Grazing Basics for Controlling Fuels

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Through the implementation of a prescribed grazing program, fire fuel loads can be managed on both small parcels and extensive landscapes. The use of cattle, goats, and sheep in combination with mechanical treatments (e.g. mowing) and prescribed fire can make property fire-resilient. Prescribed grazing is the controlled implementation of the timing, frequency, and intensity of grazing to achieve specific goals (Bailey, et al. 2019). Here, the focus is on implementation of prescribed grazing with the goal of reducing the accumulation of vegetation through defoliation or trampling, while also meeting other natural resource objectives (e.g. water quality). Prescribed grazing will not "fire proof" your property; rather, prescribed grazing can help you manage risk by reducing fuel loads and continuity of fuels and, therefore, change fire behavior (Davies, et al. 2010).

Grazing is a good option to reduce vegetative fuels that make up the 1-hour and 10-hour fuels. 1-hour fuels include vegetation that will dry within 1 hour (e.g. grass and leaves) and stems/branches that are less than one-fourth inch diameter. 10-hour fuels also change with weather conditions, but take longer to respond, such as larger brushes and small trees that have stems ranging from one-fourth inch to one inch in diameter (Nader, et al. 2007).

Grazing Management

There are six primary elements described in the table that must be defined before initiating a prescribed grazing program intended for fire fuel load control. Defining the type of livestock is important to meet objectives, specific consideration of livestock foraging behavior. Cattle and sheep are a good selection to manage fine vegetation (e.g. grasses). If your property is predominately brush, consider using goats as they are browsers and consume a higher percentage of foliage from shrubs (Ferreir, et al. 2013). In addition, consider selecting livestock accustomed to consuming a particular vegetation type - foraging behavior is often a product of early life experiences that shape grazing distribution and foraging behavior late in life. (Howery, et al. 1997).

Prescribed Grazing Program Elements

1. Type of livestock (e.g., cattle, sheep, goats)
2. Number of livestock (stocking density – head/acre)
3. Duration of grazing (stocking rate – head/acre/year)
4. Seasonal timing of grazing (e.g., spring, summer, etc)
5. Frequency of grazing (e.g., 1X, 2X per growing season)
6. Spatial distribution of grazing (e.g., fences, water)

The six primary elements of a prescribed grazing program are site-specific elements that can be influenced by parcel size, vegetation, personal preferences, and infrastructure (Bailey, et al. 2018). Grazing requires infrastructure that is dependent on parcel size and livestock species, such as type of fencing and cross fencing to create smaller more manageable pastures. Infrastructure considerations include: fencing, reliable drinking water, supplemental feeding locations, shelter, and livestock handling facilities. Livestock impact on natural resources is frequently determined by management, e.g. water availability (George, et al. 2007).

Essential Aspects of Prescribed Grazing

- Nutritional requirements
- Supplemental feeding
- Animal health and production
- Lease/Contract/Agreement
- Emergency plan
- Mitigate potential negative impacts
- Plant health
- Consider other benefits from grazing

Livestock Health

Before introducing livestock grazing to reduce fire fuel loads, there are a few essential aspects to consider that are briefly described below. The nutritional requirements of the livestock you are using should be considered, as growing and lactating animals have higher nutritional demands. These nutritional demands may require the livestock be provided with supplemental feeding (e.g. hay) and minerals to meet dietary needs. Broader animal health and husbandry should be factored in especially if you choose to purchase livestock. You should work with a veterinarian to develop a whole herd health plan, ensuring you have a client-patient relationship to address any potential injuries and illnesses.

Brett McNabb, DVM, MPVM, Assistant Professor, School of Veterinary Medicine, University of California Davis speaking at a workshop on cattle herd health.

Adaptive Management

It is imperative to create an adaptive and comprehensive grazing program that considers not only the beneficial impacts of grazing, but also mitigates potential negative aspects (Briske, et al. 2011). Unmanaged livestock grazing with high or low stocking rates can lead to increases in invasive weeds, soil compaction, riparian degradation, erosion, loss of habitat for species, and other concerns. The negative impacts range from landscape level down to individual plant health, that can be impacted from intense defoliation (Olson and Richards 1988).

Cow with a mouthful of medusahead.

Proper grazing management can minimize spread and manage noxious weeds in rangelands (DiTomaso, 2000); for example properly timed grazing can help control yellow starthistle (Goehring, et al. 2010), Himalayan Blackberry (Ingham, 2014), and medusahead (DiTomaso, et al. 2008). Livestock grazing can enhance habitat for raptors, burrowing owls, grassland birds, and other species (Barry, et al. 2007). Additionally, wildflower displays and vernal pool ecosystems can be enhanced with managed livestock grazing (Marty, 2005). You can learn more in the case study section on page 8.

This booklet is a guide to spark your interest in the use of managed grazing as a tool to reduce fire fuel loads while managing ecologically sensitive landscapes. The resources, case studies and foundational principles discussed in the book can serve as a guide to help you determine options for fire fuel load reduction on your property.

Additional Resources

The references cited in this book, and additional resources to implement a controlled grazing program, can be found at

ucanr.edu/grazing_for_fire_prevention