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# Attachment F

## Prescribed Herbivory BMP's

# Prescribed Herbivory for Vegetation Management - Best Management Practices

This document identifies best management practices (BMPs) to reduce or avoid impacts to natural resources during prescribed herbivory (also referred to as “grazing” or “targeted grazing”). BMPs identified herein will be implemented in prescribed herbivory projects undertaken by the Santa Barbara County Fire Department (SBCFD) and its project partners. Prescribed herbivory may occur within and outside of defensible space areas and may occur on private, County of Santa Barbara, city, or other publicly owned land. Additionally, the Program Environmental Impact Report (PEIR) prepared for the California Vegetation Treatment Program (CalVTP) (Board of Forestry 2019) identifies standard project requirements (SPRs) and mitigation measures (MMs) to reduce potential impacts associated with vegetation management projects. The BMPs outlined herein incorporate the CalVTP SPRs and MMs. SBCFD is responsible for ensuring these BMPs are implemented in all prescribed herbivory projects undertaken by SBCFD or its project partners.

## Prescribed Herbivory

Prescribed herbivory is the use of domestic livestock to accomplish specific and measurable vegetation management objectives, such as removing biomass (fine fuel loads), reducing populations of specific plant species, slowing the re-establishment of shrubs on burned or mechanically thinned sites, and improving plant community structure for wildlife habitat values. For example, grazing in the spring and early summer can thin understory forbs and grasses, reducing competition for light, nutrients, and water for desirable shrub species. The shrub species will then increase their vegetative output for winter browsing by deer and other wildlife (Board of Forestry 2019).

Livestock, such as cattle, goats, or sheep, browse on grasses, forbs, shrubs, and fresh growth of young trees, thereby removing vegetation from the overall fine fuel load of the site. Grazing can be a relatively inexpensive and effective treatment method and can generate revenue when grazing is contracted for large areas.

Prescribed herbivory is intended to reduce fire hazard by removing herbaceous vegetation that is readily ignitable (i.e., grasses; other light, flashy fuels; and surface fuels capable of igniting and carrying fire). As noted by Reinhardt et al. (2008), all vegetation will burn, given the right conditions. However, flashy fuels are particularly easily ignitable and can result fast spreading fires. Prescribed herbivory activities undertaken by SBCFD will generally involve reducing the amount of herbaceous vegetation within the treatment area by approximately 80% and retaining shrubs and trees. In grass-dominated vegetation types, management is intended to reduce vegetation height (e.g., mowing, grazing), resulting in a shorter and more compact surface fuel layer that is less ignitable and less likely to sustain fire spread. Implemented beneath shrub or tree canopies, such treatments also minimize the potential for surface-to-crown fire transition. Management is also intended to maintain low fuel volumes in the areas between shrub- and tree-dominated vegetation types.

## Livestock

Different types of livestock have different grazing habits and not all livestock are ideally suited for grazing treatments in all areas. Animals should be selected according to the management objectives of a given project. Cattle, sheep, and goats are the animals most commonly used for this purpose because they are relatively common and easy to manage. Grazing/browsing by these animals is best used for green herbaceous plants that produce

fine fuels and smaller diameter woody species that produce highly flammable fire fuels (Nader et al. 2007). Most livestock, with the exception of goats, do not consume live or dead, tough, woody plant material in any significant quantity as this material is generally unpalatable. Goats are typically best suited to shrubs and cattle are better suited to herbaceous plants, especially grasses. Sheep tend to prefer herbaceous plants, but they can be used in a variety of environments. Sheep graze selectively but may consume both herbaceous and woody vegetation. Dietary preference among species is not absolute as diet is also driven by the availability of vegetation, nutritional needs, experiences, and inherited and learned behaviors. Animal selection should be determined by the fuel management goal. On-site water must be provided for livestock.

The following summarizes specific considerations for different grazing animals:

