Assisted Reproduction with the Greater One-Horned Rhino

Why Artificial Insemination

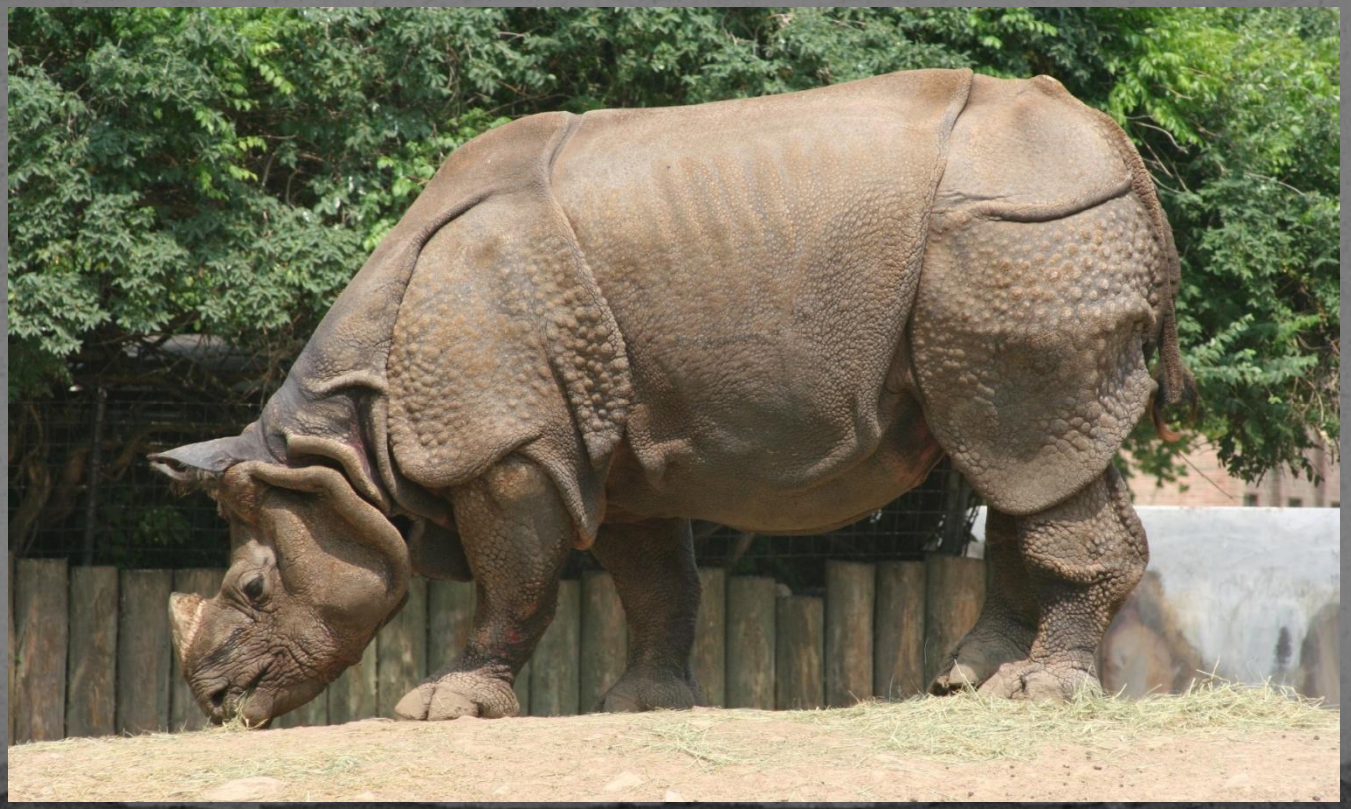
- Artificial Insemination was successful 3 times with the GOH rhino before the Buffalo Zoo attempted
- The Cincinnati Zoo and Botanical Gardens and the Montgomery Zoo were both successful with breeding the GOH rhino by Artificial Insemination

CINCINNATI ZOO & BOTANICAL GARDEN

MONTGOMERY ZOO
MANN WILDLIFE LEARNING MUSEUM

Why Artificial Insemination

- The Buffalo Zoo's proven bull GOH rhino passed away in 2011
  - He successfully sired 2 calves



