

# Using Targeted Grazing to Reduce Fine Fuels in The Santa Rita Mountains of Southeastern Arizona

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## Introduction

This project looked at the feasibility of using targeted grazing of cattle to reduce fine fuels caused mostly by Lehman's lovegrass (*Eragrostis lehmanniana*), on rocky upland slopes in the Santa Rita mountains in Southeastern Arizona. Targeted grazing is a livestock management technique that directs grazing to achieve specific objectives for wildlife or ecosystem services (Launchbaugh et al. 2006). The objectives of this study were to:

- 1) test the effectiveness of herding and supplementation to direct cattle grazing onto unused upland slopes given the challenges of no fencing and lack of water in the desired areas, and
- 2) evaluate cattle impact on biomass and other vegetation attributes and test if cattle removed enough biomass to have significant implications for reducing fuel hazard.

## Methods

Two pairs of targeted grazing and control study areas were systematically selected for a total of four, 4-5 acre study areas (Table 1). Study areas were located in McBeth Pasture on U.S. Forest Service land and were 1.6 to 2.0 km from water on steeper and rockier slopes than cattle typically use (12-20% slope). While cattle used the pasture on a yearly basis, pre-study observations indicated minimal utilization on the target-control study areas. Data collection and herding took place in the fall and winter 2010-2011 and is in progress fall-winter 2011-2012. Data from the 2010/2011 field season are reported in this poster paper.

Table 1. Comparison of Study Areas

	Study Area	Elevation	Slope	Latitude	Longitude	Aspect	Distance to Water
Pair 1	1	1383-1438	20	31° 45.549'N	110° 51.680'W	NE	3.5
	2	1279-1315	12	31° 45.815'N	110° 51.900'W	N	2.4
Pair 2	3	1226-1269	13	31° 45.952'N	110° 52.195'W	NW	1.2
	4	1260-1291	20	31° 45.603'N	110° 52.549'W	W	2.1

### Vegetation Measurements

Four 100 m permanent baselines were randomly established within each target and control study area. Vegetation measurements included:

- Frequency and point cover (Elzinga 1999)
- Stubble height of *Lehman's lovegrass* (Coulloudon et al. 1999)
- Herbaceous biomass (Coulloudon et al. 1999)
- Dry-weight of fecal matter per hectare (not reported in this poster; Tate et al. 2000)

### Telemetry Data

Three cows of the ~60 cow/calf pairs in the study were tracked at 10-min intervals with global positioning system (GPS) 3300 collars (Lotek Wireless, Newmarket, Canada) during the time when cows occupied McBeth Pasture (Nov. 2010–Jan. 2011).

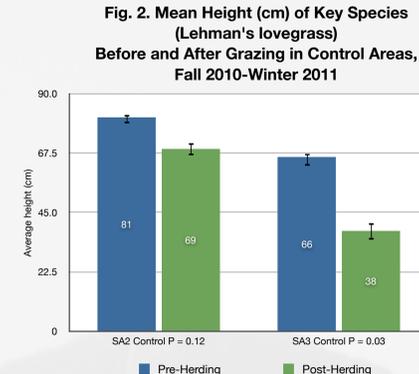
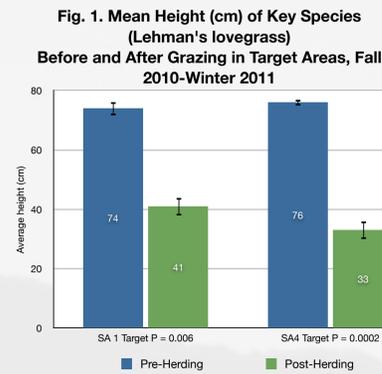
### Herding and Supplementation

We used mules to pack 500 lbs. of Low-Moisture Block (LMB) supplement into the two target areas prior to herding. No supplement was packed into either of the paired control areas.

Cows were herded to target areas by 2-5 people on horseback or on foot using low-stress animal handling techniques (Cote 2004). Cattle were not herded to control sites. Cows were herded 5 times to the targeted areas over 2, 10-day periods.

## Results

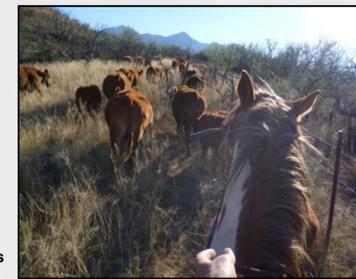
### Vegetation Measurements



View from McBeth pasture



Packing supplement to target areas



Herding cow/calf pairs to target area

Fig. 3a.

Fig. 3a,b. Telemetry Data

Fig. 3b.

