

Targeted Grazing: Applying the Research to the Land

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The discipline of range science is in part based on the observation that vegetation on rangelands changes in response to livestock grazing.¹ For much of the history of range science, livestock grazing was considered to affect range plants and ecological condition negatively. Thus range plants were classified as increasers, decreaseers, or invaders as a function of their response to grazing.² The concept that grazing can be used to restore degraded rangelands is relatively new.³ It requires a paradigm shift for most people from grazing animals reaping the benefits of the land to the land reaping the benefits of the grazing animals. Using livestock to accomplish vegetation management goals is referred to as targeted grazing. Targeted grazing is defined as the application of a particular kind of grazing animal at a specified season, duration, and intensity *to accomplish specific vegetation management goals*.⁴ It is the last half of this definition that differentiates targeted grazing from traditional grazing. The focus is on the vegetation and the subsequent outcomes and changes in composition or structure, rather than the performance of the grazing animal. Where the potential for targeted grazing to create positive change on the landscape has been clearly demonstrated through research and the experiences of practitioners, it still struggles to gain recognition as a viable vegetation management option. The recently published handbook *Targeted Grazing: A Natural Approach to Vegetation Management and Landscape Enhancement*⁵ was organized and written largely by range scientists to provide the scientific basis for targeted grazing. However, it did not provide much information on the practical and daily management decisions required by contract graziers and land managers. While the scientific basis for targeted grazing provides the foundation for understanding and improving this technology, as with all grazing management it is the daily operations and decisions that determine its success. The diversity of situations to which this tool can be applied necessitates the exchange of real-life experiences to promote learning among practitioners and to inform land managers of the successful programs and potential pitfalls to avoid.

The Targeted Grazing Committee (TGC) of the Society for Range Management (SRM) was formed in 2009 to focus attention, share knowledge, and communicate information that will promote the use of targeted livestock grazing and to advance the knowledge and skills required to help practitioners and land managers employ this technology to restore degraded rangelands, improve wildlife habitat, and enhance ecosystems. To help accomplish this goal, the committee organized a symposium at the 2010 Society for Range Management annual meeting to share knowledge from skilled practitioners to bridge the gap between research and the application of targeted grazing as a tool to manage rangelands. Readers should keep in mind that much of the following information represents personal experiences gathered within the context of specific vegetation management projects. The success of the described strategies depends on the individual operator, their animals, the skill of the labor, and the unique environmental conditions of each project area. What works for one person or in one area may not be applicable by another manager in a different scenario. Even so, it is through experience that we learn and better still if we can glean knowledge from the first-hand experiences of others to straighten and smooth our path to success. This article highlights the experiences and observations of the contributing contract graziers and agency land managers. The contract graziers share their personal knowledge of providing land services in a diverse array of situations, from small, rigorously managed parcels to watershed-scale projects. They expound on the immense planning, preparation, and oversight necessary to successfully conduct a vegetation management contract, as well as the challenges of surviving economically in the industry. Public land managers reveal the challenges of employing targeted grazing on public lands and provide insight on what must be done to make targeted grazing a widely accepted management practice. Readers are encouraged to visit the Targeted Grazing Committee Web site¹ to view the narrated presentations that are summarized in this paper.

