

MONITORING REPORT
COMPARISON OF BRUSH SPROUT
CONTROL METHODS

*Authorized by the Secure Rural Schools and Community
Self-Determination Act of 2000*

Coarsegold Resource Conservation District
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Introduction:

The ultimate goal of the Coarsegold Resource Conservation District (CRCD) is a fire safe landscape that produces abundant water. Over the last ten years, the CRCD board of directors (board) has been involved with 30,000 acres of fuel reduction, construction of 300 miles of fuel breaks, and construction of 100 miles of fire breaks. However, clearing excess brush and trees does not end the job of maintaining a fire safe landscape and increasing water production. Many species of brush and trees sprout after cutting and new trees and brush quickly reestablish after clearing because of increased sunlight and water. If not maintained, a fire safe landscape quickly becomes overgrown with brush and trees and becomes prone to catastrophic wildfire once again.

To address the maintenance problem, the CRCD board asked for and received a grant of \$18,400 to compare various brush sprout control methods and provide this information to all residents in Eastern Madera through a mass mailing. The board was required to offer \$3,500 in matching funds (As of October 1, 2004 matching funds totaled \$13,019.45). The grant was authorized by the Secure Rural Schools and Community Self-Determination Act of 2000. The Madera County Resource Advisory Committee and the United States Forest Service administrate the funds cooperatively.

The project compared maintenance of brush sprouts by goats, mechanical methods, and herbicide. The project included a target of 30 acres of brush sprout maintenance by goats and a 60-acre target for brush sprout maintenance by a hand crew.

Goats and other Animals:

The board had several reasons for including goats in the comparison analysis. First, board members wanted to see if grazing by goats was a viable method of maintaining brush sprouts. The group knew goats ate brush but would they eat what we wanted them to eat? Secondly, the board wanted to find out if an improvement in soil productivity through goat grazing could be detected. Scientists and soil specialists report improved soil conditions following goat grazing because their sharp hoofs push organic matter into the soil increasing percolation by aeration, mulching, and fertilization. Pushing organic material (carbon) into the soil helps both the water cycle and the carbon cycle because carbon remains in the soil rather being released into the atmosphere.

The board also wanted to see if the project would create a demand for goat grazing in Eastern Madera County thereby offering an opportunity for a new “cottage” industry.

Finally board members wanted residents of Eastern Madera County to have an alternative to chain sawing, weed eating, brush cutting, mowing, and herbicide.

Brushing by goats: The project included grazing goats on 30 acres. Rodney York, Shuteye Packgoats, agreed to use his goats for the project. His operation included a portable electric fence to control the goats and guard dogs, protecting them from predators. The dogs required daily feeding. Because goats tend to eat tastier things first, in order for the project to be successful, the goats had to be confined to a small area to force them to eat brush sprouts they might not ordinarily choose to feed on.

Tamar Armstrong, North Fork, cleared the brush from her 27-acre property in 2000. She agreed to use Mr. York's goats for maintaining brush sprouts. In addition, Mr. Ron Severe, also from North Fork, agreed to make the fuel break on his property available for the project once the goats were done with the Armstrong property.

The project reimbursement rate was for up to \$160 per acre for maintaining brush sprouts and up to \$500 per acre for clearing blackberries.

Monitoring: On April 30, 2003, Brent Roath, Regional Soil Scientist with the U. S. Forest Service and Dennis Dudley, Range Conservationist with the Department of National Resources, obtained pre-grazing samples. Mr. Roath established two 100 foot long tran-sects, one in an undisturbed blackberry patch and the other in an area cleared by a bulldozer. Five samples were taken from each transect to determine soil cover, bulk density and percent of organic carbon. Mr. Dudley established four 50 foot transects in the blackberry patch and three 50 foot transects in the area cleared by the bulldozer. In addition, photo points were established both in the blackberries and in the cleared area.

Mr. Dudley monitored grazing effect on vegetation on August 18, 2003 and Mr. Roath monitored grazing effect on soil on September 2, 2003.

Accomplishments: Nine acres of brush sprouts were maintained by goats including 7.5 acres on the Armstrong property and 1.5 acres on the Severe fuel break. Mr. York decided not to participate in the project in 2004 because of low forage values of the brush and higher than expected costs. No other person with enough goats to finish the 30-acre target could be found. The unused funding for goats was used to hire a hand crew to cut brush sprouts along the Road 274 Fuel Break and a contractor with a DR mower to cut brush for a day to demonstrate its capabilities. The acres accomplished by the crew and mower will ensure the 90-acre brush sprout maintenance target is met.