- **Goats:** Goats have the ability to access steeper slopes in an efficient manner. Unlike other livestock, goats prefer to browse on woody vegetation (e.g., tree leaves, twigs, vines, and shrubs) and will consume materials up to 6 feet above the ground. This grazing pattern makes goats a desirable choice for fuel reduction treatments as they can effectively create and maintain vertical separation between surface vegetation and the lower limbs of overstory trees (NRCS 2005). Additionally, substantial amounts of invasive plant seed can effectively be removed from the landscape by the use of time-controlled, short-duration, high-intensity grazing in early spring (Menke 1992). However, since goats will indiscriminately damage most plants, their use in areas with desired shrub and tree retention should be minimized as goats can girdle shrubs and trees by browsing on bark. Alternatively, portable electric fences can be effectively used to control goat herds and more effectively guide the outcome of grazing efforts.
- **Sheep:** With proper management, sheep dramatically reduce the density of grasses and can be used to suppress annual grasses (Lerner 2007). Similar to goats, sheep have the ability to access steeper slopes in an efficient manner. Sheep have an intermediate diet, as they have no preference for grasses, forbs, or shrubs and commonly consume large amounts of green grass during rapid growth stages but avoid dry mature grass (Bush 2006). In addition to their diet making them versatile for grazing, sheep can also be utilized with other species such as cattle or goats for diversity of fuel treatment (Bush 2006). Substantial amounts of invasive plant seed can effectively be removed from the landscape by the use of time-controlled, short-duration, high-intensity grazing in the appropriate season (Bush 2006). However, since predation of sheep by animals such as coyotes is common, consideration needs to be given to anti-predation techniques. Portable electric fences can be effectively used to control sheep flocks and help prevent predation.
- **Cattle:** Management of cattle herd population density is necessary to limit impacts, especially as they relate to soil compaction and erosion, plant cover retention, water quality, and animal waste concentrations. However, the steepness of the terrain significantly influences the distribution of cattle, which tend to prefer level to gently rolling hills (Bush 2006). Cattle may be better suited to larger expanses for fuels treatment rather than small confined areas, to avoid unnecessary impacts. Cattle are considered grazers and have a diet dominated by grasses and grass-like plants such as forbs (Bush 2006). Individual invasive plant species can effectively be removed from the landscape by the use of time-controlled, short-duration, high-intensity grazing in early spring for yellow star thistle and in late spring for medusahead (Bush 2006). Grazing for invasive species management needs to be carefully monitored to ensure the timing is correct to prevent regrowth. Fencing or cattle guards should be used to ensure cattle do not escape and unintentionally graze not prescriptive areas or interfere with adjacent land uses.

## Fuel Types

Grazing activities will typically be implemented to target grass/herbaceous fuels. Grass/herbaceous fuels in the County of Santa Barbara are represented by the California annual grassland and coastal perennial grassland vegetation types and are found throughout the county. Grass and other light, flashy, or surface fuels may be found within other mapped vegetation types and should also be treated to the standards outlined in this document. Livestock does not effectively create fuel breaks but is well-suited to maintain new annual growth within them, as well as remove fine fuels from within shrub and woodland areas. Thus, it should be noted that prescribed herbivory may be paired with other treatment activities and conducted within other vegetation types.

## Timing

Grazing is typically conducted in the late spring, when growth of annual grasses has slowed, and continues through the summer to reduce fine fuels prior to the onset of peak fire season (historically, June through October in Santa Barbara County). As a fuel reduction technique, grazing does not need to be conducted annually if the intent is to control shrubs or maintain understory fuels; however, if the intent is to reduce grass or other flashy fuels, grazing should be conducted at least annually.

## Grazing Management

Site-specific grazing management plans should be completed for proposed grazing treatments, considering site-specific conditions and management goals. Management plans should identify goals and implementation techniques to ensure that grazing treatments meet vegetation management standards and to minimize impacts to natural resources. Grazing management plans should also identify the optimal stocking rate, grazing duration (turn-out and turn-in dates), and monitoring requirements and performance criteria. Stocking rates are determined by a range analysis, which calculates the number of animals required for a given period to attain the desired reduction in vegetation, which is typically measured in pounds per acre of residual dry matter. Optimal residual dry matter levels should be determined by overall management objectives, such as suppression of weeds, fuel load reduction, control of invasive species, or minimizing erosion potential.

Control of livestock movement and timely movement of livestock to the next treatment area once identified goals have been met is important to minimize potential adverse effects, including soil compaction, overgrazing, and resource damage. Using professional herders and/or portable fences may be an alternative to fixed fencing where the treatment is ephemeral. Additional controls may also be needed for the protection of retained plants, riparian zones, and sensitive resource areas and to minimize erosion potential. Fencing is used to prohibit livestock from leaving the identified treatment area or gaining access to sensitive resource areas. The frequency of moving the livestock would be based on numerous site-specific factors, including slope, density and type of vegetation, stocking rate, type of livestock, and precipitation/moisture content of vegetation. Generally, herds may be moved as often as every 1 to 3 days and one to two workers would be required on average to implement treatments.