¹<http://www.rangelands.org/targetedgrazing/>

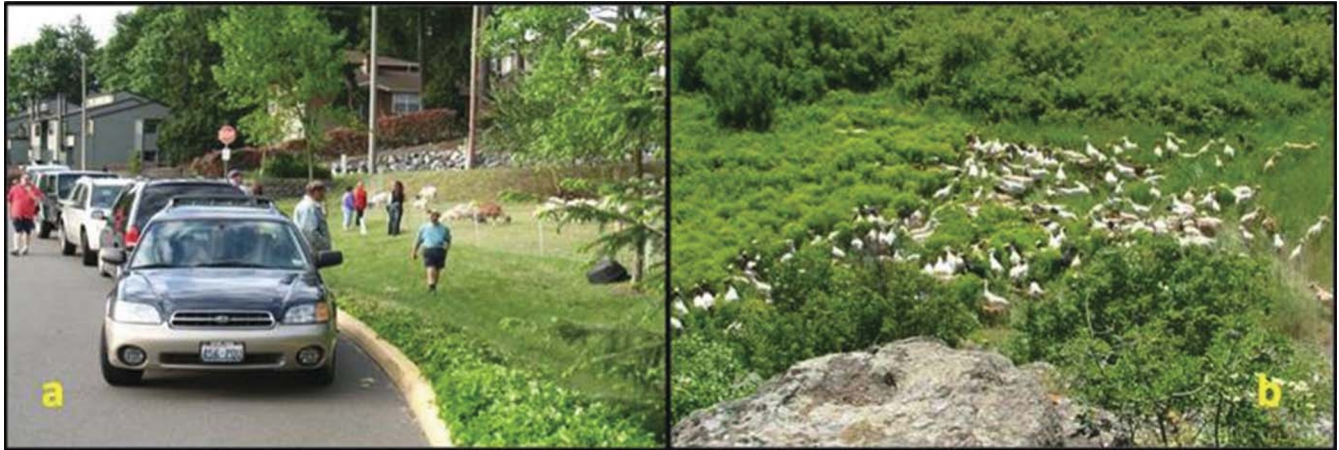


Figure 1. Targeted grazing can be used to manage vegetation across a range of situations from (a) urban landscapes to (b) invasive leafy spurge on large tracts of public lands.

Using Goats as a Tool to Help Clients Achieve Landscape Objectives

After attending a Holistic Management training course, Craig Madsen, a Range Management Specialist with the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) for 14 years, left the agency to establish Healing Hooves, LLC, in 2002 with his wife, Sue Lani. The first challenge for Healing Hooves was to identify their niche in the targeted grazing realm. Starting out with a small herd, Craig was not capable of completing landscape-scale targeted grazing projects on thousands of acres. However, Craig and Sue Lani realized that there was a need for grazing animals to manage vegetation in other settings. Many small acreage parcels face unique challenges in terrain and access that limit conventional vegetation treatment applications. Craig taps the natural agility and surefootedness of his goats to tackle areas where hand crews fear to tread and it is too dangerous to operate equipment.

Concentrating on small acreages means that Healing Hooves often works in urban settings with a unique assortment of challenges (Fig. 1a). Their biggest challenge to working in urban areas is dealing with the people. Education is a critical component, and Craig begins each new job with a community meeting to inform neighbors of the goats' presence and purpose. He finds that people in urban areas are at first hesitant, then curious about the goats, and finally, they really enjoy the goats' presence. Craig has slowly built up a very specialized herd that adapts well to different jobs and constantly changing locations. These animals are exposed to numerous situations in an urban setting that rural agriculture animals never encounter, making calm, experienced animals, well-trained dogs, and appropriate, well-maintained equipment essential. Furthermore, all goats are not created equal, particularly in their aptitude for a life of targeted grazing. Goats come equipped with varying skills, foraging abilities, and dietary capabilities. For targeted grazing projects to be successful, training and maintaining a uniform set of equally qualified goats is critical.

The final key to Craig's success in targeted grazing is his ability to observe, learn, and adapt so that his grazing management skills are always improving. Over time a targeted grazer will learn the optimal time to graze each plant species and how to schedule different projects to meet the grazer's needs, the animal's needs, and the client's needs. Honest, open communication about the effectiveness of targeted grazing builds credibility for the grazer as well as targeted grazing as an industry. If a grazer is good at both people and goat management, then his or her projects are limited only by creativity.

Connecting Us to the US

Ray E. Holes of Grangeville, ID, owns and operates Prescriptive Livestock Services, the largest contract grazing company in the Pacific Northwest. Ray and his family run approximately 2,500 nannies for production and maintain a herd of over 4,000 additional goats of various ages and classes for use on targeted grazing projects. For the last 10 years, Ray has been providing targeted livestock grazing services for weed control and fuels reduction on both public and private lands throughout Idaho and the surrounding states (Fig. 1b).

One of the most frequently asked questions about targeted grazing is "How much does it cost?" That question is not answered easily because each project is bid on an individual basis, and there is no "going rate" for targeted grazing. Even projects targeting the same plant species cannot always be bid at the same rate because each project represents unique circumstances regarding access, landscape, camping requirements, predators, bed ground restrictions, and water availability. Pricing usually is calculated either on a dollar per head per day basis or a dollar per acre basis. In general, the number of days required to treat the area decreases as the project progresses. Consequently, by the third year of a project, the contractor is using only a fraction of the goats and moving through much quicker, so the cost is greatly reduced.

