

Creating Firebreaks With Targeted Grazing:

A comprehensive approach to wildfire mitigation and prescribed fire management

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Introduction

Using livestock to create firebreaks is an effective strategy for managing vegetation, reducing wildfire risk, and supporting prescribed fire operations. Known as **targeted grazing**, this approach uses grazing behaviors of livestock (such as goats, sheep, and cattle) to strategically remove fine fuels like grasses, brush, and shrubs that can carry fire across the landscape. By focusing livestock in specific areas, managers can intentionally reduce fuel loads, disrupt fuel continuity, and create natural firebreaks that serve as barriers to fire spreading.

Well-designed firebreaks are critical for safe and successful prescribed fires, but traditional mechanical construction methods are not always practical. Equipment such as plows, discs, and bulldozers can effectively clear vegetation to bare mineral soil, yet many rangeland areas are too rocky, steep, or sandy for such machinery. In these cases, targeted grazing offers a flexible, cost-effective, and ecologically sustainable alternative.

When animals are concentrated within defined areas, their grazing, trampling, and hoof action help create discontinuous fuels and patches of bare ground. This natural disturbance reduces both vertical and horizontal fuel loading, enhancing fire control and providing safe anchor points for prescribed fire ignition or wildfire suppression. Unlike mechanical or chemical methods, targeted grazing minimizes soil disturbance

and supports soil health while simultaneously lowering input costs.

Grazing to bare ground in concentrated, strategic areas rather than across an entire pasture can intentionally alter fuel type and structure to reduce fire spread. While annual weeds may colonize these intensively grazed areas, they are generally not a fuel type of concern, as they typically maintain higher fuel moisture and do not readily carry fire. Targeted grazing may not always produce a continuous bare mineral soil line. However, it provides an environmentally sound option that complements other fire management practices. When integrated into early fire planning, livestock-based firebreaks created through targeted grazing enhance prescribed fire safety, support wildfire mitigation efforts, and contribute to healthier, more resilient landscapes across rangeland and urban-wildland interfaces. Although bare ground or bare ground dominated by annual weeds is not inherently desirable, it represents a calculated tradeoff in specific locations where wildfire management and mitigation benefits outweigh short-term vegetation impacts.

What is Targeted Grazing?

Targeted grazing refers to the controlled and intentional application of livestock (goats, sheep, cattle) to selectively consume vegetation that serve as surface and ladder fuels for wildfires, especially grasses, brush, and invasive plants. By reducing this fuel load, grazing creates natural firebreaks to help control and mitigate the spread, speed, and impact of wildfires. These firebreaks are created without the additional input of herbicides or physical soil disturbance from mechanical operations.

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Firebreaks

A firebreak is an area where vegetation is removed or significantly reduced to stop, slow, or redirect the spread of fire (Fig. 1). Grazed firebreaks are strategically placed in areas like:

- ▶ Wildland-urban interfaces (WUIs);
- ▶ Around critical infrastructure or homes;
- ▶ Along roads and trails for firefighter access;
- ▶ Perimeter boundaries on ranches; and
- ▶ Pasture lines for future prescribed fires.



Figure 1. An example of a two-track road that can be improved and buffered for future wildfire mitigation or prescribed firebreak. *All photos by Haley M.*

Why Use Livestock for Firebreaks?

With proper management, livestock are an effective and sustainable tool for creating and maintaining firebreaks because they naturally reduce fuel loads while providing ecological and economic benefits. As they consume highly flammable plants like grasses and shrubs, livestock help lower potential fire intensity and spread. When concentrated into tight groups, their hoof action further disturbs the soil surface, breaking up accumulated mats of vegetation and removing fuels through physical disturbance. This dual action of grazing and trampling makes livestock an efficient, low-impact fuel management tool (Fig. 2).

When compared to mechanical or chemical vegetation control methods, grazing is often more cost-effective as it requires fewer external inputs. It also offers an environmental advantage by avoiding the use of heavy machinery and herbicides, which can disrupt soil health processes. Intensified, confined grazing allows for aboveground biomass to be trampled, reducing overall height and structure, and turning volatile fuel into manageable litter that is on the soil surface. Through hoof action and trampling, livestock convert standing vegetation into surface litter that protects the soil surface, reduces erosion from wind and water, and supports recovery of degraded areas.



Figure 2. Net wire or panel fencing can be very effective in containing livestock for short-term durations to maximize livestock effect in specific areas for rangeland goals and objectives.