Results: The goats ate brush sprouts. They ate their way through the blackberry patch, devoured bear clover, and consumed brush sprouts of every kind. They ate some live oak sprouts and left some. On the Severe property they ate poison oak.

However, several problems were encountered: 1. The dogs had to be fed and checked every day. This meant someone had to drive to the Armstrong property every day raising labor costs significantly. 2. The forage value of the brush sprouts was low. 3. Brush sprouts, especially poison oak, came back in 2004. 4. The battery for the electric fence went dead; the goats escaped and stripped bark from manzanita the property owner was saving, (The property owner said the damaged manzanita lived.). In addition, the goats ate plants and flowers by Ms Armstrong's house and to make matters worse, the dogs killed her cat.

The monitoring went much better. Soil scientist Brent Roath said in his summary: "Overall, the effects of the goat grazing on soil characteristics such as soil cover, bulk density and organic carbon appear to be insignificant. The number of samples taken for bulk density and percentage of organic carbon determination was small but there did not appear to be any dramatic differences between pre and post-grazing characteristics."

It should be noted that in the blackberries, significant amounts of goat droppings were left on the site. These should eventually work their way into the soil. Furthermore, the organics would more than likely get punched into the ground if the goats were brought back into the blackberries when the ground was wet.

Range conservationist Dudley said, "All of the brush was almost totally defoliated. However, mortality was probably 0% since none of the stems were removed. Everything was already re-sprouting leaves and by next year it will look as if the goats were never there."

It should be pointed out that goats really like blackberries and may provide a good opportunity for brush clearing for landowners with a blackberry problem. A person could walk all through the blackberry patch after it was grazed while it was impassible before.

Costs:

Driving ...1,819 miles @ .36 per mile.....	\$654.84
Labor...189.50 @ \$10.00.....	\$1,895.00
Saw Expense: Gas, Two-Cycle Mix, Bar Oil, Chain, Files.....	\$108.38
Guardian Dog Care: Both canned and dry dog food.....	\$126.97
Goats: Both hay and grain.....	\$938.47
Fencing: Batteries, Charger, Tester, Water Dispenser, Energizer....	\$2,753.76
Total.....	\$6,477.42
Rate of Reimbursement: \$160 per Acre regular for 7 acres.....	\$1,120.00
Rate of Reimbursement: \$500 per Acre blackberries 2 acres.....	\$1,000.00
Total Reimbursement.....	\$2,120.00
Total Donated to Project by Rodney York.....	\$4,357.42

Average Cost per Acre: \$6,477.42 divided by 9 Acres equals \$719.71/ acre

Discussion: At first glance it appears grazing by goats is too expensive and has no lasting value. However, an examination of the costs show that many were long term investments: goat feed may have to be provided whether the goats are on a project or at home, and perhaps there is a more efficient method of protecting goats than dogs that need daily attention. In order for Mr. York to successfully work on this project he needed to invest \$1,327.08 in a premier portable fence/energizer, \$896.95 in a premier fencing/charger, \$153.30 in post/connectors/testers, and \$278.63 for a portable 110 gallon water dispenser. The total of these needed investments was \$2,655.96. For discussion purposes let's subtract that amount from the total. Also for discussion purposes let's assume we would have to feed the goats wherever they were. If this were the case we could subtract \$938.47. Literature suggests llamas are effective for protecting goats. If llamas are used instead of dogs, perhaps daily visits could be reduced to visits every other day thus cutting labor in half. This would reduce costs by \$947.50. In our hypothetical situation, costs would be reduced by \$4,541.93 making the cost of grazing 9 acres \$1,935.49. This would amount to a per acre cost of \$215.

Additional savings may be realized by having enough goats in the enclosure so that the fence could be moved every time the site was visited. This would maximize the acreage while minimizing the visits. Other savings undoubtedly could be made through experience.

This hypothetical cost analysis was not made to discredit any of Mr. York's hard work or to criticize the purchase of his needed investments, but to encourage others to explore the potential of getting into the goat herding business. It is the opinion of the CRCDC board that there is a demand for brush sprout maintenance by animals.

