UC CE UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources | UC Cooperative Extension

# Virtual Fencing to Target Medusahead and Barb Goatgrass on California Rangelands

NRCS Natural Resources Conservation Service

# Invasive Annual Grasses on California Rangelands

Expanding across CA rangelands

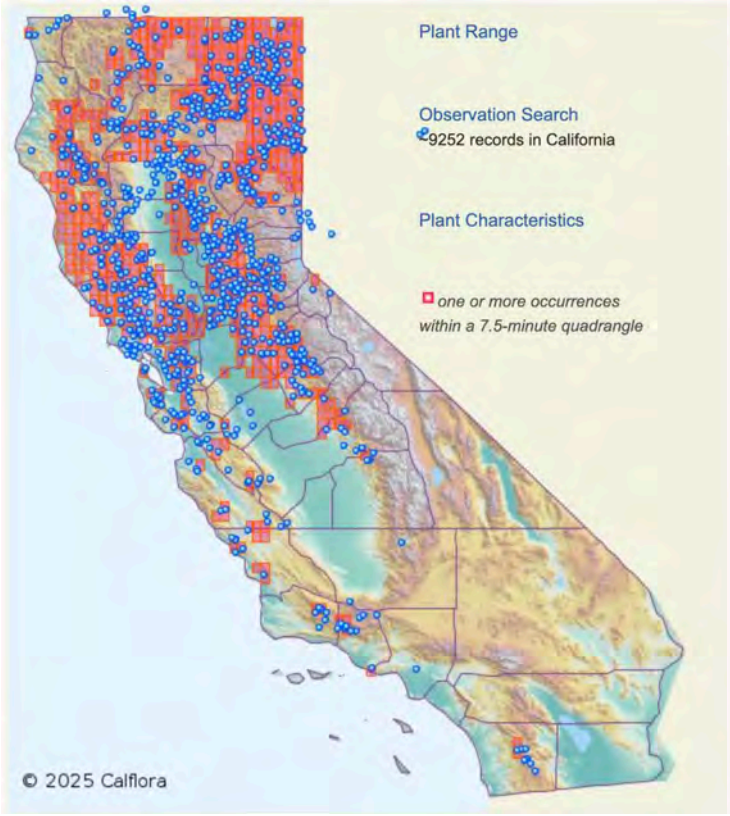
- Slow to decompose. Thatch buildup suppresses desirable forage and biodiversity
- Livestock generally avoid, and seeds can cause physical harm when mature

Depend on seed production to persist.

- MH: 2 years
- BGG: 5 years

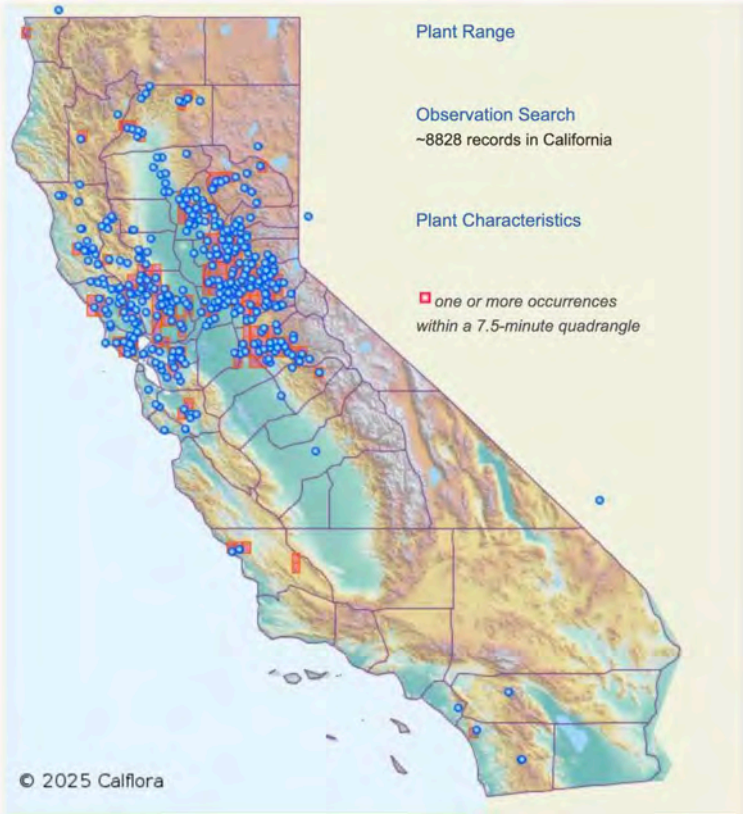
Medusahead

Elymus caput-medusae




Barb Goatgrass

*Aegilops triuncialis*



# Control Strategy

- Multiple management strategies exist.
- Grazing too early (V1 – V2) may be ineffective.
- Grazing too late (R5 – L12) unpalatable and may be harmful.
- High intensity, short duration grazing when plants are soft and most palatable, but before viable seed set (V3 – R4). Timing (varies with elevation & rainfall)
  - MH: Early April – May
  - BGG: Late April – early May

*Table 1.* Phenological stages of medusahead and barb goatgrass in California annual rangelands

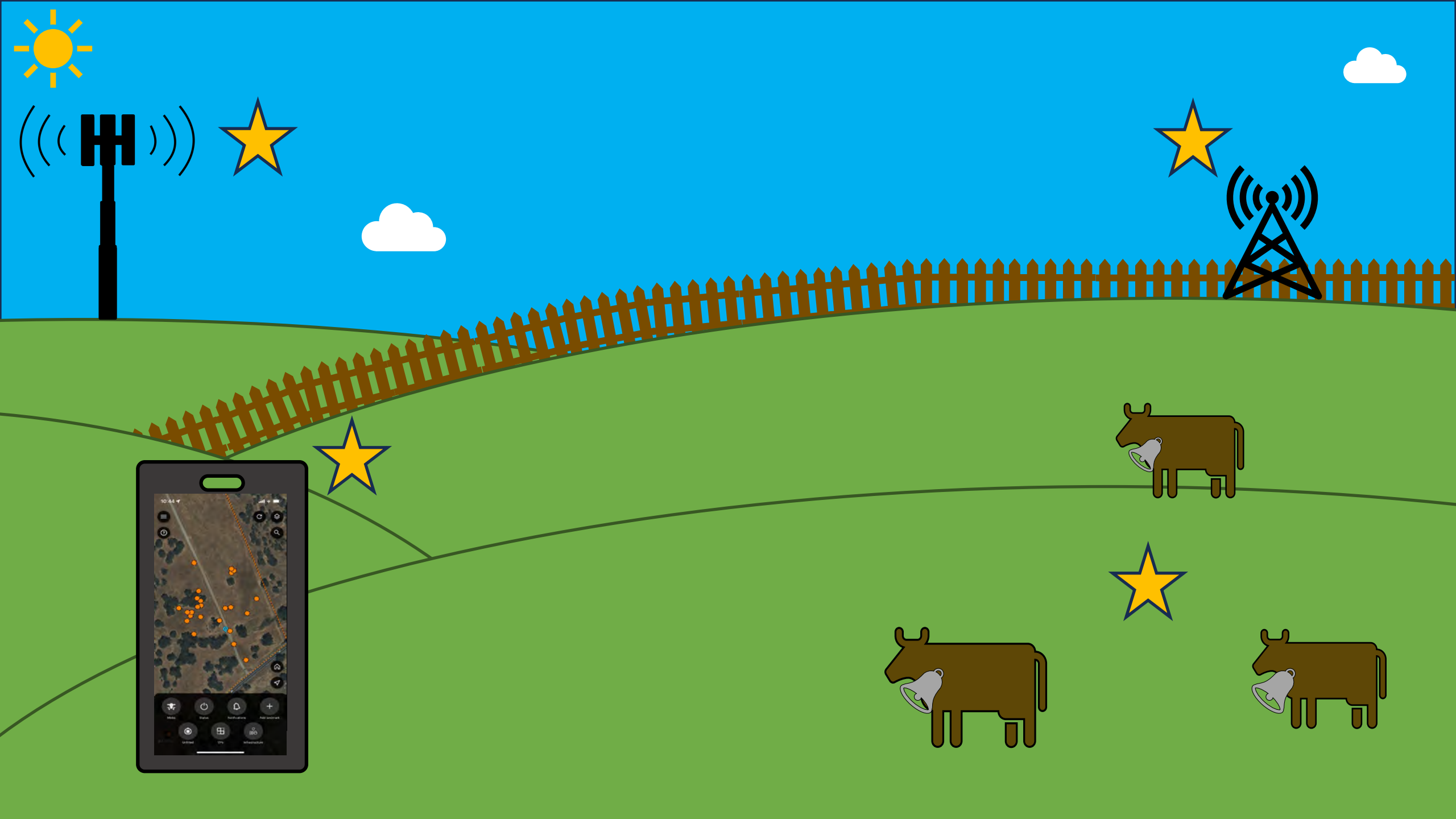
| Stage | Description | Season* |
|---|---|---|
| V1 | Germination occurs at the onset of fall rains (roughly 0.5–1 inch of rain within 5 days) followed by growth of the seed leaf. | fall |
| V2 | The early vegetative stage occurs with shortened day length. Lower temperatures during the winter may inhibit growth and last for months. | fall–winter |
| V3 | The late vegetative stage occurs as temperatures increase in the late winter and early spring, characterized by lengthening internodes and transition into the boot stage. This stage indicates the start of the spring growing season and quicker growth and development. | late winter to early to mid-spring |
| R4 | Emergence of awns through the full emergence of the inflorescence. | mid to late spring |
| R5 | The florets open and anthers emerge (anthesis). | late spring |
| R6 | Anthesis ends and kernels begin to form. | late spring |
| R7 | Kernels elongate to reach the full length of the palea. | late spring |
| R8 | Seeds in the milk stage and kernels occupy the full length of the palea. Seeds will continue to mature and become viable if cut off. | very late spring |
| R9 | Seeds in dough stage. | very late spring |
| M10 | All seeds are mature and hard. The plant is not yet dead, though there is some red, brown, and green in the seed heads. Glume veins are dark. | early summer |
| D11 | Seeds fully mature. Flowering stem is dead and dry. The whole plant is a reddish-yellow (barb goatgrass) or uniform sandy-yellow color (medusahead). This stage includes seed head shatter and seed dispersal. | early summer |
| L12 | Plant material from the previous year is leached of nutrients, leaving gray plant material (typically medusahead has much more litter in this stage than other annual grass species). | fall–winter |