Why Artificial Insemination

Tashi had her first calf at 7.8 years of age in 2004

Then had her second calf at 11 years of age in 2008

It was already 5 years since she passed her last calf and we didn't have a breeding bull

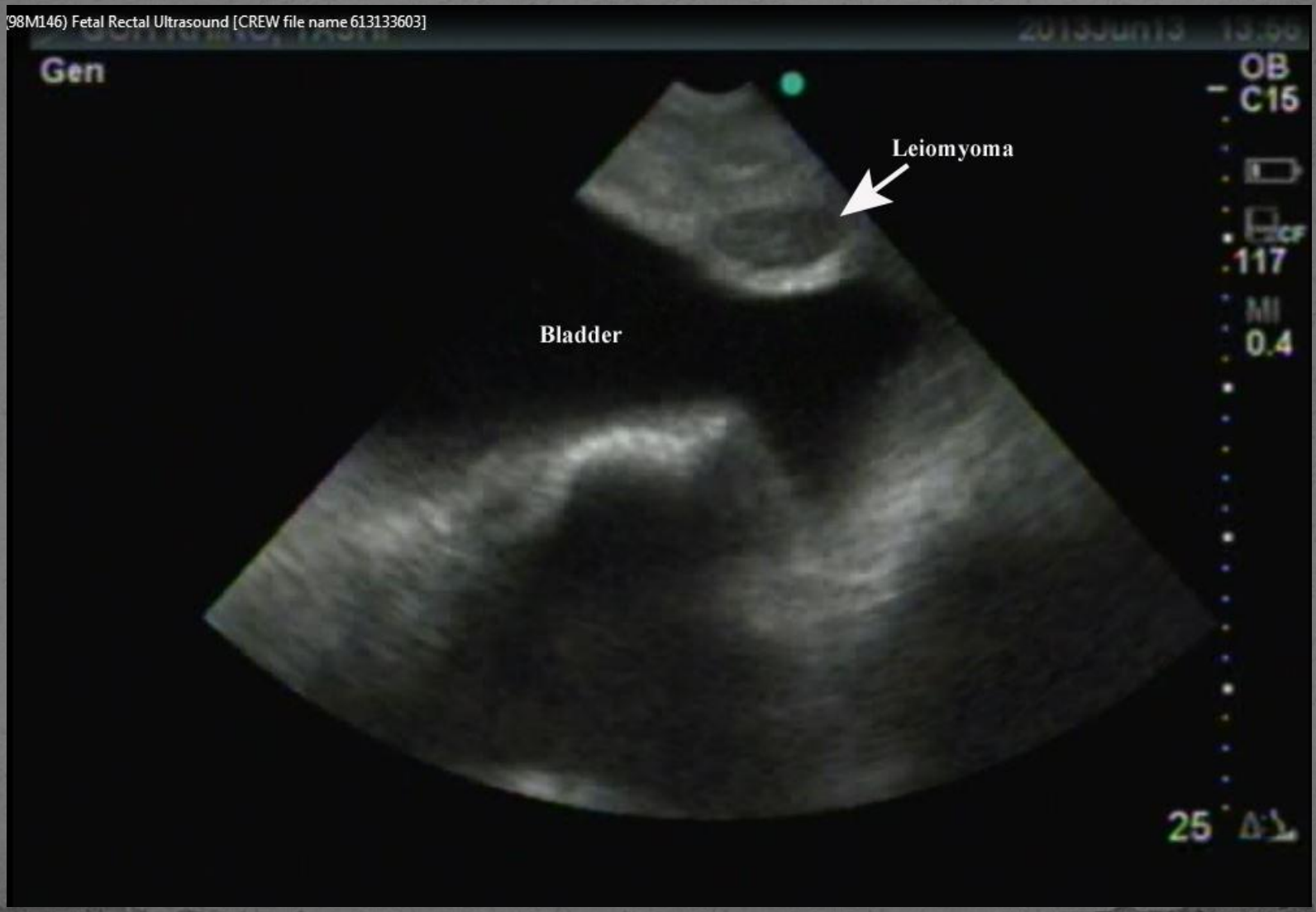
Why Artificial Insemination

Leiomyoma

If the rhino is not bred or pregnant for a long period of time, Leiomyomas can form in many areas of the reproductive track. If the Leiomyomas become to large, or too many form, they will prevent the possibility of natural breeding and conception

