

# Prescriptive Grazing and Prescribed Fire on the Mark Twain National Forest

## Fact Sheet

Lauren Pile

- Land managers, including those within the National Forest System, are increasingly interested in the restoration and maintenance of oak and pine woodlands. In the Central Hardwoods region, management objectives commonly prescribe lower levels of stocking, minimal mid-stories, and diverse ground floras. However, maintaining open understories in these communities requires frequent disturbance that reduces occupancy from woody stems and promotes ground flora diversity and abundance.
- The Mark Twain National Forest is testing and monitoring the effects of prescriptive grazing and prescribed fire to meet restoration objectives at two sites representing oak and pine woodlands in the Ozarks.



Gina Beebe

### GOATS, FIRE, AND OAKS

- 85 acres within the Mark Twain National Forest near Rolla, MO
- Overstory: White oak, post oak, black oak, black hickory
- Thinned to 70-80 BA in 2012
- Masticated in 2017
- Mid & understory: flowering dogwood, oaks, hickories, white ash, Carolina buckthorn, aromatic sumac, grapevine, Virginia creeper, elm-leafed goldenrod
- Project initiation: January 2019
- Design: 6 treatments (control, dormant bud graze & fall graze, spring graze, spring burn, spring graze & spring burn, fall graze) & 3 replications in the study area (Figure 1)
- Annual long-term monitoring: pre-treatment and post treatment collection of overstory, midstory, ground flora species, and woody regeneration to assess grazing and prescribed fire effects on community structure and biodiversity

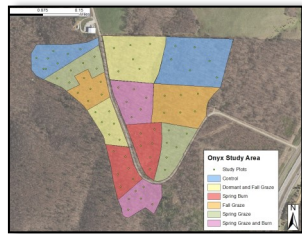


Figure 1. Study Design ( third replication not shown)

### GOATS, FIRE, AND SHORLEAF PINE

- 50 acre stand within the Cane Ridge unit near Poplar Bluff, MO
- Overstory: Shortleaf pine
- Thinned to 50 BA in 2012
- 2 year Rx fire (March/April) re- turn interval, last burned 2019
- Mid & understory: abundant blackberry, and winged and fragrant sumac. Border privet. Big bluestem present.
- Project initiation: August 2019
- Design: 6 paired plots (Figure 2) including 3 exclosures (control) and 3 active grazing (treatment)
- Annual long-term monitoring: pre-treatment and post treatment collection of overstory, midstory, ground flora functional groups, and shortleaf pine regeneration to assess grazing effects on community structure and composition

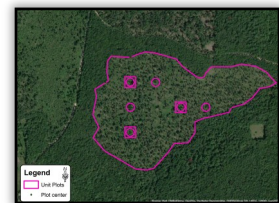


Figure 2. Plot arrangement

#### For more information contact:

Gina Beebe, University of Missouri, [grb2gh@mail.missouri.edu](mailto:grb2gh@mail.missouri.edu)  
 Lauren Pile, Northern Research Station, [lauren.pile@usda.gov](mailto:lauren.pile@usda.gov)  
 Mike Stambaugh, University of Missouri, [stambaughm@missouri.edu](mailto:stambaughm@missouri.edu)  
 Brian Davidson, Mark Twain NF, [brian.davidson@usda.gov](mailto:brian.davidson@usda.gov)



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# Mark Twain Grazing Allotment - Vegetation Management with Prescriptive Goat Grazing.

By Angela Sokolowski - Forest Botanist

**Location:** Mark Twain Grazing Allotment, T22N, R17W, Sections 8, and 17.

**Size:** 140 acres

**Landowner:** USDA, US Forest Service, Mark Twain National Forest, Ava/Cassville/Willow Springs Ranger District (Ava unit)

**Species of invasives managed for:** Sericea Lespedeza (*Lespedeza cuneata*) is the primary invasive, as well as patches of Johnsongrass (*Sorghum halepense*), multiflora rose (*Rosa multiflora*), beefsteak (*Perilla frutescens*), and some non-native thistles (*Cirsium* species).

**History of land and invasives management:** This land was privately cleared and grazed prior to acquisition by the US Forest Service. In 2001 the Forest Service designated 4 open pastures, totaling 125 acres, as a permitted cattle grazing allotment called “Mark Twain Allotment,” for its proximity to the Mark Twain School in Taney County. The pastures are composed of a mix of tall fescue and native warm season grasses and forbs. It was grazed annually by cattle with oversight from the Forest Service until 2016. From the winter of 2017 to mid-summer of 2018 no grazing or active vegetation management took place, resulting in expansion of present Sericea lespedeza infestations, and dense woody encroachment in several pastures.