Brownsey, P., Davy, J., Becchetti, T., Easley, M. L., James, J. J., & Laca, E. A. (2016). Barb Goatgrass and Medusahead: Timing of Grazing and Mowing Treatments.

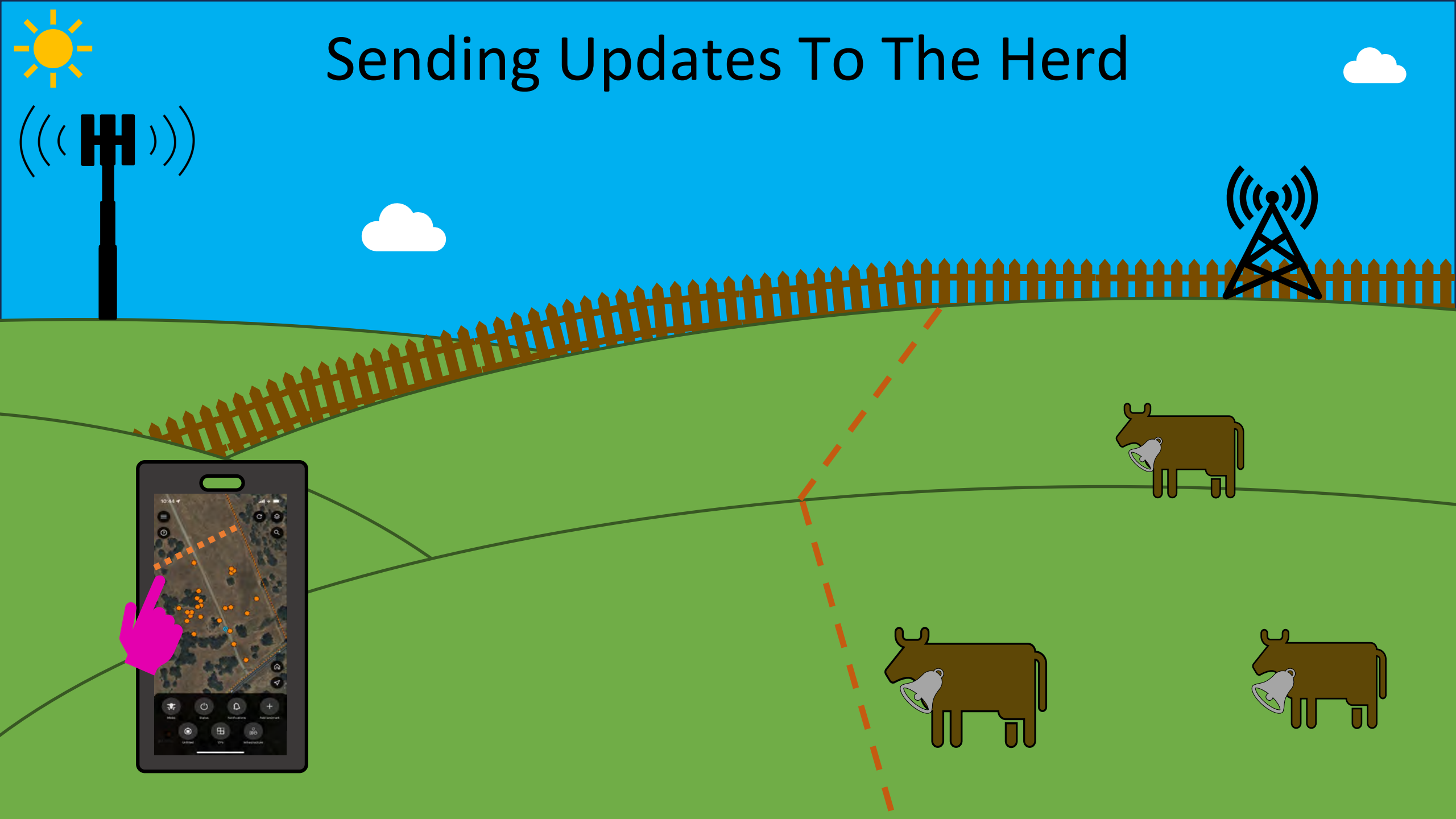
# What is Virtual Fence?



Livestock management tool using GPS collars and sensory cues to track and contain animals without physical fences.

# Sending Updates To The Herd



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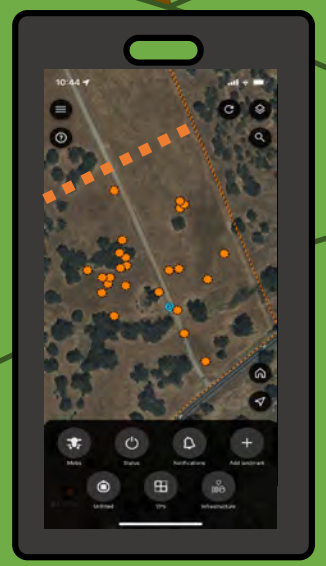
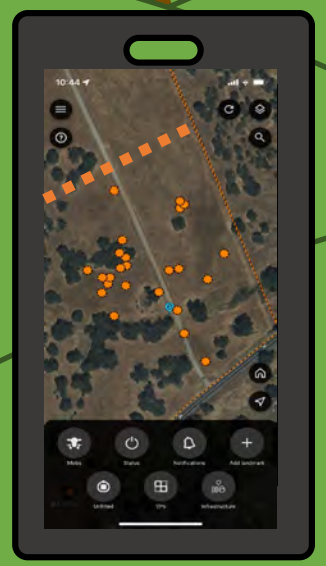


# Containing The Herd



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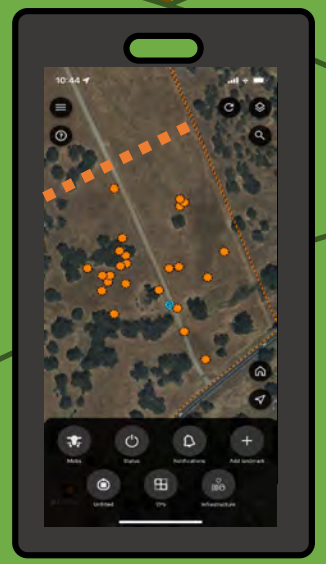

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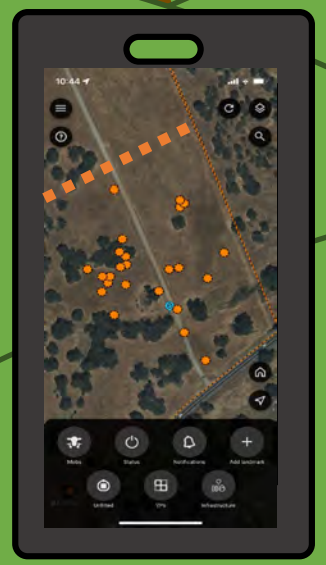

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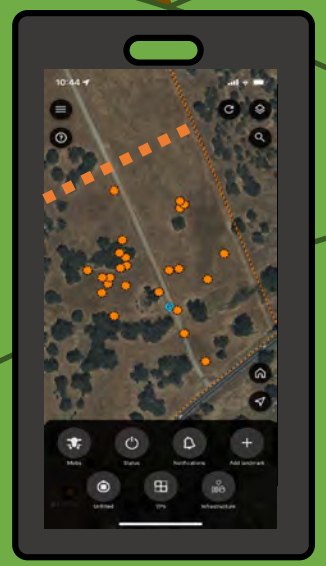