BMPs shall be integrated into the design of prescribed herbivory projects to minimize potential environmental or social impacts and shall be outlined in the Grazing Management Plan. The BMPs discussed herein and outlined in Table 1 shall be incorporated into project design and the following strategies to implement the BMPs shall be incorporated into grazing plans.

**Table 1. Prescribed Herbivory Best Management Practices**

Best Management Practices	Implementation Strategies	Associated CalVTP SPRs/MMs
Develop a Grazing Management Plan	<p>Develop a site-specific grazing management plan for proposed treatment projects in coordination with contract grazer. Confirm that the contract grazer has well thought-out animal care procedures and protocols in place to ensure the animals are cared for in a responsible, humane fashion (ample stock watering, safety from predators, and careful animal observation and action for sickness or disease).</p> <ul style="list-style-type: none"> <li>▪ Outline implementation of BMPs in the Grazing Management Plan</li> <li>▪ Consult with Certified Range Managers (CRM) when appropriate.</li> <li>▪ Develop a monitoring program that determines the effectiveness of the grazing program compared to the original planned results.</li> <li>▪ Consider vegetation type, terrain, access fire history, and management goals when selecting grazing animals.</li> <li>▪ Consider the timing and level of grazing practices to promote plant recruitment (e.g., timing prior to seed set of annual grasses to promote perennial species establishment).</li> <li>▪ Sensitive areas and protected resources should be clearly identified on project maps and marked in the field with highly-visible flagging or clear, existing landscape demarcations (e.g., edge of a roadway) prior to beginning any treatment to avoid disturbing the resource. The protection measures need to be included in the Grazing Management Plan and clearly communicated to the herder and project manager, including a pre-operational field visit when appropriate.</li> <li>▪ Grazing shall be implemented in accordance with local policies, plans, and ordinances.</li> </ul>	SPR AD-2 SPR AD-3
Identify and establish buffers zones around cultural resources and culturally sensitive areas	<ul style="list-style-type: none"> <li>▪ Conduct pre-field research, including a records search and contacting geographically and culturally affiliated Native American tribes.</li> <li>▪ Coordinate with an archaeologically trained resource professional and/or qualified archaeologist to conduct a site-specific survey of the treatment area.</li> <li>▪ Avoid cultural resources, built historical resources, and tribal cultural resources to the extent feasible. Work with an archaeologically trained profession to establish appropriate buffers around resources. Take steps to develop appropriate protection measures in collaboration with archaeologically trained resource professional and/or qualified archaeologist and tribal representatives as necessary.</li> <li>▪ Train all crew members and contractors implementing treatments on the protection of sensitive archaeological, historical, or tribal cultural resources.</li> </ul>	SPR CUL-1 through SPR CUL-8
Identify and establish appropriate buffer zones around environmentally	<ul style="list-style-type: none"> <li>▪ Identify and assess sensitive biological and cultural resources in potential grazing areas prior to turn-out and install exclusionary fencing where necessary.</li> </ul>	SPR BIO-9 SPR BIO-11

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Best Management Practices	Implementation Strategies	Associated CalVTP SPRs/MMs
sensitive areas or implement measures to reduce or avoid impacts	<ul style="list-style-type: none"> <li>▪ Prior to grazing in Environmentally Sensitive Habitat (ESH) areas, consult with the local jurisdiction to identify thresholds to reduce or avoid potential impacts.</li> <li>▪ Design treatments to avoid the loss of sensitive natural communities and oak woodlands. Retain oak saplings and seedlings where they occur in the treatment area to the extent feasible.</li> </ul>	Mitigation Measure BIO-3a Mitigation Measure BIO-4
Prevent introduction of seeds from undesirable plant species to the site. Prevent the spread of invasive plants, noxious weeds, and invasive wildlife	<ul style="list-style-type: none"> <li>▪ Consideration must be given to where the animals are coming from and whether viable seeds of undesirable species are present. If this is the case, the herd should be fed a weed free diet for 3 days prior to being introduced to the grazing site. Any supplemental feed brought on site should be free of noxious weeds.</li> <li>▪ Minimize the spread of invasive plants and pathogens through the use of quarantine periods, holding areas, clean stock water, and personnel, equipment, and vehicle sanitation.</li> <li>▪ Inspect animals, equipment, and clothing and take appropriate steps to wash or decontaminate prior to entering treatment area.</li> <li>▪ Target invasive plant species for removal whenever feasible. Dispose of invasive plant biomass off site at an appropriate quarantine site for the animals.</li> </ul>	SPR BIO-9
Prevent soil erosion	<ul style="list-style-type: none"> <li>▪ Use the highest appropriate stocking density to achieve uniform utilization of the targeted vegetation.</li> <li>▪ Trampled grasses/herbaceous material may be left on the ground surface to protect soil as long as it does not exceed 4 inches in height.</li> <li>▪ Graze grasses (annual and perennial), weeds, and thistles to a height of 4 inches. Avoid removal of the mineral soil to minimize erosion.</li> <li>▪ Avoid grazing in unstable slope areas and slopes greater than 75% (i.e., 37 degrees). Require review of project sites with slopes greater than 50% by a Registered Professional Forester (RPF) or licensed geologist to determine erosion potential and identify measures to minimize impacts to slope stability (e.g., reducing herd size to retain vegetation, avoiding grazing where saturated soil conditions exist, shortening grazing duration, installing exclusionary fencing).</li> <li>▪ Avoid damage to existing trails, which in turn may result in soil erosion and slope instability following prescribed herbivory, by avoiding established trails on slopes in excess of 50% (i.e., 27 degrees).</li> <li>▪ Suspend grazing activities during heavy precipitation and resume once soils are no longer saturated.</li> </ul>	SPR GEO-1 SPR GEO-3 SPR GEO-4 SPR GEO-7 SPR GEO-8