Ray has learned several management strategies that have improved his operation. Taller goats can browse higher, creating a browse line that is out of reach of smaller goats. The length of stay on a paddock should then be set so that the younger or less aggressive animals can maintain their body condition. Like Craig Madsen, Ray found that all goats are not equal, and mixing inexperienced goats with experienced goats can cause problems. When animals are brought from a different region into a new area, it can take an entire grazing season for them to acclimate and learn to utilize the local forages. It is important to be flexible as a targeted grazer. Projects may be delayed because of weather, livestock transport, or compatibility with other land uses. When working with government agencies that have not previously been involved in contract grazing, delays may be encountered because the managers are unfamiliar with the process required to get appropriated funds to the contractor.

“A project is not always about what you get done as much as how it is perceived.” Ray describes the process of targeted grazing as similar to restoring an old house: It often looks worse before it looks better. Think of the TV show “Flip This House,” where investors purchase a run-down house and completely renovate it. Targeted grazing could be thought of as “Flip This Landscape.” When the largest vegetation component on the landscape is a noxious weed, the removal of that weed makes the landscape look denuded. Because of incorporation of the seed into the soil, the second year may be worse than the first year, but then the rejuvenation process begins and the landscape begins to heal. In some instances, Ray has found that abandoning a partly completed project could result in more negative results than not attempting the project in the first place. Consequently, education is a large part of Ray’s business, informing people who see only a portion of the process about what is going on, so they do not panic and try to end the process in the middle.

Ray and most successful targeted graziers are the first to advocate that livestock are only one of many tools to be used in vegetation manipulation. Although goats are a very versatile tool that can be applied in many different ways, integration of several tools in weed management projects is important to increase the chances of success. In fact, targeted grazing appears to be synergistic with insect biological control because it reduces the area infested by weeds and the insects can concentrate on the remaining weeds. Ray defines success as securing a project, creating positive change on the landscape, and, most importantly, being able to complete a project and leave. Having multiple cooperators on a project contributes greatly to its success because if one of the cooperators has a lack of funding or encounters other problems during a given year, the other cooperators can step in and take up the slack. He contends that an often overlooked part of targeted grazing is designing an effective exit strategy, in other words, helping clients design a maintenance plan once the weeds are suppressed enough that the goats can leave.

For real success to be achieved, not only do the weeds have to be gone, but the goats have to be gone.

More Is Better—A Montana Rancher Employs More Than 3,000 Sheep to Combat Leafy Spurge and Spotted Knapweed

John H. Lehfeldt is the fourth generation to operate Lehfeldt Land and Livestock in Lavina, MT. He began doing targeted grazing work in 1984 when he was contacted by the 40,000 acre N Bar Angus Ranch to combat their leafy spurge infestation. Since then, his operation has expanded into other areas of Montana, and for most of the summer, the sheep of Lehfeldt Land and Livestock are more than 200 miles away from their home range. John’s preference is to work with cattle ranches that are in production agriculture and help them solve their weed problems. Operating away from home base and its accompanying resources and facilities provides a unique array of challenges, risks, and additional costs. Often targeted grazing locations are remote, with limited access and rough terrain, the exact characteristics that make these areas prime candidates for targeted grazing.

One of the most essential considerations when moving sheep into another area is providing and maintaining a constant supply of fresh water. John prefers to have two different sources of water available; this helps to ensure that the vegetation response determines when a job is complete rather than other circumstances or mechanical malfunctions. Another necessity is a set of suitable corrals that are close to the project and large enough to handle 700–800 ewes with lambs. Along with their basic camp needs, John likes to provide his herders on remote targeted grazing jobs with a four-wheeler and cell phone so they can respond to emergencies and communicate with the home base. The four-wheeler also helps the herders distribute the additional salt that John provides for his sheep on targeted grazing projects. John contends that the salt needs of sheep grazing weeds are greater than those of sheep on native range and that intake will decrease if salt is not readily available. Keeping remote camps in multiple locations adequately supplied with salt and provisions for the herder requires the camp tender to spend a lot of time on the road and increases fuel costs. Contamination of wool by burrs and poly twine are constant threats, particularly when grazing unfamiliar landscapes and using off-site corrals. Both of these contaminants can be very costly to sheep producers and can forever tarnish their reputation of producing high-quality wool.

