

time of day provide a consistent challenge as well. For the past two years DAK has been undergoing growth and change. The largest project, the Safari Night Experience, has involved managing animals so that extensive construction could take place in the exhibit spaces overnight, adding additional keeper shifts to cover the extended hours, and most importantly, reevaluating current animal husbandry strategies to better suit the new hours. The shifting cue response has been an integral aspect of managing construction, guest satisfaction, and animal welfare. In previous DAK protocols, when the rhinos did not respond to shifting cues, they stayed out on the exhibit overnight and the exhibit was locked down, meaning that no work could occur. To help streamline the construction process and improve rhino cue response, a small group of keepers acted as advocates for the shifting behavior. A new mobile cue was chosen so that the rhinos could be cued from the barn or a truck. The new cue was paired with their grain in the barn before being moved out onto the exhibit, where it was paired with their hay drops from a truck. Finally, the cue was brought back to the barn where communication between the shifters and the truck keeper has been key. The ability to cue from the truck has been a helpful management tool to visually remind the rhinos to shift. On the rare occasion that rhinos choose not to respond and high priority work must take place on the exhibit space, a second and sometimes third cue attempt will take place, often from the truck. In conclusion, this presentation will highlight the changes and challenges involved with implementing a new guest experience. It will also examine how the extended hours and the new cueing strategy allowed for a new housing strategy to be implemented so that two separately managed crashes of rhinos could be alternated between being housed on exhibit and in the barn each day.

ARE YOU MY MOTHER?

Justin Smith, Fossil Rim Wildlife Center, justins@fossilrim.org

This presentation will be about the birth and hand rearing of 1.0 southern white rhino that was rejected by its mother. Specifically, my talk will focus on the reintegration of the rhino calf into Fossil Rim Wildlife Center's crash.

INTRODUCING MALE RHINOS FOR COMPANIONSHIP

Mandy Siegel, The Maryland Zoo in Baltimore, mandy.siegel@marylandzoo.org

Historically, the Maryland Zoo in Baltimore (MZiB) housed a pair of southern white rhinos. Our female, Daisy arrived in 1992 at the age of 24, followed by our male, Stubby in 1996 at the age of 4. Though unfortunately never successfully producing offspring, the two were very closely bonded. In April of 2016 Daisy was euthanized at the age of 48 due to worsening age-related mobility issues. The SSP was contacted with the hopes of acquiring a companion for Stubby. As Stubby adjusted to being the only rhino at MZiB, his daily activity budget changed, with a dramatic increase in stereotypic behavior. Knowing Stubby had always been sensitive to external stimuli, keepers monitored a number of factors in his environment; however, none were found to be compounding his stereotypic behavior. Subsequently, when the SSP allocated MZiB a four-year-old male, Jaharo, the decision was made to introduce him to Stubby for companionship. As of March 2017, construction of a "howdy" door has been completed for introducing the two males – all doors between pens and yards were previously completely solid. We are currently in the process of acclimating each male to the "howdy" door set up. The two males have been alternating time spent on exhibit and defecating in the same midden since the beginning of February. I expect to have detailed information about the full introduction process and how it has impacted the behavior of both individuals in plenty of time for the workshop in August.



Are you my mother?

By Justin Smith

Senior Animal Care Specialist – Hoof Stock
Fossil Rim Wildlife Center



Presentation Overview

- Birth
 - Leading up to delivery
 - Decision to hand rear
- Hand rearing
 - Feedings and Formula Consumption
 - Jiwe's care
- Companions
 - Stuffed Animal
 - Goat
 - M'Bili
- What is next for Jiwe?



Mission

- Fossil Rim Wildlife Center is dedicated to the conservation of species in peril, conducting scientific research, training of professionals, responsible management of natural resources, and public education. Through these activities, we provide a diversity of compelling learning experiences that inspire positive change in the way people think, feel and act towards nature.

Vision

- We focus on the good stewardship of wildlife for the well being of our planet, our children and the generations to come, supported through the participation of an informed and concerned public.