For example if a large Leiomyoma is above the cervix, sperm would not be able to pass

Why Artificial Insemination



Why Artificial Insemination

The Buffalo Zoo received a 4 year old bull from the Bronx Zoo

Male GOH rhinos aren't usually successful at copulating until 8-10 years of age

Why Artificial Insemination

The International Studbook has the first reproduction of a known male at age 5

Adult male testosterone can be produced at a younger age, but it usually takes longer for the male to match behavior with hormones

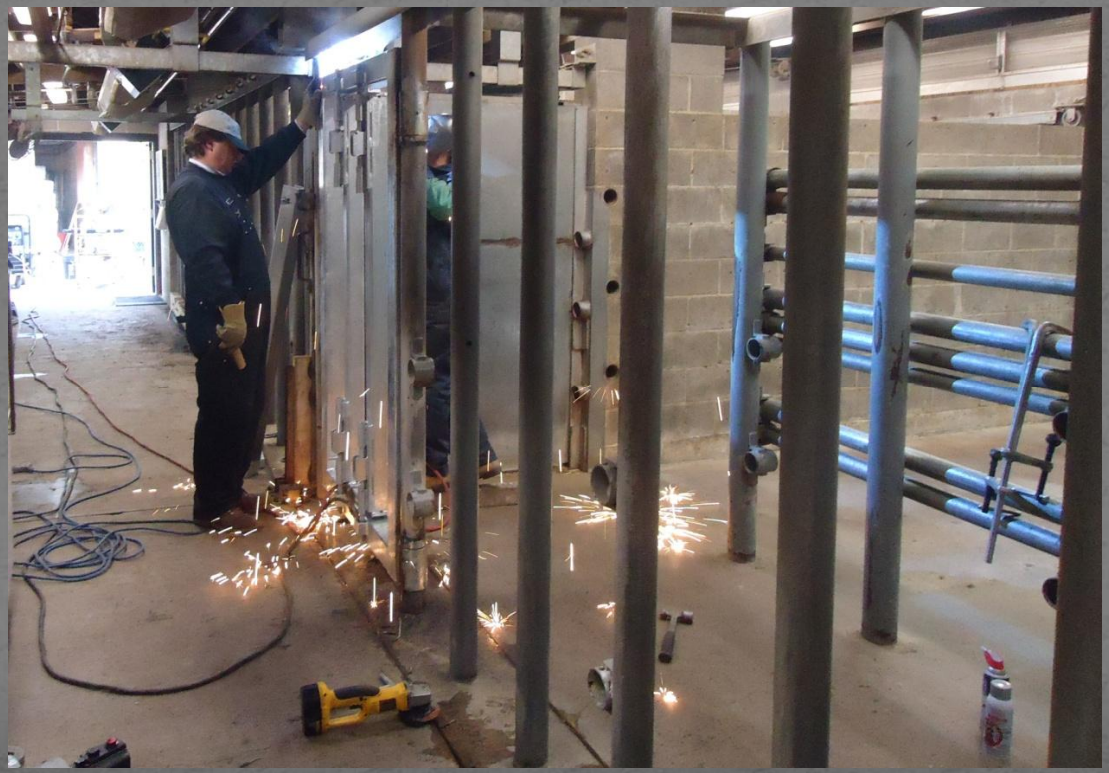
Center for Conservation and Research of Endangered Wildlife

Dr. Monica Stoops from CREW agreed to perform Artificial Insemination on Tashi, at the Buffalo Zoo

Dr. Stoops performed all of the AI's on the GOH rhino in North America

Preparing for Artificial Insemination

Installing a hydraulic gate into the chute to restrain the rhino from front to rear and to be able to safely stand behind the animal



Hormone Analysis

Collected urine and mapped out hormones for 3 cycles prior to the Artificial Insemination procedure

