

How Much Does It Cost To Burn?

Russell Stevens, Hugh Aljoe, Terry Stuart Forst, Frank Motal, and Kent Shankles
The Samuel Roberts Noble Foundation, 1996

Prescribed burning has become a tool commonly used by ranchers as a means for brush control and improving forage quality and manipulating wildlife habitat. Although prescribed burning is a very effective tool for accomplishing these tasks, it can be incorrectly applied. Burning, just like any management tool, should only be applied once the need for the burn has been properly evaluated.

Once a rancher has determined that a prescribed burn can be effective, a burn plan should be developed. This plan is critical to the success of a prescribed burn for two reasons: First, a properly planned burn is not as likely to get out of control as a burn implemented without forethought, therefore reducing liability. And second, prescribed burns, like all other management tools, cost money to apply.

Following is a description of the costs associated with prescribed burning on one of the Noble Foundation properties and on that of Terry Stuart Forst, a Noble Foundation cooperator, who has graciously provided an overview of prescribed burning costs on her properties.

There have been several prescribed burns conducted on the Noble Foundation/D. Joyce Coffey Resource and Demonstration Ranch. The Coffey ranch is located west of

Marietta Oklahoma and has a variety of topographical features and plant communities from which to evaluate the effects of prescribed burning. It has also provided the opportunity to develop approximate costs involved with conducting prescribed burns.

Materials

If prescribed burning is to be implemented as part of the management of any given ranch, specialized equipment will be needed. Some of this equipment can be purchased or made from existing equipment on the ranch. Other equipment such as tractors, 4-wheelers, sprayers and bush hog mowers are probably already being used in the day to day operation of the ranch.

It is important to keep in mind that the burn plan will largely determine the equipment and tools to be used. Size of the area to be burned, types and widths of fireguards, fuel type and load, etc., should be known to properly select the correct equipment. Don't get caught with a sprayer that is too small!

Equipment used to conduct burns on the Coffey Ranch included: a 4-wheeler, a fifty gallon sprayer designed to be pulled by a 4-wheeler, a cattle sprayer, a bush hog mower, a tractor and a fire truck (brush unit). As previously men-



*Burning broomsedge bluestem (*Andropogon virginicus*) using a mowed fireguard and wetline to contain the fire.*

tioned, much of this equipment is already on the ranch. The fire truck is not an everyday item but, there are many different types of spray rigs that will serve as an adequate substitute.

Equipment used to conduct burns on the Coffey Ranch included: two drip torchs, four fire rakes and three back pack sprayers (Table 1). With a little ingenuity, a person can make a drip torch, or one can be ordered from a forestry supply catalog for approximately \$145.00. A piece of old sickle bar 1.5 feet long can be converted into a fire rake or they can be purchased for around \$21.00. A reliable back pack sprayer is more difficult to make but can be purchased for approximately \$135.00. The cost associated with tool and equipment use on the Coffey Ranch burns are listed in Table 1.



Burning broomsedge bluestem.

TABLE 1
BURNING COST PER ACRE ON TIMBER
COFFEY RANCH - 1996

Costs	Total
Fuel\$ 83.10 (Drip Torch, Fire Truck, Tractor, 4-wheeler, sprayers) Diesel - 35 gal @ \$1.05/gal Gasoline - 45 gal @ \$1.03/gal.	
Fireguard Preparation\$729.00 Mowing - 13 hrs (1 man @ \$6/hr) 13 man hrs @ \$6/hr. = \$78 Raking - 16 hrs (6 men @ \$6/hr) 96 man hrs. @ \$6/hr. = \$576 Dozing - 15 hrs @ \$40/hr (8 yr life) = \$75	
Labor for Actual Burn\$936.00 (6 men @ \$6.00/hr) - 5 burns No. hours for burn - 26 hrs. (156 man hrs @ \$6/hr)	
Tool Use Cost-Purchase basis\$135.80 (5 year life) 2 Drip Torches - \$190/5 =\$ 38.00 4 Fire Rakes - \$84/5 =\$ 16.80 3 Back Pack Sprayers - \$405/5 = \$ 81.00 \$135.80	
Equipment Cost-Rental basis\$596.69 (0.008 x Equipment cost) 4-wheeler - \$40/day (1.1 days) =\$ 44.00 4-wheeler sprayer-\$12/day (1.1 days) = \$ 13.20 Cattle sprayer - \$8/day (1.1 days) =\$ 8.80 Bush Hog (1 day) =\$ 21.60 Tractor - \$234/day (1.1 days) =\$257.40 Fire truck - \$234/day (1.1 days) =\$250.80 Fire Igniter - \$0.89/box =\$0.89 \$596.69	
Grazing Loss Cost - lease rate\$337.68 607.83 ac (\$5/ac) = \$3,039.15/yr \$3,039.15/yr divided by 9 A.U.D./ac/yr	
Total Cost.\$2,818.27	
Total Acres Burned608.00	
Total Cost/Acre\$4.64/ac	

Labor

Labor is the most costly item associated with prescribed burning. Topography and type of fire guard probably influence labor costs more than any other factor. Areas surrounded by rivers, crop fields or roads are usually less expensive to burn. Areas containing rolling hills or steep slopes with timber usually require the mechanical or physical establishment of fireguards, increasing the amount of labor and cost of the burn.