About Us

- We are a non-profit, 501c(3) corporation that sits on about 1,800 acres.



Meet the Parents



Ursula

- Born at Fossil Rim Wildlife Center on 27 Oct 11 to Edith.
- Breeding Behavior (chin resting) observed on 26 July 15.
- She conceived at 4 ½ years!
- Ursula gave birth as a first time mom at 6 years old.



Bernard

- Bernard arrived on 17 June 2014.
- He sustained some wounds during his transport that required several months of medical treatment.
- Introduced in early December 2014
- Removed because of aggression.
- Reintroduced on 21 April 2015 and has remained with the crash.

Ursula prior to delivery

- 4 months prior to delivery she had noticeable weight gain.
- 2 months prior she was confirmed pregnant through trans-abdominal ultrasound by CREW.
- 30 Days prior she had minor bag development.
- 2 Weeks prior her bag was continuing to enlarge.
- 3 days prior she was uncomfortable, shifting weight, and had noticeable vulva swelling.



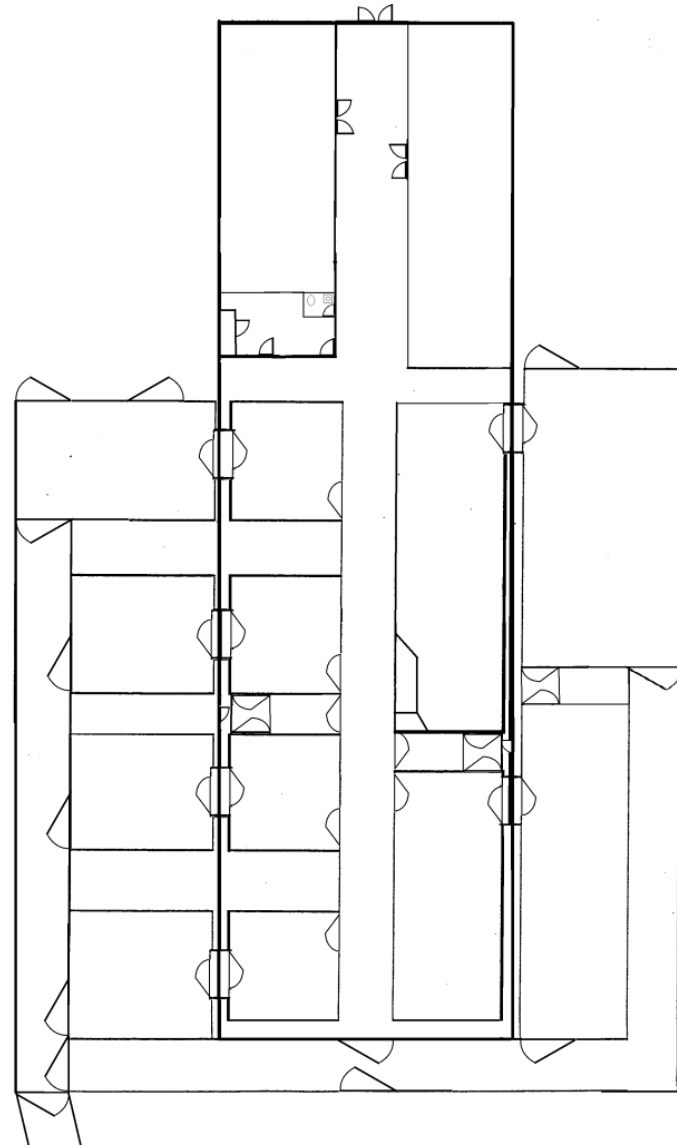
Rhino Husbandry Manual

Table 2.6. Physiological and behavioral indicators of impending parturition.

30 Days Prior to Birth	2 Weeks Prior to Birth	24 to 48 Hours Prior to Birth
Increase in teat size	Nipples enlarge	Udders increase dramatically in size
Beginnings of milk production	Nipples develop wax plugs	Inappetance
Milk may be expended with pressure on the teats	Vulva swelling occurs	Becomes irritable and aggressive to stimuli, including staff
Female may prolapse vaginally when defecating		Mucus plug forms
		Increased vulva dilation
		Increased restlessness, lies down often

Ursula birthing stalls

- We did not add any extra substrate.
- Ursula has separation issues.
- She was housed with M'Bili because she is our only experienced mother.
- All rhinos were up in the barn because of cold weather.



