

The success of our program has encouraged other businesses and agencies to utilize the same program to help manage and eradicate noxious weeds in other areas. The Colorado Division of Wildlife will use the same control program to reduce Canada thistle on three other state wildlife areas in Colorado. To continue this project the Chapter plans to incorporate the use of a Canada thistle weevil (*rhinocyllus conicus*). The weevil will be introduced into the area and later harvested to be distributed to farmers and ranchers who have Canada thistle infestations.

The weed eradication project has resulted in immense educational value for all of the Chapter members. First, the project has been a long-term activity that required advanced planning, assumption of responsibility, and sincere dedication and commitment in completing an activity. Second, the members have learned the advantages and disadvantages of cooperating with many dif-

ferent organizations as well as the necessity and importance of continuous communication. Third, the Chapter members have gained an appreciation of the value of conserving natural resources including land, wildlife, water, and trees. Moreover, the members have acquired an understanding of noxious weeds and the many different methods of control of these noxious weeds. As a result of mutual agreement between all organizations involved, the Chapter used the method which was the least hazardous, provides the quickest chemical residual, and effective for our climate. Fourth, the members, who are primarily production oriented, have gained an appreciation for diversity in adapting range conservation practices to local farms and ranches in the community. Finally, the most significant items learned were group cooperation, self esteem, pride, and service for the benefit of others.

Controlling Juniper: Fire and Goats, A Combination?

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Economical? Ecological? In the vastly changing ranching and farming society of today, there are many words like the two above that ranchers and farmers have forgotten were in their vocabulary. Finding the meaning of these extremely important words may present a problem in the range society when it comes to juniper control. How can a rancher economically and ecologically care for juniper on the precious land? Hopefully I can uncover some interesting facts and opinions that will help you finally decide that caring for our land can be done with enjoyment, ease, and fulfillment.

Juniper, as defined in Webster's dictionary is, "a small evergreen tree or shrub of the pine family, with scale-like foliage and berry-like cones; and an evergreen tree with a characteristic fragrance and durable wood." As most of us know, juniper is not always a shrub. Most species of juniper are more tree-like, which is a problem for ranchers and farmers or anyone who cares for their land.

In the juniperus family, there are many different species. The three main species I'll be referring to are the redberry juniper (*Juniperus pinchotti*), blueberry juniper



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(*Juniperus ashei*), and eastern redcedar (*Juniperus virginiana*).

Redberry juniper is usually found in the northern and western parts of Texas. The fruit is a distinct bright red and its branches and leaves have a distinguishing characteristic of white waxy dots. The base of the tree is single-trunked and can get very large in diameter. Redberry juniper is also known as a root sprouter. If you cut off the top of the tree, it will grow back.

Blueberry juniper, commonly called ashe juniper, is mainly found on limestone formations in the Edward's Plateau where I reside. Its fruit ranges from copper color to a dark blue. The base of the tree forms many branches from the bottom. If blueberry juniper's top is cut off, it will not grow back at all. It is not a root sprouter.

Eastern redcedar can be found from Maine on down to northwestern Texas.

Redberry and blueberry junipers are the main problem in my area of residence.

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Editor's Note: This is the 2nd place paper in the High School Youth Forum contest at the Annual SRM Meeting in Albuquerque, New Mexico.

Table 1. Summary of total costs per acre for burning in the Edward's Plateau.

Acres	Planning/ Organizing	Fireland Construction	Burning	Post Burn Patrol	Forage Loses	Total Cost
160	.95	.81	2.43	.43	.75	5.37
320	.48	.61	1.58	.33	.75	3.75
640	.24	.41	1.11	.23	.75	2.74
1280	.12	.36	.63	.16	.75	2.02

The juniper problem came as a result of someone trying to make the land a little bit better. On the rangeland, before we had fences or property lines, ranchers would burn their pastures to control brush and bring back nutrient-rich grasses. As a result, too many livestock and wildlife grazed the rangeland, which caused overgrazing. The overgrazing allows the juniper to become dominant on the Edward's Plateau.

Juniper, today, is almost the largest ecological problem for range management in the Edward's Plateau. The disadvantages of the juniper seem to be never-ending to the one trying to control it. It reduces plant diversity by limiting the sunlight reaching the ground surface and so keeping desirable plants from growing. Because of the limited plant growth beneath the juniper canopy, there is increased soil erosion. It chokes out the sun needed by desirable plants but, unfortunately, not the rain and wind which can erode the soil.

On all the empty, desolate ground beneath the juniper, we could be growing more desirable forage. When forage production is limited, however, so is the livestock and wildlife carrying capacity. Research on the Texas A and M Experiment Station in Sonora indicates that for every 12% of juniper canopy cover in a pasture, approximately 1 out of every 8 acres is lost for livestock grazing. If we run the same amount of livestock and wildlife on a reduced area, then our pastures will become overgrazed and our land will be in worse shape than it already was with the juniper invasion.

All of these disadvantages answer our question as to why we should control the juniper that has taken over our rangelands in the past 20 years.

There are a number of methods for the control of juniper. The limiting factors to many are the cost and the ecological aspect. Some methods of use are grubbing, rootplowing, hand cutting, chaining, herbicides, fire, and goating.

Fire control is the burning of the juniper in a safe and effective way. When ranchers set fire to restore nutritious forage for the livestock and wildlife, they also control the brush and juniper. The burning process must be carefully planned and carried out. Certain temperatures may be preferred, depending on what you want to keep in your pasture. If you want to keep liveoak trees you will need a cooler temperature. You must also consider the season of burning, the stage of plant growth and sizes of different plants that may be desirable after the burn.