John trains his herders to understand the differences between targeted grazing and regular grazing. Instead of simply scattering the ewes out on a grassy hillside where feed is abundant and predators are spotted easily, herders often have to move sheep through rough terrain such as canyons and narrow crevices where weeds are growing. In essence, these herders are maneuvering a large, sweeping weed eater over the landscape as they skillfully direct its path and speed of operation.



Figure 2. There are many opportunities to incorporate targeted grazing as part of a traditional livestock production enterprise. **a**, Lehfeltd Land and Livestock uses opportunities to employ their sheep in targeted grazing projects to enable them to expand their operation. **b**, Jay Springs Lambs uses their sheep to manage competing vegetation on their own timber lands while producing a high-quality lamb carcass that brings a premium in the market because it is sustainably and organically grown.

Even more challenging than maneuvering the flock is the fact that John's sheep are constantly eating themselves out of a job, so he is always looking for somewhere to go when the task is complete. Despite the uncertainty and the complicated process of keeping jobs lined up for the future, John asserts, "If you don't eat yourself out of a job within three to five years, you are not doing what you are supposed to do." When his sheep are no longer needed, John typically turns the weed control over to the landowner and finds another location to graze his sheep because it becomes too difficult to divide groups of sheep or move every two to three days.

Targeted grazing works for the Lehfeltd operation for several reasons. First, John does not have a large land base, so targeted grazing allows him to run more sheep with less land (Fig. 2a). Targeted grazing improves the ecological condition of his private land because the sheep are gone during the time of critical plant growth. Being able to take advantage of the high forage value of the weeds has actually increased lamb weights an average of 7 to 10 lbs compared to grazing on his home range. Additionally, removing the ewes and lambs from the area removes the food source of predators and effectively breaks the predation cycle on his ranch.

Using Targeted Grazing to Produce More Grass, More Trees, and More Lamb

Jennifer Cunningham, a third-generation sheep farmer from Kamloops, British Columbia, operates Jay Springs Lamb with her family. In addition to running sheep, the family owns a commercial woodlot, and today the farm uses a flock of 150 crossbred ewes in an intensive rotational grazing system on forested range pastures with the objective to produce more grass, more trees, and more lamb (Fig. 2b).

Jay Springs Lamb differs from many of the previously discussed targeted grazing operations because the lambs are not contracted out for services. Rather, the Cunninghams use the lambs to accomplish vegetation management on

their personal property to improve sustainability, both ecologically and economically. The sheep maintain and manage the woodlot, which provides the bulk of the income for the family enterprise. However, current economic times demand that the lambs still bring a premium after they do their job of improving the vegetation in the woodlot. In this way, Jennifer attains the maximum return from her animals by receiving an ecological service from the lambs on their way to a very specialized market. The way in which the lambs are managed improves the quality of the meat and adds consumer value to the lambs because they were sustainably raised.

The Cunningham enterprise artfully blends the production of trees, forages, and livestock by carefully planning and managing the interactions between these commodities. It capitalizes on the involvement of its sheep in sustainable timber production and the use of grass-fed, naturally raised lamb to receive a premium price. Unlike most targeted graziers, Jay Springs Lamb does not use its animals to suppress a specific target plant. On the contrary, Jennifer is using grazing to *increase* the target plants on her property, namely, trees, by suppressing the competing vegetation. To ensure that the animals accomplish her vegetation management goals as well as produce a quality product down the line, Jennifer carefully culls and selects replacements that work best within her system. Careful observation of the animals' grazing behavior ensures that she maintains a working flock that produces quality carcasses.

Training Turns Cows Into Weed Managers

In 2004 Kathy Voth, Livestock for Landscapes, began developing a method to teach cows to eat weeds. Her work was in response to ranchers who were reluctant to incorporate goats into their operations for weed control. To develop her methods, she drew on decades of research on how animals choose what to eat conducted by Fred Provenza and his colleagues at Utah State University.⁶ Kathy learned that animals choose foods based on feedback they get from

nutrients and toxins in foods—nutrients tend to increase consumption and toxins tend to decrease it. Research demonstrates that many weeds tend to be at least as nutritious as traditional pasture forages, and some have protein values equivalent to alfalfa. She reasoned that if she could get a cow to eat a weed and receive the benefit of the nutrients, that cow would continue eating the weed in the pasture.