Jiwe was born

- > 12 hours prior Ursula was uncomfortable, had milk leaking from her udder, and vulva was swollen.
- She gave birth to a male calf, Jiwe, on 4 Dec 2016 between 1 and 3 PM.
- He was found in the center alley way outside of the stall.
- Ursula and M'Bili were on the opposite end of the barn.
- We attempted to put the calf back in the stall with the cows but they were not interested.

- Attempted to call the cows over to him and Ursula reacted aggressively.



Jiwe's first 12 hrs

- Ursula was separated to help encourage her to interact with the calf and not M'Bili.
- She continued to act aggressively towards the calf and we realized that she was not going to accept him today.
- She was partially sedated with hopes of her allowing the calf to nurse.
- Evolved into a full sedation (for safety) to be able to remove what colostrum milk we could get from her.
- Successfully bottle fed all colostrum milk to the rhino calf.



- Jiwe was taken to the veterinary clinic for the night and given horse colostrum in 1 liter of whole milk.
- We started contacting rhino facilities that have experience in hand raising rhino calves.

5 Dec 2017 – Day 1

Attempted reintroduction

- Ursula given mild sedative to help keep her calm.
- Made sure that Jiwe was hungry.
- Used placenta to have calf smell familiar.
- Ursula would come over but would act aggressively if he would move.

Jiwe will be hand raised

- He moved to the veterinary clinic.

Started on formula

- $\frac{1}{2}$ formula and $\frac{1}{2}$ cow's colostrum
- Treat for symptoms of colic.
- Improved by the end of the day



6 Dec 2017 – Day 2

- Continued to monitor for signs of colic.
- Adjusted feedings to every 2 hours.
- Continued to adjust ambient temperature to help keep rhino calf warm.
- Established hand rearing protocol.



Feedings and Formula Composition

7 Feedings per day (4 Dec 16 to 4 Jan 17)

- Birth - 2 weeks: being fed 27:9:1:1 ratio* formula mixed with colostrum so that there is 10% colostrum in the total volume. Volume being fed at 15 - 20% of body weight.
- 3 - 4 weeks: being fed 27:9:1:1 ratio* formula mixed with colostrum so that there is 10% colostrum in the total volume. Volume being fed at 17 - 19% of body weight. Added 1 ml of poly vitamin solution being added once daily.

5 feedings per day (4 Jan 17 to 18 Mar 17)

- 1 - 3.5 months: being fed 27:9:1:2 ratio* for formula. 1 ml of poly vitamin solution. Volume being fed at 12 - 14% of body weight.
 - Colostrum removed from the formula mix.

4 feedings per day (18 Mar 17 to 4 Jun 17)

- 3.5 - 6 months: being fed 27:9:1:2 ratio* for formula. 1 ml of poly vitamin solution. Volume being fed at 12 - 14% of body weight.

3 feedings per day (4 June 17 to 4 Dec 17)