In 2001, the Tumbling Creek Cavesnail (*Antrobia culveri*) was listed as a Federally Endangered Species. This snail species is found only in the cave stream of Tumbling Creek Cave in Taney County, Missouri, less than 5 air miles from the Mark Twain Allotment. When the hydrological recharge area for the cave stream was mapped, it was determined that 25% of the recharge area is on Forest Service land, including the Mark Twain Allotment. The 2005 Forest Plan authorizes the use of herbicide in the recharge area unless precipitation is predicted within 72 hours, in order to mitigate effects on the snail. Due to the critical condition of the cavesnail population, Forest Service managers have not implemented herbicide treatments for invasives in this allotment since 2014.

On February 15, 2018, the 1,900 acre Rozell Wildfire burned across approximately 85% of the allotment, resulting in top-kill of the encroaching woody species, which averaged 6 feet tall at 1 inch diameter. Following the wildfire, in May of 2018, Forest Service brush hogged the standing dead woody species in the pastures to facilitate access for future vegetation management actions. See Photo 1.



*Photo 1: Brush hog mowing of standing dead woody encroachment after the 2018 Rozell Wildfire. (USDA Forest Service Photo)*

**Current invasives management:** In 2018, Mark Twain National Forest added a new tool to its integrated pest management toolbox by implementing a service contract for prescriptive goat grazing. Two Missouri ranchers were contracted to supply goats for small area targeted grazing, large area prescriptive grazing, and woody shrub understory grazing projects. The Mark Twain Allotment, with its proximity to the endangered cave snail, was a perfect opportunity to utilize this new chemical-free invasive management method.

Goats, contracted through Loren Steele of Living Lands, LLC, were put on the allotment in August, 2018. Portable electric net fencing was used to sequester the goat herd to several acres of pasture at a time, until target species were reduced by at least 80%. The foragers were rotated through all sections of the allotment once from August through early October. The contractor began with around 200 nannies and kids, and increased the herd size to over 800 goats in order to maximize the grazing pressure and ensure two grazing cycles would be completed before the dormant season.



*Photo 2: Goats rotated to a new section of Sericea-infested pasture. (USDA Forest Service Photo)*

**Results of Management:** The first prescriptive grazing project on this district of the forest was successful from both logistical and management objective standpoints. Loren Steele worked closely with the Forest Service to adaptively meet the expectations of the project. More than 80 percent of the invasive populations were successfully defoliated and were prevented from producing seed before the dormant season. Beefsteak (*Perilla frutescens*), which is toxic to livestock, was the only invasive not consumed by the goats. The post-fire resprouts of woody species in the pastures were also heavily grazed which constrained or killed the majority of the resprouting stems. Following defoliation, a flush of annual ragweed emerged in a high percent of several of the pastures.

The Forest Service will continue prescriptive goat grazing here in 2019, monitoring the response of invasive species populations and native warm season grass and forbs. During the summer of 2019, contracted goats will be rotated twice through this allotment, with 3-5 weeks between grazing. A soil seedbank study will be conducted to monitor the effect on the *Sericea lespedeza* seedbank over time.

In response to this work, Loren Steele, Living Lands, LLC. Rancher, commented,

“The goats loved this project. Goats are a natural match for decreasing seed set of *sericea lespedeza* and defoliating, which stresses, small woody plants. Additionally, the goats were able to control invasive and woody species in some hard-to-get-to locations such as draws and field edges where mechanical and chemical treatment is difficult. We were glad to be able to provide control of invasive plant and brush species in a natural and herbicide-free manner in an ecologically sensitive area.”



*Photo 3: Regrowth next to recently grazed. Electric fencing has been removed immediately following high intensity grazing on the right. The left side was grazed several weeks prior. October 2, 2018. (USDA Forest Service Photo)*



Photo 4: Defoliated vegetation after targeted goat grazing. Primary species shown: *Sericea lespedeza*. (USDA Forest Service Photo)

**Other information:** The land adjacent to the north of this allotment is dolomite glade habitat that has been under prescribed fire management by Forest Service for many years. It has a rich diversity of native grasses and forbs, including Purple Beardtongue (*Penstemon cobaea* var. *purpureus*). Control of invasive species in the allotment should help prevent invasive populations from spreading into the glade.