Kathy's process requires about 10 hours over 10 days. To reduce neophobia (the fear of new things), she feeds a group of trainees a small amount of a series of unfamiliar but nutritious foods (rolled corn, barley, beet and alfalfa pellets, etc.), once in the morning and once in the afternoon for four days. On the fifth and sixth days of training, weeds are clipped fresh from the pasture and fed once a day along with grain. On the seventh day, the cattle are offered weeds only. Animals are then moved to a small pasture with a variety of forages and the target weeds before heading out to join the rest of the herd in normal grazing operations.

Kathy and others using her methods have trained cows to eat Canada, milk, musk, distaff, and Italian thistle; spotted and diffuse knapweed; Dalmatian and yellow toadflax; and black mustard. Kathy has observed trainees voluntarily add other weeds to their diets and teach their calves and herd mates to be weed eaters. Kathy believes that training cows to include weeds in their diet along with grasses may reduce the competitive pressure on the grasses and help maintain a more balanced vegetation composition on the landscape.

Heifer Targeted Grazing—Potential Impacts on Downy Brome in Nebraska Loess Canyons

The concept of managing vegetation using resident livestock is economically attractive to land managers, as long as vegetation goals can be accomplished in a manner compatible with the production goals of the operation. Bob Welling of Ridley Block Operations contends that innovative managers must explore ways to focus animals on target areas to achieve landscape-scale vegetation management. Fencing is rarely an option on large landscapes. Instead, herding or some other means of animal control is used to focus animals on the vegetation and areas that require treatment. Herding is expensive and very labor intensive, so one ranch in the Nebraska Loess Canyons decided to explore other ways to lead animals to target areas and encourage them to remain there until the desired vegetation results were achieved. The project's objective was to concentrate cattle grazing pressure on cheatgrass in canyon floors to prevent seeding and to increase utilization of decadent forage on upland plateaus. The landowner and grazing lessee decided to explore the potential of using heifers to control the cheatgrass while grazing in a manner that was compatible with this large-scale operation. In March 2008, 150 head of spayed heifers from multiple origins were trained for a horseback directed start, trail, turn, and stop. The cue for the heifers to stop was a piece of surveyor flagging tied in a tree above a 250 lb barrel that contained a low moisture block (LMB)



Figure 3. Low moisture protein barrels (yellow circle) as a positive reward and surveyor's flagging (red circle) as a visual cue were used to concentrate cattle on cheat grass to provide sufficient grazing pressure to reduce seed production.

protein product. These LMB barrels were purposefully placed in dense cheatgrass stands, and the cattle were rotated through the four pastures every four to seven days, with the flags and LMB relocated to fresh cheatgrass patches as needed (Fig. 3). When the heifers were returned to a pasture for a second grazing, the LMB barrels and flagging were moved to the plateaus to utilize the decadent forage on the uplands. Previous studies⁷ have demonstrated the use of LMB to affect cattle distribution during the dormant season, but this was the first time that LMB were used to target cattle location during the growing season.

Flags were used as location cues every time the cattle were moved, and the heifers began to recognize the flagging as a “safe” place. They were content to remain near a flag and even appeared to channel some of the yearling wanderlust into flag hunting when being trailed.

Although it was difficult to measure the actual impact on cheatgrass seed production and subsequent year emergence, the cheatgrass visibly decreased in the plant community, and the landowners were pleased with the results. Bob found that there is definite potential to quickly train stocker cattle to carry out vegetation management projects as they transition through a production system. Although some targeted grazing jobs require highly trained and carefully selected herds of animals to accomplish the desired objectives, other vegetation management projects can be accomplished with transitory livestock.

Targeted Grazing of Plants With Toxic Properties

Zane Davis works for the USDA Poisonous Plant Research Laboratory to help reduce livestock losses to poisonous plants. The USDA Poisonous Plant Research Laboratory located in Logan, UT, conducts research on poisonous plants, their risks, possible treatments, and recommendations for affected livestock.

Grazing animals nearly always forage in the presence of toxic plants. Sometimes the toxic plant is the dominant plant in the environment, and at other times it is only a minor component of the landscape. Contract graziers will probably be asked to control “toxic” plants at some point, or toxic plants will be present in the plant community, so it is important to understand the plants, their toxins, and effects on animals. For example, alfalfa, lupine, and larkspur are all very nutritious plants that can cause serious toxicosis under certain conditions.⁸ It is the dose, the timing, and the grazing animal that determines the outcome of the toxic plant-animal interaction. To further complicate the matter, the concentrations of toxins within plant tissue can change over the grazing season from year to year and between different populations of the same plant. Even slight changes in concentrations can result in major toxicity problems in livestock.⁹

Zane described a couple of precautions that he believes contract graziers should take to minimize livestock losses to poisonous plants. Pregrazing job assessments should be conducted and all poisonous plants identified. The grazer should research the poisonous plants and use the information to answer the following questions: 1) What are the toxins in the plants? 2) What species (or even breeds) of animals are susceptible? 3) When are the plants toxic? 4) When are the plants palatable? 5) What other forages are available? and 6) Will animals graze out the desirable forage and be forced to graze the toxic species?

