where the bats were in the exhibit at a given time. The ethograms were performed for 5 minutes, on the hour, between 7am – 4pm.

-4 different lighting arrangements were tested:

- Lights on both sides ON (Baseline)
- Left Side lights OFF
- Right Side lights OFF
- All lights OFF

- Two weeks of ethograms were performed for each lighting arrangement.



**Chart 3. Map of Egyptian Fruit Bat Exhibit.**





# BRIDGING THE GAP: ZOOKEEPERS IMPACTING THE COMMUNITY

Alyssa Deats, Rainforest Biologist II  
Moody Gardens  
Galveston, Texas



## SEEDING GALVESTON

### WHAT IS IT?

- A community garden with a CSA (Community Supported Agricultural) component
- Their **MISSION** is to...
  - Provide reasonably priced, fresh and locally grown organic fruits and vegetables to Galveston Island residents and visitors
  - Reduce the community carbon footprint
  - Enhance the security of the neighborhoods by eliminating unused vacant lots



## Goat Training

### WHY GOATS?

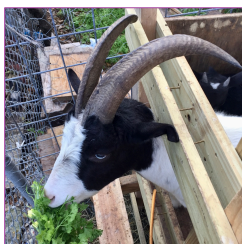
- Goats provide milk that the farmers can sell to the community
- An animal with a friendly, calm demeanor that children and adults can visit and connect with during weekly farm stand markets

### WHAT DO KEEPERS DO WHEN THEY VISIT?

- Practice their training skills
- Teach the farmers how to use positive reinforcement training to trim their goats' hooves and milk them voluntarily
- Bring enrichment and set it up in the enclosures

### POSITIVE IMPACTS

- A better quality product to sell obtained through a stress free environment
- Both animals and people learn while positive relationships are created
- Welfare improvement through reduced stress and the implementation of enrichment



Rainforest Biologists training the goats to stay at their milking station voluntarily and targeting through positive reinforcement

## ANIMAL CONTROL

### ASSISTING THE CITY OF GALVESTON

- Moody Gardens is a valuable resource for local and state agencies regarding confiscated or seized animals
- These agencies can contact us when they encounter a case that is outside of their realm of expertise
- Some animals need extra care whereas others call for temporary housing

### POSITIVE IMPACTS

- City has a safe, reliable outlet to relinquish animals
- Staff gains valuable experience and husbandry knowledge of unique species

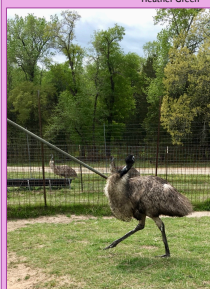
## Second Chances Animal Control

### 1.1 EMU (DOMINIQUE & HUBERT)

- Escaped from the backyard of a Galveston resident and found wandering outside a local elementary school
- Captured and brought to Moody Gardens for full health evaluations
- Sustained severe injuries from being out overnight and undergoing the stress of capture
- 1.0 Emu, Hubert, succumbed to his injuries early on
- 0.1 Emu, Dominique, was gavage fed and medicated for over two months and after much time, love and care by a determined staff and an excellent veterinary team, gained strength back and began eating on her own again
- Made a full recovery and transported to a nearby sanctuary-Black Beauty Ranch in Murchison, Texas
- She now lives with 2 other emus, ostriches and hoof stock on a 30 acre pasture with a pond



Arrived at Moody Gardens on January 22, 2019  
Dominique and senior Rainforest Biologist Heather Green



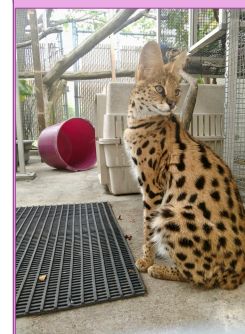
Picture taken upon arrival to her new forever home at Black Beauty Ranch on April 3, 2019