# Medusahead: Site and Setup

- 10 days: May 7 – 17
- 3 acre VF
- 25 steers & heifers

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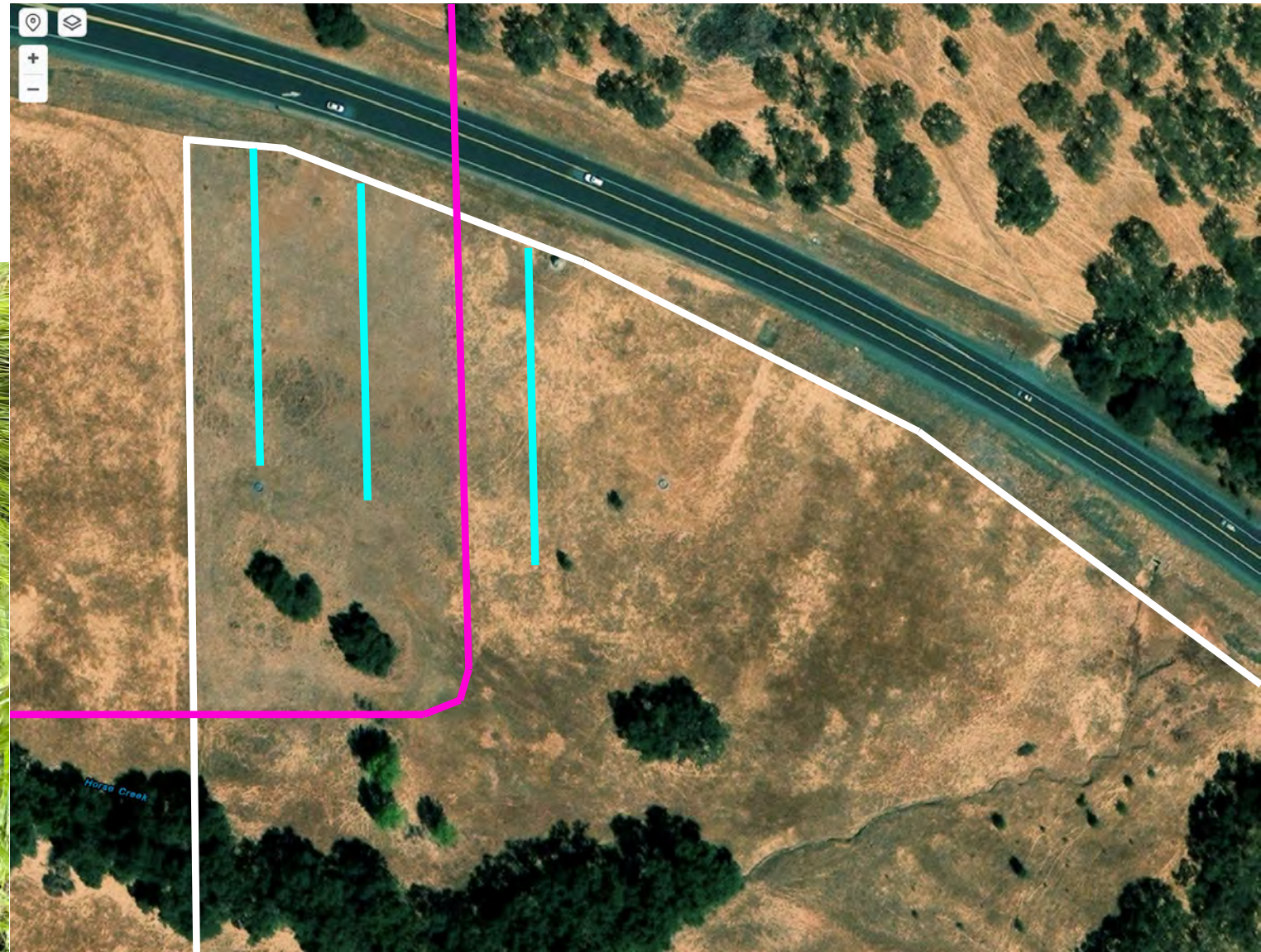