Zane emphasized that herders should be educated about any poisonous plants present on the job as well as the symptoms and clinical signs of poisoning in livestock. Correct identification of plants and early detection of toxicity symptoms may prevent catastrophic death loss. Additionally, if herders understand the dietary habits of animals and the toxic properties of plants, they can use this knowledge to increase consumption of toxic plants during safe windows, or they can provide supplements or adequate alternative forage to buffer the effects of the toxins.

Even though the focus is on vegetation management, targeted graziers should closely monitor animals and their plane of nutrition. Animals that are being pushed hard on targeted grazing operations may be more susceptible to toxic plants than animals on a good plane of nutrition. The additional stresses of targeted grazing, including frequent hauling and new environments, can exacerbate the effects of toxicosis (i.e., stressing livestock with high levels of alkaloids in their system).¹⁰ Zane stressed that knowledge of the toxic properties, ecology, and physiology of toxic plants by land owners and livestock managers enhances their power and ability to better utilize infested rangelands; it also increases their productivity, sustainability, and profitability.

Opportunities for Grazing as an Ecological Tool on National Forests

Grazing has long been a traditional use of national forests and public lands, and it continues to be an important use.

Unfortunately, grazing is not always perceived as beneficial in the eyes of the public. Many people still equate livestock grazing, especially on public lands, with degraded conditions, which often makes it difficult to demonstrate the positive effects of grazing. However, Dave Bradford, Rangeland Specialist with the USDA Forest Service’s Grand Mesa, Uncompahgre, and Gunnison National Forests, has found that livestock grazing to manage range vegetation is an appropriate and approved tool on national forests and grasslands. Targeted grazing fits most of the objectives of the National Forest Range Program,¹¹ particularly the first objective, which is to “manage range vegetation.” Well-received treatments will be designed to impact target species and provide recovery for desired species.

There are numerous potential uses of targeted grazing on National Forest Service (NFS) lands, including 1) controlling noxious weeds, 2) altering vegetation composition to more desirable or natural conditions, 3) altering vegetation structure for improved wildlife and habitat, 4) reducing livestock mortality due to poisonous plants, 5) improving deteriorated or unsatisfactory land conditions, and 6) improving threatened and endangered species habitat. Dave has used several different types of grazing permits to accomplish vegetation management goals, often with much less intensity of management and control of livestock than typically used by contract graziers. Targeted grazing is the most advanced type of grazing management but still uses the same principles as all grazing management, namely, stock density, timing, duration, and opportunity for recovery. When planning targeted grazing, the grazer should plan to graze at a time that optimizes the palatability and susceptibility of the targeted plant to grazing and minimizes negative impacts on desirable vegetation.

Dave provided examples using cattle and sheep in several targeted grazing projects on Forest Service lands in the state of Colorado. Cattle belonging to the permittee were used in a targeted grazing application to reduce the density of whitetop and incorporate seeds from desirable forages into the soil. Sheep and cattle were used in different areas to reduce the density of mule’s ear and restore the vegetation composition to more natural conditions (Fig. 4). Another permittee used his cattle to conduct targeted grazing in dense stands of oak brush to open the canopy and improve forage production for cattle and wildlife, without impacting the mast production of the oak stands. Sheep regularly graze areas infested with tall larkspur before cattle to decrease the incidence of cattle losses to larkspur poisoning. On the Fairplay district, a winter grazing program was initiated to graze the dormant vegetation, improve forage palatability, avoid conflicts with summer recreationists, and improve habitat conditions for Porter’s false needlegrass (*Ptilagrostis perteri*), a threatened species.

