Proceedings of the 49th Annual American Association of Zoo Keepers National Conference

AAZK OMAHA 2024

Together We Grow

September 22-27, 2024

AZA/AAZK Panel Discussion

AMERICAN ASSOCIATION of ZOO KEEPERS

ASSOCIATION OF ZOOS & AQUARIUMS

Keepers are Key: Elevating Animal Welfare/Well-being through Assessments, Research, and Animal Management Practices

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Animal welfare and well-being are taking an increasingly central role in the management of modern zoos, aquariums, and related facilities. Keepers are uniquely positioned to collect and provide crucial data about their animals' well-being, which informs both small and large scale decisions that can dramatically impact the lives of animals in human care. This panel discussion will begin with a review of key terms surrounding welfare/well-being. It will then evaluate day-to-day actions keepers take which can easily be turned into assessments that positively impact animal well-being, and look at ways in which keepers can take raw data from record keeping and turn it into larger projects that help inform animal management practices. Case studies will be used to discuss how keepers can collaborate with other staff and zoo management to create welfare assessments, research projects and more that directly impact the lives of the animals in their care - even within the restrictions of a busy daily keeper schedule. Small group discussion and Q&A will be used to help audience member's problem-solve issues they may be facing at their own facilities.



Keepers are Key: Elevating Animal Welfare/Wellbeing Through Assessments, Research, and Animal Management Practices

AZA/AAZK Joint Panel Discussion – Omaha 2024

ASSOCIATION OF ZOOS & AQUARIUMS

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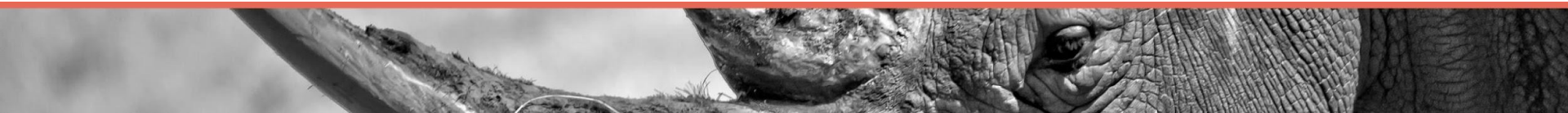
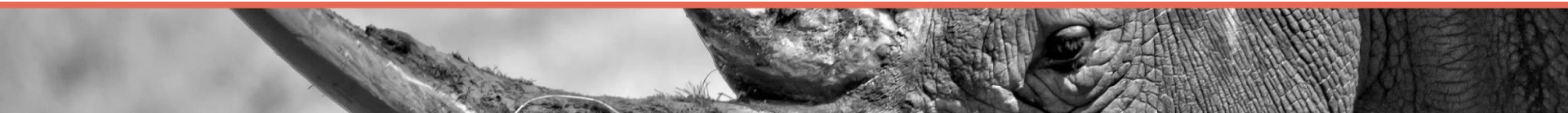


Safe Space

This is a safe space. A space free of discrimination or fear; a space, free of bullying, harassment, and/or retaliation of any kind. We will treat one another with equality, politeness and respect at all times. If we are subjected to or witness discrimination, bullying or harassment, we will speak out knowing that our voices will be heard and we will be taken seriously.

Please feel free to communicate openly within this room and know that nothing you say will be shared externally. All of the panelists will have their preferred contact information at the bottom of their Bio slides. You are more than welcome to contact any of us privately if that will make you feel more comfortable.

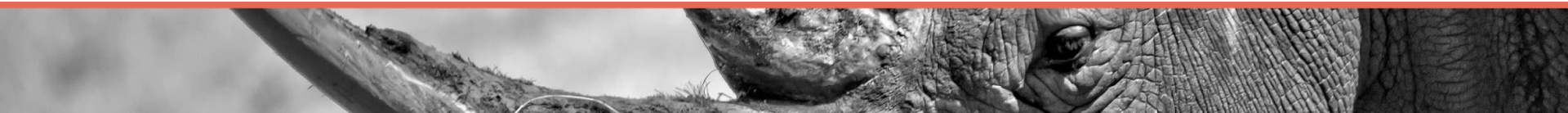
Citation: Google Images, 2024



Outline of Topics/Program

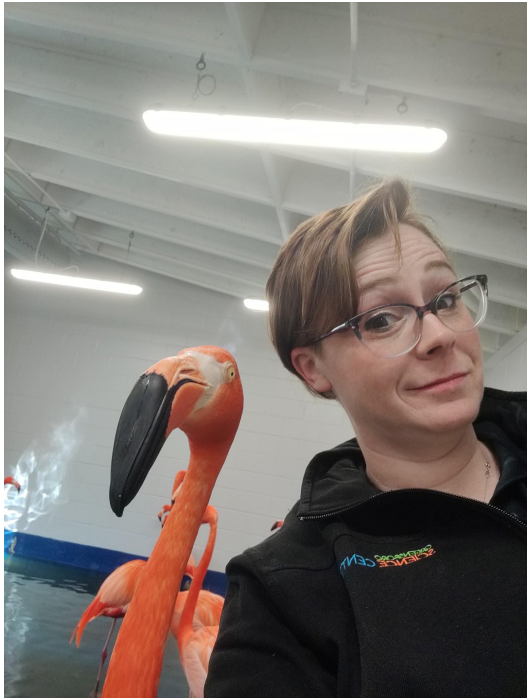
- Define and compare Animal Welfare and Animal Wellbeing
- Types of available assessment strategies and tools
- Strategies for collecting data and making use of it
- How keepers are key to welfare/wellbeing
- Troubleshooting through common problems
- Case studies of collaboration

Citation: Google Images, 2024



Nicole Pepo- AAZK Panelist

- AAZK President, Executive Board of Directors
  2023-Present
- Lead Keeper at the Greensboro Science Center- Greensboro, North Carolina
  2022-Present
- AAZK Vice President, Executive Board of Directors
  2020-2023
- AAZK Board of Directors, Conservation Oversight
  2018- 2020
- Rocky Coast Keeper at the North Carolina Zoo- Asheboro, North Carolina
  2009-2022



Contact information: Nicole.Pepo@aazk.org

Russell Pharr- AAZK Panelist

- AAZK Board of Directors, 2021-Present
  - Education Oversight

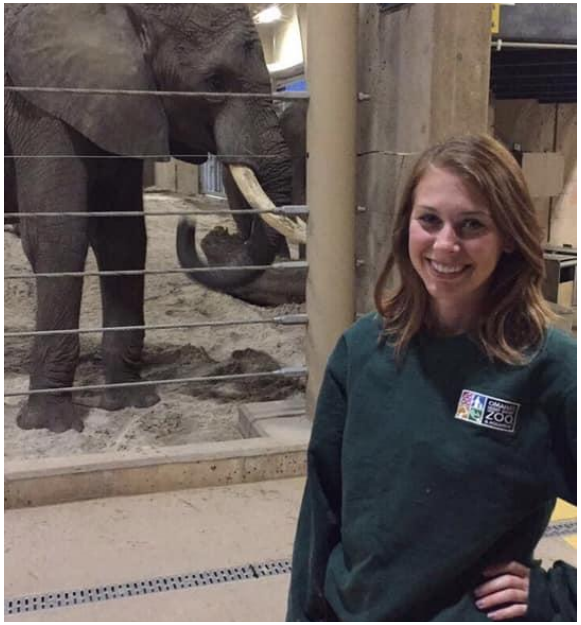
- Dallas Zoo, 2012-2018
  - Keeper I, North Savanna 2012-2015
  - Keeper II, Elephants 2015-2018

- Point Defiance Zoo & Aquarium, 2018-Present
  - Staff Biologist

Contact Information: Russell.Pharr@aazk.org

Kaitlyn Wiktor- AZA Panelist

- Manager of Animal Behavior and Wellbeing, Omaha's Henry Doorly Zoo and Aquarium 2021-present
- Behavior Management Coordinator, Fort Wayne Children's Zoo 2018-2021
- Omaha's HDZ
  - Elephant team
  - Great Ape & Sea Lion team



Contact Information: kaitlyn.wiktor@omahazoo.com

Kimberly Leser- AZA Panelist

- Behavioral Husbandry and Welfare Manager, Oklahoma City Zoo 2017- present
- Behavioral Husbandry Associate, Disney's Animal Kingdom 2015-2017
- AZA Chair, Behavior Scientific Advisory Group (BSAG)
- Member, AZA Animal Welfare Committee

Contact Information: KLeser@okczoo.org

Definition of Key Terms



Welfare

- An animal's collective physical, mental, and emotional states over a period of time, measured on a continuum from good to poor (AZA Animal Welfare Committee, 2024)

Wellbeing

- A state of being comfortable, healthy, or happy; achieved by AZA facilities giving animals lifelong opportunities to thrive. (AZA Animal Welfare Committee, 2024)
- Supported through:
  - Leadership, culture, and operations
  - Science and innovation
  - Expertise and passion
  - Collaboration and sharing
  - Engagement and communication
  - Our approach to the conservation of species and natural spaces

Why "Wellbeing" Instead of "Welfare"?

ANIMAL WELFARE: an animal's collective physical, mental, and emotional states over a period of time, and is measured on a continuum from good to poor.

ANIMAL WELFARE is a **science**

ANIMAL WELLBEING: a state of being comfortable, healthy, or happy

WELLBEING is a **relatable word that implies a positive state**

ANIMAL WELFARE is the **science** that informs our understanding of **ANIMAL WELLBEING**

Assessments

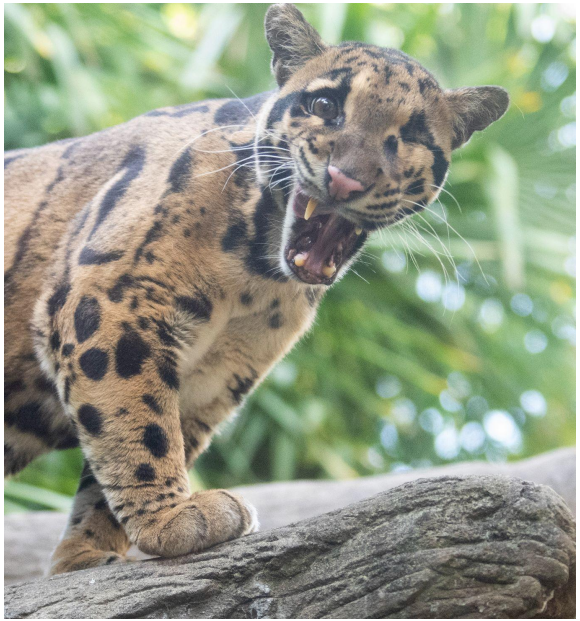
- **AZA Accreditation standard 1.5.0**
  - The institution must have a process for assessing animal welfare.