Another advantage to livestock-based firebreaks is their versatility. Grazing can be implemented precisely where needed, including areas that are difficult or unsafe for machinery to access (Fig. 3). Temporary fencing systems allow for control of animal movement and intensity of grazing in targeted areas. Recommended types of temporary fencing can vary with the areas. Electric net fences work great in highly populated areas, while single or double stand poly wire fences are suitable in rural areas. Given the intensity of this targeted grazing practice, using a robust rotation and monitoring schedule is crucial for maintaining the balance of firebreak maintenance, livestock productivity, and ecosystem health. Providing water for livestock is manageable with large ruminants,

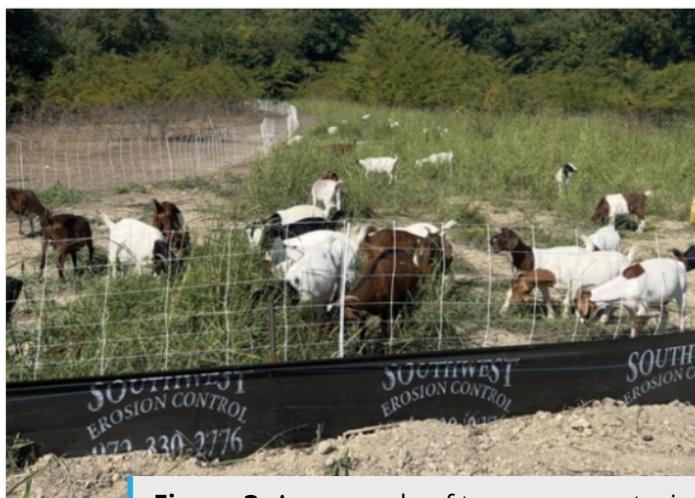


Figure 3. An example of temporary net wire fencing used to contain livestock for short-duration grazing to meet fuel reduction objectives for wildfire mitigation.

such as cattle which generally consume about 10 to 15 gallons of water per head per day depending on the forage moisture. Smaller ruminants like sheep and goats consume roughly 1 gallon per head per day, also depending on the forage moisture. Similarly, assessing forage availability is critical, with 1 animal unit (1 animal unit, or AU = 1 cow, 6 sheep, 7 goats, etc.) consuming about 36 pounds of forage per day. For example, 450 goats can clear about 1 acre per day in areas with dense, heavy vegetation. This level of forage demonstrates that targeted grazing is an efficient and scalable method for developing and maintaining firebreaks.

In short, livestock-induced firebreaks provide the following benefits:

- ▶ **Fuel Reduction:** Livestock consume fine fuels like dry grass and shrubs that are highly flammable. While in tight groups, they also create hoof action that disturbs the soil, breaking up vegetation and removing fuel by physically disturbing the surface.
- ▶ **Cost-effective:** Grazing is often cheaper than mechanical or chemical methods of vegetation removal.
- ▶ **Environmentally Sustainable:** Grazing is eco-friendly, avoiding the use of heavy machinery or herbicides. Livestock grazing can reduce erosion by maintaining plant cover that stabilizes soil, using hoof action to improve water infiltration, promoting vegetation regrowth through rotation, redistributing plant cover in degraded areas, and even acting as windbreaks to protect against wind erosion.

How Does Targeted Grazing Work?

1. Assessment

Targeted grazing begins with a careful assessment of the landscape to identify areas at high risk of wildfires or locations where firebreaks are most needed. These areas often include:

- ▶ Wildland-urban interfaces, where homes and communities border undeveloped wildlands and are especially vulnerable to wildfire spread.
- ▶ Forested areas with high fuel loads caused by dead trees, dense understory growth, or insufficient thinning. These areas are also prime candidates for targeted grazing.
- ▶ Steep slopes and canyons, which are prioritized because fire tends to move more rapidly uphill

as wind channeled through these topographic features increases fire intensity in these areas.

- ▶ Recreational sites such as parks and campgrounds, where campfire-building and outdoor cooking occur also benefit from targeted grazing treatments to protect surrounding vegetation from risk of burning.

In addition to reducing fuels in these critical zones, targeted grazing can be used to establish defensible property boundaries that limit the potential for wildfire to spread into grazing lands, buildings, or other infrastructure. Within rangelands, pasture firebreaks (cleared or grazed strips of land) are strategically placed to contain prescribed fires and prevent fires from escaping into unintended areas.