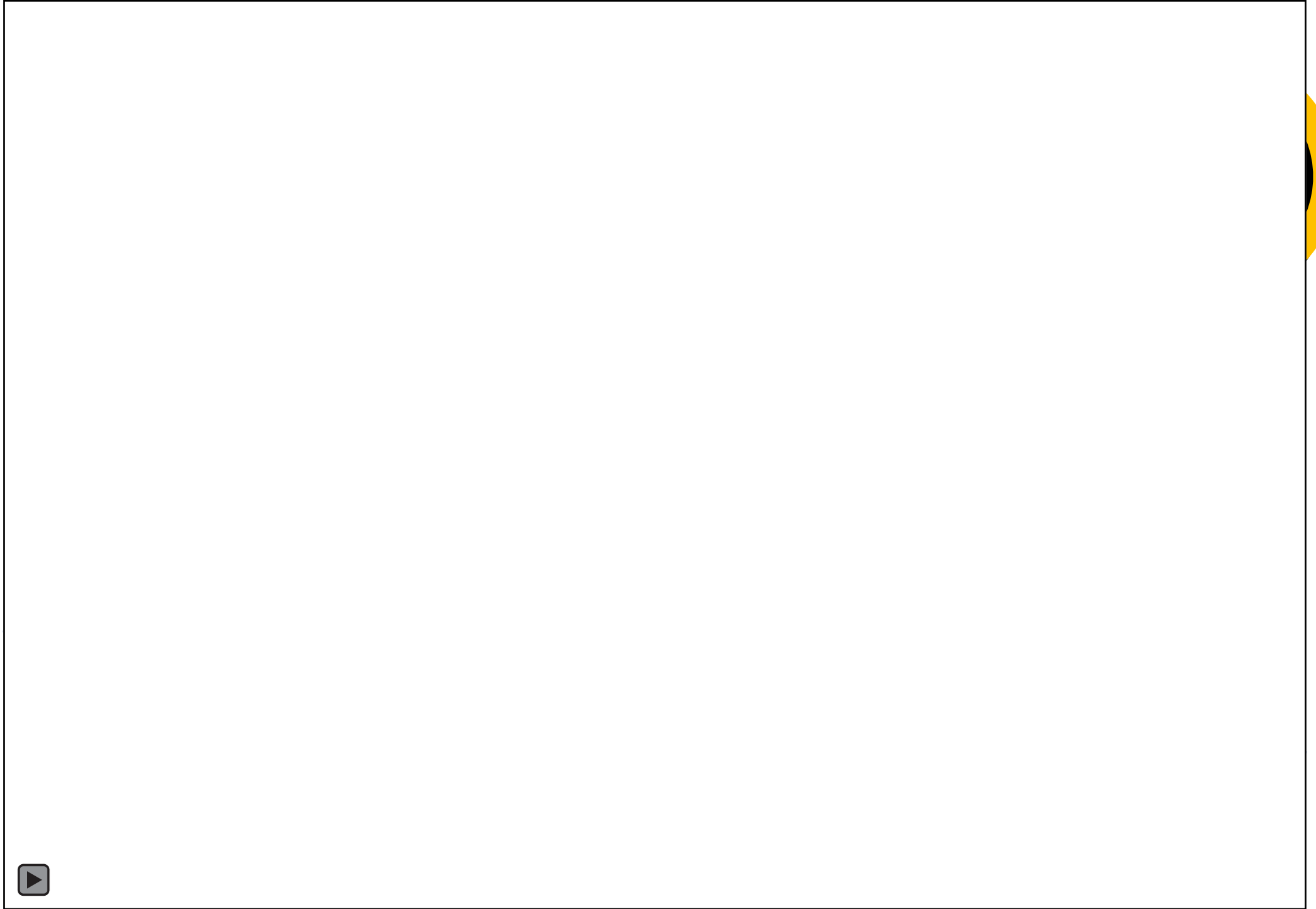

# Medusahead: VF System Performance

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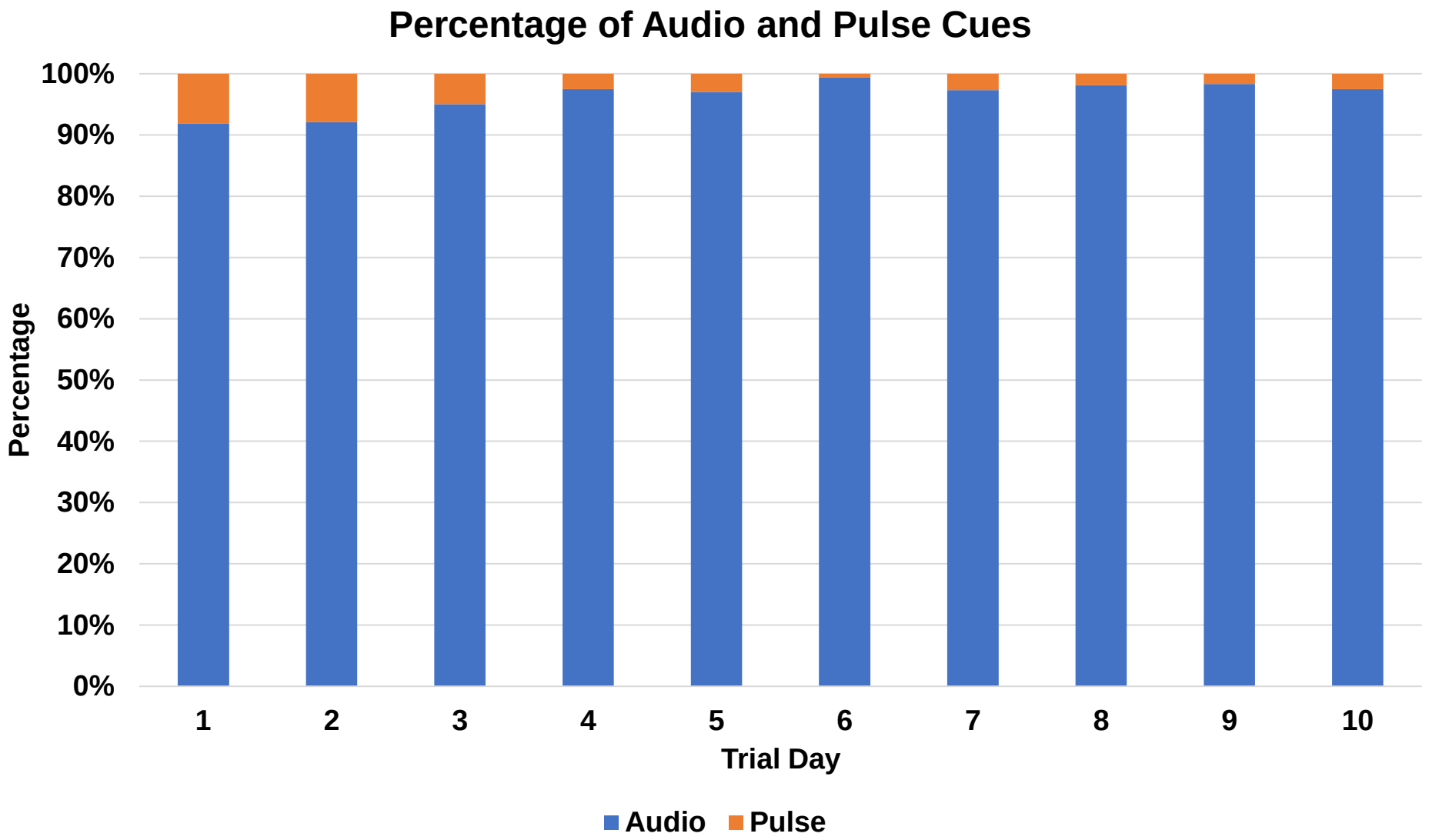
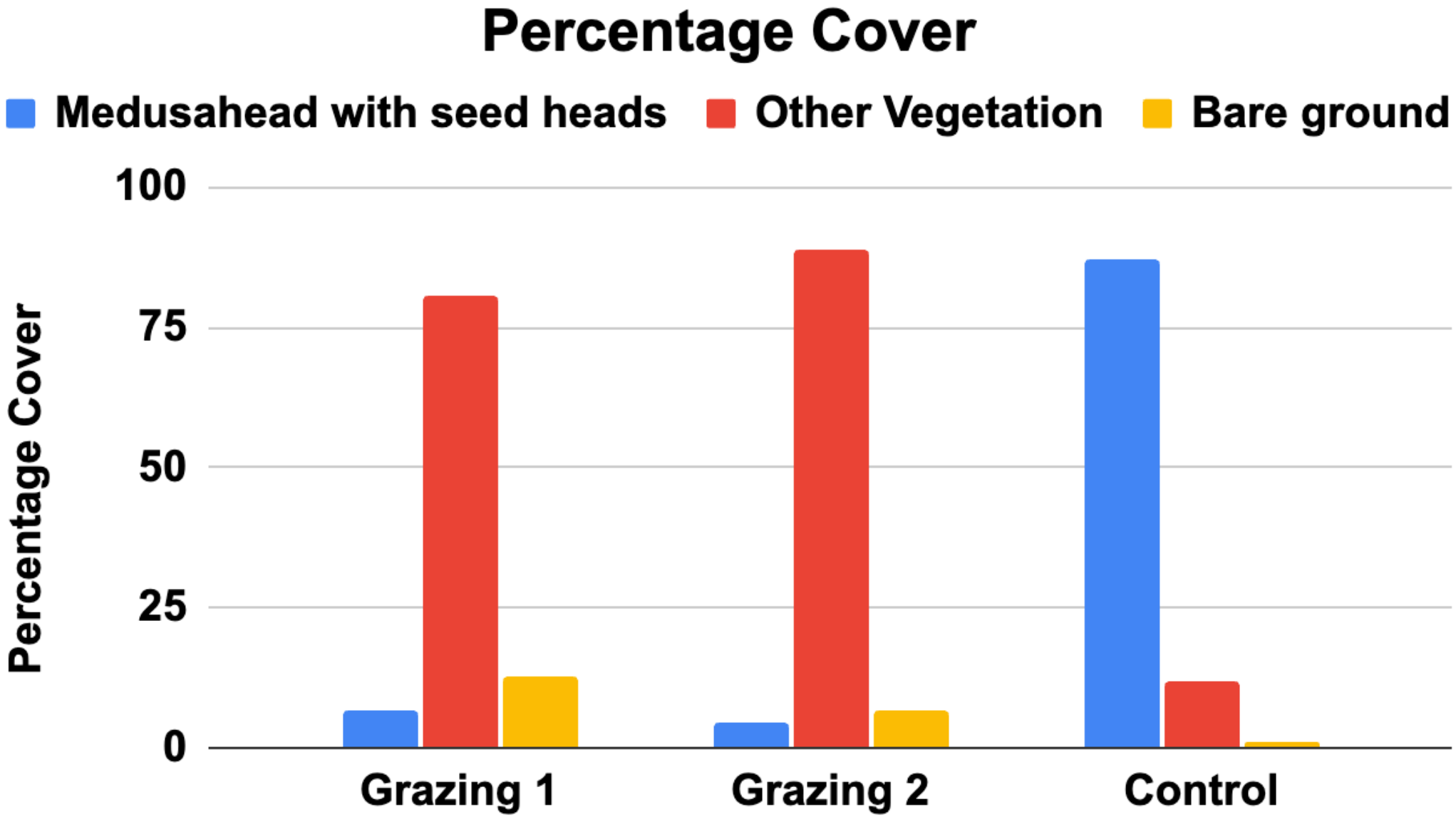
Avg weight gain

2.23 lbs / day



# Medusahead: Post-Grazing Results



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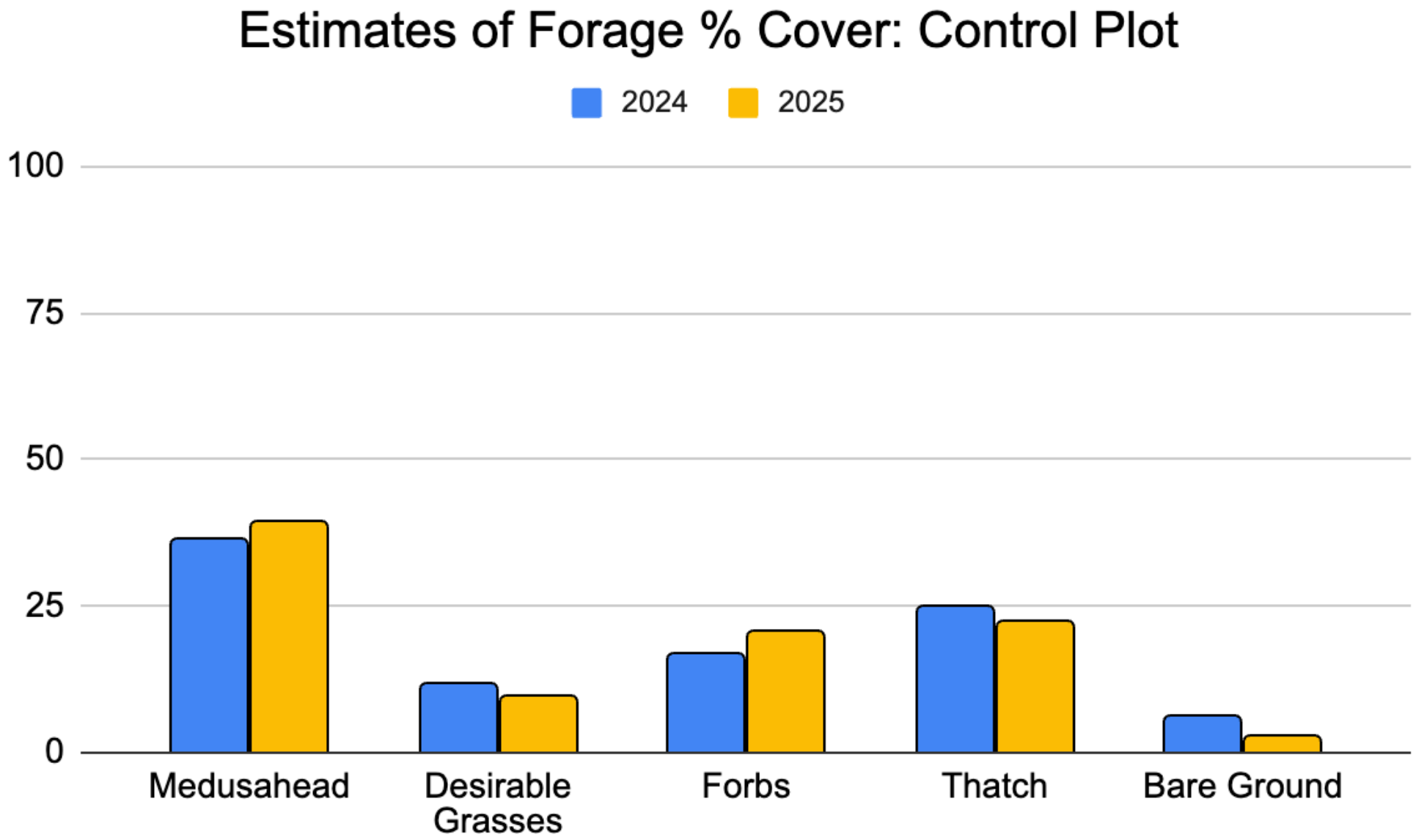