Assessments

- Welfare Assessment
  - Regular review of welfare for an animal (or group of animals)
  - Should be based on what you want to know about the animal's wellbeing
  - Should be reviewed promptly after completion
  - Copies should be kept on file
  - Can be in response to a concern, but better to be proactive
- AZA Resources for welfare assessments: follow QR code or aza.org/welfare-assessments

Assessments

- Quality of Life Assessment
  - QOL can be hard-to-define
  - Often used for elderly/infirm animals
  - Should be started earlier rather than later - can help inform care and management decisions



Research

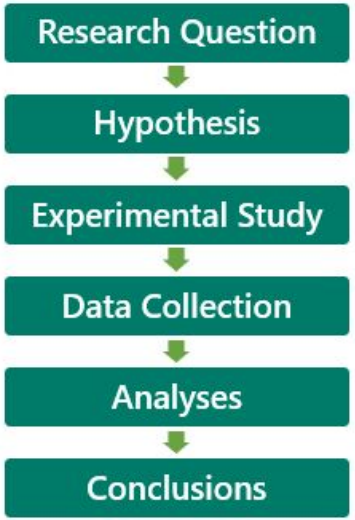
- Do your own
- Network among colleagues
- Connect with other facilities
- Peer reviewed literature

Citation: Jason Wark

Behavior Monitoring vs. Research

Behavior Monitoring Program

Hypothesis-driven Research



Behavior Monitoring vs. Research

Behavior Monitoring Program

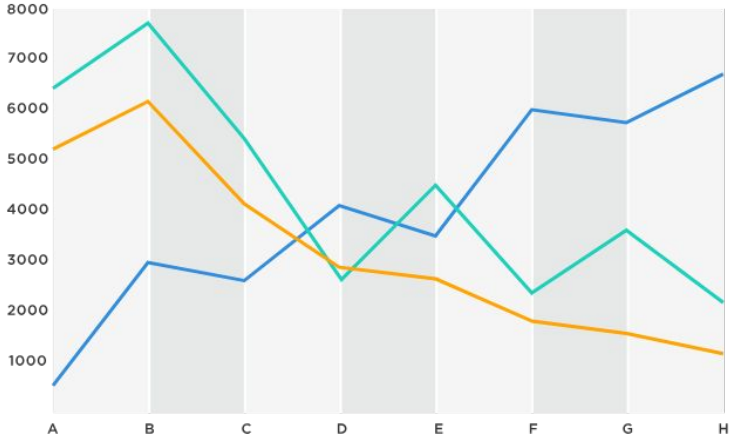
- Pros:
  - Provides baseline information
  - Promotes process of continual evaluation and enhancement
- Cons:
  - Time consuming
  - Inefficient

Hypothesis-driven Research

- Pros:
  - Responsive to on-going questions and changes
- Cons:
  - Should include an initial baseline period but may not always be feasible
  - Need understanding of study design

Data Collection

- Lots of data can be collected; what do you need?
- Common examples
  - Weights and body condition scoring (physical)
  - Fecal scoring (physical)
  - Consumption (behavior)
  - Stereotypies/Activity Budget (behavior)
  - Individual/Species-Specific Needs
  - Space use



Citation: jaspersoft.com

Tools for Assessments/Research

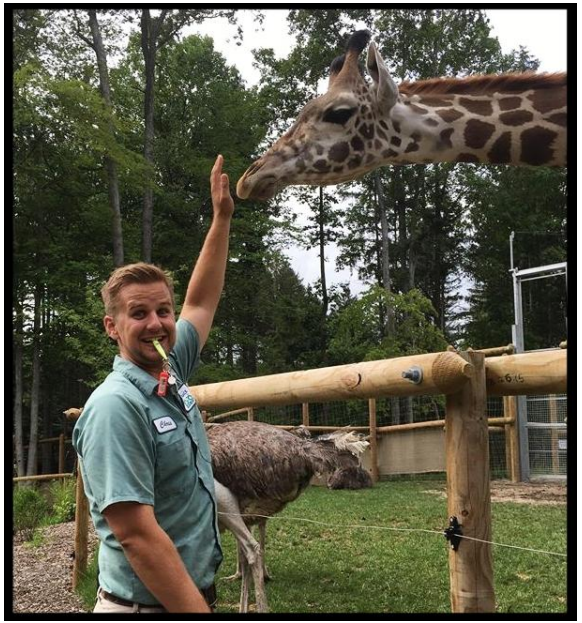
- ZooMonitor - LPZ - freely available to all
- Software with specific welfare modules
  - ZIMS (Species360)
  - TRACKS
  - Animal Care Software
- Microsoft/Google Office (Excel/Sheets)
- Additional tools/resources: follow QR code or https://assets.speakcdn.com/assets/2332/behavior_research_tools_guide_v3.pdf

Role of Keepers



Keepers are Uniquely Positioned Keepers are Key

- Daily observations of animals
- Long-term familiarity/relationships with animals
- Keepers will generally notice changes before anyone else
- Close proximity with animals/training
- Daily decisions that impact welfare/wellbeing

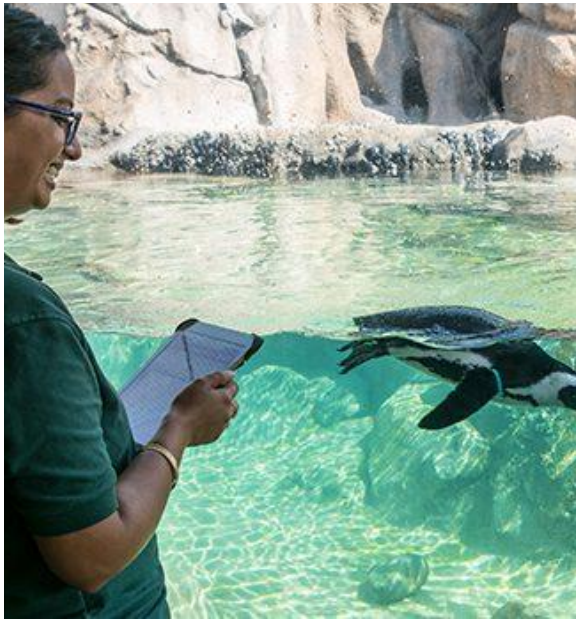


Citation: Why Animals Do The Thing/Turtle Back Zoo

Keepers Doing Assessments

Assessment Examples:

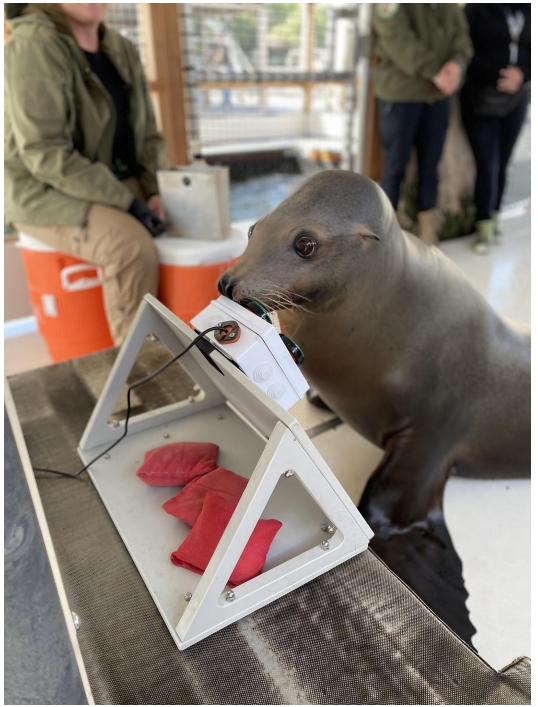
- QOL
- Welfare
- Training and enrichment logs
- Mate choices
- Breeding or nesting records
- Quarantine
- Medical records
- Animal transfers
- Others?



Citation: Lincoln Park Zoo

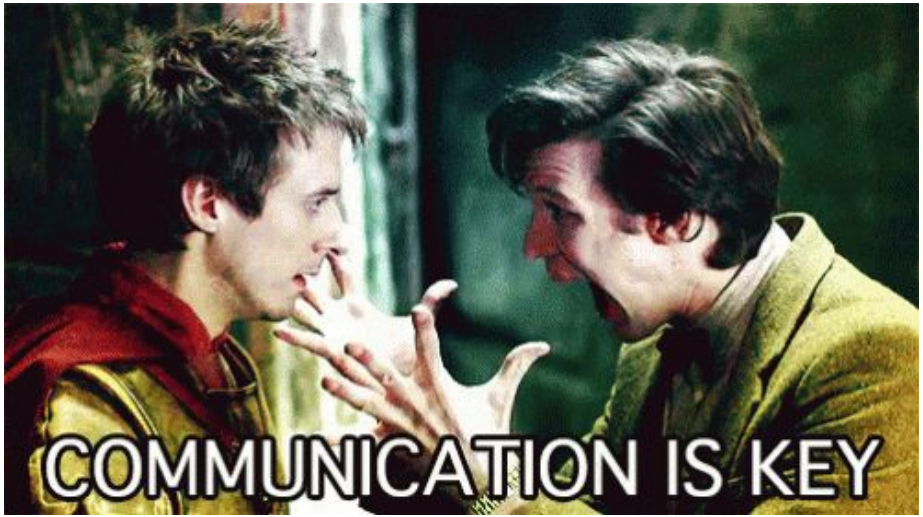
Keepers Doing Research

Assessment	Research
Is my animal pacing?	
Is my animal having mobility issues?	
Does my animal use enrichment?	



Communication is Key! All departments interface on wellbeing

- Veterinary
- Curatorial/Management
- Exhibits/Facilities/Horticulture
- Nutrition/Commissary
- Education
- Behavioral Husbandry
- Conservation
- Marketing/PR
- Guest Services
- Volunteers/Docents



Guiding Principles of AZA Animal Wellbeing Culture

- 12 Guiding Principles
- “Cultivate a common culture of commitment to the wellbeing of animals across all member facilities and partners.”

But I have no time…

- You only need a few minutes - build into your daily schedule/routine
    - Make a checklist
- Cell phone - quick notes/photos/video/recording
- Management reinforce/highlight that it is already part of daily routine - positive
- Look for opportunities to standardize data collection
- Remember to ask for support from your leaders and coworkers

But I have no money...