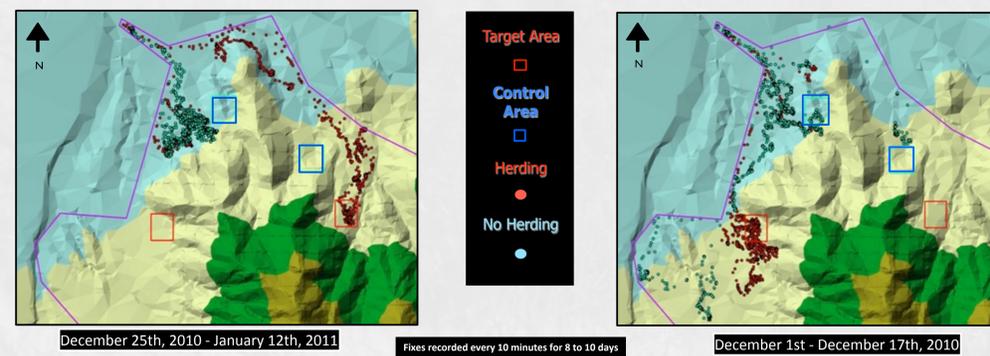
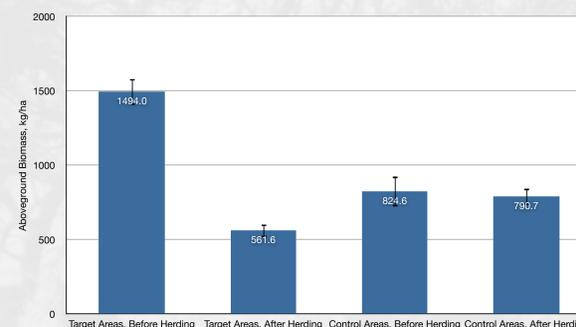


Fig. 4. Mean Biomass (kg/ha) of Perennial Grasses in Target and Control Areas (pre- vs. post treatment), Fall 2010-Winter 2011



- During herding, cows spent more ( $P < 0.01$ ) time in target areas ( $35\% \pm 4$  SE) than corresponding control areas ( $0.3\% \pm 0.3$  SE).
- Cows did not use target areas during the preceding control period when cattle were not herded and LMB was not available.
- Cattle used higher ( $P = 0.01$ ) elevations ( $1284 \text{ m} \pm 13$  SE) and areas farther ( $P = 0.01$ ) from water ( $1.54 \text{ km} \pm 1$  SE) when cattle were herded to target areas containing LMB, compared to when no herding was conducted and no LMB was present (c.f.,  $1212 \text{ m} \pm 12$  SE elevation, and  $0.88 \text{ km} \pm 1$  SE from water).

### Supplementation

Cows consumed most of the supplement in both targeted areas during the 10-d periods of herding. Cows consumed all but 4 lbs of the 500 lbs of supplement in Study Area 1, and all of the original 500 lbs in Study Area 4 following herding in 2010-2011.

### Herding

Herding was successful on every occasion, however the number of cows herded varied. We could not always locate all the cow/calf pairs, and some cow/calf pairs were already at the target site prior to herding on every occasion following initial herding. We successfully herded between 13 and 40 cow/calf pairs at each herding event. Cows were most difficult to herd on the first day they were introduced to a targeted area, after which herding got progressively easier. After the first herding event at each site, we typically found 10-20 cow/calf pairs already at study sites.

## Discussion and Implications

1. Preliminary results indicate that herding and supplementation effectively changed cattle distribution and increased utilization on upland slopes that previously showed little utilization. This is consistent with previous findings using low-stress animal handling and supplementation (Bailey et al. 2008).

2. Even without fences, our findings suggest that cow/calf pairs lingered in, or returned to, target areas for as long as supplement was present between herding events.

3. Cow/calf pairs did utilize other areas of the pasture besides targeted areas, including control areas, particularly when herding ceased and there was no LMB present in targeted areas. Preliminary data suggests that herding and supplementation are more effective at encouraging cattle to utilize new areas of the pasture than excluding them from areas they might normally graze.

4. Similar studies demonstrate higher utilization in targeted areas than we were able to achieve with our study. In studies in Nevada, 70-80% utilization was achieved (Diamond et al. 2009, Launchbaugh et al. 2006), however, these studies took place close to urban areas where fencing was used to intensively target grazing into desired areas.

5. Fire modeling, using biomass data from this study, will assess the implications in terms of fire-mitigation based on our data.



GPS collar on cow



Grazing in target area



View of McBeth pasture: Control and target areas marked by white polygons. Source: Google Earth