A NEW RECIPE FOR SOUTHERN WHITE RHINOCEROS BREEDING SUCCESS?

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The captive southern white rhinoceros (SWR) population is not currently self-sustaining due to low fertility of captive-born females. Our research has focused on the potential role of dietary phytoestrogens in this phenomenon. Specifically, we have shown that SWR endocrine systems are likely more vulnerable to disruption by phytoestrogens than those of greater one-horned rhinos that eat similar captive diets, but exhibit higher fertility. Overall, we have demonstrated that the estrogenicity (i.e., phytoestrogen content) of captive diets is directly proportional to the amount of soy and alfalfa-containing pellets fed. We have also observed a significant negative relationship between the estrogenicity of an institution's diet and the fertility of their captive-born females. We found no such relationship for wild-born captive female SWR fed high phytoestrogen diets, supporting the hypothesis that gestational exposure to phytoestrogens compromises fertility of female SWR. Recently, our institution developed a low phytoestrogen pellet containing minimal soy or alfalfa-based ingredients, and reduced the total amount of pellet consumed by SWR by nearly 80%. This change resulted in a greater than 90% reduction in the estrogenicity of our SWR diets. Although our goal in modifying captive SWR diets was to reduce potential harmful effects of developmental phytoestrogen exposure, we were uncertain if the diet change would affect fertility of the current population of non-reproductive captive-born female SWR. Interestingly, after the reduction in dietary phytoestrogen exposure of our herd, three pregnancies have been achieved in two captive-born female SWR that had previously not reproduced. Thus far, one of those pregnancies has resulted the successful birth. Taken together, our data strongly suggest that phytoestrogens negatively affect SWR fertility. While we still suspect the primary mechanism is through gestational exposure, our recent observations indicate that adult exposure could also be lowering fertility of some individuals, but may be reversible. As a result, we strongly suggest that dietary phytoestrogen levels be reduced in order to increase fertility of SWR in managed settings.

SLING TRAINING WHITE RHINOS: THE PROCESS AND PURPOSE

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Having the option to safely sedate a rhino while suspended in a sling can be a valuable tool during a medical procedure. The North Carolina Zoo has incorporated sling training into the rhino management program and would like to share what we have learned. The purpose of the sling is to allow vet and keeper staff to accomplish a standing sedation while in the chute allowing for safe access to the rhino. Our rhinos are currently chute trained and we typically ask them to enter the chute a minimum of twice a week. Having our rhinos come into the chute allows us to train/desensitize for a large number of veterinary tasks. However this does not rule out the potential of a sedation procedure in the case of a more serious veterinary need. The general process of using the sling goes as follows: the rhino walks into the chute and keepers secure the sling on them, vet staff hand injects anesthetic and the rhino stays in chute. Once the drugs begin to take effect the sling is secured to the top of the chute to support the rhino. Once it is time to reverse the anesthetic, keepers watch the animal's behavior to determine when to release the sling. Wearing the sling voluntarily is a behavior we include in our training program and when completed practice once a month. In my presentation I will explain the training/desensitizing process of accomplishing the sling behavior, materials used to fabricate the sling, barn/chute design, occasions where the sling would be used and explain in detail the process of utilizing the sling in a veterinary procedure. Thus far we have used the sling behavior to accomplish a standing sedation during artificial insemination and an emergency ultrasound to check the kidneys of our male. In both situations it proved to be a valuable tool and pictures were taken to document the process. This is a tool that I feel can be helpful with artificial insemination and geriatric care which are both topics for roundtable discussions at this year's conference.

Sling Training White Rhinos:

The Process and Purpose

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What is a rhino sling?

- Device used to support a rhino's weight during a standing sedation
- Custom order device from LiftAll https://www.lift-all.com
- Heavy duty canvas and nylon
- Support 24,000 pounds
- 4 feet wide 10 feet long

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How the sling fits

- Sling placed under belly
- Keeper on either side of rhino to lift sling up
- Loops connected with Velcro over rhino's back to hold in place
- During a procedure Velcro is removed and loops are attached to chains at the top of the chute to support them