- Some software is free (ZooMonitor)
- AZA Care and Wellbeing Grant Fund
  - New in 2024
  - For both professional development and research
- AZA Behavioral Scientific Advisory Group (BSAG)
  - $1,000 grant
  - Springtime deadline, announced during AZA annual
- AAZK Institutional Research Grant
  - Offered in 2025 - apply by March 1st
- AZA Wellbeing Summit - first ever!
  - November 11-13, 2024, New Orleans

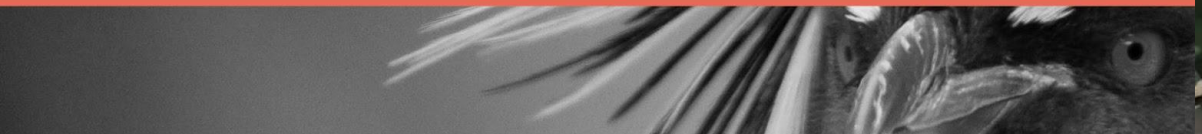
Case Study #1 Keeper driven enhancements for reptile wellbeing at Omaha Zoo



Australian Freshwater Crocs Enclosure

- 3 Australian Freshwater Crocs arrived 1999
- Slow growing species, difficult to sex juveniles
- Sexes Unknown
- No backholding
- Limited terrestrial space on exhibit

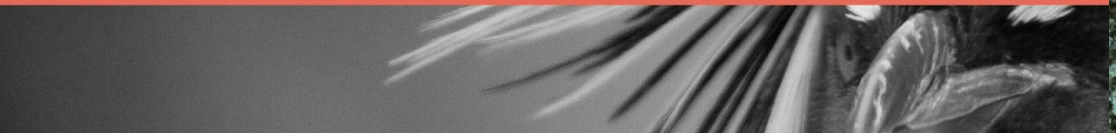
- Utilizes mammal team holding space
- Team initiates a training program
- Shifting, targets, tactile
- Eventually ultrasound training



- Matt worked with the vet team to conduct an ultrasound in June 2019
- Learned one female was gravid
- Keepers used materials found around grounds to expand holding


Photo credit: Matt Tietgan

- Added lighting and plants
- Nested Feb 2020
- 8 eggs, keeper pull to regulate conditions
- Infertile



- 1 surviving juvenile after nesting again

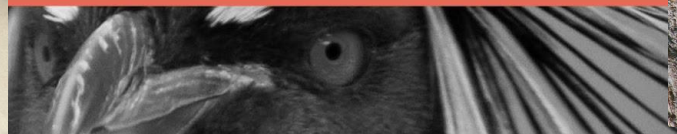
- 100% keeper driven, supported by leadership
- Collaboration with vet team
- Low budget
- Increased Wellbeing
    - -Voluntary shifting and training program
    - -Increased space and choice of where to spend time
    - -Opportunity to perform nesting behavior

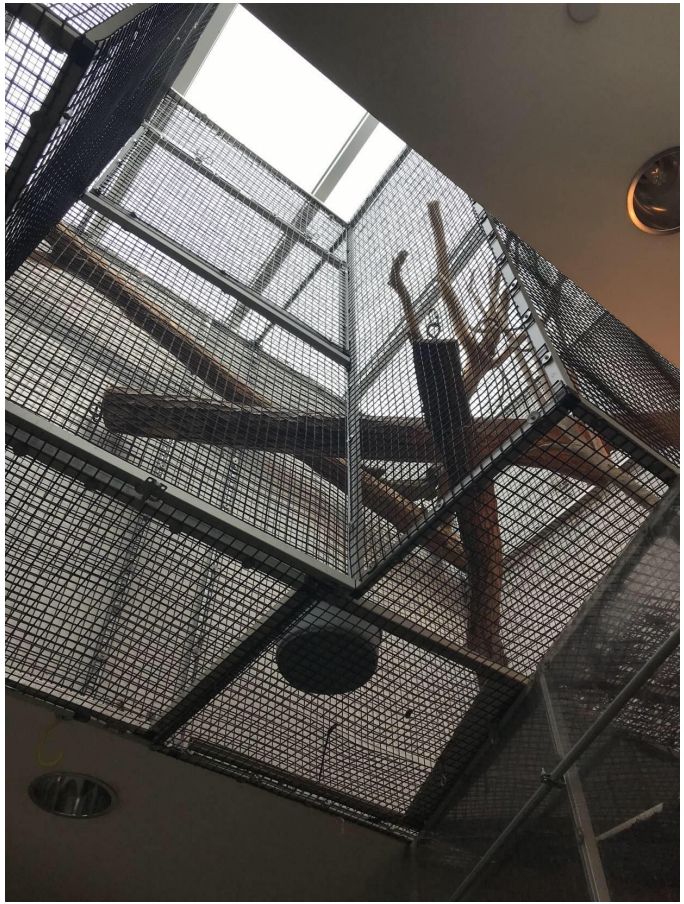
Crocodile Monitor Enclosure

- started with 1 male
- eventually added a female

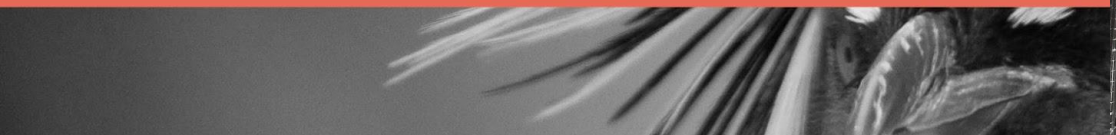
- exhibit previously used for komodos

- Logs on back wall for vertical climbing
- Two nest/digging options
  - one heated
- Live ficus tree
  - 2 years





- arboreal space
- filtered sun

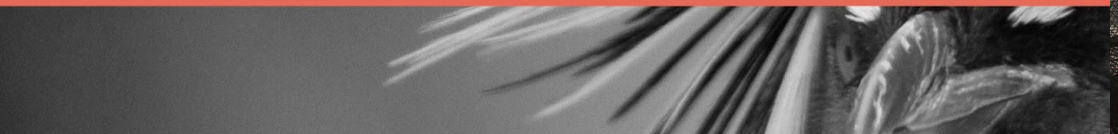


But how do you service this..?

- Voluntary shifting and training!

Whats next?

- Currently alternate individuals between upper and lower space
- Housed together at times for breeding
- Expand to the additional skylight so each individual can have a terrestrial and arboreal space 24/7



Reptile Wellbeing Assessment

- Driven by our Curator of Reptiles and Amphibians
- Taxa specific
- Beyond the minimum requirements

Inputs and Outputs

- Lighting
- Infrared Spectrum Measured Temp
- Response to Lighting and Infrared Spectrum
- Chronic Health Issues
- Diet/Nutrition Quantity and Choice
- Feeding Strategies
- Species Typical Feeding Behaviors
- Physical Appearance
- Body Condition
- Ecdysis
- Fecal Quality
- Terrestrial Habitat Complexity
- Aquatic Habitat Complexity
- Substrate
- Seasonal Environmental and Diet Shifts
- Interactions with Keepers
- Social Interactions with Conspecifics
- Water Presentation
- Water Quality
- Enclosure Size
- Abnormal Repetitive Behaviors

Rating/Points

RepLighting (Circle any that apply)

Max Points- 6	**Points**
Access to unfiltered sunlight three months out of the year	1
Pitch black 24/7	0
Ambient room lighting	0
Intentional source of the visible light spectrum	1
UV bulb unmeasured in the last 8 months	1
UV bulb with measured usable level	2
UV bulb with measured level to recommend UV tool or Access to UV transmitting sky light planes	3
Access to UV transmitting sky lights measured and within the recommendations of the UV tool	5
Access to unfiltered sunlight three months out of the year	1
Access to unfiltered sunlight six months out of the year	2
Unrestricted access to unfiltered sunlight	5
Data Deficient	
Not Applicable	

Reptile Well-Being and Best Pr... | Assessment Details | Follow-Ups | Flagged Responses | Assessment Individual Reports | Group Scores Print Out | Alert- Assessment Score <50%

Reptile Well-Being & Best Practices

< 30%	30%-49%	50%-69%	70% +
	10	82	26

Date: This year

Survey ID: (All)

ZIMS#: (All)

Common Name: (All)

Scientific Name: (All)

Department: (All)

Assessor: (All)

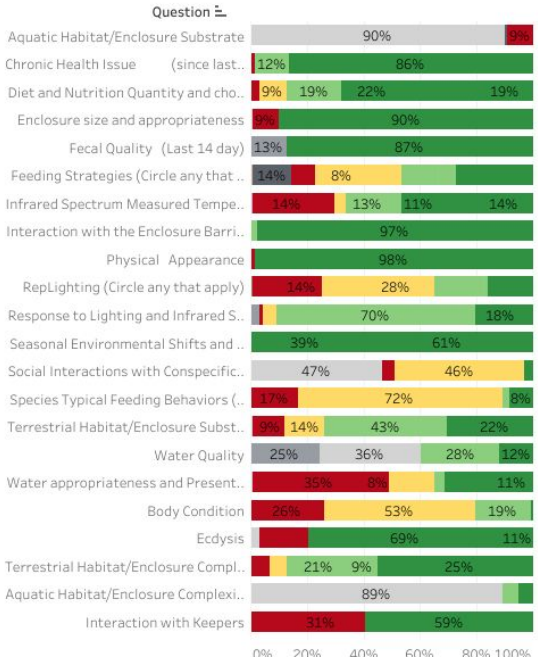
Reason for Assessment: (Multiple values)

Assessment Scores - *Select an assessment to view details below*

ID	ZIMS# / Group#	Scientific Name	Common Name	
250	28787; 28786	Drymarchon couperi	eastern indigo snake	62%
253	26272; 26273	Crotalus cerberus	Arizona black rattlesnake	64%
254	21631; 20044	Agkistrodon bilineatus	Cantil viper	65%
255	22917; 22896; ..	Crotalus cerastes	sidewinder	65%
256	8632	Acrantophis dumerili	Dumeril's Boa	32%
257	1,833,618,513,..	Leioheterodon madagas..	Madagascar Giant Hognose snake	61%
258	19020	Astrochelys radiata	Radiated Tortoise	51%
259	19963	Astrochelys radiata	Radiated tortoise	69%
260	19751	Oplurus cuvieri	Cuvier's Madagascar swift	63%
261	21161	Manouria emys emys	Tortoise, Asian Brown Mountain	71%
262	23298	Pantherophis obsoletus	Snake, Black Rat	63%

ID	Scientific Name	Common Name	Total Score	Question	Response	
250	Drymarchon couperi	eastern indigo snake	62%	Aquatic Habitat/En..	Not Applicable;	0
				Chronic Health Issu..	No chronic issues	4
				Diet and Nutrition ..	3	3
				Enclosure size and ..	Animal (s)can freely extend ..	10
				Fecal Quality (Last ..	Brown or Black semi-forme..	3
				Feeding Strategies ..	Scatter fed or broad cast;Va..	6
				Infrared Spectrum ..	(Infrared A, B, and C) via me..	6
				Interaction with th..	No repetitive behavior obse..	2

Response Aggregation



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Still a work in progress!

Thank You Dome Reptile Team!