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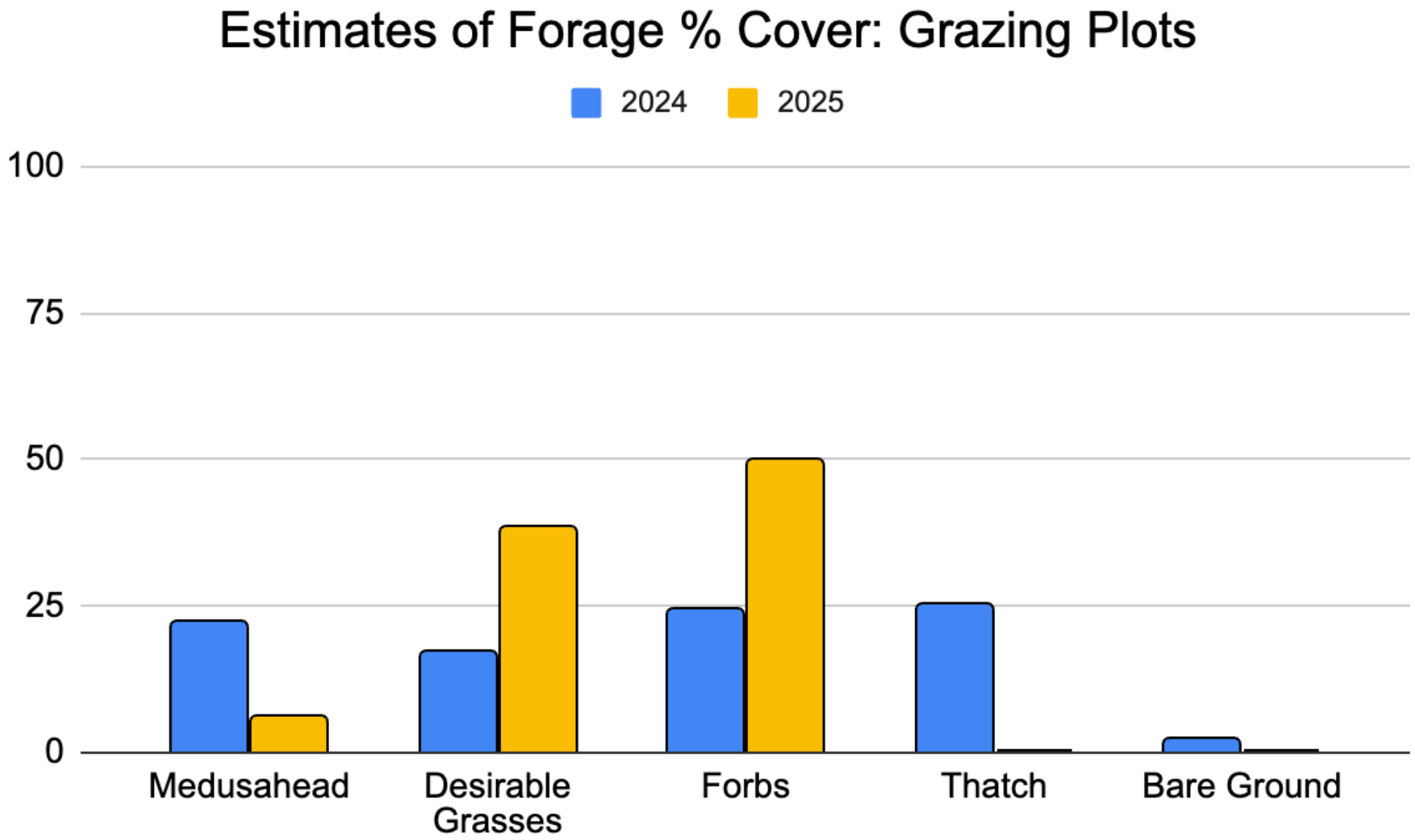

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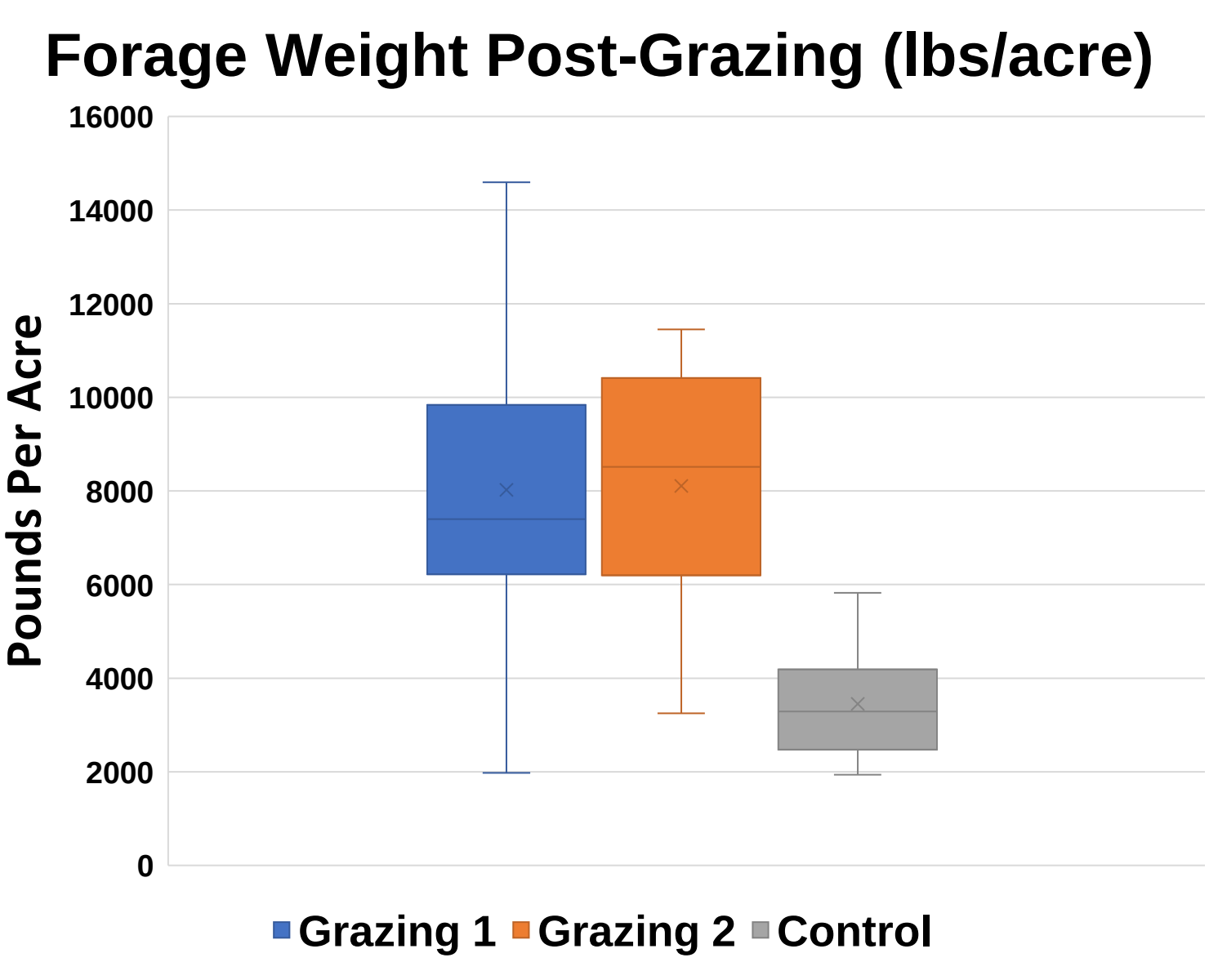
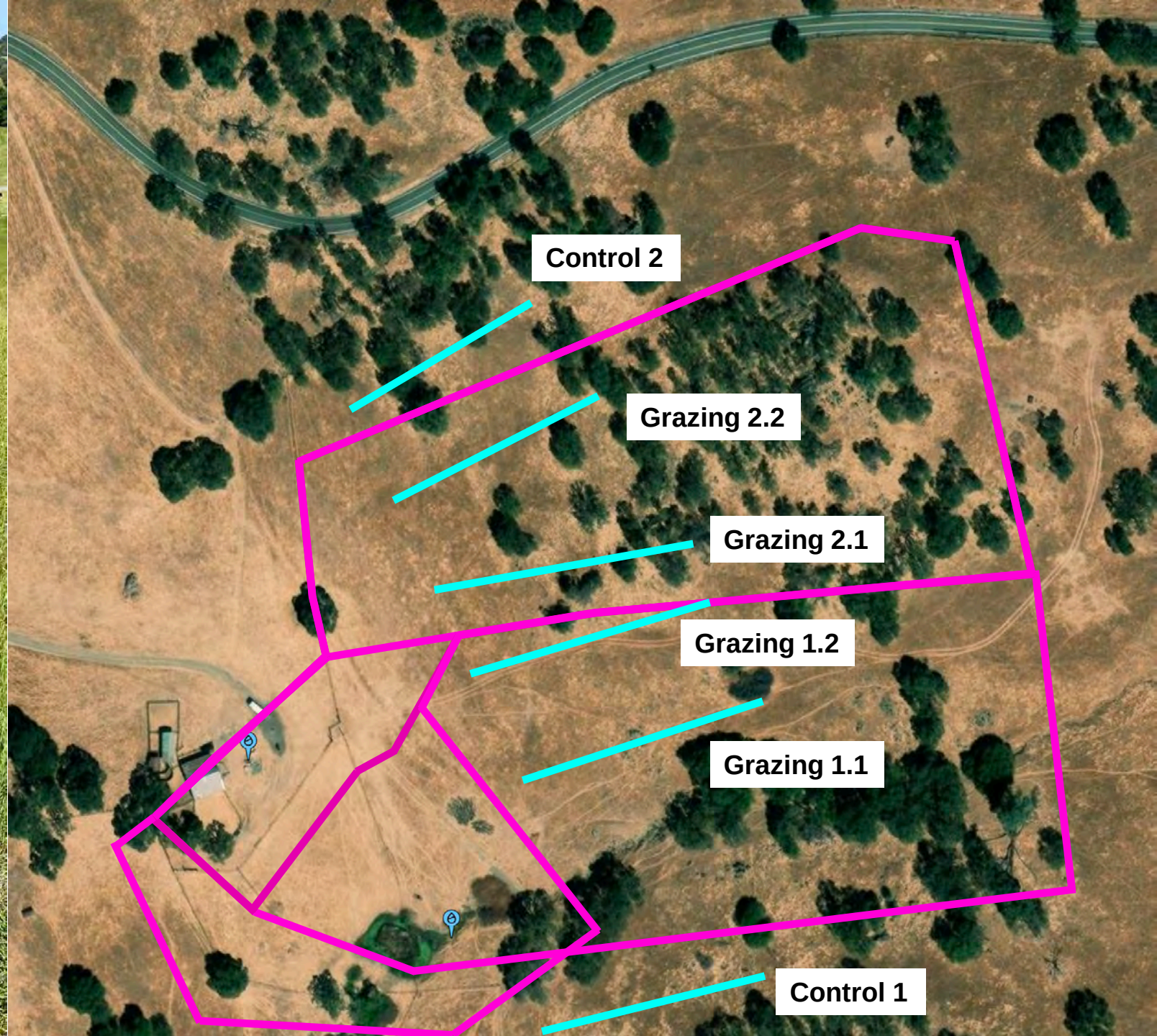