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Best Management Practices	Implementation Strategies	Associated CalVTP SPRs/MMs
	<ul style="list-style-type: none"> <li>▪ Avoid over grazing. If grazing results in exposure of bare soil over 50% or more, stabilize treatment area with mulch or equivalent immediately following treatment activities.</li> <li>▪ Inspect treatment areas for the proper implementation of erosion control measures prior to precipitation. Inspect treatment areas for evidence of erosion following precipitation. Immediately remediate identified erosion.</li> </ul>	
Maintain water quality	<ul style="list-style-type: none"> <li>▪ Identify and avoid environmentally sensitive areas such as waterbodies, wetlands, or riparian areas using temporary fencing or active herding. Mark the buffer boundary with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway). A buffer of approximately 50 feet will be maintained between sensitive and actively grazed areas. Grazing in these areas would require a Streambed Alteration Agreement.</li> <li>▪ Provide on-site water for grazing animals in the form of an on-site stock pond or a portable water source located outside of environmentally sensitive areas.</li> <li>▪ Design treatment prescriptions to protect soil stability. Herd animals out of an area if accelerated soil erosion is observed.</li> </ul>	SPR HYD-3 Mitigation Measure BIO-4
Avoid impacts or disruptions to the public recreational users, private landowners, etc.	<ul style="list-style-type: none"> <li>▪ Post signs warning public of danger of electric fences and unleashed guard dogs when the treatment area is open to the public. Discuss public interactions with the on-site herder and grazing project manager.</li> <li>▪ Conduct appropriate public outreach so that the public will understand the project objectives. The general public will be very interested in what the animals are doing. Consider project signage or a one page pamphlet or brochure available on site describing the overall project, its objectives, and how herbivory is helping to achieve those objectives.</li> <li>▪ If treatments are proposed within a public recreational area or facility, avoid impacts to existing recreational resources by coordinating treatments with the owner/manager of the recreational area or facility, notifying the public, and maintaining public access to the extent feasible.</li> </ul>	SPR AD-6 SPR REC-1

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Best Management Practices	Implementation Strategies	Associated CalVTP SPRs/MMs
	<ul style="list-style-type: none"> <li>▪ If a treatment activity would require temporary closure of a public recreation area or facility, the project proponent will coordinate with the owner/manager of that recreation area or facility. If temporary closure of a recreation area or facility is required, the project proponent will work with the owner/manager to post notifications of the closure at least 2 weeks prior to the commencement of the treatment activities. Additionally, notification of the treatment activity will be provided to the Administrative Officer (or equivalent official responsible for distribution of public information) of the county(ies) in which the affected recreation area or facility is located. This SPR applies to all treatment activities and treatment types, including treatment maintenance.</li> </ul>	

## References

Board of Forestry. 2019. California Vegetation Treatment Program Final Program Environmental Impact. <https://bof.fire.ca.gov/projects-and-programs/calvtp/calvtp-programmatic-eir/>

Bush, L. 2006. *Grazing Handbook: A Guide for Resource Managers in Coastal California*. Santa Rosa, California: Sotoyome Resource Conservation District. <http://sonomarc.org/wp-content/uploads/2017/06/Grazing-Handbook.pdf>.

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