Dr. Stoops needed to see if she had good cycles, was ovulating, and length of cycle to plan procedure

GOH Cycle

A cycle on a GOH rhino can range from 30-65 days

The average is 45 days

Tashi had the shortest cycle recorded at 28 days

Tashi was always at the shorter end of the cycle ranging from 35-39 days

Training Tashi In Chute

- Trained to go in chute several times a day to prepare for the procedure at any time
- Slowly lengthened time in chute to prepare for a 30-45 minute procedure

Species Survival Plan

SSP recommended to breed with “Jimmy”

Deceased bull 9 years prior to AI procedure

Only 2 bulls in cryo-preservation bank that never sired a calf

Estrus

With natural breeding you would put male and female together while female is in estrus which is when the female is the most receptive

With Artificial Insemination, you wait 24 hours after the female started displaying estrus behavior. This will get us closer to ovulation. The female rhino will also work better in the chute after estrus.

Tashi began displaying estrus behavior February 24th at 2:00 PM.2013

Artificial Insemination

Started the AI procedure at 3:30 PM on February 25th 2013, after Tashi slowed down with estrus behavior.

Standing Sedation

The drugs used for a standing sedation does not effect the ovulation time.

Butorphinol and Azaporone were used for the standing sedation

Artificial Insemination was never successful with a full immobilization. It may be possible but was not done enough to be sure. Drugs used for a full immobiliztion may also impact ovulation time

Ultrasound Post- AI

Jimmy

Used frozen-thawed sperm from EEJ collection and post mortem

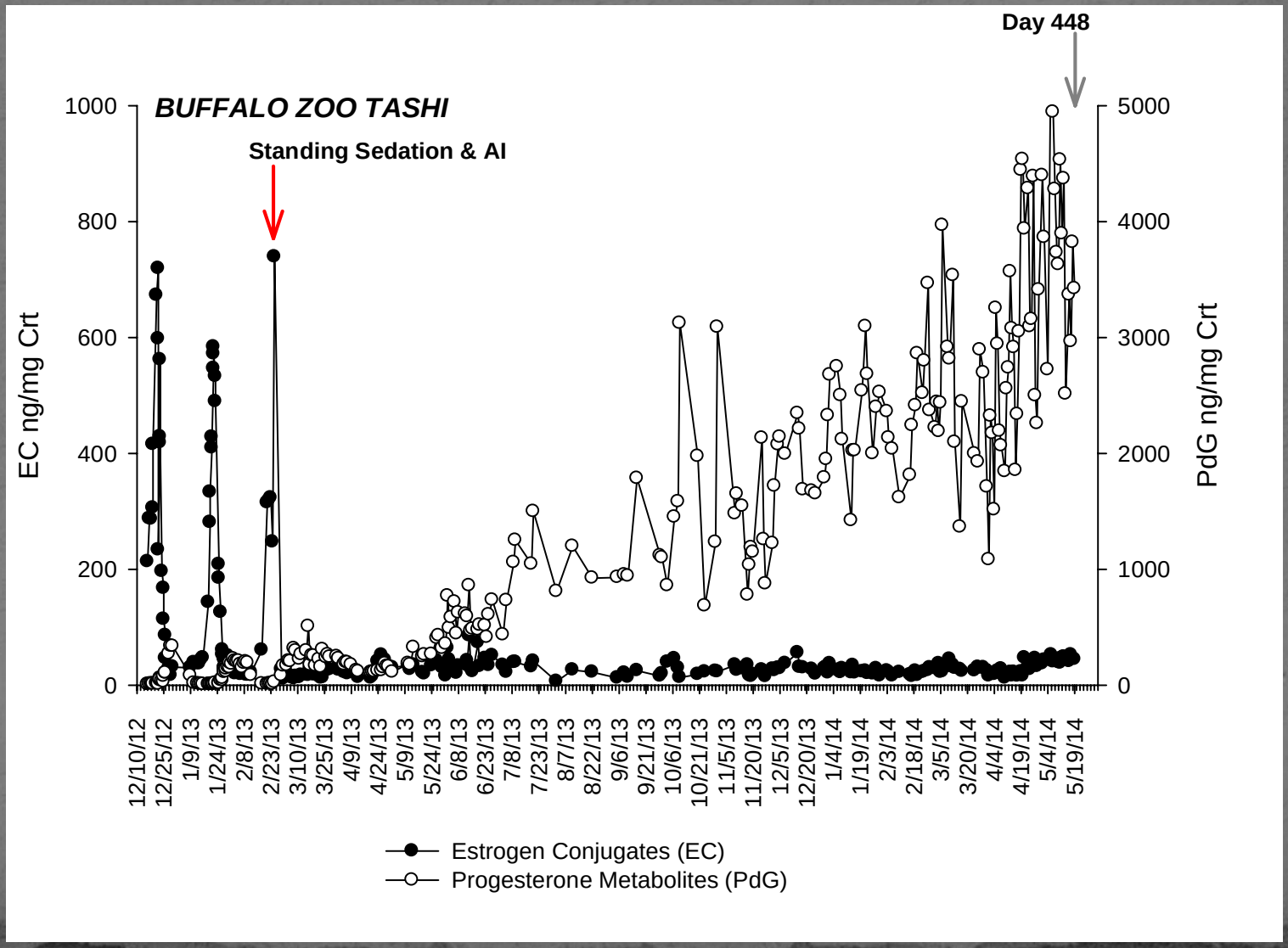
A total of 16 straws were thawed for a 7mL volume