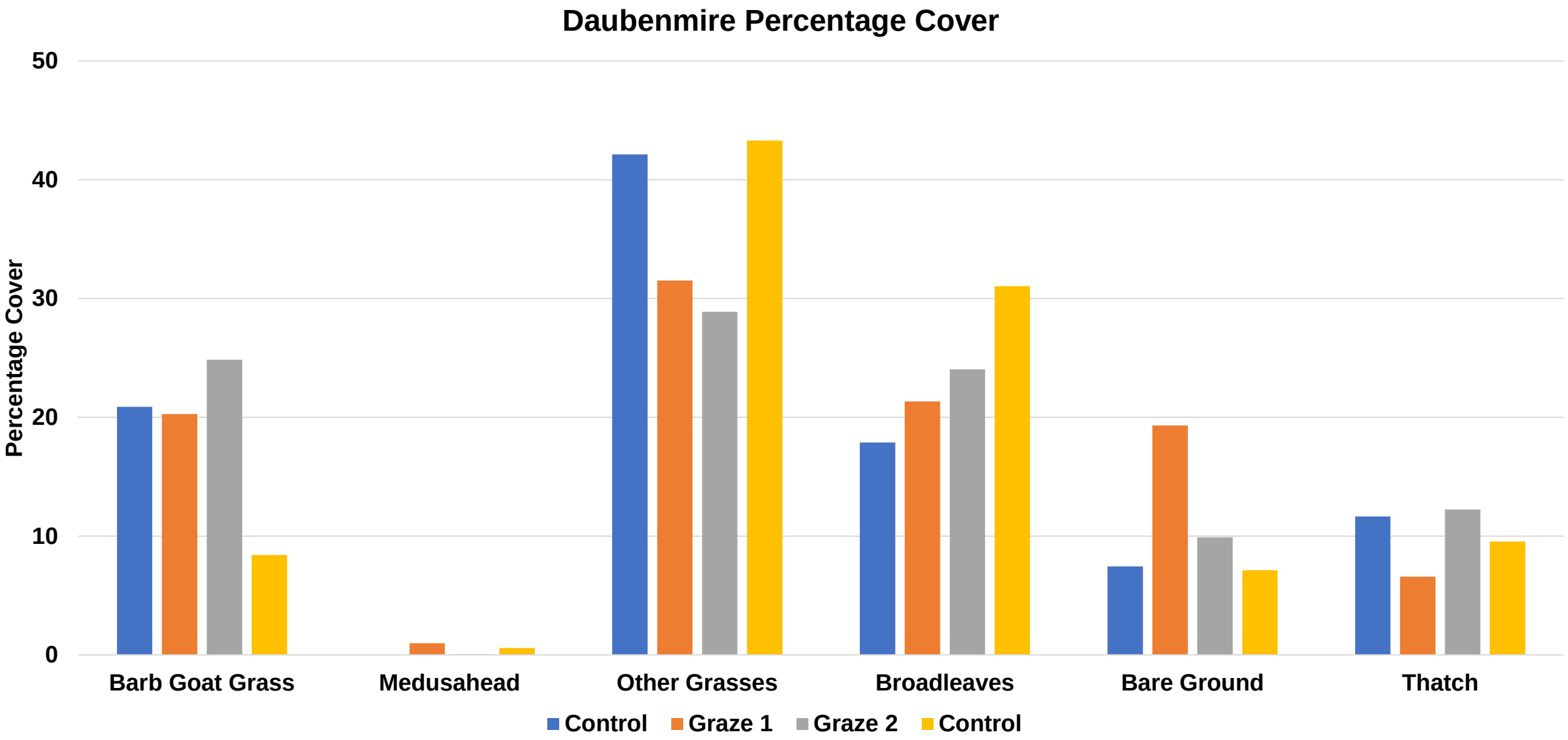

# Barb Goatgrass: Site and Setup

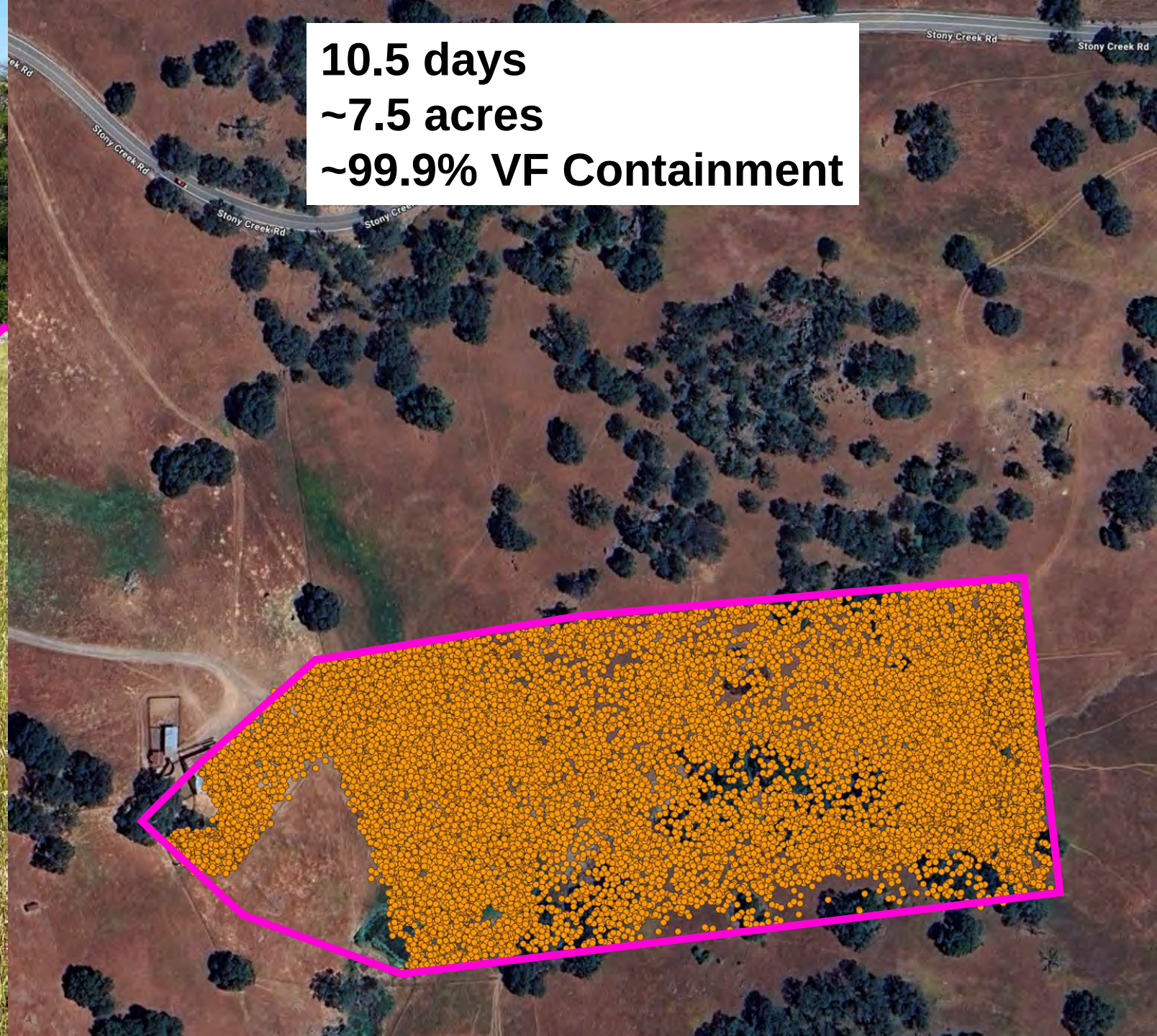
22 days: May 1 – 22
2 ~7.5 acre VFs
40 heifers