- Matthew Tietgen, Lead Keeper Reptiles
- Andy Reeves, Supervisor Reptiles
- Jessi Krebs, Curator of Reptiles and Amphibians

Photo Credit: Omaha Zoo Social Media

Case Study #2: Bakari- Okapi



Bakari

Okapi (*Okapia johnstoni*)

- 17 years old and the first Okapi managed at the Greensboro Science Center
- He came to us with some already established ailments
  - Drooping ears
  - Intermittent skin/coat issues
  - Intermittent poor fecal quality
  - Some stereotypic behaviors-pacing and tongue rolling

Bakari

- Assessments used- Welfare
- Data collected- diet consumption, fecal samples, fecal scoring, weights, behavior observations, training for blood collection
- Updates to his records on Animal Care Software and ZIMS 360
- Medications used- prednisone
- Supplements- probiotics, cocasoya, mazuri boost grain, beet pulp
- Changes to diet and presentation of diet items
- Networking with other Okapi keepers

Bakari

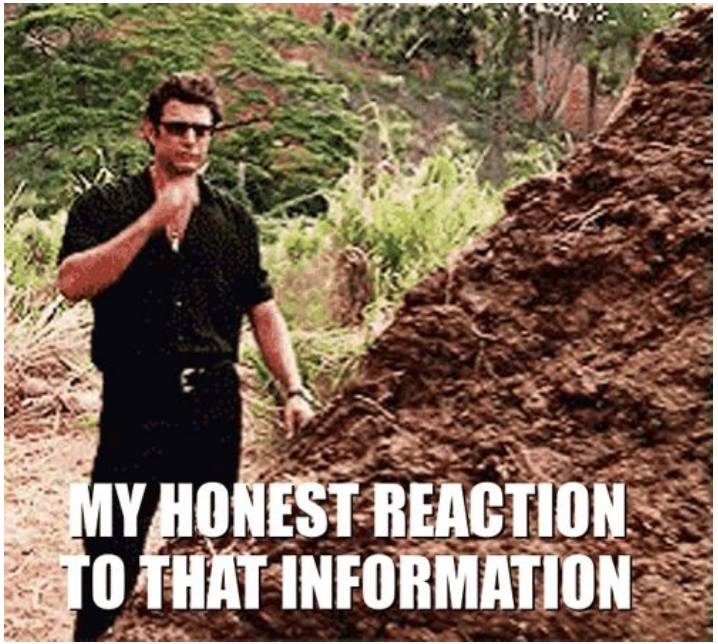
Worked with Leadership and Veterinary Staff to…

- Increase shade on his habitat
- Created a habitat expansion for more space and shade- more natural for a forest dwelling species **
- Adjusted medications for fly bite prevention and other suspected environmental allergies
- Adjusted his diet to pinpoint the possible reasons behind his intermittent poor feces

Bakari

Created a visual aid for fecal scoring based on individual pictures that I took of Bakari's feces.

- It helps keep Keeper staff consistent when recording
- It gives Keeper and Vet staff clearer information on fecal trends
- It gives tangible data that can be utilized to advocate for changes in Bakari's management



Bakari

Bakari Fecal Scoring

File Edit View Insert Format Data Tools Extensions Help

Share

A1 | Date

	A	B	C	D	E	F	G	H	I	J
1	Date	Scorer	Number of Fecals Scoring 1	Number of Fecals Scoring 2	Number of Fecals Scoring 3	Number of Fecals Scoring 4	Number of Fecals Scoring 5	Number of Fecals Scoring 6	Daily Fecal Output	Comments
2	6/18/2024	NP		3	4				7	
3	6/19/2024	MA			1	6			7	
4	6/20/2024	MA				4			4	
5	6/21/2024	NP		3	3	2			8	
6	6/22/2024	NP		5	3				8	
7	6/23/2024	DH	2	2	1				5	
8	6/24/2024	MA			3	2			5	
9	6/25/2024	MA			2	2			4	
10	6/26/2024	JD			3	1			4	all of them kinda inbetween 3 and 4.
11	6/27/2024	MA		1	2	1			4	
12	6/28/2024	NP	1	3	2				6	
13	6/29/2024	NP		3	5				8	
14	6/30/2024	NP		2	5				7	
15	7/1/2024	NP	3	2					5	
16	7/2/2024	NP	1	4	3				8	
17	7/3/2024	MA		3	2				5	
18	7/4/2024	MA		2	2	2			6	
19	7/5/2024	mm	0	2	5				7	
20	7/6/2024	mm	0	0	7				7	
21	7/7/2024	NP			5	2			7	
22	7/8/2024	NP			4	3			7	
23	7/9/2024	NP		3	3	2			8	

New Fecal Scoring Sheet | Description of Fecal Scoring | Old Fecal Scoring

GREENSBORO SCIENCE CENTER

Okapi (*Okapia johnstoni*) Fecal Scoring Table

Scale runs from optimum to poor-range 1-6

Score 1 – Individual pellets that are almost perfectly round. Firm and relatively dry. Feces leaves no residue on the ground when picked up.

Score 2 – Clear that individual pellets were formed in the appear colon, but moist and misshapen. Holds form when picked up. Pellets tend to stick together in clumps.

Score 3 – Some segregation of the pellets is clear but leaves the body in large clumps and cannot be teased apart easily. Much wetter but still holds form when picked up.

Score 4– Pellets are melded together and hardly recognisable. Very loose in texture, does not hold form when picked up and leaves a muddy residue on ground.

Score 5 – Mostly liquid feces. Leaves a very sticky residue. Disintegrates when picked up and splatters on surfaces when expelled. Coats the legs and feet of the animal.

Score 6 – All liquid consistency. Splatters on the floors and walls when expelled. Coats the legs and feet of the animal.

Bakari

Worked with our Horticulture department on multiple levels

- Went on “browse safaris” around the property to identify all locations available for cutting browse
- Identified new species of browse to add to our approved list
- Worked with the City Parks in the surrounding area to expand our browsing outside of our property
- Worked to increase our winter browse stock and creation of silage

Bakari

I created a digital consumption record to track trends in his diet.

- It helps identify needs for changes in his diet
- Identifies dietary preferences
- Shows potential correlations between consumption and feces quality
- Creates tangible data that can help influence changes in his management

Bakari

Okapi Consumption Record

Date:	Produce Items Offered	Produce Amount Offered	Produce Amount Leftover	Produce Amount Consumed	Percent Leftover	Percent Consumed	Grain Amount Offered	Grain Amount Leftover	Grain Amount Consumed	Percent Leftover	Percent Consumed	Browse species offered
7/1/2024	Romaine and celery	589	511.5	77.5	86.84210526	13.15789474	2715	1401	1314	51.60220994	48.39779006	Willow, black gum, beech, bamboo, sweet gum
7/2/2024	Purple kale and broccoli	551	483	68	87.65880218	12.34119782	2715	1214.5	1500.5	44.73296501	55.26703499	Willow, black gum, beech, bamboo, sweet gum
7/3/24	purple kale & celery	544	486.5	57.5	89.43014706	10.56985294	2715	878	1837	32.3388582	67.6611418	
7/4/24	butter lettuce & bananas	574.5	545.5	29	94.95213229	5.047867711	2715	0	2715	0	100	
7/5	kale/celery/Romaine	562.5	213	349.5	37.86666667	62.13333333	2715	0	2715	0	100	banana leaf/ sweet gum/ black gum/ bamboo / beech
7/6	romaine lettuce broccoli	498.5	451.5	47	90.57171515	9.428284855	2715	0	2715	0	100	bamboo/beech/sweetgum/ sycamore/tulip poplar
7/7/24	romaine and celery	626.5	592.5	34	94.57302474	5.426975259	2715	0	2715	0	100	beech, bamboo, sweet gum, mimosa
7/8/2024	romaine and banana	595	390.5	204.5	65.6302521	34.3697479	2715	0	2715	0	100	beech, mimosa, sweet gum, willow, bamboo
7/9/2024	green leaf and celery	582.5	528	54.5	90.64377682	9.356223176	2915	627	2288	21.50943396	78.49056604	mimosa, sweet gum, willow, bamboo, black gum
7/10/24	kale/purple kale/celery	574.5	505	69.5	87.90252393	12.09747607	2915	16	2899	0.5488850772	99.45111492	black gum, sycamore, bamboo(SL), willow, banana, sweet gum
7/11/24	romaine & banana	589.5	414.5	175	70.31382528	29.68617472	2715	194	2521	7.145488029	92.85451197	black gum, mulberry, sycamore, bamboo(SL), sweet gum, banana
7/12/24	Butterleaf and broccoli	560.5	527	33.5	94.02319358	5.976806423	2715	963.5	1751.5	35.48802947	64.51197053	black gum, mulberry, sycamore, bamboo(SL), sweet gum, banana
7/13/2024	Kale and carrots	584	531	53	90.92465753	9.075342466	2915	0	2915	0	100	black gum, sycamore, bamboo(SL), sweet gum, mimosa, red bud
7/14/2024	Romaine and celery	567	483	84	85.18518519	14.81481481	2915	1164	1751	39.93138937	60.06861063	black gum, red bud, mimosa, banana, mulberry, sweet gum, bamboo, kudzu
7/15/2024	Romaine and celery	598.5	543.5	55	90.81035923	9.189640769	2915	1289.5	1625.5	44.23670669	55.76329331	black gum, mimosa, banana, mulberry, bamboo, kudzu, beech, grape vine
7/16/2024	Romaine and broccoli	583	535.5	47.5	91.85248714	8.147512864	2915	734	2181	25.18010292	74.81989708	banana, beech, mulberry, short leaf bamboo, kudzu, sycamore, willow, tulip poplar
7/17/2024	Romaine, Kale, celery	598.5	533	65.5	89.05597327	10.94402673	2915	1148	1767	39.38250429	60.61749571	

+ ≡ June July August September October November December Blank Template

Bakari

Created an ethogram and behavior observation sheet

- Focused on natural history, but also catered to Bakari as an individual
- Will help us track stereotypic behavior
- Will hopefully help us understand seasonal behavior trends
- Helps create an activity budget

Okapi Behavior Ethogram and Descriptions		
Behavior	**Behavior Code**	**Descriptions**
Browsing- desired	BD	Consuming leaves off of offered browse
Browsing- undesired	BU	Consuming leaves from around exhibit perimeter- potential unapproved species
Grazing	GZ	Consuming grass and plants from exhibit or side yard floor- potential unapproved species
Eating Grain	EG	Consuming grain from offered bucket
Eating Hay	EH	Consuming hay from feeders
Drinking	DK	Consuming water from offered buckets- holding or exhibit
Standing	ST	Standing in one place
Running	RN	Fast gate, galloping
Walking	WK	Slow gate moving from one place to another, not in a repetitive pattern
Laying Down	LD	Laying down- take note of location in comments
Urinating	UN	Standing in one place, not moving feet
Scent Marking	SM	Rubbing body on or urinating on objects
Defecating	DF	Defecation inside or outside
Grooming	GM	Rubbing body on brushes or licking parts of the body or face- intent of scratching or shedding fur
Stereotypic behavior	SB	Repetitive walking pattern- must be at least 3 repetitions to be considered pacing- or tongue rolling
Object Manipulation	OM	Interacting with offered enrichment items
Other	OT	Any behavior not described within this list- describe in comments when recording

Bakari

Okapi Observation Record

Date	Weather and temp- High and low	Access Status	Time	Browsing Desired (BD)	Browsing Undesired (BU)	Grazing (GZ)	Eating Grain (EG)	Eating Hay (EH)	Drinking (DK)	Standing (ST)	Walking (WK)	Running (RN)	Laying Down (LD)	Urinating (UN)	Scent Marking (SM)	Defecating (DF)	Grooming (GM)	Stereotypic Behavior (SB)	Object Manipulation (OM)	Other (OT)	Comments
8/1/24	70-low 90	Access all day until being brought in/locked in due to high temps	10:20			1															
			11:00			1															
			12:00							1											
			2:00			1															
			3:20						1												
			4:30	1																	
8/2/2024	72 low and high of 93	Access all day Locked in around 4pm when thunderstorms began	8:20																	1	Drinking urine
			9:11	1																	Exhibit
			10:20	1																	Holding
			11:42							1											Chewing cud
			1:25							1											Holding
			4:19			1															exhibit

August 2024 | September 2024 | October 2024 | November 2024 | December 2024 | Ethogram

Bakari

Work in progress…

- Lots of networking
- Lots of creativity
- Lots of collaboration
- Lots of patience
- Lots of perseverance

= improved welfare and wellbeing for Bakari!