Additional EQ extender was added to bring the volume up to 11 mL

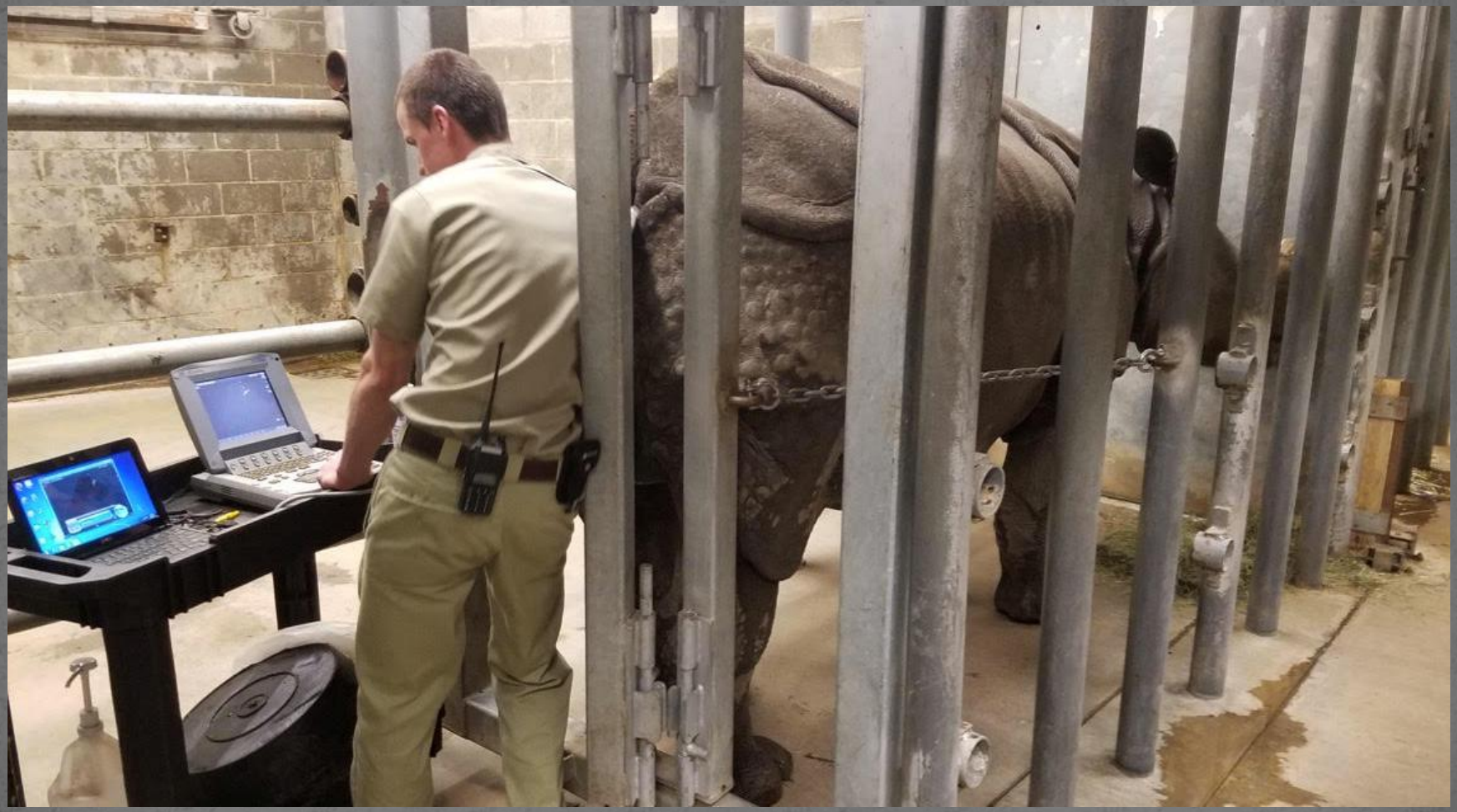
Post-thaw motility was 60% at a 3.5 forward progressive status