Calflora

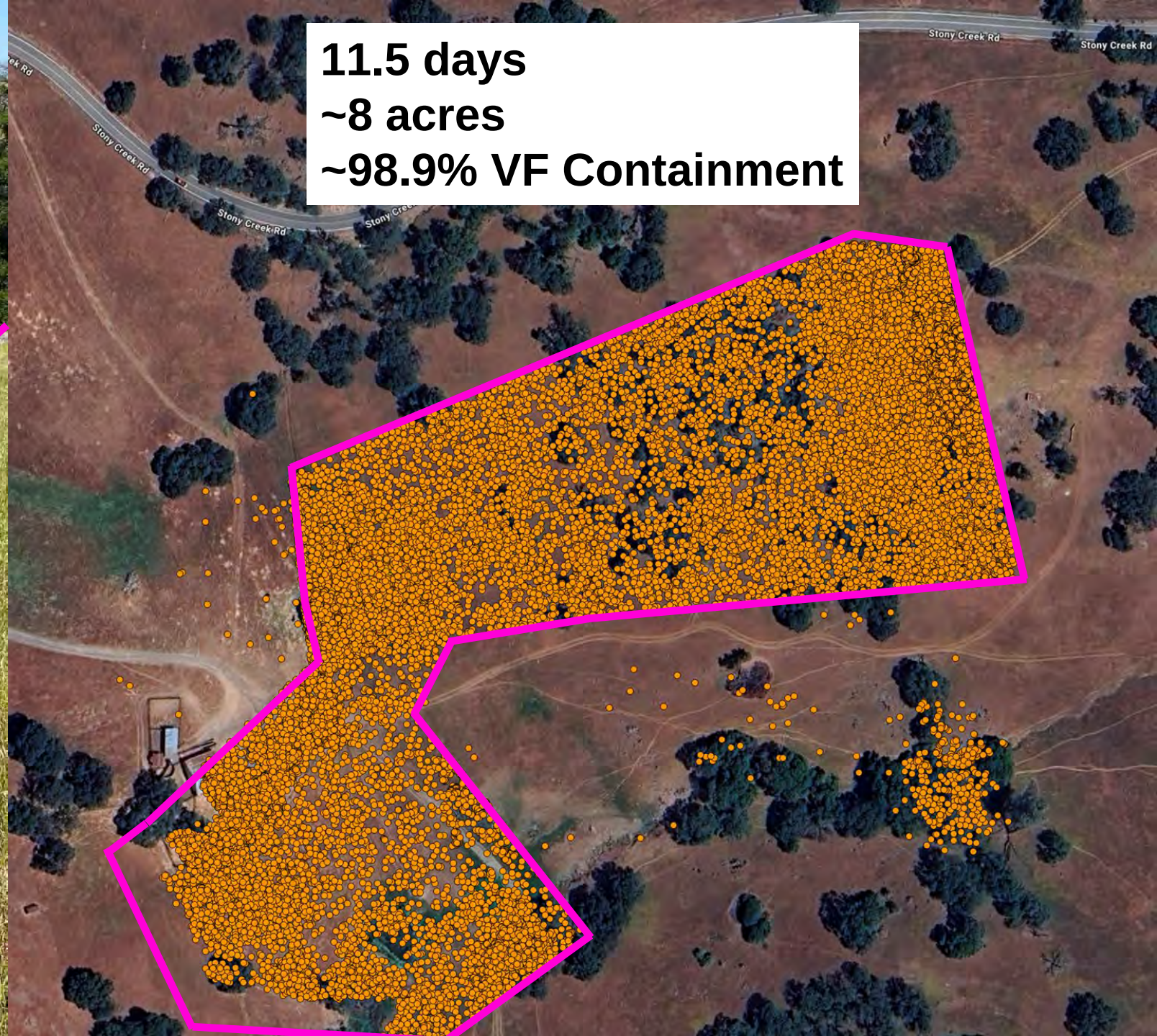

Control 2
Grazing 2.2
Grazing 2.1
Grazing 1.2
Grazing 1.1
Control 1

# Barb Goat Grass: Pre-Grazing Data Collected





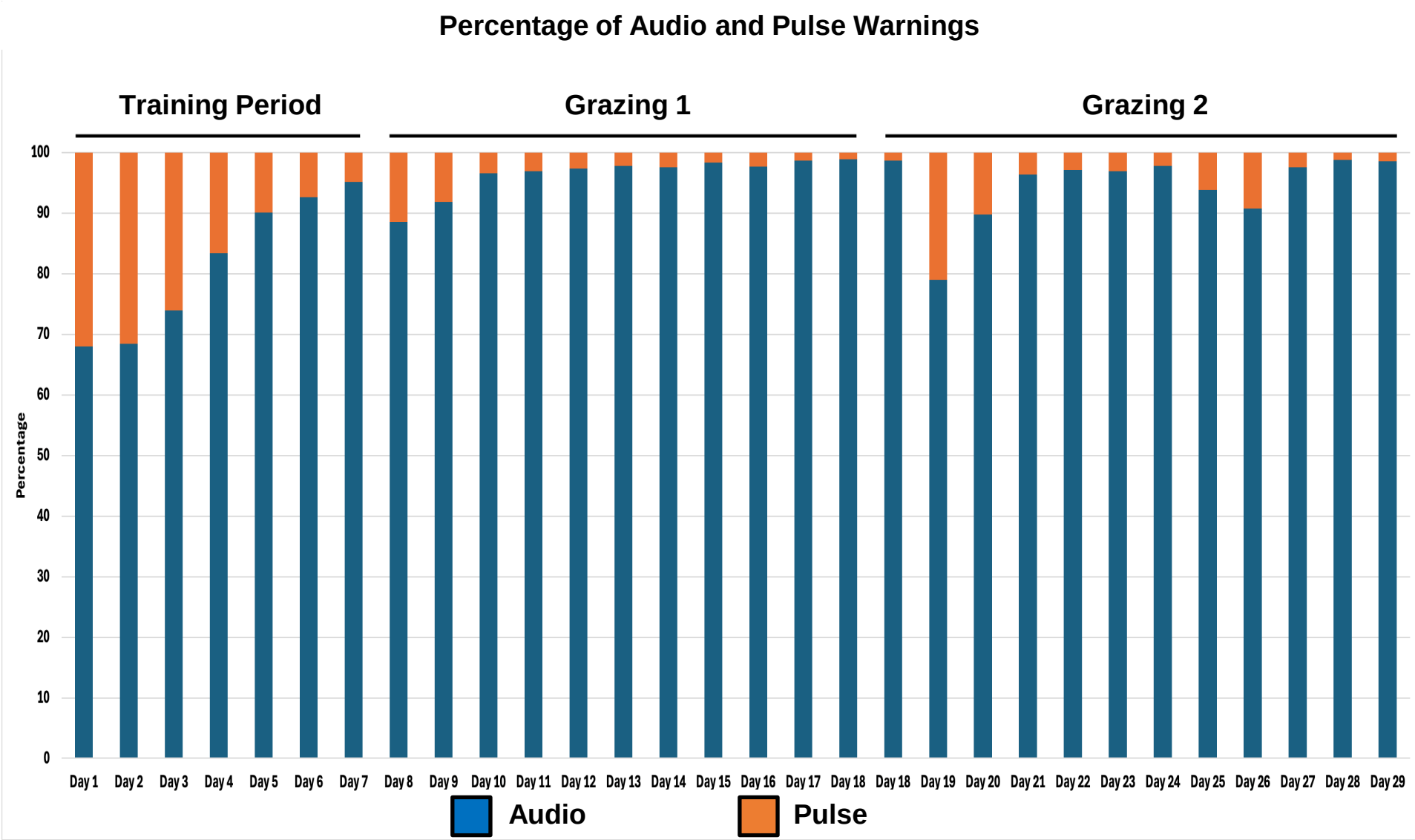

**10.5 days**
**~7.5 acres**
**~99.9% VF Containment**


11.5 days
~8 acres
~98.9% VF Containment
Stony Creek Rd
Stony Creek Rd
Stony Creek Rd
Stony Creek Rd