2. Planning

Effective planning is essential. This process begins with selecting the appropriate livestock species based on the terrain and vegetation type, followed by adjusting grazing intensity to meet fuel reduction goals. A high-density, low-duration grazing strategy is often recommended. This involves concentrating a large number of animals in a small area for a short time to maximize vegetation removal, hoof action, and uniform grazing (Fig. 4).

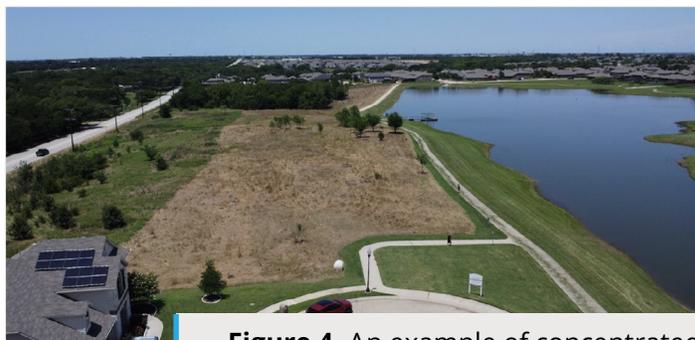


Figure 4. An example of concentrated livestock grazing within a Homeowners Association (HOA) area in an urban area.

Different livestock species offer unique advantages depending on site conditions.

Goats are particularly effective at clearing brush and can easily navigate steep slopes, rocky inclines, and uneven terrain. Producers have observed that a herd of approximately 450 goats can effectively clear an acre of thick, dense vegetation within just one day.

Sheep are ideal for grazing grass and managing sloping terrain as well. High-density sheep numbers,

sometimes up to 500 sheep in a targeted area, can increase hoof action and intensify grazing pressure when rapid vegetation reduction is needed.

On the other hand, cattle are best suited for large, open, and relatively flat areas. Their greater body mass provides more significant hoof impact and soil disturbance, allowing managers to stock fewer animals while achieving substantial fuel reductions. Additionally, cattle can be managed effectively with simple infrastructure, such as single-strand hot wire fencing, making them a practical and flexible component to targeted grazing. When used together, cattle, sheep, and goats have complementary grazing habits, creating a balanced and efficient multispecies system.

Using livestock for targeted grazing is a powerful rangeland management tool, but like any effective practice, it involves a balance of supply and demand. When livestock are intentionally concentrated into small, strategic areas to achieve a specific vegetation height or fuel reduction goal, they are often limited to less desirable and potentially lower quality forage. In a rangeland pasture setting, animals naturally choose the most palatable and nutrient-rich plants available. However, when confined to a targeted area, their ability to be selective is significantly reduced, and they may be required to consume the plants that are less nutritious and/or less palatable. As a result, animals can experience a temporary decline in body condition, particularly when grazing pressure is intense or prolonged. Careful monitoring of livestock performance is essential, and supplemental feed or protein may be necessary to maintain overall body condition, breed-up, and herd health. If the duration of grazing causes livestock performance concerns, consider integrating targeted grazing in short durations at high intensity for a few days. Follow this up by rotating livestock to a larger pasture where they can selectively graze and recover their body conditions. Successful targeted grazing programs must acknowledge this trade-off to achieve vegetation management goals, all while proactively supporting animal nutrition to ensure that both rangeland and livestock remain healthy and sustainable over time.

3. Implementation

The implementation phase of targeted grazing focuses on managing animal movement and behavior to achieve precise, effective fuel reduction within designated firebreak areas. Proper planning and control are essential to ensure livestock concentrate

their grazing efforts where they will provide the greatest benefit. A combination of tools and strategies can be used including temporary fencing, herders, and GPS or virtual fencing technology to maintain focus on target zones.

Temporary electric fencing is one of the most widely used and successful methods among ranchers implementing targeted grazing. It allows land managers to subdivide pastures and allocate livestock to small, clearly defined treatment areas. This focused impact results in a well-defined grazed strip that functions as an effective firebreak, reducing the risk of fire spread and supporting safer prescribed fires. Electric fencing can be set up with poly wire and step-in posts. Another great option is electric netting fence. Once the desired fuel reduction is reached, the fence can be moved quickly and easily to the next section, allowing for rotational grazing and vegetation recovery.