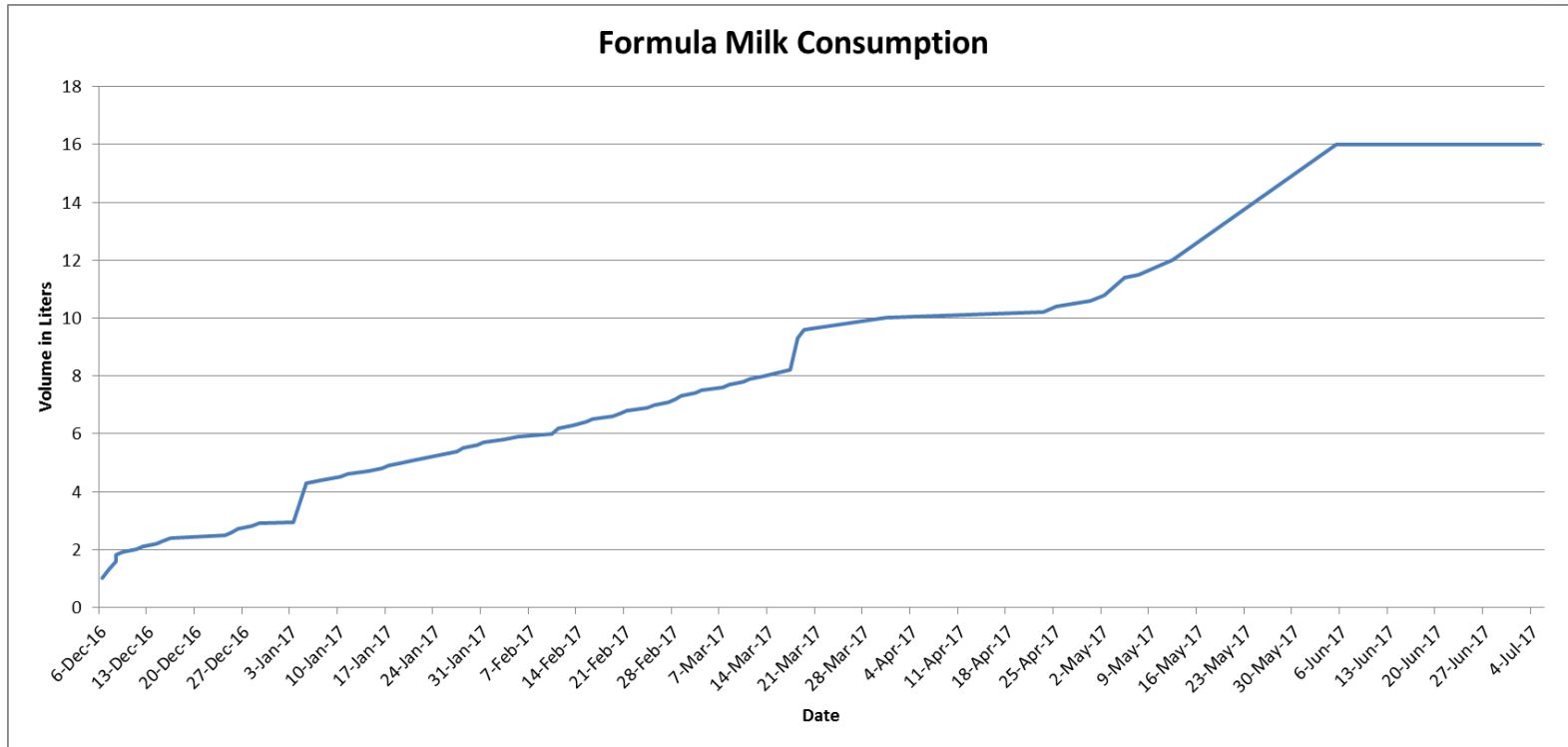
- 6 - 9 months: being fed 27:9:1:3 ratio* for formula. 1 ml of poly vitamin solution. Volume being fed at 8 - 12% of body weight.
- 9 - 12 months: being fed 27:9:1:4 ratio* for formula. 1 ml of poly vitamin solution. Volume being fed at 5 - 7% of body weight.

2 feeding per day (4 Dec 17 to 4 Apr 18)

- 12 - 15 months: being fed 27:9:1:6 ratio* for formula. 1 ml of poly vitamin solution. Volume being fed at 3 - 4% of body weight.
- 15 - 16 months: being fed 27:9:1:8 ratio* for formula. 1 ml of poly vitamin solution. We will be weaning him.

* Ratio is Nonfat cow's milk: 1% low fat cow's milk: dextrose powder: water

Formula Consumption



Decrease in the number of feedings with increased formula consumption.