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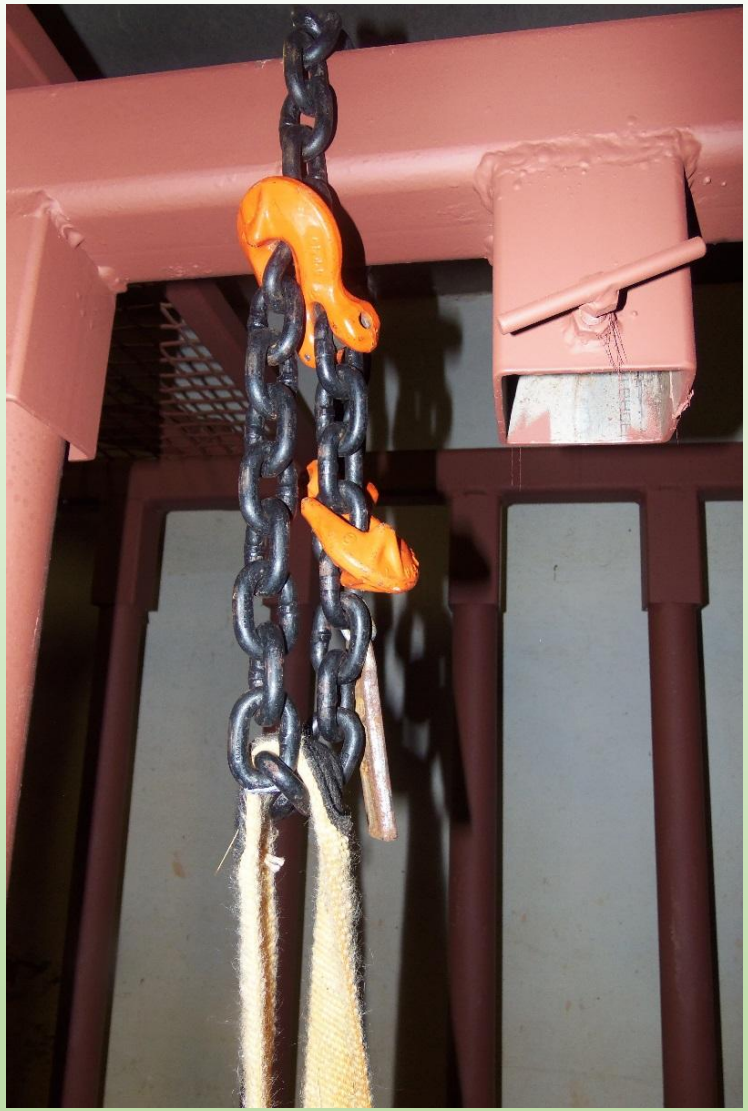
Protocol to utilize sling

- Call rhino into chute and fasten sling on them
- Rhino continues to stand in chute while anesthetic is given via hand injection
- As the anesthetic takes effect loops are secured to top of chute with chains
- As the rhino relaxes the sling supports their weight during procedure
- Precaution to prevent rhino from going down in chute
- Reversals given, keepers watch for rhino to become sturdy then release chains and remove sling



Examples of Sling Uses

- Rectal Ultrasound
- Artificial insemination
- Any medical task that only requires light sedation
- Precautionary tool to be used during a standing sedation or moving a rhino during a full anesthesia
- Can be connected to a hoist, come along, etc.