Case Study #3:Wellbeing data expansion through small steps and building blocks



Small steps can lead to big data!

Beginning in 2020, Oklahoma City Zoo staff and volunteers have been regularly scoring the visibility of animals in a range of habitats across the zoo.

What began as a simple check has led to over 4 years of data expansion!

In the beginning…

COVID started it all:

- Limited 2 month study
- Included 5 areas and 28 species
- Observations occurred at 3 times (9am,11am,& 2pm)
- 5 observations per week for each time
- Additional protocol ensured standards for visibility of animals
- Data collected by 3 people

First data sheet

Spring Visibility TIME:	Sun /	Access Y/N	Beh	# Guest	Tues /	Access Y/N	Beh	# Guest	Wed /	Access Y/N	Beh	# Guest	Thurs /	Access Y/N	Beh	# Guest	Sat /	Access Y/N	Beh	# Guest
Observer																				
Temp																				
Chimp																				
Gorilla (B)																				
Orangutan																				
Gorilla (F)																				
Jaguar																				
Fishing cat																				
Ocelot																				
Serval																				
Caracal																				
Bobcat(CF)																				
Clouded Leopard																				
Tayra																				
Tiger large yard																				
Tiger small yard																				
Lions																				
Bobcat																				
Mountain Lions																				

Even limited data is impactful!

Results:

Species	on habitat	not visible
Jaguar	75%	25%
Fishing Ct	47%	53%
Ocelot	41%	59%
Coatimundi	75%	25%
Caracal	72%	28%
Cl. L	75%	25%
Snow L	39%	61%
Tiger Lg	55%	45%
Tiger S	71%	29%
Tayra	74%	26%
Lions	94%	6%
Bobcat	74%	26%
Mlions	61%	39%
	Totals	Totals

Total averages from 114 events over 10 weeks

Ocelots high percentage of time was in the tree. Guest mostly missed the cat unless pointed out by other guests or Staff. Other times at entrance with some visibility.

Caracal usually visible in rock den in front of glass. Mostly not visible because she was off exhibit

Clouded Leopard usually visible resting/sleeping in, around shelter, or in ledge on the rock wall. If he wasn't visible he had access or was on top of rock wall (only in the beginning of study when weather was cooler.)

Snow Leopards mostly not visible in very hot temps. Male hangs out by the pool, female on the lakeside between trees.

Tiger large yard often not visible in hot temperatures with access.

Tiger small yard often not visible in hot temperatures with access.

Tayra usually visible unless he had access or sleeping behind bamboo or close to keeper door.

Lions usually visible. Females lay against the glass so great visibility.

Bobcat usually visible.

Mlions often not visible in intense heat of the day. Shelter in the rocks or behind logs. Do not often use the rock dens.

Opportunities for improved visibility:

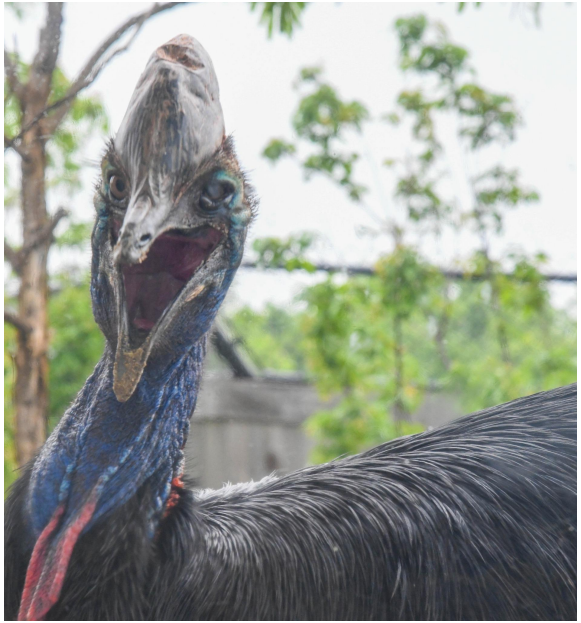
- Additional plantings and shade opportunities in the proper locations could allow for greater guest visibility. The following habitats would benefit most from this suggestion: Coatimundi, fishing cats, and Large tiger yard.
- The ocelot, mountain lion and snow leopard habitats would benefit from modifying existing shade opportunities The ocelots spent time in the tree but due to pruning, were often missed by guests. They also spent time in mainly 2 locations---the tree or doorway. Adding elevated areas in the shade or shading the current elevated options could improve guest visibility. The mountain lion and snow leopards both have significant shade opportunities but changing those locations could allow greater visibilities to guests.
- The habitats with less than 70% visibility rates were exceedingly not visible during the 1-3pm observation times. The species in these habitats would benefit from enrichment offered during this period versus earlier in the day to encourage guest viewing. Particularly, if the enrichment addresses temperatures.

Surprising outcome

Original purpose of the project was to see how COVID affected animals visibility.

Unexpected additions from the study:

- Effect of temperature
- Tracked access due to other projects
- How changes affect animals
- Tips for guests to view animals
- Identify guest flow, placement of resources, guest questions, etc.
- Confirmed animal caretaker suspicions



We wanted to learn more!

Next steps:

- Meet with teams
- Identify additional animals and questions for data collection
- Expand to all guest hours
- Identify additional resources for adding more data collectors
    - Other department staff/keepers
    - Volunteers, interns, etc.

What does it look like today?

OKCZ Visibility Monitoring

Observations should take place 9-5 on days the Zoo is open (time blocks ar
and 4-5), no more than three times per zoo area per day, and observations
block. For example, if observation 1 takes place at 9:30, observation 2 can t
out this survey on days the Zoo is closed (e.g., partial closure days, furlough
"Submit," and please submit a separate form for each observation. Tha

* Required

1

What is your department? *

- (●) Conservation, Education, and Science
- ( ) Guest Experience
- ( ) Housekeeping/Sanitation/Grounds
- ( ) Vet/Commissary
- ( ) Animal Care
- ( ) Volunteer
- ( ) Junior Curator
- ( ) Trainee
- ( ) Other

2

Please select the time slot you are assessing visibility for *

- ( ) 08:00-09:00
- (●) 09:00-10:00
- ( ) 10:00-11:00

19

What is the visibility status for the species of **ocelot** in any of these habitats?

Visible = Front half of the animal, including the head, can be seen. Do not try to guess if a guest could see it or not.

Obstructed = Some part of the animal can be seen, but the front half and head of the animal cannot be seen.

Not Visible = No part of the animal can be seen.
*

- ( ) Visible
- ( ) Obstructed View
- ( ) Not Visible

16

What is the visibility status of the **species of giraffe**?

Visible = Front half of the animal, including the head, can be seen. Do not try to guess if a guest could see it or not.

Obstructed = Some part of the animal can be seen, but the front half and head of the animal cannot be seen.

Not Visible = No part of the animal can be seen.
*


Giraffe


Indoor Exhibit


Savannah Middle/Upper


Savannah Lower

- ( ) Visible
- ( ) Obstructed View
- ( ) Not Visible

New Additions

21

Did you see the caracal pacing? (*Animal is walking in a repetitive manner along a fixed p*
without an apparent goal or function. The animal must move along the path three times to
qualify as pacing) *

Yes

No

12

What is the **Guest Count of Elephant 1**?

Approximate total number of guests at each habitat (sum each viewing area), not counting infants or toddlers in strollers.

For example, if there are five guests walking up the boardwalk and two at the waterfall, consider that 1-10 guests at Elephant 3.