4. Timing

The timing of targeted grazing is a critical factor in achieving effective fuel reduction, and maximizing the safety and success of both prescribed fire and wildfire mitigation efforts. Grazing should generally be scheduled prior to the wildfire season or prior to a prescribed fire. Specifically, during periods when vegetation is beginning to dry but has not yet reached peak flammability or high probability of ignition. This approach ensures that fine fuels, such as grasses, forbs, and shrubs, are reduced before they can contribute to rapid fire spread, while minimizing the risk of accidental ignition during grazing operations.

When the grazed area is intended to serve as a preparation zone for a prescribed fire, it is important to ensure that grazing occurs close enough to the burn date to effectively remove fine fuels. Conversely, if grazing occurs too early, fine fuels may regrow, undermining the effectiveness of the fuel break and necessitating additional treatments.

Grazed Firebreaks for Prescribed Fires

Combining targeted grazing with prescribed fires creates a comprehensive, proactive wildfire management and prescribed fire strategy. Best practices for burning off a grazed fire line are to first place a wet line (line of water), which is then followed by a drip torch, and then the outside (away from the burn unit) fire spread is suppressed using water or hand tools. Igniting from grazed firebreaks in this

manner provides blacklines (areas of burned and consumed fuels), which provide improved containment and stops fire spread and spot fire potential.

Grazed Firebreaks for Wildfire Defense

Using grazed firebreaks for wildfire protection can reduce wildfire intensity by creating strategic areas of low/reduced fuels. Simultaneously, grazed firebreaks also improve firefighter access and mitigate negative wildfire outcomes. Additionally, for properties with existing livestock grazing, grazed firebreaks allow for the continued use of those firebreaks as grazeable acres and minimize the economic cost of firebreak maintenance. For land in the wildland-urban interface, targeted grazing of firebreaks can reduce noise pollution and use of machinery or herbicides near populated or sensitive areas.

Timing and Strategy for Combining Grazing with Prescribed Fires

Table 1: Example timing and window of opportunity integrating targeted firebreak grazing and prescribed fires.

Season	Treatment
Late Winter to Early Spring	Use grazing to reduce early season grass and shrub growth.
Late Summer to Early Fall	Fine-tune grazing to further lower fuel loads before starting prescribed fires.
Fall and Winter	Conduct prescribed fires using established grazed areas as containment lines and ignition points.

Table 2: Livestock selection for grazed firebreaks.

Animal	Best Use	Notes
Goats	Brush and scrubby vegetation	Excellent for invasive species and difficult terrain.
Sheep	Grassy areas, savannas	Effective in open fields and grasslands.
Cattle	Grasslands, rangelands	Great for large, open spaces and reducing fine fuels.

Table 3: Benefits of using grazing for wildfire mitigation and prescribed fires.

Benefit	Details
Fire Risk Reduction	Grazing reduces fuel loads, decreasing fire intensity and spread.
Ecosystem Restoration	Helps manage invasive species and supports native plant regrowth.
Cost-effective	Often more affordable than mechanical methods or chemical treatments.
Enhanced Control	Grazing followed by prescribed fires allows for more precise and controlled fire management.
Improved Biodiversity	Grazing maintains habitats for a variety of wildlife and plant species.

Summary

Overall, targeted grazing can be a very effective tool for clearing and maintaining firebreaks, particularly in areas that are challenging to access with machinery. Useful for both wildfire protection and prescribed fires, grazed firebreaks can readily integrate with existing livestock grazing management. They also support other land and community-based management systems.



Figure 5. Both pre-and post-targeted grazing in a municipal urban park. Targeted grazing reduced fuel loads and enabled additional follow-ups to be cost-effective.

Considerations when using targeted grazing:

- ▶ **Grazing Management:** Avoid overgrazing to prevent erosion or habitat loss.
- ▶ **Correct Timing:** Grazing too early or too late can reduce effectiveness.
- ▶ **Public Engagement:** Grazing and prescribed fires may require coordination with local communities and agencies, and approval from regulatory bodies.
- ▶ **Animal Welfare:** Ensure livestock have adequate water, shelter, and care, particularly during fire seasons.

Resources:

- ▶ Targeted Grazing Handbook: *Targeted Grazing: A Natural Approach to Vegetation Management and Landscape Enhancement* (edited by Karen L. Launchbaugh, John W. Walker, and Ron J. Daines; published December, 2006)
- ▶ Prescribed Fire and Grazing Integration: USDA Forest Service
- ▶ State Extension Resources: University of California Agriculture and Natural Resources, Colorado State University Extension, Oklahoma State University Extension

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