Hoist on track to move rhinos under anesthesia

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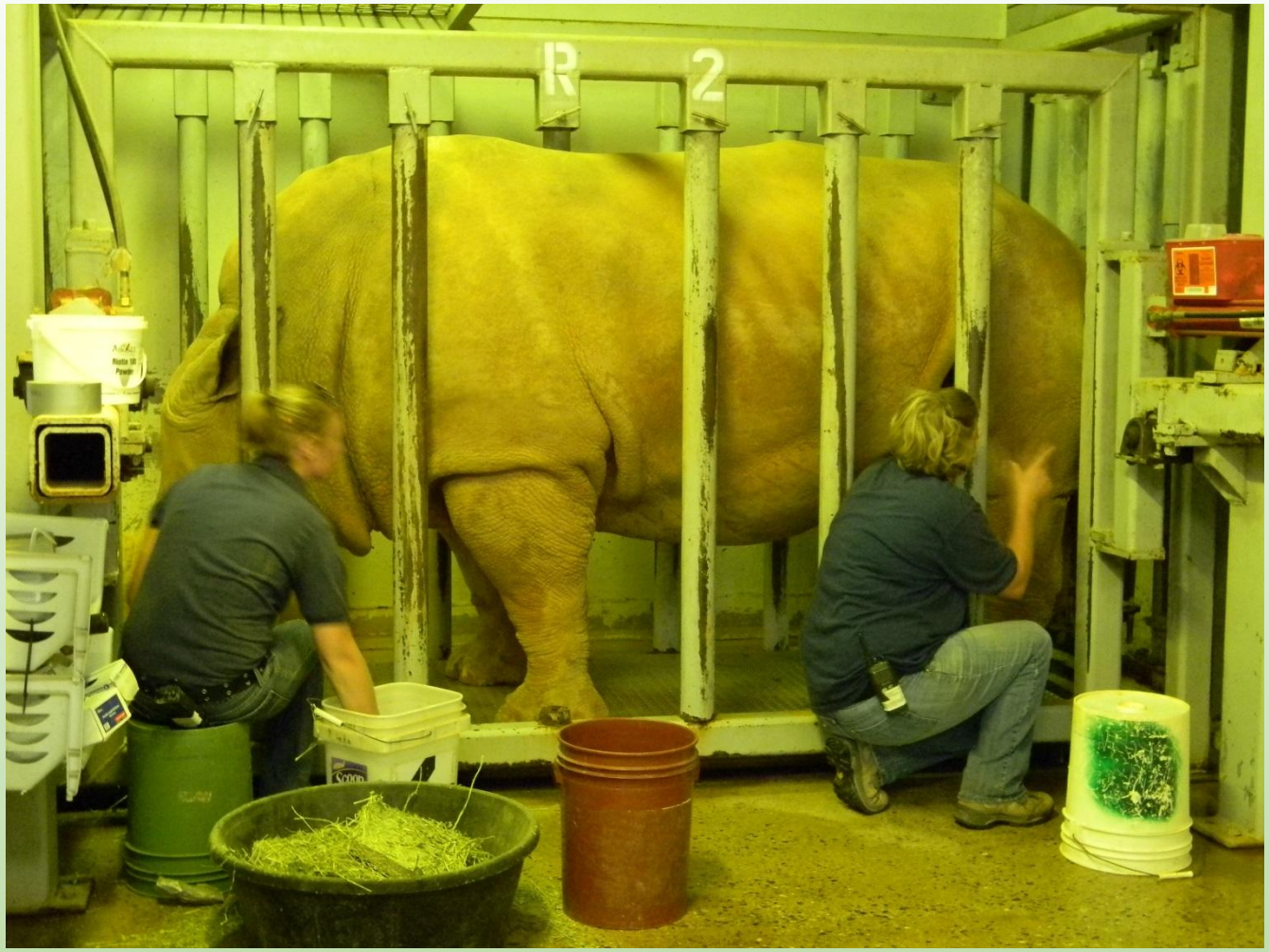
Preliminary Behavioral Requirements for Sling Training

- Rhino is comfortable in chute
- They can be touched in chute and are comfortable with staff working around them
- Hand injection behavior complete
- Desensitized to basic medical task/examination



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Approximations to Sling Behavior

- Sling folded in half laid in chute; rhino given time to investigate
- Sling folded; rhino walks over sling; steps on sling; stands with sling underneath them while it is still laying on the floor
- Once comfortable with standing over sling, unfold sling underneath the rhino
- While rhino is standing over sling, rub belly with strip of burlap

Approximations continued

- Keepers on either side hold each end of burlap and lift up to touch rhino's belly
- Switch from burlap to sling first just touching bottom of belly
- Then touch one side of rhino at a time until holding each side up to them
- Hold sling up to rhino, connect loops with Velcro and they are wearing the sling!

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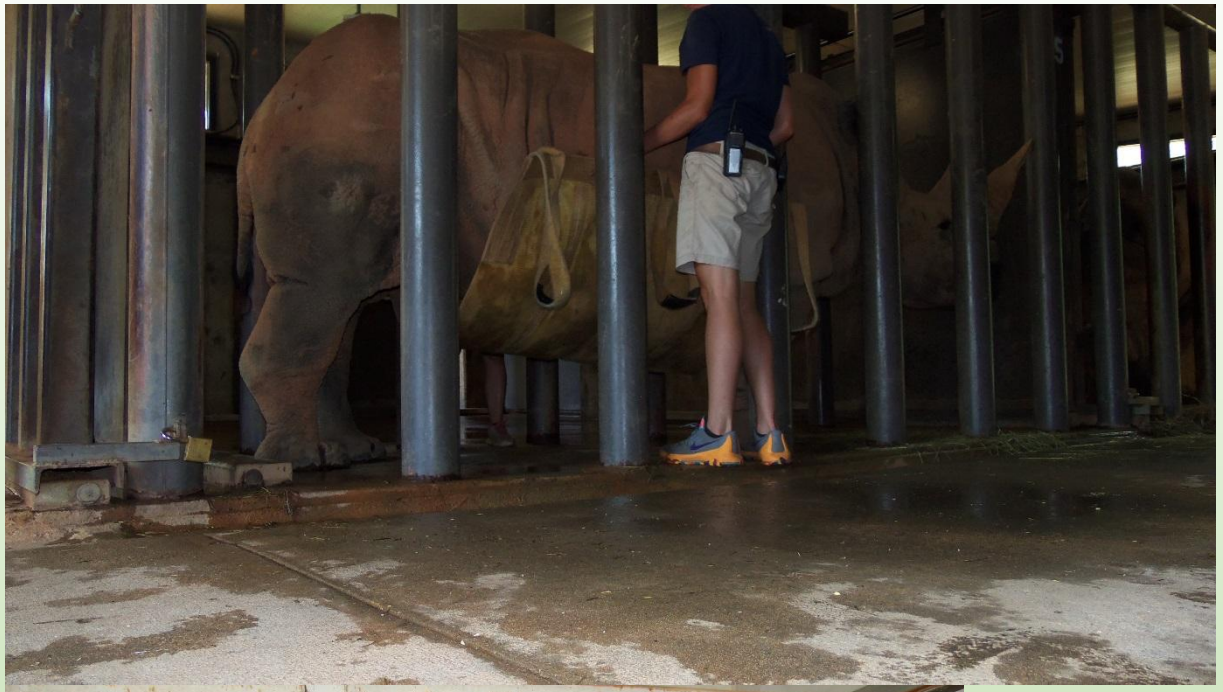