Sperm was still motile at 24 hours post-thaw

Determined Pregnancy by Hormone Analysis

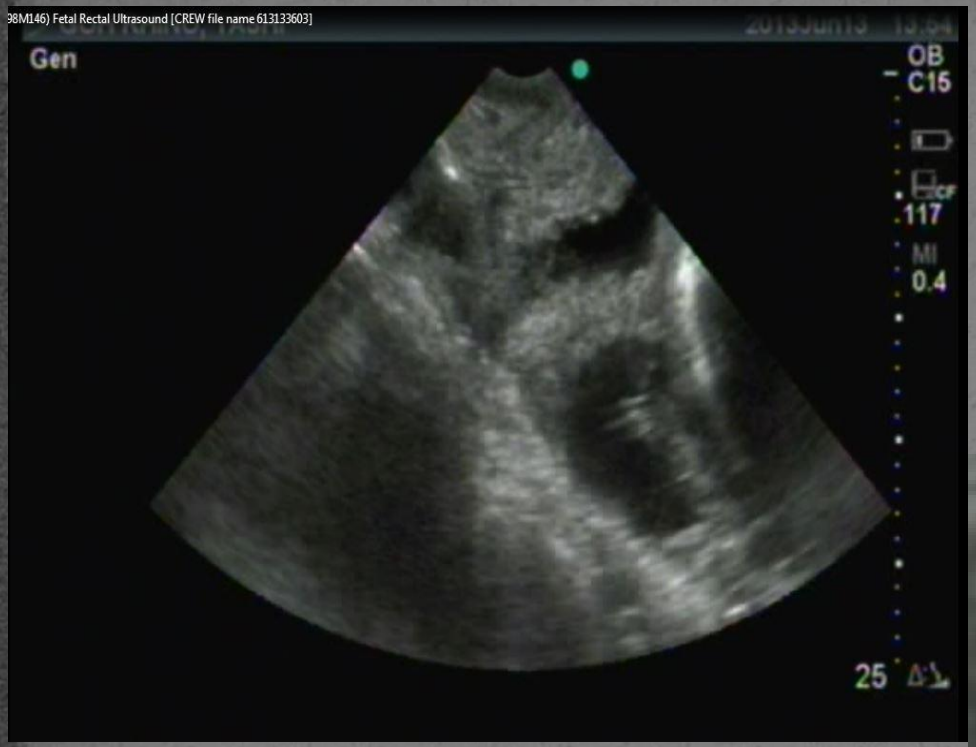


Transrectal Ultrasounding



Transabdominal Ultrasounding

Gender Determination



Tashi gave birth at 3:30 PM June 5th 2014

Calf named “Monica” in dedication to Dr. Monica Stoops

Now at San Diego Zoo Safari Park