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**Browsing Academy**  
**BRUSHERS, MOUNTAIN MISERY**  
**AND OTHER MATTERS**

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### **Introduction**

Prior to moving to Nevada City early last year, neither my wife Margie nor I had any agricultural experience. Before purchasing our home, we had a long discussion with our local Fire Prevention Officer. He explained the problems of wildfires in the Sierra Foothills and, specifically, the problems we would have to deal with if we purchased this property. After we moved to Nevada City, we joined the Fire Safe Council of Nevada County to learn more about what we could do to protect our home in the event of a wildland fire. We developed a plan that we are now implementing. One of the solutions we came up with was to use goats to manage the vegetation on our property. This paper outlines the nature of the problem, how we are using goats and some of the lessons we have learned. It is beyond the scope of this paper to address the other strategies we are using in addition to the goats.

This paper is a primer for people who would like to work with goats but like us, lack agricultural experience. Our advice after working with the goats for a year - Go For It!

### **Background**

Our home, on six ½ acres of forestland near Nevada City, California, is covered with pine, cedar and oak trees as well as manzanita, deer brush and other native plants that grow at 3,000 feet elevation. Roughly sixty percent of the property was covered with mountain misery (also known as bear clover), an invasive plant that due to a high resin content burns rapidly with a flame two to three times its height. In some areas of our property young cedar trees were so thick that it was impossible to walk through them.

Before the foothills became a popular place to live, nature did a good job of maintaining a healthy forest. The understory was cleaned out through grazing. Periodic fires set by native Americans and lightning reduced vegetation and tree density. As people began moving into the foothills grazing stopped and fires were no longer allowed to follow their natural course.

Battalion Chief Frank Rowe of the California Department of Forestry, who grew up in Nevada County, recalls that as recently as the late 1950's, it was common to see shepherders grazing their sheep in the foothills. As they moved their sheep down the mountain at the end of summer, the shepherders set fire to the forest to clean up the understory and prepare the meadows for the following year. Because there was very little vegetation on the ground the fire lacked intensity and did little damage to large trees.

A similar story was told by Bill Goss, who lived near the old Nevada City Airport all his life. Bill recalled helping his father and uncle burn off the hill every year or so, to keep the brush under control.

In response to people moving into the foothills in large numbers, the fire services invoked a no burn policy to protect private property. The foothills that were filled with open meadows now suffer from heavy overgrowth of ground vegetation and excessive tree density. This not only impacts the health of our forest, but it also impedes the growth of grasses that forest animals depend on for feed.

More importantly, the heavy undergrowth and excessive tree density dramatically increases the danger of intense, catastrophic forest fires.

“The forest service estimates that inland west tree density in the 1600s averaged 20 to 50 trees per acre. Today these same areas are covered by 400 to 800 trees per acre. To fire experts this means enormous fuel concentrations that burn hotter, longer and faster than the historic fires within the natural range of variability. <sup>1</sup>”

Can an individual home owner possibly have any impact on this problem? Post fire studies have produced compelling numbers that support the advantages of thinning vegetation and creating defensible space around your house.

The following chart shows the percent of homes destroyed by wildfire by type of roof and the size of defensible space<sup>2</sup>

<b>Size of Defensible Space</b>	<b>Wood Roofs</b>	<b>Fire Resistant Roofs</b>
0 to 30'	50%	24%
30' to 80'	28%	5%
80' to 100'	15%	2%
More than 100'	15%	0.7%

A study by the California Department of Forestry following the Williams fire a couple of years ago concluded that within the fire zone 85% of the homes that did not have defensible space suffered serious damage or were destroyed. On the other hand, of those houses with defensible space only 20% suffered damage.

Our newly purchased home lacked a defensible space around the house, and much of the forest was over grown. In its state at the time we moved in, the house could not be defended successfully by the fire services if a wildland fire were to threaten it. We developed a plan to address the many problems we faced. One of the problems was to reduce ground vegetation that would fuel a fire and limb up our trees so that a ground fire would not be able to work its way into a crown fire. We decided to use goats for this part of our plan.

## **Project Objectives**

Given the heavily overgrown vegetation on our property, we had three objectives. 1) Increase the probability of our property surviving a wildland fire by creating a defensible space around our house, reducing ground fuels and limbing up trees. 2) Replace mountain misery as the predominant ground cover with a variety of native plants. 3) Minimize the use of chemicals.

## **Our Solution**

Like mowing a lawn, clearing vegetation has to be done on a regular basis. Without yearly maintenance the vegetation will grow back. We concluded that we would use animals to graze the property, trying to replicate nature's method. After thinking about dairy cattle, horses, llamas, sheep and goats, we decided that goats would be most effective in clearing the kind of vegetation we have on our property.

## **Goat Selection Criteria**

We looked for goats that had a proven track record as brushers. Not all goats are good brushers, so finding the right goats was important. We also wanted goats that were hardy and able to survive on native plants with minimal supplemental feeding. We wanted animals that require low maintenance, ruling out dairy goats or breeding stock. And finally, we wanted animals that were familiar with electric fencing.