# Barb Goat Grass: VF System Performance

Avg weight gain

2.08 lbs / day



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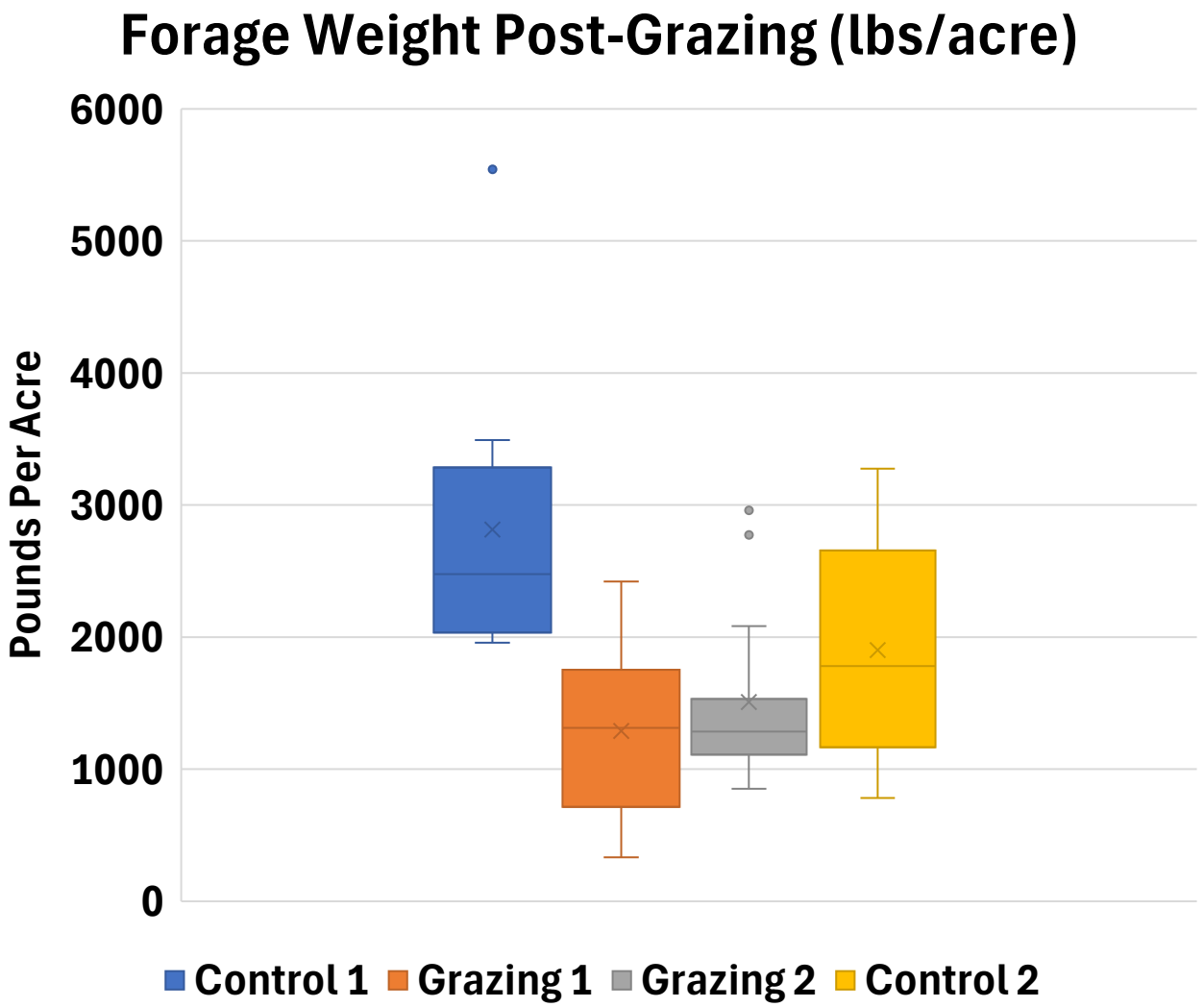


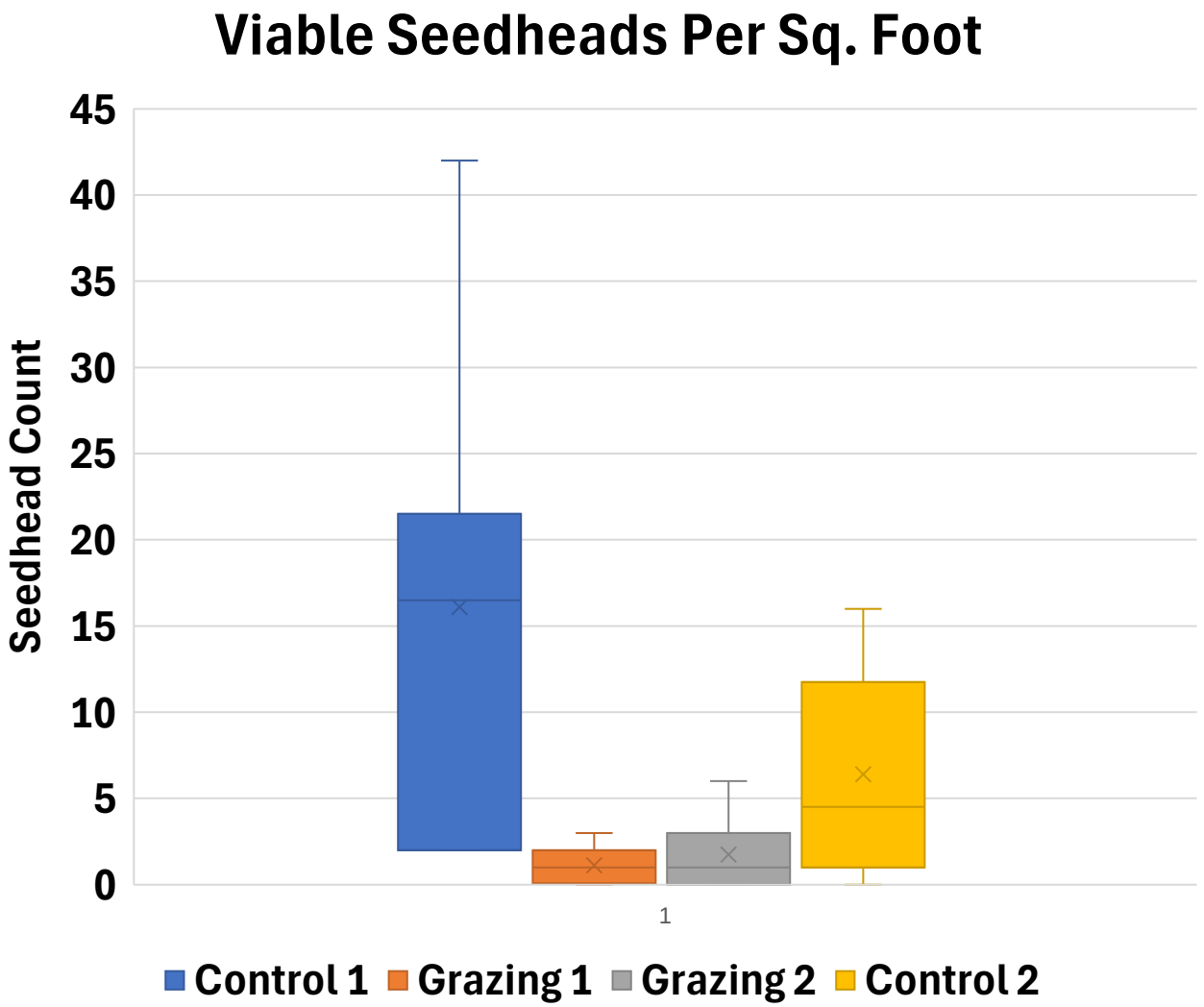

# Trial Takeaways

- VF effectively contained the herds 99-100% of the time, primarily with audio cues.
- High intensity, short duration grazing of MH and BGG during the early stages of seedhead emergence can successfully disrupt seed formation.
- For MH, a single application in Y1 resulted in improved conditions in Y2.

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# That's It!!

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**Leslie Roche**, Assistant Professor of Rangeland Management, UC Davis

UCCE VF Website

**Mount Echo Ranch**

**Dell'Orto Ranch**

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