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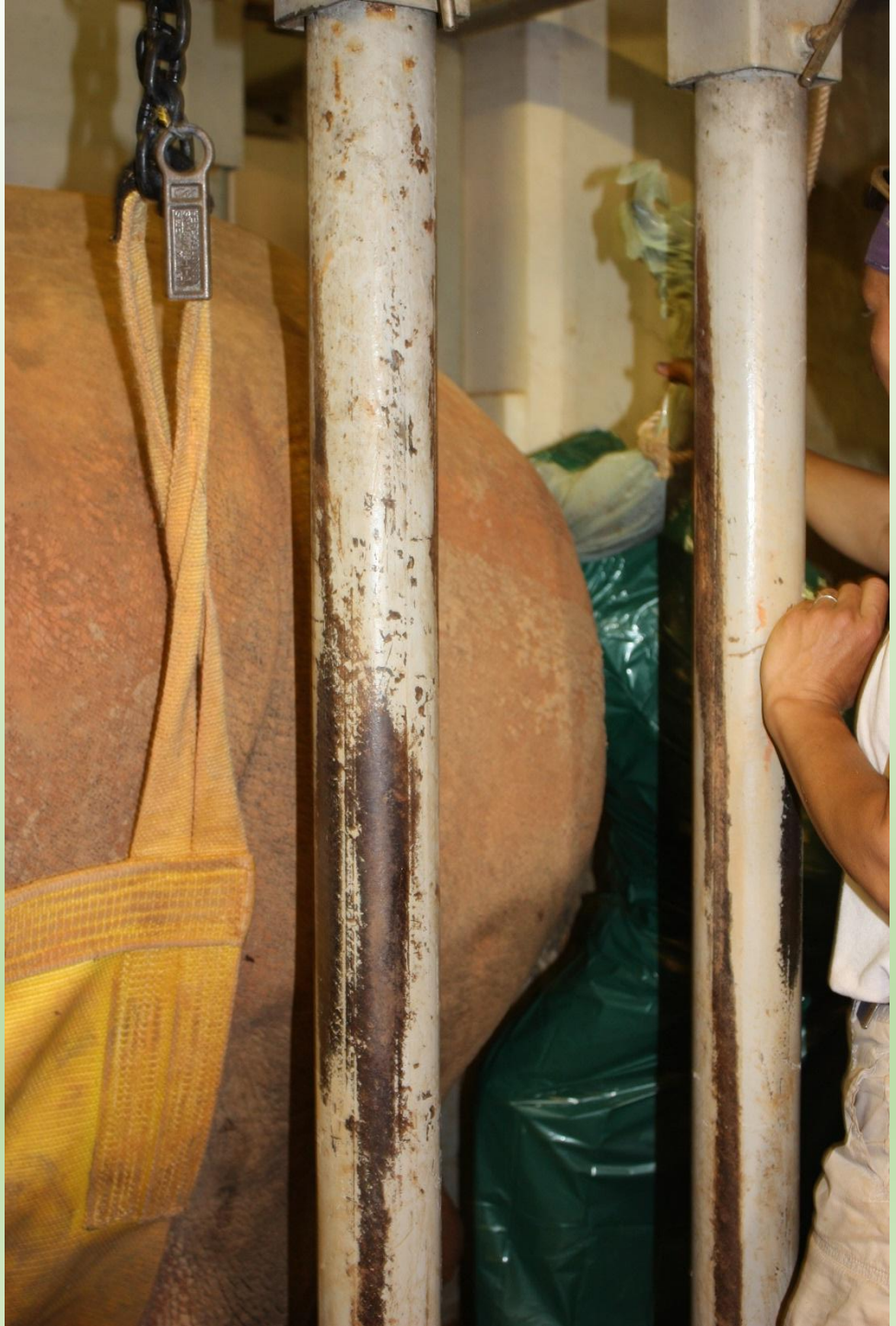
Artificial Insemination Using Sling