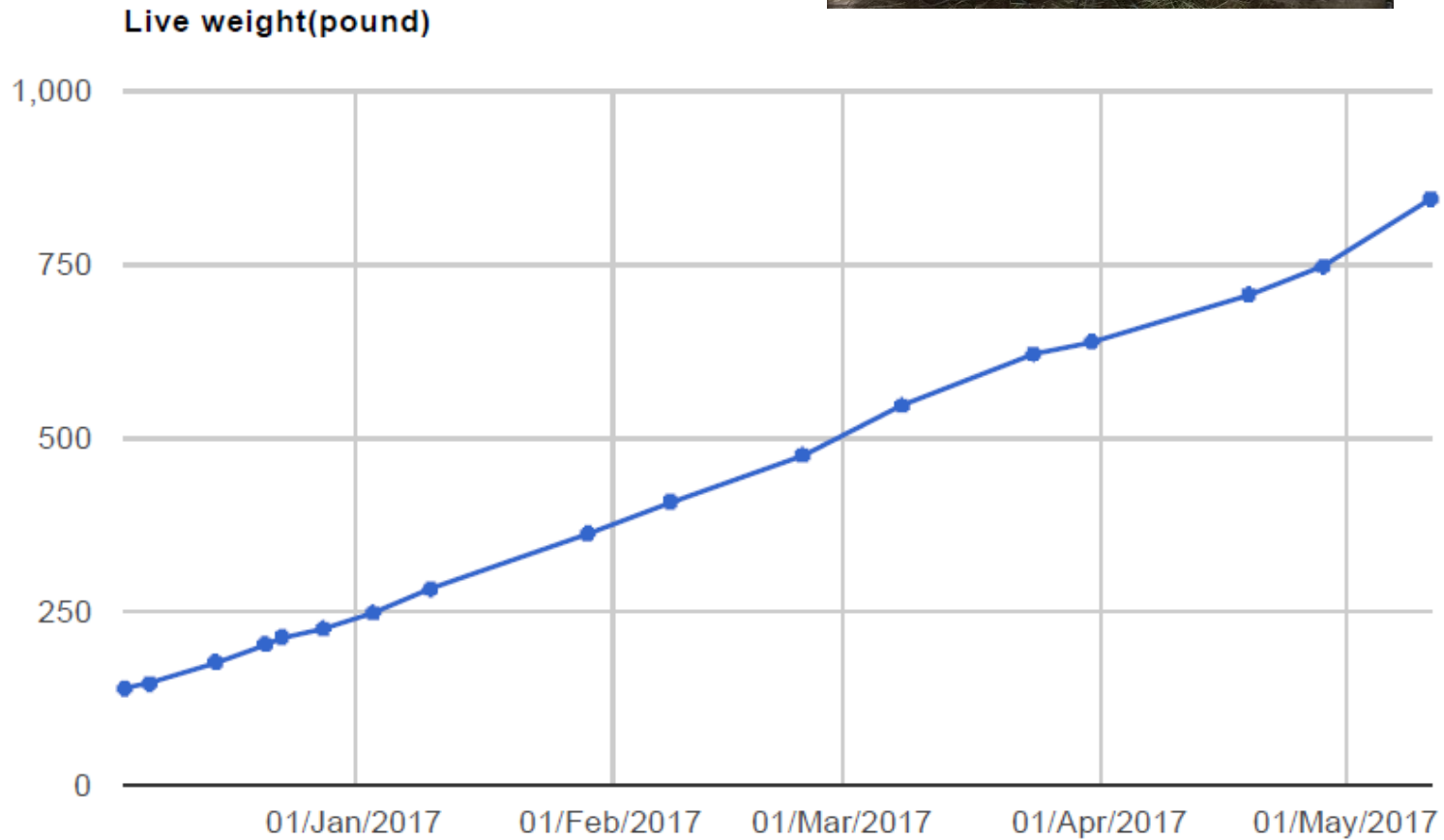
- 4 Jan 17 reduced from 7 to 5 feedings a day
- 18 March 17 reduced from 5 to 4 feedings a day
- 4 June 17 reduced from 4 to 3 feedings a day

Jiwe formula consumption break down.