All livestock grazing and other livestock use on lands under Forest Service administration or control must be authorized by written grazing permit or agreement. Targeted



Figure 4. Term grazing permittees with their existing herd of cattle were used in Grand Mesa, Uncompahgre, and Gunnison National Forests to reduce the density of mules ear. This was done by changing the season from late September to late June, which is a time when the plant was both palatable and susceptible to damage from defoliation.

grazing can be authorized by Livestock Use Permits, modifications of Term Grazing Permits, contracts, or letters of authorization. Regardless, all projects have to go through the National Environmental Policy Act (NEPA) process before they can be implemented. Compliance with NEPA is fundamental to all management processes on Forest Service Lands, but Dave noted that it is not an insurmountable obstacle. Although compiling a NEPA document can be a daunting assignment, focusing on the science and biological principles of grazing, coupled with persistence and an open mind, will produce positive results.

NRCS Programs That Encourage Targeted Grazing

Jana Malot is the NRCS State Grassland Conservationist for the state of Pennsylvania. The NRCS can help support targeted grazing in two ways: through technical assistance and financial assistance. Technical assistance is given in the form of conservation planning and implementation assistance. NRCS employees provide assistance designing conservation practices, such as new fencing systems and water developments to improve livestock distribution. Financial assistance can be provided for the implementation of conservation practices by the NRCS.

Two places within conservation planning that can involve targeted grazing are prescribed grazing and brush control. Prescribed grazing, as defined by the NRCS, is the development of a grazing plan with specific goals for vegetation management, soil protection, and improved water quality. Prescribed grazing is generally accomplished through the use of fencing and carefully planned rotational grazing systems. Conversely, targeted grazing usually occurs outside the bounds of an existing grazing system and relies more

on human management than fencing and pre-determined livestock movement dates. Still, targeted grazing can be employed within the prescribed grazing plan developed by NRCS range professionals. The second way that conservation planning could be used to support targeted grazing is through brush control. Approved brush control methods include chemical, mechanical, and biological control. Jana noted that under NRCS provisions, once a brush control program has been approved, a cost share payment is issued on a dollar per acre treated basis. These cost share programs can be used to pay for targeted grazing as long as the brush control objectives for the program are fulfilled.

Jana described specific programs within the NRCS that can assist with targeted grazing: the Conservation Stewardship Program (CSP), the Grassland Reserve Program (GRP), and the Wetlands Reserve Program (WRP). The CSP program is designed for producers who already have existing conservation practices in place. The funding provides for “enhancements” to the existing conservation practices. This funding can be used to incorporate targeted grazing practices into approved prescribed grazing plans, using either resident livestock or contract grazing services. The CSP also provides funding for producers involved in organic agriculture to use targeted grazing practices for vegetation management on cropland. The GRP uses prescribed grazing to protect and enhance the grassland communities and address habitat needs of wildlife. Targeted grazing could be used to control weeds while maintaining healthy grass populations that support ground nesting birds. The WRP has helped fund projects to reduce invasive plants like reed canarygrass and restore native plants to wetland areas. There is potential for targeted grazing to become recognized as a maintenance tool for lands enrolled in the Conservation Reserve Program (CRP).

It is important to realize that each state differs in the programs offered and the way that those programs are administered. It is essential to contact your state office directly to learn about these programs and how you might use targeted grazing within their specific funding opportunities. Jana suggested that the best way to influence the programs your state offers is to serve on the NRCS State Technical Committee. These committees provide valuable input on program guidelines for their state.

Targeted Grazing on Public Lands for Hazardous Fuels and Weed Reduction

The Bureau of Land Management (BLM) in Idaho has been using targeted grazing for both weed management and fuels reduction. John Sullivan, with BLM’s Boise District, mused that weeds have no respect for political boundaries and infest large areas of mixed ownership, making comprehensive control efforts difficult. A Cooperative Weed Management Area (CWMA) is a group of local landowners, land managers, agencies, and other interested individuals and organizations pooling their resources and capabilities to protect the landscape from the invasion of noxious weeds. The BLM is a member

of the Washington County CWMA and participates in a targeted grazing project to control leafy spurge along the Weiser River. Targeted goat grazing has proven to be very effective in reducing seed production and the spread of seed downriver. John explained that this will require a long-term effort, and if the goats were removed, the leafy spurge would return.

The BLM is also using targeted grazing to manage fuel loads in the Morley Nelson Snake River Birds of Prey National Conservation Area (NCA) south of Boise, ID. In this instance, the problem is caused by the wildland-urban interface and a need to protect private property and avoid litigation that can result from fires that originate on BLM land. Because of the difficulty of controlling wildfires at the wildland-urban interface, extensive efforts and resources are used to suppress fires when they threaten private land, which results in a greater spread of fire in other areas and associated loss of resources and habitat.