Guests can be double counted if they are seen at multiple habitats. *

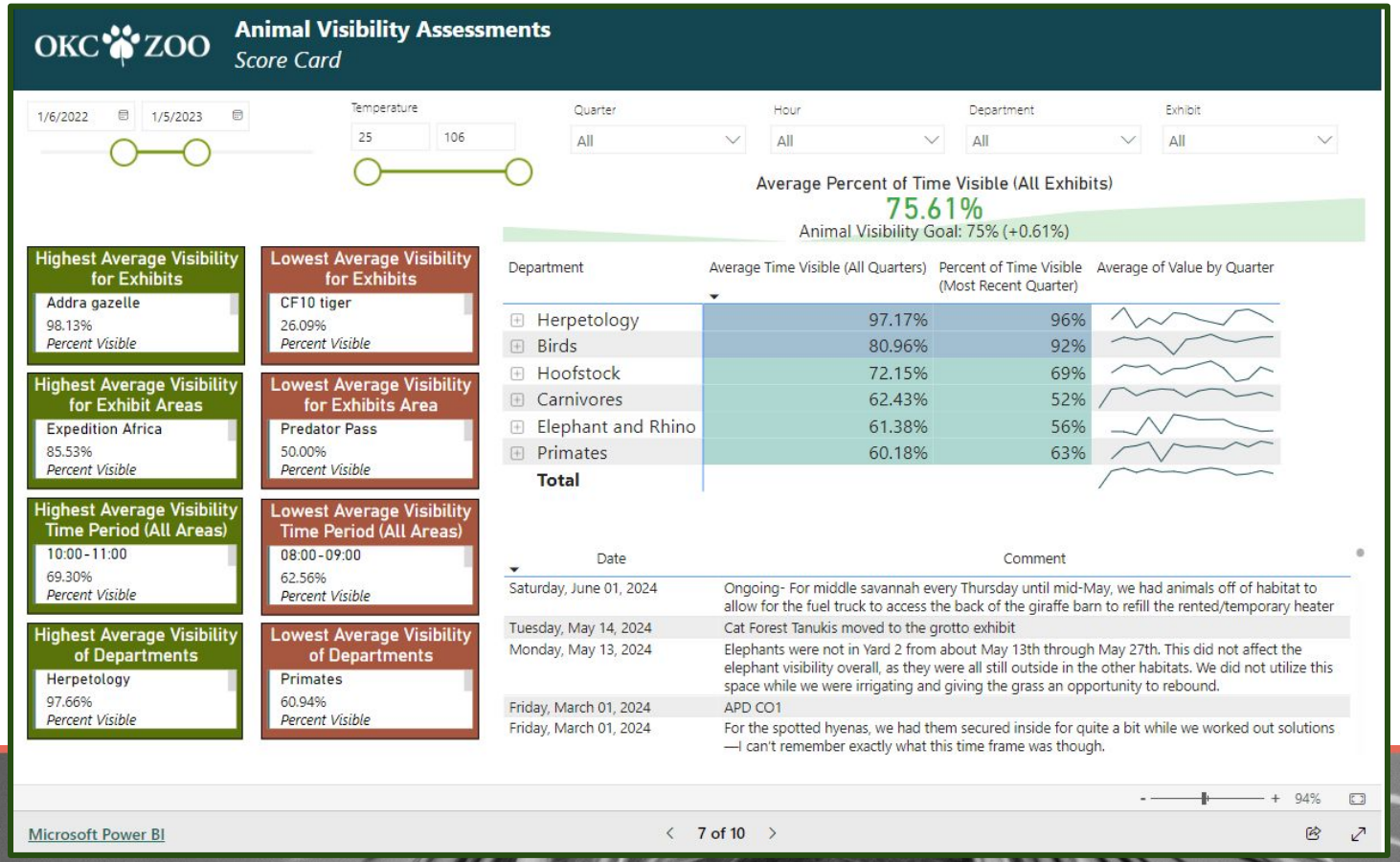
0 Guests

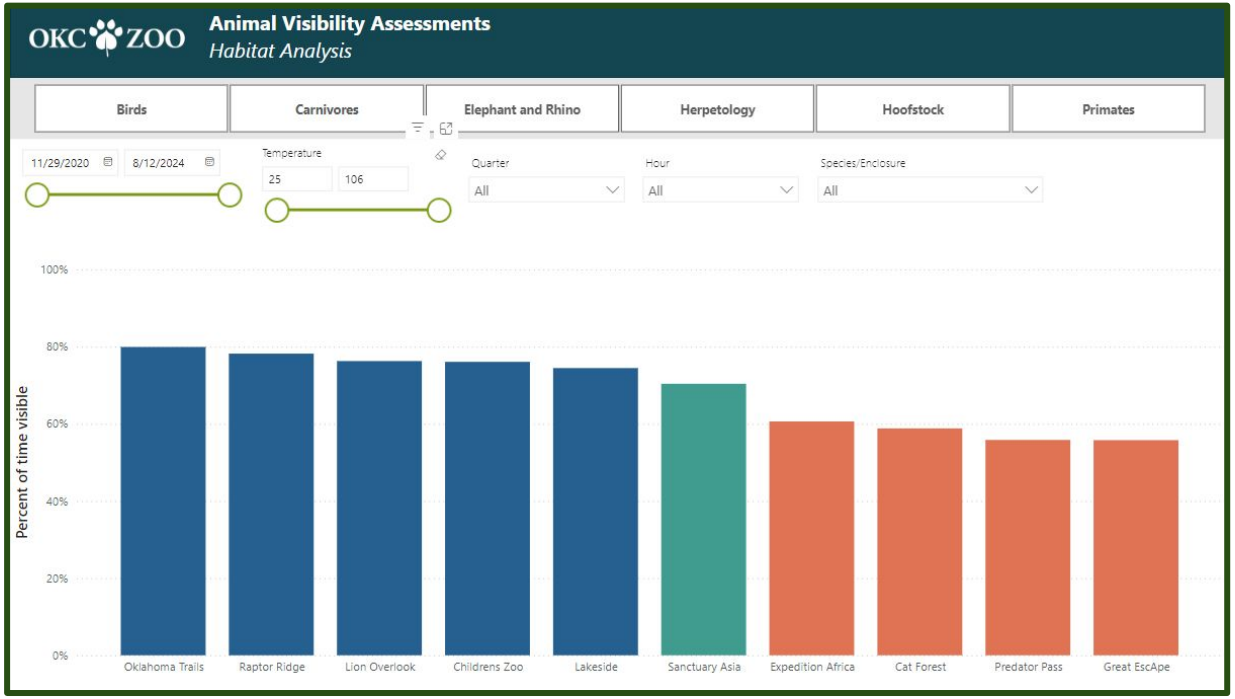
1 - 10 Guests

10 - 20 Guests

20+ Guests

Keepers use real time data to influence decisions





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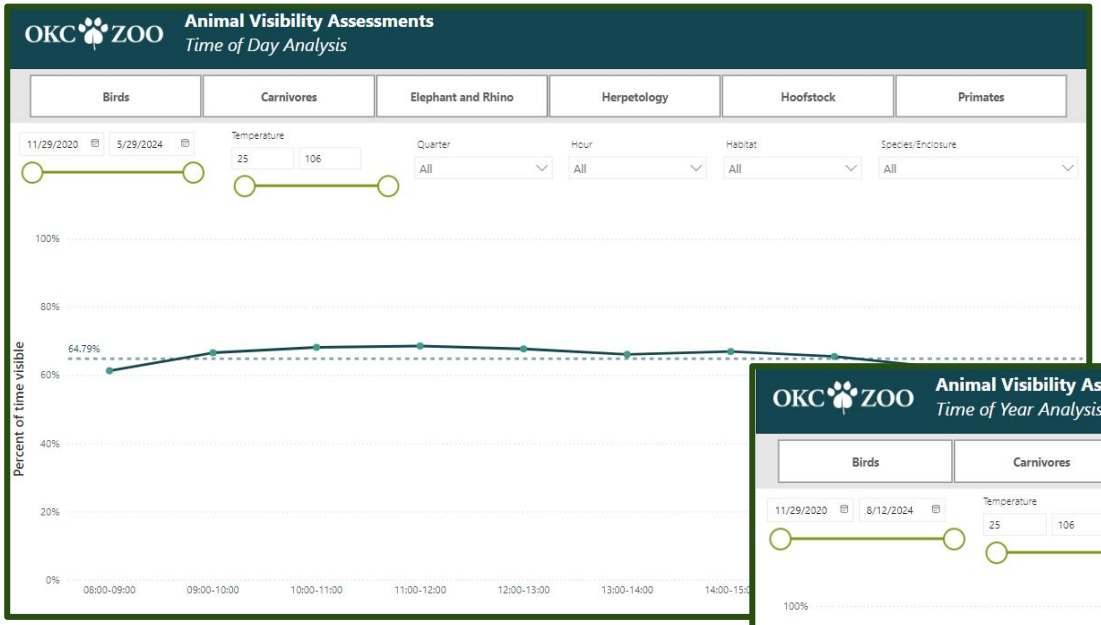
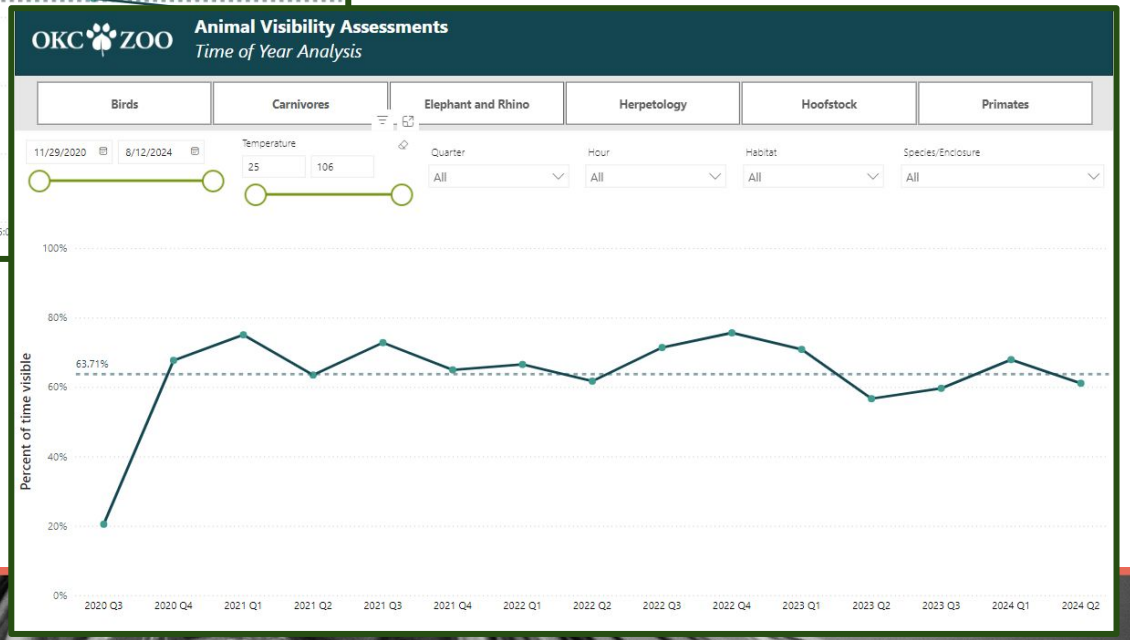
Data can be sorted into specific dates, species, habitat, etc.

Department	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	Total
Birds	88.38%	84.13%	83.62%	81.00%	80.90%	78.33%	78.67%	77.96%	75.74%	73.86%	**80.31%**
Carnivores	57.22%	68.51%	67.35%	65.10%	63.44%	62.71%	63.71%	60.73%	55.95%	54.17%	**63.42%**
Elephant and Rhino	43.40%	49.07%	56.58%	70.96%	64.95%	62.19%	61.63%	63.46%	69.18%	45.83%	**61.86%**
Herpetology	95.83%	99.63%	96.38%	98.53%	99.29%	95.59%	96.27%	96.54%	96.40%	100.00%	**97.31%**
Hoofstock	76.92%	69.51%	71.82%	72.21%	72.78%	75.00%	74.22%	75.37%	70.20%	52.27%	**72.67%**
Primates	48.47%	51.22%	60.69%	62.40%	64.89%	59.74%	62.96%	61.20%	57.69%	43.18%	**59.86%**
Total	**61.26%**	**66.54%**	**68.13%**	**68.52%**	**67.67%**	**66.03%**	**66.89%**	**65.44%**	**62.29%**	**55.10%**	**66.35%**





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All staff have access and data is automatically updated daily

OKLAHOMA CITY ZOO + BOTANICAL GARDEN

5. What are the management concerns for providing appropriate care for this animal? (Ex. Long term isolation, enclosure modifications, other practical limitations).