We chose Kikos and Kikos crossed with New Zealand Boer or La Mancha from An Peischel's herd because they met our criteria. We purchased six goats, all wethers, between three and six months old, weighing between 37 and 52 pounds.

## **Infrastructure**

Before building our corral and paddock, we spent time with Mark Eidman of LiveWire Products in Marysville. This was time well spent. Mark was generous in sharing his knowledge of electric fencing both during our visit as well as during subsequent telephone calls.

## **Corral**

Throughout the foothills there are a number of predators that are a threat to goats, including bear, mountain lion, bobcat, coyotes, fox and neighborhood dogs. The dogs are probably the biggest threat in our neighborhood, although bobcat and coyotes have been frequent visitors. We decided to build a corral with an electric fence to protect the goats at night. The 14' by 22' fence is constructed with 9-gage wire. The nine-strand wire fence is 70" high. The ground and hot wires alternate, ensuring a strong jolt for any animal trying to get through the fence. The bottom wire is hot to prevent an animal from crawling under the fence. We are using a Stafix SM1 energiser, plugged into a 120-volt

line, to maintain the fence at more than 7,000 volts. The fence is grounded with one seven foot one inch pipe.

We discovered that keeping our voltage above 6,000 volts was important. Due to a malfunction with the energizer, the voltage dropped to 3,400 volts. At that level, the goats were able to climb through the fence without any discomfort. On more than one occasion, we awoke in the morning to find a goat waiting for us at the front door. If goats were able to get out, we also assumed predators could get in. We now monitor the voltage more frequently to make sure it is high enough to do the job.

When we first bought the goats in September, we put a small lean-to covered with a plastic tarp inside the corral to provide shelter. For light rain showers it served its purpose. However, after the first long, cold winter rain we realized this was inadequate and built an 8' by 12' barn. This provided a place for the goats to sleep and a protected area for feeding. Although the barn has a dirt floor, there is a raised plywood platform for the goats to sleep on. The sleeping platform has a six-inch wall to contain the bedding. In the beginning we used straw for bedding on the sleeping platform, but found we preferred wood chips. The chips do a better job of absorbing urine and are easier to clean up. We continue to leave straw in the corners of the barn so the goats can make a nest for sleeping.

We built a feeding trough inside the barn. The trough is eight feet wide and 17 inches deep. It is 18 inches off the ground, with a step at 13 inches. The trough has a six-inch lip, to hold in the feed. We are adding a keyhole manger at the front of the trough to discourage fighting between the goats while they are eating.

### **Working Paddock**

Our property is not fenced. To protect the goats from predators during the day and better manage their production we decided to use a four-foot high flexinet fence. This is a lightweight net fence made of poliwire. The bottom wire is grounded and the other wires are hot. The fence is powered with a Stafix SB1 energizer connected to a 12-volt RV deep cycle battery, which produces 7,000 plus volts. The fence is grounded with a seven foot one inch pipe. We have put eight or nine ground pipes around the property, so that wherever the fence is located there is a ground nearby. The fence comes in rolls of 50 meters and weighs only a couple of pounds. Our paddocks are from one to four rolls, or 150 to 600 feet of fence, depending on topography and vegetation.

We move the fence every week or so, once we are satisfied with the amount of vegetation cleared by the goats. When setting up the fence, it is important to have a clean fence line. Were we to put in the fence without clearing vegetation from the fence line, it would create a path to ground that would reduce the voltage. Since it is important to keep the voltage levels above 6,000 volts, having a clean fence line is critical.

The fence works. Most of our neighborhood dogs have tested it once or twice. One of the neighborhood dogs that has been killing chickens in our area crept up to the fence one

afternoon to see if he could catch a goat. We watched the black lab/rotweiler mixed breed crawl across our lawn. As soon as his nose touched the fence, he was gone. Although he has been back of couple of times, he will not go near the fence.

The paddock also requires a shelter in the winter in case it rains and we are not around to let the goats' back into the barn. Although goats tolerate cold weather, they do not like rain. We have used a couple of shelters in the paddock. The first was a lightweight wooden frame covered with a plastic tarp that could be easily moved. The second was a large plastic dog crate. The crate worked better than the wooden frame. It is easy to move, provides excellent shelter and is almost indestructible. In addition, the goats find it is great for playing king of the mountain!

### **Water**

Access to water is important. At first, we used water troughs with a float valve, fed by a hose. This worked well. However, as the paddock was moved further away from the house we used large water buckets that are filled each morning. This is adequate for three goats. When the temperature drops to freezing in the winter, we use an immersion heater to keep the water from freezing. The heaters have an automatic switch that activates when the temperature drops below 45 degrees. Although we have had water buckets freeze into solid blocks of ice, using the immersion heater we have not had any problem.

### **Mineral Blocks**

We use one 50-pound mineral block in the corral and a smaller brick sized block in the paddock to supplement nutritional requirements. The mineral brick is attached to a tree with two bungee cords to keep it off the ground.