In an effort to prevent wildfire escaping into developed areas and improve the BLM's ability to quickly combat fires in the shrubland of the NCA, the BLM decided to create a firebreak in the rarely grazed, northwest corner of the monument. They approached the current grazing lessees who ran sheep and offered to waive grazing fees if they would adjust their grazing management to create a fire break 2.5 miles long and 400 feet wide. However, after looking at the increased requirements for labor and potential for lost production, the permittees decided it was not in their best interest to enter into this agreement. The reality is that when livestock production is the goal, free forage is not really free, so the BLM decided to contract out the services. According to John, with a clearly written contract, there was no room for error in the application of the grazing contract, and the fire line was created exactly as desired (Fig. 5). The contract has been issued three times in seven years; each time it has been managed differently using sheep only, sheep and goats, and goats only.

The contract continues to be issued as needed to maintain the firebreak, generally every two to three years, depending on rainfall and subsequent forage accumulations. It is expensive to treat the 120 acres, but it is still cheaper than litigation. It also frees the BLM fire fighting resources to protect BLM lands critical to wildlife habitat rather than focusing on protecting homes on private land. Furthermore, most other forms of vegetation management were not feasible because of the rocky terrain and the threat to slickspot peppergrass (a threatened plant), located immediately adjacent to the project site.

Common Themes

The experiences of the targeted grazing managers summarized in this article demonstrates the wide diversity of applications and ways that targeted grazing can be used to manage vegetation. These range managers used common species of domestic livestock (i.e., cattle, sheep and goats). They varied in scope from commercial scale operations whose primary objective was production of food and fiber to



Figure 5. The BLM in Idaho has used contract grazers to create fire breaks at the wildland urban interface. Originally free grazing was offered to permittees in exchange for providing the targeted grazing. Because of the extra cost and potential lost production, none of the permittees were interested and a contract grazer was hired to create the fire break.

very intensive operations where livestock production was secondary. Although many of the examples given have not been substantiated directly in the scientific literature, all examples used the same basic principles of grazing management that have been recognized since the early days of our profession. The difference is that rather than having the traditional objective of maximizing sustainable livestock production, these graziers' objective was to change the composition of the landscapes they were grazing. In some examples the primary source of income was based on their ability to modify the vegetation. In other examples livestock production remained the chief revenue source, but the ability to graze in a manner that also accomplished landscape management goals allowed them to expand their operations or reduce their production cost. The idea of paying for grazing as a service, when one used to get paid for animals to graze, has been a hard shift for land managers, and even livestock producers.

A number of important points based on the targeted grazer's experiences kept surfacing throughout the session:

- If things are done right, except for fine fuels management, the targeted graziers work themselves out of a job, so that after several years, fewer animals and less time are required or other vegetation management becomes more appropriate.
- The importance of working with people cannot be overstated. The graziers need the skills to educate their employees, the people with whom they have a contract, and the public about all aspects of the project. Then everyone will know what to expect and what the finished job will look like.
- Livestock training and handling is also important. Training situations should be set up so that animals know their job and learn to consume the target plant.

- Graziers should know what their animals are capable of doing and not oversell their abilities.
- Targeted grazing should be integrated with other weed management tools such as herbicides and biological control. This can increase the efficacy of biological control.
- Reliable, well-trained herding dogs and livestock protection dogs are essential.
- There always needs to be an exit strategy and, if possible, new jobs lined up ahead of time.
- It requires more effort and expense to be away from home than to graze at home.

The Reality, Potential, and Future of Targeted Grazing

For targeted grazing to become a widely used method for vegetation management, there is a real need for more information in the following areas: 1) more economic data on the efficacy of targeted grazing, 2) documented success stories, 3) easy ways to implement contracts and grazing treatments on public lands, and 4) better understanding of plant community dynamics in relation to targeted grazing and herbicides or other conventional treatments. True weed management is past the point of simply diminishing the weed in the plant community. Land managers should be focused on the complete ecological response and function of the plant community, including native grasses and forbs and the reseeding potential of the treated landscape. When all of these factors are considered, it is probable that true targeted grazing will be recognized as a legitimate vegetation management tool, a true range improvement practice, not simply animals grazing.

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