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# Sheep and Goats: Ecological Tools for the 21<sup>st</sup> Century

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Sheep and goats have been used for centuries to provide humans with food and fiber. However, in more recent times, these species of small ruminants are being looked at increasingly for their ability to manipulate forage to accomplish a variety of land management objectives, which benefit not only man, but also the environment.

Historically, the West has been seen by most as a “land of plenty,” full of rich resources such as timber, minerals, clear flowing streams and lakes and rolling shrub-type grasslands. In the early days, following settlement of the West, folks thought these resources were endless in scope. However, in the past few decades, society has become more cognizant of the fact that many of these resources are indeed limited and that how they are used may determine whether they remain for our children to enjoy.

One way we can conserve and preserve our natural resources is through the use of what is termed “prescribed grazing.” Prescribed grazing is nothing more than using grazing animals, in this case sheep and goats, to manipulate forage in such a way that we accomplish a set of objectives for that portion of land upon which the prescription is applied. Prescribed grazing can be used to accomplish a variety of land management objectives such as control of noxious weeds, reducing the incidence of wildfire, rangeland improvement, riparian and watershed management, improving wildlife habitat and reducing nutrient competition in tree plantations.

In the past these types of objectives were only accomplished through huge investments of money, fuel, labor and chemicals. Today, society deems many of the practices of the past as unacceptable and research has shown that many were less than effective and unsustainable. Use of prescribed grazing accomplishes these objectives and at the same time produces food and fiber for an ever-growing population in a way that is acceptable to society and sustainable.

## Controlling Noxious Weeds

Sheep and goats are currently being used throughout the Great Plains and Intermountain regions to control noxious weeds. Many of these weeds could not be controlled by means of chemical, mechanical or cultural practices due to the high cost associated with these control methods or their relative ineffectiveness.

One such weed is leafy spurge (*Euphorbia esula*), a Eurasian weed which has consumed millions of acres and is so competitive that it quickly crowds out all other plants to form a monoculture. Cattle won't consume leafy spurge as it contains a latex-like sap which causes digestive distress, leading to reduced productivity. Sheep and goats, however, are not affected, and are now being used in several places west of the Mississippi River to effectively control this weed. (See photo at right.)



Another weed, which has impacted many areas throughout the West, is Spotted Knapweed (*Centaurea maculosa*). This weed invades native ranges and threatens even pristine areas such as our national parks. Sheep readily graze knapweed and are being looked at as another tool to fight this aggressive invader. Sheep are also used to reduce the impact of Tall Larkspur (*Delphinium spp.*) upon cattle. Tall Larkspur is deadly when eaten

by cattle, but rarely affects sheep. It has been found that if sheep graze ahead of the cattle in areas where Larkspur is a problem, the availability of the Larkspur is reduced and it is no longer an acceptable forage to cattle.

## Reducing the Incidence of Wildfire

Sheep and goats are being used in many places to reduce the threat of wildfire in areas where wildlands interface with urban communities. This method of reducing wildfire is called creating a “fuelbreak.” On an area of the Sierra Nevada Mountains where Carson City, Nevada, neighborhoods abut wildlands, wildfires historically occurred about every 15 years, threatening the safety of the community. Animal researchers from the University of Nevada/Reno worked with community leaders to create a fuelbreak to mitigate the problem. A group of 350 dry ewes grazed a 200' wide corridor approximately 3 miles in length at a stocking density of 1.1 Animal Unit Month (AUM) per acre for 30 days in May. The corridor was located about 150 to 200 yards from the homes. Primary fuels on this site were cheatgrass, crested wheatgrass and sagebrush. The project's goal was to reduce the amount of fuel, reduce vegetation height and create an effective firebreak. The results of the demonstration were that 73% of the forage was eaten, ground litter was reduced by about 60%, and vegetation height was reduced by approximately 75%. Fire experts estimated this would decrease the speed with which a fire would travel through the area by about 75% and reduce the height of the flames from 6'-10' down to about 2'-3'. Given the current cost to conduct the demonstration project, the sheep could graze for 15 years for the cost of just one home saved from destruction by wildfire.

In another study by Utah State University researchers, goats were used to create fuelbreaks at Camp Williams, the Utah National Guard's training range. Goats were confined to areas of dense Scrub Oak (*Quercus spp.*) using field fence. The goats

would browse on the low-growing branches, leaving only the branches above where they could reach (right photo). This effectively disrupted the fuel continuum. This research was put to the test, as fire swept through the area in the



summer of 2001 following the period when the goats were on site.

The photo to the left shows how effective the goats were at hindering the fire's progress. The unburned area in the center of the picture is where the goats had been grazing prior to the fire.

## Improving Rangeland and Riparian and Watershed Management

Numerous studies have shown how sheep and goats, used under prescribed conditions, can help increase the plant biodiversity on western ranges. Small ruminants have been used in a variety of management schemes to accomplish range management goals. Some of these include using sheep to restore marginal cropland, trampling seed into the ground following aerial seeding in forests to increase grass establishment while at the same time decreasing competition of weedy species, changing plant community diversity by manipulating the timing of sheep grazing and restoring critical shrub species to ranges damaged by overgrazing by changing the season of use on those rangelands.

Since sheep prefer to graze and bed on upland areas away from wet lowlands, they are easier to manage in grazing areas where critical riparian and watershed issues are a concern. Unlike larger ungulates such as cattle, elk and moose, which tend to prefer riparian and meadow areas, small ruminants will come into a riparian area for the purposes of watering, but then tend to migrate onto uplands to graze and bed where they

have a greater ability to protect themselves from predators. Add to this the gregarious nature of sheep, and you can see why they are preferred when grazing delicate riparian zones.

Additionally, when sheep are grazed in the same areas for several years, the level of perennial grasses within the plant community tends to increase which has been shown to increase water infiltration and decrease erosion.

## Improving Wildlife Habitat

Prescribed sheep grazing has been shown to enhance wildlife habitat in a variety of ways. By allowing sheep to graze different areas at specific times of the year, the quality and quantity of certain critical vegetation types can be enhanced. For example, grazing certain areas with sheep in the spring and summer can increase the nutritional value of the forages used by deer and elk in the fall. Also sheep have been used to increase the productivity of bitterbrush (*Purshia tridentata*), which is critical winter feed for deer by keeping it “pruned” to a lower shrub height. This encourages the plants to send out fresh shoots that have a higher nutritional value than the woody older growth.

Finally, as stated above, when sheep and goats are used to reduce wildfire impacts, wildlife cover needs are protected and enhanced.

## Enhancing Tree Plantations

Sheep producers in Canada are now being paid up to \$35 per sheep to graze newly planted tree plantations. This method of prescribed grazing increases the viability of the new tree seedlings by reducing the competition of grasses, forbs and weedy species for water, soil nutrients and sunlight.

Similarly, power companies in the Northwest are “hiring” sheep and goat herds to keep areas under power lines in forested areas grazed, thus reducing the chance that an errant spark from the lines might start a wildfire and destroy the power line and surrounding forest.



## Conclusions

As society’s concern for the environment increases, natural methods of enhancing the environment will become greater. Sheep and goats can play a pivotal role in the management of natural resources, while at the same time, continuing to produce high-quality food and fiber. When managed correctly, small ruminants have been shown to be effective tools to control noxious weeds, enhance rangelands and reforestation projects, improve wildlife habitat and accomplish riparian and watershed management objectives. Additionally, they can do all of this in a manner that is not only sustainable, but can be profitable in today’s environment of shrinking profit margins in agriculture.

## References

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