### **Bribery...or Follow Me!**

An early question we had was how do we move the goats from the corral to the paddock. In the beginning, we built an alley out of three strands of politape that ran from the corral to the paddock. The alley worked well, but as the paddock moved further and further away from the corral and the alley got longer and longer, we ran out of politape. Next we tried putting a collar on each goat and attached three goats to a ten-foot length of rope. This seems to work well at the county fair with show goats. My guys are brushers! They do not like leashes or ropes. It became a game of who gets to drag whom. We frequently lost.

Then we tried bribery. A branch of deer brush or manzanita works well. The goats will follow us anywhere with a branch of deer brush or manzanita. However, Branches are not always available. Instead, I started carrying a handful of corn in my right front pocket. Every morning, before letting the goats out, I feed them a bit of corn through the fence. Then I open the gate and start walking. They are never far behind. When we get to the paddock, its pay up or be yelled at. And if I'm slow to come up with some corn,

one goat will start exploring my pocket and another will put his hoofs on my shoulder, look me in the eye and demand his corn!

Goats do communicate, from a gentle murmur to a full-throated yell, depending on their state of mind. One of our goats even barks to express his displeasure or to intimidate one of the other goats. They let us know when it is time to go to work in the morning or if the feed in their paddock is getting low and it is time to move. If they think a social visit is overdue, we also hear about it or any other commentary they choose to make.

### **Supplemental Feed**

We give our three goats roughly 1/2 a flake of supplemental feed in the evening, half alfalfa and half oat hay. This is the equivalent of 3/4 of a 33-gallon plastic garbage bag. I give them enough in the evening so they feel rewarded for their day's labor, but not so much that they begin to depend on their supplemental feed and lose interest in brushing. If they are working in an area where there is limited feed or little variety, I will increase their feed. I also increase it if the weather is particularly cold.

### **Goat wrestling, or how we learned to trim hoofs!**

Goat hoofs need to be trimmed every few weeks. At first, we used a pair of garden clippers, although I found that a pair of shears with a sharp point designed for trimming hoofs are worth the investment. I do not have any easy suggestions as to how to do this. When the goats were young, we put them on their rumps, sitting in our lap. They relaxed in that position and it was easy to trim their hoofs. As they have gotten older and bigger, they are more difficult to handle. Margie and I work together. Margie sits in a chair holding the goat across her lap, and I trim the hoofs. This seems to work, although we have both ended up with a few bruises. This is still a work in progress!

### **Time Commitment**

The goats take about half an hour of our time each day to clean the barn, fill the watering trough, provide supplemental feed, move them between the corral and paddock plus a few minutes for general commiseration. Every week or so we spend a couple of hours moving the paddock fence.

### **Has it been successful?**

We started out with six goats in September 1998. They cleared an average of 1/8 of an acre per week. At that pace, it only took them a few months to clear the property. In the spring the mountain misery grew back, so we are now running them through a second time. We reduced the mob to three goats early this summer, which has helped to slow their pace down. I think we have enough work to keep them busy through the winter. Next spring we will run them through the mountain misery a third time.

We think we are putting enough stress on the mountain misery that its growth is stunted. Our hope is that if we continue to stress the plant it will die. That should open the meadow for other native plants.

The mob has also done well with cedar and manzanita. The small cedar plants have been stripped, making them easier to remove and chip. The larger cedar trees have been limbed up to about six feet. They also limbed up the manzanita to six feet. However, an unexpected result is they have stripped much of the outer skin from the manzanita, which kills the plant. Any plants that we want to protect need to be fenced in.

We put the mob on hypericum (St Johns Wort) in the spring. They picked away at it, with little impact. We have also put them on Poison Oak. They ate it, but it came right back. We will run them through the poison oak again in the fall.

An interesting use of the goats has been to put them to work on brush piles or trees that we have felled. I cut down two large oak trees a couple of months ago. I put a flexinet fence around the trees and put the goats to work. In a week or so, they ate the oak leaves and significantly reduced the size of the pile, making it much easier to cut up and chip.

## Resources

### Electric Fencing

Although materials for electric fencing can be purchased from most feed stores, the experts in this field are LiveWire Products, Inc., 1127 “E” Street, Marysville, California 95901, Tel (530) 743-9045 Fax (530) 743-0609.

### Books

The following books may be ordered through your local bookstore or Amazon.com. If you are only going to buy one book, I recommend “The New Goat Handbook” as a good introduction to working with goats.

- “Veterinary Guide for Animal Owners” by C.E. Spaulding, D.V.M. and Jackie Clay, Rodale Press, Inc, Emmaus, Pennsylvania
- “Keeping Live Stock Healthy” by N. Bruce Haynes, D.V.M., Storey Books, Schoolhouse Road, Pownal, Vermont
- “Goat Husbandry” by David Mackenzie, Faber & Faber, Boston
- “The New Goat Handbook – Housing, Care, Feeding, Sickness and Breeding with a Special Chapter on Using the Milk, Meat and Hair” by Ulrich Judas and Mathew M. Vriends

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<sup>1</sup> Maureen Gilmer - Land Management Dilemma – The Good Fire - Bad Fire Controversy

<sup>2</sup> Moore, Howard Protecting Residences From Wildfire: A Guide for Homeowners, Lawmakers and Planners, U.S. Department of Agricultural