6. Is the animal currently being treated for pain or discomfort? Is it helping?

7. Can health concerns be corrected or improved through medical treatment and/or husbandry changes?

8. What challenges are associated with medical treatment for this animal? (Ex. Length of treatment, isolation of the animal, side effects).

9. How often do you feel a quality of life assessment should be performed for this animal?

10. Please provide a summary of data collected as part of this individual's or group's monitoring plan.

Director of Veterinary Medicine — Date

Animal Curator — Date

Director of Animal Collections — Date

Mobility Score:

Definitions:

- **Weight Bearing:** animal supporting or withstanding body weight on the body part that appears to be injured or lame.
- **Non-Weight Bearing:** animal avoiding putting body weight on the body part that appears to be injured or lame.

0	No mobility issues observed.
1	Mild issues observed: Mild stiffness and general slowness.
2	Mild lameness: Weight bearing lameness. Difficult to observe, not consistent regardless of circumstances (walking, jumping, change in surface, etc.)
3	Moderate lameness: Intermittent, non-weight bearing lameness. Consistently apparent during specific circumstances (walking, jumping, change in surface, etc.)
4	Severe lameness: Non-weight bearing lameness majority of time. Intermittent weight bearing. Consistently observed during all situations
5	Non-weight bearing lameness at all times. Inability to move limb(s).
N/A	No locomotion was observed

- If lameness is observed, indicate which limb(s) are affected.
  - Example if showing lameness in a single limb: Mobility Score: 1-back right.
  - Example if showing lameness in multiple limbs: Mobility Score: 1-back right, 2-front left.
- N/A is to be used if the animal refuses to shift on the day that scoring is to take place and no locomotion, even outside of shifting, is observed.
  - If the animal has an average score of 0-1.99 (within the past four scores), the mobility scoring can wait until the next week to be scored as normal.

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Visibility data collection has inspired keepers to add important questions to other documentation

Enrichment Log & Analysis

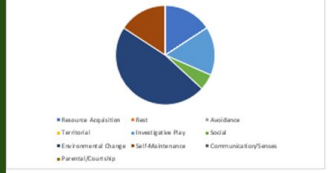
Insert rows as needed if more than one enrichment is given in a day (Right-click on the row's cell underneath the date given, click "Insert")
Use the drop downs for Observation Time, Behavioral Goal, Behavioral Category, Measurement Goal, Parameters and Rating
Analysis will occur automatically as data is entered. Don't alter the summary fields. It will do it all by itself! :)

Month	Date	Obs Time	Initials	Behavioral Goal	Behavioral Category	Measurement Goal	Parameters	Enrichment Item/ Strategy	Rating	Comments
April	1									
April	2									
April	3	1-5	KT	Self-care	Self-Maintenance	Frequency	3	Scratch post	4	Avoidant at start, juveniles engaged with unit within 5mins. Casual pass-bys, no one consistent.
April	4	1-5	KT	Water play	Environmental Chang	Frequency	3	New airstone setup for overnight cart		Increased aeration for overnights, multiple animals flew through and on
April	5	1-5	KT/MY	Water play	Self-Maintenance	Frequency	3	Left airstones in all day		
April	6	1-5	KT/MY	Locomotion	Environmental Chang	Frequency	3	Hurdles(3)		
April	7	6-10	MY	Food-locating/obt	Resource Acquisition	Duration	6-10min	Crab legs		
April	8									
April	9	6-10	MY	Water play	Investigative Play	Frequency	3	Hula hoops		
April	10	6-10	KT	Water play	Environmental Chang	Frequency		Kelp forest		
Apr										
Apr										

Data Analysis

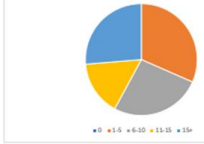
The following graphs are a rapid assessment of the goal-based enrichment you are documenting. This analysis is for the purpose of evaluating and readjusting your goals. Happy Enriching!

BEHAVIORAL CATEGORY % SUMMARY

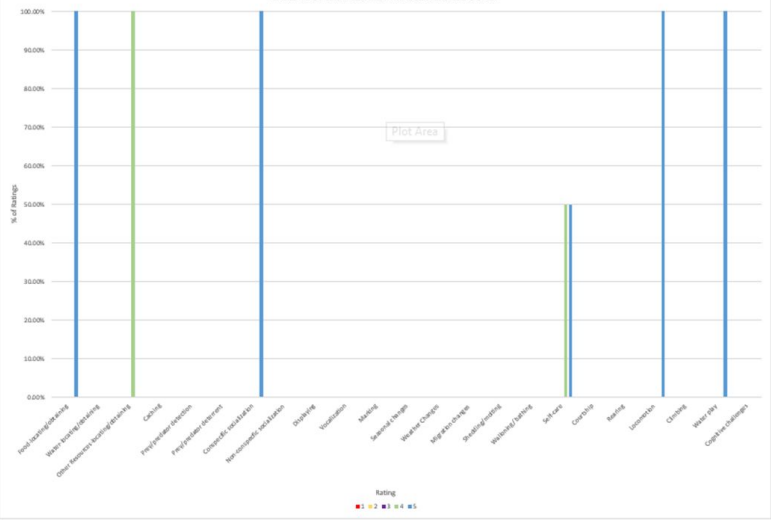


BEHAVIORAL GOAL % SUMMARY

OBSERVATION TIME % SUMMARY



WHAT % OF RATINGS MET MY BEHAVIORAL GOAL?



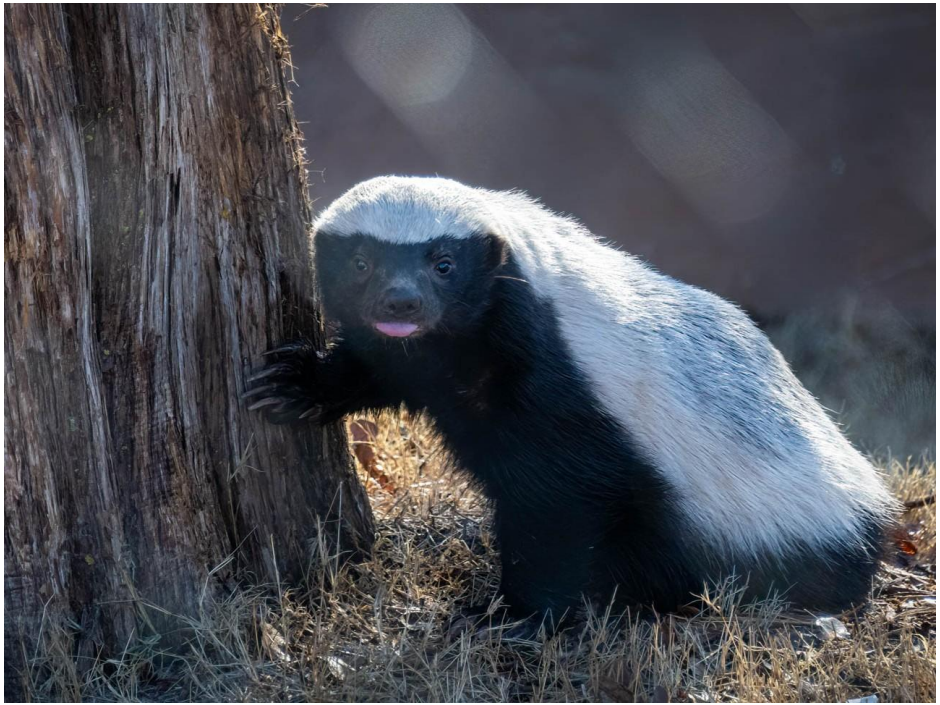
Data leads to more data!

Visibility data collection has led to identifying other opportunities:

- Habitat usage and behavior budgets
- Shade availability
- Stereotypic pacing
- Social dynamics

Tips for expanding your data collection

- Start small and do what you can!
- Analyse what you have
- Add one or two questions to current documentation
- Use all your resources!
    - Volunteers/interns
    - Technology
    - Free programs

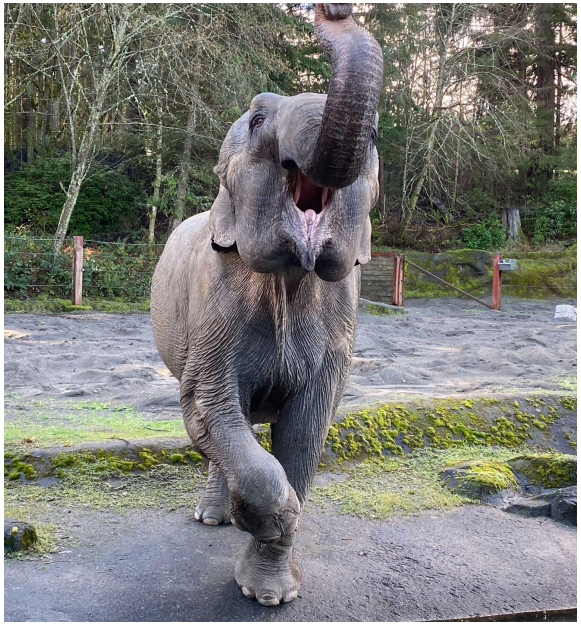


Case Study #4: Suki - Asian Elephant



Suki

- Asian elephant born ~1964, housed at Point Defiance Zoo & Aquarium 1996-2024
  - Considered geriatric
- Diagnosed with active Tuberculosis in 2019
  - Attempted treatment was refused by Suki
  - Decision made to manage Suki without treating TB
  - Coordination required between keepers, zoo management, vets, and public health agencies



Suki

- Significant changes to policy & procedure
  - Restricted barn access
  - Renovation of air handling system
  - Disinfection protocols
  - Use of personal protective equipment (PPE)
  - Monitoring of staff health
- Quarterly “TB team” meeting

Suki

- Daily quality of life assessments
- Utilize ZIMS Care and Welfare module

Care and Welfare

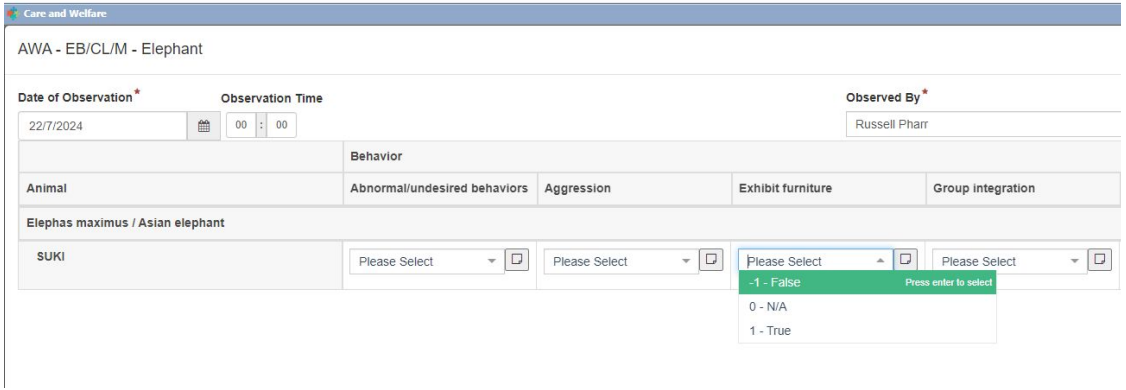
QOL - Elephant

Date of Observation* 23/7/2023 | Observation Time 00 : 00 | Observed By* Russell Pharr