### 0.1 RED-TAILED BOA (PETUNIA)

- Came to Moody Gardens on April 12, 2017 as a confiscation from a hoarding case
- Became a valued part of our ambassador animal collection
- Participates in presentations where keepers talk about responsible pet ownership



## Second Chances Parks and Wildlife



### 0.1 AFRICAN SERVAL (KIRA)

- Found by police in the back seat of a car after it was pulled over for a traffic violation
- Serval was confiscated by Texas Parks and Wildlife, surrendered and brought to Moody Gardens on April 22, 2019
- Owner had illegally kept her as a house cat from the time she was a kitten
- Lived in multiple environments with inadequate nutrition
- Is now receiving excellent veterinary care and training to alleviate displaced aggression

## GALVESTON ISLAND HUMANE SOCIETY

### WHAT IS THEIR MISSION?

- Promote animal welfare and the protection and prevention of unwanted or homeless animals of Galveston Island

### HOW DOES MOODY GARDENS SUPPORT THIS MISSION?

- Keepers train dogs via positive reinforcement while socializing them to make them more appealing to potential adopters

### WHAT BEHAVIORS DO TRAINERS FOCUS ON?

- Establishing a bridge, name recognition, sit, stay, lay down, leash etiquette
- POSITIVE IMPACTS**
- Good manners lead to a better chance of finding their forever homes
  - Keepers practice training skills and complete one of the requirements to move up to the next trainer level in our staff training program



Rainforest Biologists (Left to Right) Alyssa Deats, Dori Colburn, Brooke White and Shara Reedy

# CORKS *for* CONSERVATION

**Versatile piece of merchandise used to bolster fundraising efforts**



**Purchase in bulk at a discounted rate for your next chapter event**



- ❖ Educational labels for sustained engagement
- ❖ 3D printed with biodegradable plant-based plastic
- ❖ Packaged using eco-friendly materials

Fundraising for species in peril can be difficult without collaborative efforts. Together we aim to grow this endeavor and encompass additional taxa.





# Living with Wolves: Working for a Sustainable Facility Education



## The Refuge

Nestled in the Wet Mountains of Southern Colorado, lies Mission Wolf. A 40 acres, nonprofit refuge, dedicated to the rescue and lifelong care of unwanted captive bred wolves. The refuge is almost completely self-sustaining. All electricity comes from solar panels and water is obtained from an underground well by a solar powered pump. The buildings are all earth bermed and built by volunteers. They are made entirely from scrap and recycled materials.



## The Staff

Living in tents and Tipis spread in amongst the wolf enclosures, the staff of Mission Wolf find themselves at the constant mercy of the elements. Staff live as a community sharing a kitchen and one bathroom.



## Ambassador Wolves

Throughout our history and even today wolves have been demonized in things like fairy tales and movies. This is the main reason for Mission Wolf's ambassador wolf program. It is a rare animal who has the inclination and temperament to be an ambassador wolf and meet the public. The wolves are leash trained using what is traditionally horse training techniques. Such as pressure release. This technique works, by one person approaching the animal in question until they show any kind of response. The person then stops, and approaches



## Education

Through Mission Wolf's experiential education programs, visitors to the refuge learn about a wide variety of topics including: How to live sustainably, why wolves do not make good pets and the important role predators play in the environment. The refuge facilitates many kids camps each year. For many of the children it is their first experience with nature. I once came across a boy of about 10 staring at the sky completely entranced. When I asked what he was doing he told me he had never seen the stars before.



## Spirit

Mission Wolfs resident animals all have different and varied backgrounds. Spirit's story begins in a small Colorado town near the refuge where she was bred to a malamute. Her pups were sold as wolf hybrids. When Spirit's owners were arrested, her pups and the malamute all found homes and she did not. She was left in a tennis court for several weeks, until Mission Wolf was contacted. The refuge immediately retrieved her, and she was paired with a male wolf named Mowgli. The two bonded immediately and could be seen sleeping in a pile together for the remainder of their days.

By Hailey Adams  
Chimp Haven