The controlling of juniper through goating may be a possible option. There is very little information on this technique. Experiments do show that overgrazing goats on a section of land will force them to eat juniper as an emergency resource after all of the desirable forage is eaten. It is known that goats have the ability to eat and utilize juniper foliage, which is a very nutrient-rich forage for them.

The economical aspect of controlling juniper can be significant considering the money it takes to burn pastures and to raise goats.

The cost to control juniper by fire involves a number of considerations. You must calculate a cost for planning and organizing, fire lane construction, burning, post-burn control, loss of forage, and size of pasture. As you can see, the cost of fire control can be a real damper on your budget. The question is, will it be worth it in the long run?

Economically, raising goats at this point and time is not a good idea. To raise goats you must have a place to keep them and care for them. You shear goats in the spring and fall and sell their mohair. In today's market, the price received for mohair is on a decline. Mohair, from an angora goat is sold, usually, in 3 categories: (1) kid, (2) young adult, and (3) adult. The prices vary once again, depending on where you sell. Kid usually runs about 80 cents to \$2.00 per pound. Young goat usually runs anywhere from 75 cents to 90 cents per, and adult is from 63 cents to 75 cents per pound. An average commercial pasture or range adult goat will shear around 4 to 6 pounds each shearing, also depending on the weather. The younger goats will of course shear less. An average registered Angora showgoat will shear anywhere from 6 to 12 pounds each shearing. The quality of the mohair is usually better with a registered bred Angora goat. The total for a registered Angora fleece would run around \$9.00 each. For a commercial Angora adult fleece, you could get a total of \$4.50.

Goats themselves are selling at an average steady price. Currently commercial goats are selling around \$30-\$45.00 a head. For \$25-\$100.00 a head you can get a good commercial Spanish goat. You can also count on an income with mutton, or meat goats. Good mutton sells for around \$55-\$120.00 a head. These prices may vary depending on the time of year and the health of the world economy.

Then, the money for feed and care comes into the picture. This price can vary depending on the size of your

operation, the type of goats you raise, the number of goats you raise, and the condition your pastures are in. If you have a pasture full of excellent forage for goats, the less you will have to feed them. Goats usually eat brush unless they have nothing else to eat.

To my knowledge and understanding, running goats on a pasture to kill off juniper would be cheaper than burning your pastures every few years. Besides, you get a quick income with goats. But the income with your fire could continue for 20 years.

The ecological aspects of these 2 main controls I am talking about have many good and bad points. Which control is better ecologically, fire or goats?

The ecological part of fire control could turn you against this method. One disadvantage would be destroying the habitat for the black-capped verio and the golden-cheeked warbler. Once you burn your cedar off, these 2 beautiful creatures will not have a place to live. A second disadvantage could be the problem of burning off a certain desirable forage that may not grow back because of the heat of the fire. A third disadvantage would be the wildlife that would be killed and burned up in the fire. These disadvantages hit hard when it comes to doing the right thing. Fire has just as many advantages, though! After you burn your pasture, most of your desirable forage will come back greener, bigger, and healthier than before, plus, there will be more of it because the pasture's carrying capacity will be increased as the fire also takes care of the cedar. A third advantage would be decreasing the soil erosion problem. More grass will grow, therefore, there will be more roots and less soil erosion. Even if the animals are killed and habitats destroyed, your pasture will come back better than ever and become a better habitat for the new animals looking for a peaceful, well-managed home.

With goats, the ecological problems and advantages almost equal each other. When you try to control juniper with goats, you must not supply them with food they want so that they will use juniper as their emergency source. In order for this to happen they will overgraze your pasture. It may take longer for your desirable forage to come back. Another disadvantage of using goats is that goats cannot reach the tops of most juniper trees. With redberry being a root sprouter, even if they could reach the top, goats wouldn't be able to kill the tree unless they ate it totally. If they could reach the top of a blueberry juniper, their purpose would be served. Since most trees are out of that goat's reach, what's the use in overgrazing your land just

so the goats can mess around and try to kill the juniper?

An advantage of using goats would include controlling the juniper seedlings which fire cannot control. If you don't control the seedlings, they'll come back fast and make the same problem we first started with. With fire, you would have to come back nearly every 3 years to control the juniper seedlings. In this way, goats supplement the fire control.

In my opinion, fire and goats just about balance each other out. Although, fire destroys helpless animals' habitats, I believe it can do a lot of good. Fire is generally economical. My only problem with fire would be the short time periods it will take care of your juniper problems.

With goats, I feel the future is bright and future research will uncover many more advantages. The only problem I have with goat control is the fact of overgrazing the land. The information about goats and juniper is still very young but even now it seems to show that using goats can certainly be a choice.

What have I learned about writing this paper? Goats and Fire: A Possible Combination? Of course. If you use a combination, the money you'll put out for the burning will be restored by the fast income of goats. This balances out our economical problems. To eliminate our ecological problems, the overgrazing from the goats will be brought back quickly from the burning. The desirable forage will be even healthier for the goats. In the few years it takes for the goats to bring the range land back into fair condition, the seedlings will start to sprout and the goats will eat them and kill them, giving you an extra few years before you'll have to burn again.

With the conclusion I have reached, this cycle will just continue on and on forever. You get your income and the fulfillment of success to one of the largest range-management problems in the Edward's Plateau.

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