This project made one point abundantly clear: grazing goats to maintain brush sprouts is not a one-time procedure. It takes several years of grazing to get a property into a more permanent fire safe condition. Both a property owner near Kerckhoff Reservoir and a property owner from O'Neals told the project manager that it took five years of fairly intense goat grazing on their properties to really make a lasting difference. They both claimed that after five years, poison oak was virtually eliminated, brush sprouts were few and far between, and their properties were protected from fire.

During this project, two other potential options for property owners became apparent. Project manager Paul Rich was asked to make a presentation to the Manzanita Garden club. A few members of the club said they were considering the purchase of one of Mr. York's goats. They planned to tether it during the day and put it in a safe place at night. They felt if two or more families got involved, then the goat could be moved from property to property depending on who was available to take care of the goat. Mr. York said that at least two goats were needed because goats are gregarious and need company. It is not known if the women pursued goat grazing on their properties.

Another more appealing opportunity would be for a property owner or combination of property owners to invest in a small portable electric fence and move it after goats grazed an area to a fire safe condition. A resident from Leisure Acres purchased two female goats, 180 feet of electric fence and a battery. Her costs including extra feed were about \$700. She and

her husband enjoyed the goats and they did a good job brushing their property. She warned that goats took a lot of hard work including fence moving (the fence route must be brushed) and moving the goats from fenced area to the protected area every morning and every evening. They purchased their fence and batteries from Premier Feed and Supply, 2031 300 street, Washington, Iowa.

Other Animals: Horses, cattle, and sheep have all been effectively used to control brush sprouts. Horses and cattle are good at eating vegetation, trampling vegetation and pushing organic material into the soil. One successful technique has been to scatter the seed of the plants you want on an area and then turn in the livestock. The cattle or horses end up trampling both organic material and the desired seed into the ground. A family in Pony, Montana gained permission from several landowners to graze various properties. By using proper grazing techniques, soil conditions were improved and the fire danger reduced.

Their report titled “Horse Hooves Stimulate Desirable Vegetation, Our Real-World Experiments,” included ideas that might help those in Eastern Madera County who have horses or cattle. The report is based on grazing horses but the techniques should be applicable for cattle as well. Some note worthy excerpts from their report include the following:

“If you own a few horses and have limited forage available, then you are probably buying Hay all winter and through most of the summer already. You know why people call horses ‘hay-burners’, but you don’t have to throw all that money away for nothing. You can seize the opportunity to build up the health of the soil with every bale of hay.

“People usually throw the hay over the fence in the same spot every day. It might seem easy and convenient to do so, but then the horses stand in the same spot every day and crap in the same spot every day, until there is a visible manure pile at the feeding spot. By spring time the pasture is completely smothered in that one spot, killing out all the desirable vegetation, so that only weeds can grow there. The solution is as simple as feeding the animals in a different spot every day.

“Think about it every time you put out the hay-where is it needed most? Feed the animals where the ground is exposed and barren to trample organic matter into the soil. Throw hay out where there is standing dead vegetation or weeds that the horses don’t want to eat. They will eat the hay and trample the vegetation into the ground. Put the hay out in a different spot just about every day, being careful to avoid getting so much manure build up in one spot that it will smother the existing grass and forbs when they emerge during the growing season. Rotating the water trough and salt block around the pasture will also help to focus impact where needed.”

Conditions seem right in Eastern Madera County for someone to start a business using horses to control brush sprouts. Horses may be more practical than cattle for a brush sprout maintenance business because they are easier to load and unload. A potential contractor would probably need some sort of an electric fence in order to provide a grazing service for someone with an unfenced property.

Brush Sprout Maintenance by Mechanical Means:

The CRCD board wanted to find the cost effectiveness of brush sprout maintenance by using a hand crew. The 60-acre target was planned for the North Fork Mono Rancheria. The area had been cleared in 1999 and brush sprouts were becoming unmanageable. The work was to be done with a Native American crew. There were two additional objective of the project: 1. Encourage publicity to create public awareness of this local crew to enhance work opportunities in Eastern Madera County, and 2. Give the crew experience so they would be able to make accurate estimates when bidding future projects.

An opportunity occurred to try a second hand crew when Mr. York made the decision not to use his goats on the project in 2004 freeing up approximately \$2,700 dollars. In order to meet the 90-acre target of brush sprout maintenance, it was decided to cut the brush sprouts along the Road 274 fuel break where it crosses National Forest. This fuel break was constructed in 2000, 2001 and 2002 and had become badly overgrown in many locations. Central Sierra Pest Control did the brush sprout cutting.