- Jiwe is currently consuming 16 Liters per feeding.
- That is 48 L (12.7 gallons) of formula per day.
- Our current milk bill is \$250.00 per week.

Weight Gain

We stopped weighing Jiwe because he outgrew our current weight platform.



Jiwe's care

We established several rules from the beginning to ensure safety while working around Jiwe.

- If any type of “rough housing” occurred towards a staff member then we walked away immediately.
- We are not in there to be a companion or entertainment.



Companion - Stuffed animals

Oversized stuffed animals were introduced within the first week of Jiwe's life.

- To be a temporary companion.
- Winter weather conditions prevented all other options from occurring during his first month.



Companion - Angel

(LaMancha Goat)



- On 20 Jan 17 Angel was brought to the veterinary clinic from the Children's Animal Center and introduced to Jiwe.
- Jiwe was interested and would approach Angel but the goat was timid and would leave the area.
- Interactions were mostly of them avoiding each other.
- Supervised interactions for the first month.
- Jiwe and Angel were transported to the White Rhino Barn on 9 Feb 17 after we baby rhino (and goat) proofed their holding stall and we had optimal weather conditions.



Companion - M'Bili



- She is a 39 year old experienced mother.
- She has a very laid back and tolerant disposition.



Introductions

- M'Bili was housed in the stall next to Jiwe with a visual barrier between them that was slowly moved to allow them to see each other.
- Day 1: Howdy along common fence line and calf was allowed to explore M'Bili's yard alone.
- Day 2 -8: Jiwe and M'Bili were put in the same yard. Intros went great. Calf would back himself into a corner and get upset. He would snort and throw his head at M'Bili who would just calmly stand and tolerate it. Slowly he became more confident that M'Bili was not going to hurt him.
- Then Spring Break occurred (with record setting attendance) and we were forced to stop intros temporarily. M'Bili was moved back out with the crash during this time.
- Day 9: We put Jiwe and M'Bili back together and they picked up from where they left off. We decided that we would introduce them the next day on the big stall side. Which gives them more room.
- Day 10: We gave Jiwe access to all areas but the stall M'Bili was in to allow him to explore initially. We had great calm interactions between them. Both were reinforced for their good behavior and ended on a good note.
- Day 11: Spent more time familiarizing Jiwe with the big stall side set up, having him go through all gate openings before putting M'Bili in with him. This helped out immensely and they had great interactions. M'Bili began going to look for Jiwe within the first couple hours. After seeing that we left and only checked on them periodically for the rest of the day.
- They were left together over night and have not been separated since.

Jiwe and M'Bili

The distance between them closes

- Initially Jiwe would keep his distance and avoided going close to M'Bili. He would lay in the outside doorway of the opposite stall.
- A week later Jiwe would lay in the doorway of the stall M'Bili was in.
- Over the next couple weeks the gap between M'Bili and Jiwe continued to shrink until Jiwe and M'Bili are laying down side by side.
- Around 1 month of being together M'Bili and Jiwe were heard calling to each other.



Jiwe and M'Bili

- Jiwe and M'Bili spent about 1 ½ months bonding in the barn before moving them out onto display
- They were moved onto public display on 24 May 2017.
- They did great and ran the entire length of our shift lane (~1/10 mile).
- They immediately explored the yard and wallow.



What next for Jiwe?

We will introduce him to the entire crash.

- He either needs to be large enough to protect himself or we need to be confident that M'Bili will protect him.



Thank you

A special thanks to all of the people that have help with Jiwe's care.

- Fossil Rim Wildlife Center Staff, Interns and Volunteers – for the countless hours that have been spent. We are almost half way through bottle feeding!
- San Diego Zoo Global – for helping us establish our hand rearing protocol.
- White Oak Conservation Center



Literature Sited

- Metrione, L. and Eyres, A. (Eds.) 2014. Rhino Husbandry Manual. Fort Worth, TX: International Rhino Foundation, 327 pages.
- Gage, Laurie J. Hand-Rearing Wild and Domestic Mammals. Wiley-Blackwell, 2002. 1st Edition.



Questions?