	Physical Health				
Animal	Hip joints prominently visible	Lameness Score	Nasal Discharge	Other obvious signs of discomfort (lethargy, decreased appetite, trunk biting, etc)	Rested head or trunk on cables/posts
SUKI	Please Select			Please Select	Please Select

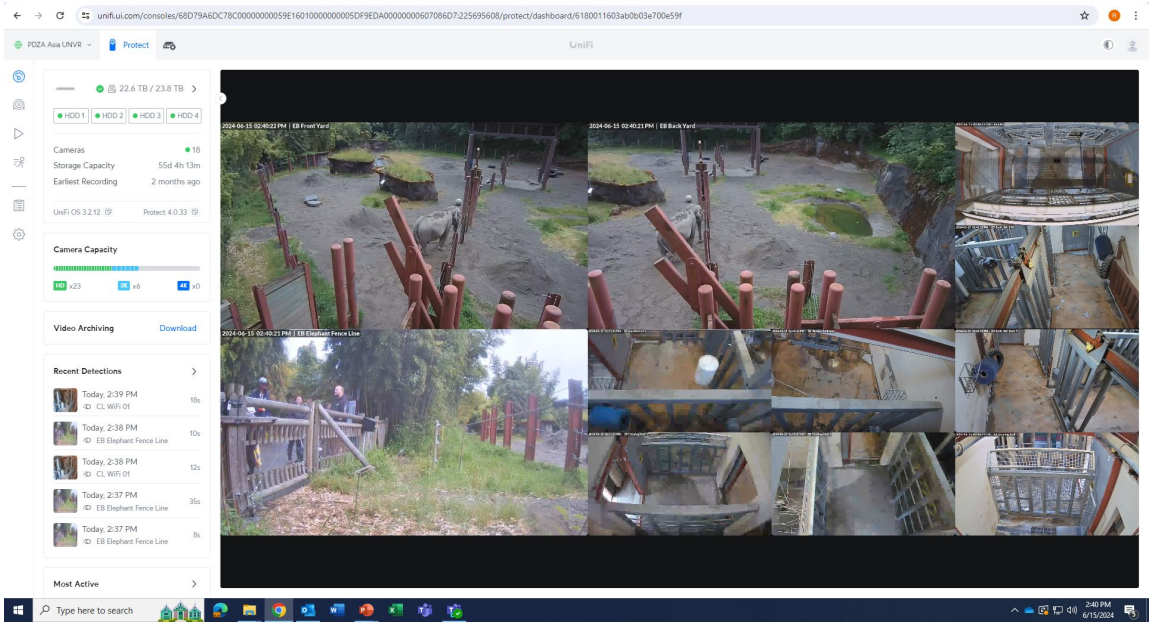
Suki

- Quarterly wellbeing assessments (same as all other PDZA animals)
- Utilize ZIMS Care and Welfare module
- 50+ individual indicators in 5 categories:
  - Behavior
  - Environment
  - Physical Health
  - Nutrition
  - Mental Domain



Suki

- Camera monitoring (UniFi)
  - Sleep records
  - Unusual activity
  - Movement patterns
  - Keeper interaction
  - Enrichment use



Suki

- Communication is vital
  - Curators
  - Vets
  - Zoo Management
  - Marketing
  - General Public
  - Public Health Agencies
- Daily record keeping is key
- Meetings
  - Elephant Management Committee (monthly)
  - Elephant Barn Team Meeting (monthly)
  - 1:1 with keepers and Curator/Assistant Curator (monthly/as needed)
  - Others as needed
- Microsoft Teams

Suki, 1964-2024

Suki

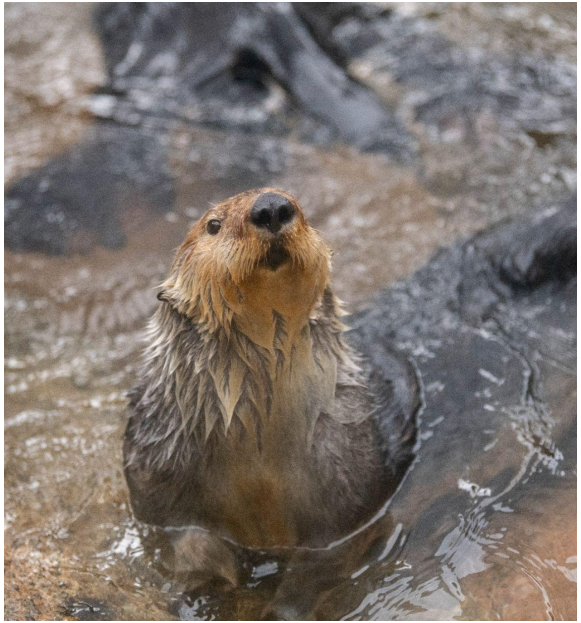
- Large time and financial investment from PDZA (but WORTH IT)
- Time commitment built into daily schedule
    - All members of team contribute

Small Group Discussion



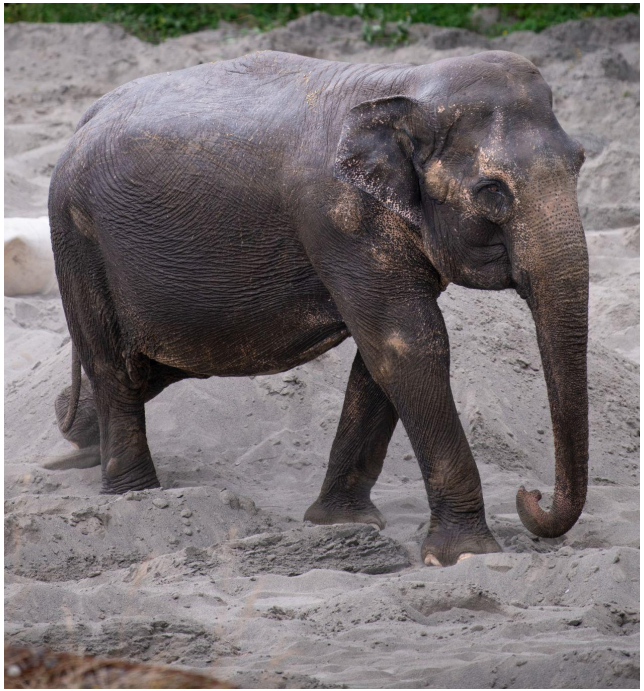
Small Group Discussion

Here are some questions that can help continue this conversation throughout this week…



Question #1

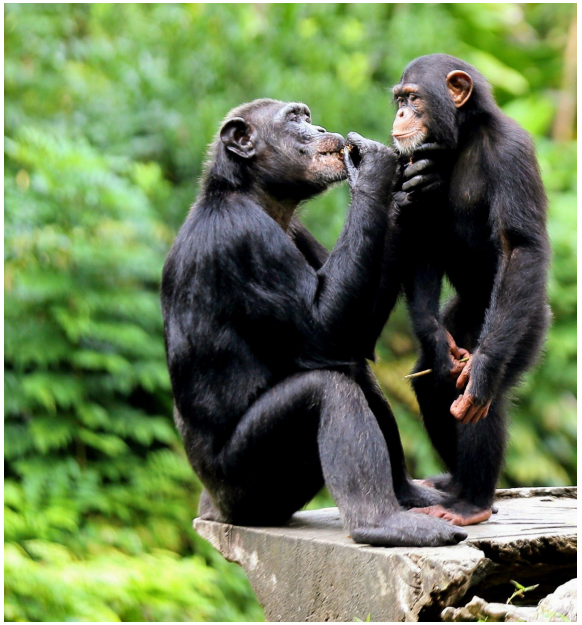
- What is a difficult medical situation you have faced at your facility?
  - How has it been managed to optimize animal welfare?
  - Any lessons or areas for improvement?



Question #2

How are you talking about Welfare vs Wellbeing at your facilities?

- Are you using language about emotions?
- What is your Public Relations team saying on social media?
- How are you interpreting Welfare data in regards to formal or informal data collection?



Citation: Earth.com

Question #3

How can you empower yourself or your peers to improve Welfare and Wellbeing for your animals?

- Free resources available
- Changes to processes
- Leaders that you feel comfortable advocating to
- Inclusion of other departments and relationship building

Acknowledgements

- Bethany Bingham
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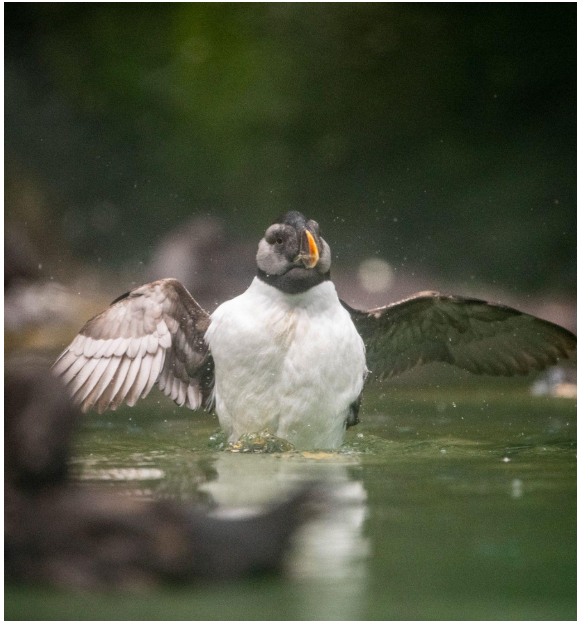
- Jason Wark

Citation: Pinterest

Resources

- Association of Zoos and Aquariums. 2024. *Animal Welfare Committee*. Accessed 30 May 2024. https://www.aza.org/animal_welfare_committee
- The Guiding Principles of AZA Animal Wellbeing Culture. *The Association of Zoos and Aquariums.* Accessed June 17 2024. https://assets.speakcdn.com/assets/2332/aza_animal-wellbeing-strategy.pdf
- AZA Animal Wellbeing Resources: https://www.aza.org/animal-wellbeing-resources
- Animal Care and Wellbeing Grants Fund: https://www.aza.org/animal-care-and-wellbeing-grants-fund
- AZA Animal Wellbeing Summit
  - November 11-13 2024. New Orleans, Louisiana
  - Register by October 11 for early bird savings
  - No final registration deadline, but caps at 250
  - https://s3.goeshow.com/aza/2024AWBS/register.cfm



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Questions for the Panel