North Fork Mono Rancheria Property: The North Fork Mono Rancheria Hand Crew cut 61.65 acres of brush sprouts on the North Fork Rancheria property and the surrounding Native American owned properties. The crew started working with chain saws and weed eaters. The budget for the crew was capped at \$160 per acre. It became apparent after the first week that to stay within the \$160 per acre budget, larger stems requiring cutting with a chain saw could not be treated. This meant the crew could only work on areas with light to moderate brush and limited them to weed eaters with both string and saw blades. In other words, live oak stems greater than one inch in diameter could not be treated.

The crew did a good job treating areas with the smaller diameter stems, but this necessitated leaving some critical fire prone areas. It was planned to treat these areas with funds from the Eastern Madera County Fire Safe Council.

Monitoring was accomplished by frequent visits to the site and before and after pictures. The brushing reduced the fire danger for 2003 and set the brush back for a year or two.

The cost for cutting brush sprouts on 61.65 acres of Rancheria and Native American property was \$8,918.80. The average per acre costs were \$144.67.

Road 274 Fuel Break: As of this writing, the Central Sierra Pest Control crew cut brush sprouts on 16.4 acres of the Road 274 fuel break. Most of the work was accomplished with chain saws. However, some of the smaller brush was cut with weed eaters with blades. Only brush that had sprouts was cut as opposed to cutting all vegetation common for hazard reduction projects.

Monitoring was accomplished by visually driving along Road 274.

The Central Sierra Pest Control crew cut brush sprouts on 16.4 acres for \$1,080.00. The rate they used was \$24.00 per hour, \$10.00 per hour less than the normal rate. The average per acre cost was \$65.85. If the normal rate were used, the cost would have been \$93 per acre. The reduced price was made to increase the Crud's cost share portion of the project and increase the acres that could be treated. The project has been held up for the last two months because of high fire danger. The results of the additional work are not expected to change the findings in this report except to add additional completed acres.

Discussion: Using some form of mechanical device to cut grass, weeds, brush and small trees is the most common method used by property owners in Eastern Madera County to maintain a fire safe landscape. The advantages are the tools are relatively inexpensive and easy to use. The disadvantage is the brush sprouts come back every year.

Neither the Rancheria nor the fuel break had been treated since initial clearing. The brush, trees and weeds were much thicker on the Rancheria property than the fuel break mainly because the vegetation had a few more years to grow. This resulted in a higher cost per acre. In addition, the Rancheria crew cut grass and weeds creating a more fire safe landscape. The objective for the fuel break was to only cut brush sprouts in order to maintain the integrity of the fuel break.

In summary, both the North Fork Mono Rancheria hand crew and the Central Sierra Pest Control crew did a good job.

Other Commonly Used Tools for Controlling Brush Sprouts:

Weed eaters, trimmers, and lawn mowers can be effectively used to treat brush sprouts and make a property fire safe. However they can only be used if the sprouts are small and easily cut. Lawn mowers can only be used on relatively flat ground free from rocks and stumps. Many property owners use a variety of these tools. However, it is imperative the property is treated at least once a year or chain saws will have to be used to cut the larger stems. Neglect of this principal results in an area's rather rapid return to a fire prone condition.

A tool not so commonly used is a DR Mower. A North Fork property owner, entered into a contract with Rich Harrell, (His business name is Weedless), also of North Fork to treat his property with a DR Mower. Mr. Harrell charged about \$90 per acre. The results were a fire safe property that really looked nice. A demonstration area using a DR Mower was completed near the intersection of the Old Central Camp Road and Road 274). Property owners have the opportunity to hire a contractor with a DR Mower or rent one from Lister Rents in Oakhurst.

It should be noted that once a cleared property is overgrown with brush, a bulldozer isn't a good option for several years because brush sprouts tend to push over rather than pull out. This means the dozer blade has to be in the ground to get the roots resulting in significant topsoil being pushed into brush piles. Burning piles of brush adds smoke to the atmosphere.

The cost of re-clearing a property with a bulldozer is normally more than \$200 per acre, not counting the cost of burning the soil filled piles.