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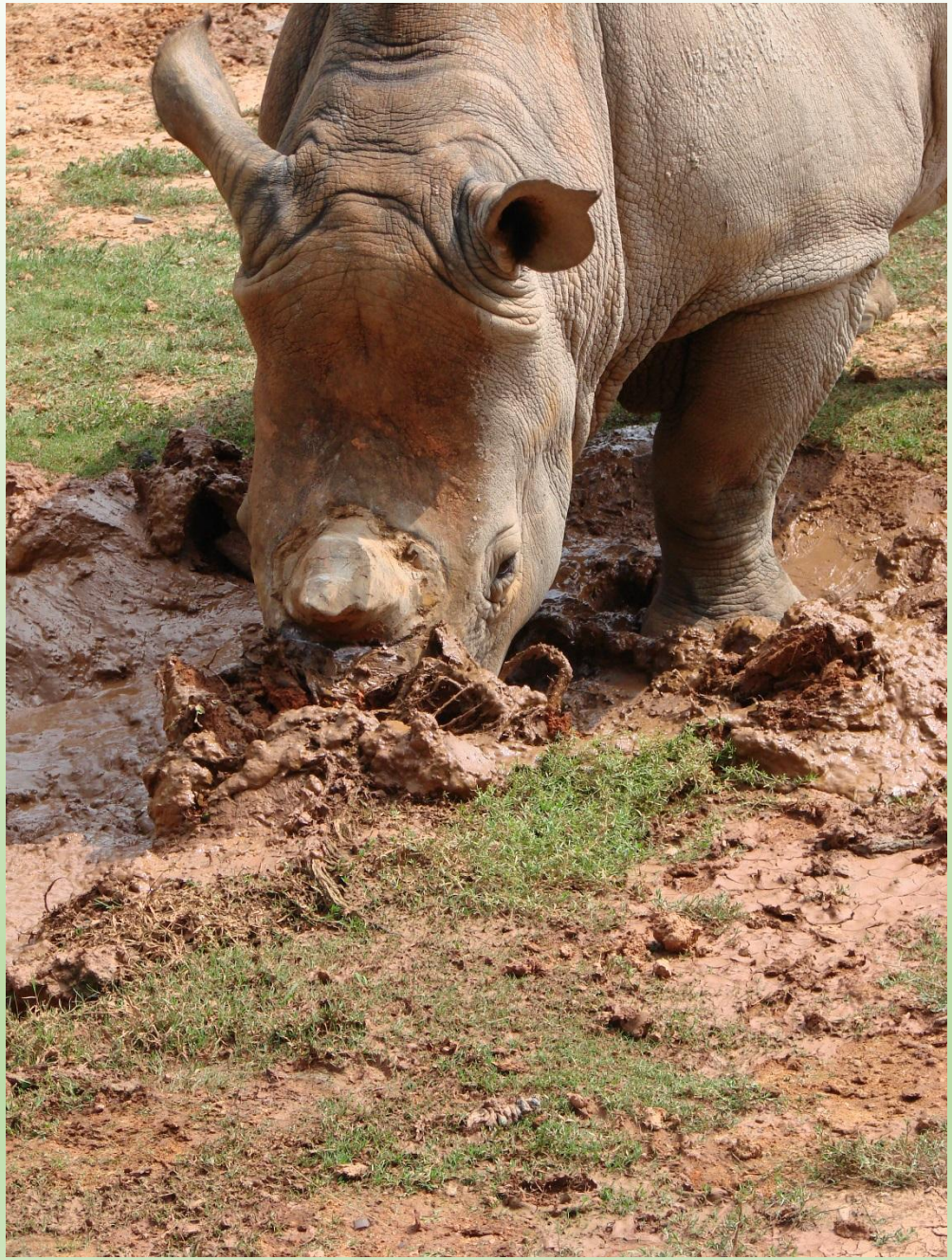
Is it useful?

- North Carolina Zoo's rhino training program is extensive
- Most medical tasks can be accomplished voluntarily
- Medical task that cannot be done voluntarily typically require a full laying down sedation
- Recent medical procedures we have not used the sling
- However when sling was used it was successful
- Valuable behavior to have as precaution



Questions?

Thank you:

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Watani Grassland Reserve Keepers