Brush Sprout Maintenance by Herbicide

The CRCD board has considerable experience treating brush with herbicide. In 1999, the board received a \$287,500 grant to help property owners clear their land and follow-up with a treatment of herbicide to control brush sprouts. Licensed contractors treated over 900 acres with herbicide. The most common treatment was with a combination of Garlon and Roundup. Results varied but for the most part, properties needed more than one treatment and some were treated each year for three years. Costs ranged from \$80 per acre to \$130 per acre.

One North Fork property owner who participated in the 1999 project, elected to spray herbicide on brush sprouts on his property using Brush-B-Gone purchased at a local hardware store. For two years he carefully applied herbicide to each brush sprout as it came up. This resulted in him going over his property many times both years. To get rid of live oak sprouts, he re-cut sprouts and painted freshly cut stumps with straight chemical. This technique killed the live oak sprouts. He was unable to control coffee berry despite several applications of herbicide. He expects his property to be fire safe for several years even though he will continue to work on the coffee berry.

For the current project, the board elected to spray 2,4-D L.V.6 Selected Weed Killer on brush sprouts on the Road 274 fuel break where Madera County owns the property. Matching funds from the CRCD were used. The results appear to be almost a total kill of the sprouts with no need to re-spray or re-treat for several years. The costs were approximately \$1,000 in chemicals and \$2,535 in contract costs to spray 33.8 acres. This amounts to approximately \$105 per acre. This herbicide must be applied with a licensed applicator.

These results are similar to the experience employees on the Wyle Ranch (North Fork) have gained over the last six or eight years using 2,4-D L.V.6 Selected Weed Killer. They found 90 to 95 percent of the brush sprouts were killed from the first application. The crew then returns to pick up missed spots and sprouts that were not totally dead. Treated areas have not had to be re-sprayed. Costs have ranged up to \$175 per acre depending on the density of the brush sprouts being treated.

The board has a limited quantity of 2,4-D L.V.6 Selected Weed Killer on hand for use on private properties that have been cleared. The herbicide will only be released to a licensed applicator.

Conclusions

The CRCSD board is committed to encouraging property owners to maintain their property in a fire safe condition to reduce the threat of catastrophic fire and increase the amount of water in our watersheds. This comparison of brush sprout maintenance techniques gives property owners an opportunity to examine what others are doing to control brush and apply them to their own property where applicable. Some conclusions can be made from this study:

- ❖ Clear surplus vegetation from your property to make it fire safe!
- ❖ Maintain your property in a fire safe condition!

Control of Brush Sprouts by Livestock:

- ❖ Goats, sheep, horses and cattle are viable tools for controlling brush.
- ❖ To our knowledge, there are no contractors in Eastern Madera County with livestock for rent for controlling brush sprouts.
- ❖ Goats can be used to get rid of poison oak and blackberry.
- ❖ Goats must be protected from predators.
- ❖ Livestock, if properly managed while controlling brush sprouts, have the potential to increase rainwater percolation deep into the soil by aeration, mulching, and fertilization.
- ❖ Livestock must graze an area for several years to gain a more permanent fire safe landscape.
- ❖ Livestock must be controlled or they will eat the wrong vegetation (someone's flowers).

Control of Brush Sprouts by Mechanical Methods

- ❖ Mechanical tools are common methods of controlling brush sprouts.
- ❖ Both individual contractors and crews are available for hire for cutting brush sprouts.
- ❖ Properties maintained by cutting brush sprouts must be maintained every year forever (if brush is cut extremely close to the ground like with a D R mower, it may be possible to skip a year or even two).

Control of Brush Sprouts by Herbicide:

- ❖ Properties sprayed with Garlon and Roundup needed several follow-up treatments.
- ❖ Through perseverance, one property owner had good long-term success using Brush B Gone.
- ❖ Properties sprayed with 2,4-D L.V.6 Selected Weed Killer were maintained for a number of years with one application.
- ❖ Both Garlon and 2,4-D L.V.6 must be applied with a licensed applicator.

The importance of putting your property in a fire safe condition and then maintaining it that way cannot be over emphasized. The condition of your property affects your neighbors and the condition of your neighbor's property affects your property. We are all in this together.

To promote a fire safe landscape throughout Eastern Madera County, the CRCDD board has dedicated a portion of its web site to information exchange. This site would give property owners an opportunity to share success stories and ask questions. It would give contractors, stores, and rental agencies an opportunity to advertise. And it would give the CRCDD board an opportunity to pass on pertinent information. Our web site is <http://www.crcdd.org>