The Coffey Ranch burns required a substantial labor force to prepare fireguards. Topography in the burned areas consisted of steep slopes with fairly dense stands of timber. Some of the fireguards in the timber (0.63 miles) were dozed. Others, where erosion was of concern (mainly on the steep slopes) were raked (0.56 miles). One and a half miles of open native grass areas were mowed. Dozed and mowed fireguards were about twelve feet wide and fireguards established by raking were about four feet wide.

Because of the topography and odd shape of the burns, the time required to set the appropriate back fires and flank fires to contain the head fire was increased. This slowed the progress of setting the fire, increasing labor costs. The burn crew consisted of six men. Excess labor should be avoided, but labor should not be short at the time of setting the fire. This is not the time to cut corners. If something goes wrong, you will want the extra men available. Labor costs associated with preparing the fireguards and burn day on the Coffey Ranch are listed in Table 1.

Grazing Costs

There can be some costs incurred due to the loss of grazing a pasture. Production may be lost due to deferment during the latter part of the growing season (or a full growing season) to allow for fine fuel accumulation. It is generally not recommended to turn cattle in immediately after the grass greens up. Depending on prescribed burning frequency, this production is not lost, but is shifted to a different season of grazing.

The areas burned on the Coffey Ranch were mostly timber and of little value to the overall forage production on the



Using a backfire to burn broomsedge bluestem.

ranch. However, our goal is to increase the production in these areas for both cattle and wildlife. From past records, we determined the grazing value of these areas to be the equivalent of nine Animal Unit Days (A.U.D.'s) per acre per year (A.U.D. = 26 lbs DM * 9 A.U.D./ac). The value of a grazing lease with this amount of production was set at \$5.00 per acre. Our costs due to grazing loss are shown in Table 1.

The Stuart Ranches

Terry Stuart Forst manages two ranches in Oklahoma (located in Jefferson and Bryan counties) of which prescribed burning is part of the management plan. Objectives for using prescribed burning on both ranches are to decrease brush and to improve forage quality and wildlife habitat. Table 2 shows the cost associated with burning grasslands on the Waurika division in Jefferson County while Table 3 shows the costs associated with burning grassland/timber on the Headquarters ranch in Bryan County.

The fuel costs incurred on both ranches include fuel used in preparing fireguards and all fuel used in conducting the actual burn. Fireguards on the ranches were established by



Eastern Red Cedar killed during a winter grassland burn.

TABLE 2
BURNING COST PER ACRE
ON GRASSLAND
WAURIKA DIVISION, STUART RANCH - 1996

Costs	Total
Fuel (Drip Torch, Fire Truck, Tractor, Pick-ups, 4-wheeler, sprayers) Diesel - 180 gal @ \$0.69/gal Gasoline - 80 gal @ \$0.97/gal Propane - 30 gal @ \$0.79/gal	\$225.50
Fireguard Preparation Discing - (1 man for 5 days @ \$50/day)	\$250.00
Labor for Actual Burn (8 people for 1 day plus meals)	\$694.00
Total Cost	\$1,169.50
Total Acres Burned	<u>5,000</u>
Total Cost/Acre	\$.023/ac

discing and dozing. Note the difference in costs with fireguard preparation between the two ranches (Tables 2 and 3). The increased cost in fireguard establishment associated with the Headquarters ranch is primarily due to the dozer needed in this type of topography and timber. Also note that tools are not included in the tables. The same tools listed in Table 1 are used by the Stuart Ranches, but they have been fully depreciated through previous prescribed burns.

The grazing method employed at both burn sites is best described as intensive early growing-season grazing with complete late-growing season rest. Therefore, the Stuart

TABLE 3
BURNING COST PER ACRE
ON GRASSLAND/TIMBER
HEADQUARTERS, STUART RANCH - 1996

Costs	Total
Fuel (Drip Torch, Fire Truck, Tractor, Pick-ups, 4-wheeler, sprayers) Diesel - 548 gal @ \$0.79/gal Gasoline - 40 gal @ \$1.07/gal Propane - 60 gal @ \$0.79/gal	\$523.12
Fireguard Preparation Discing - (1 man for 3 days @ \$53.85/day) Repairs - \$256 Dozer - (4 days @ \$100/day) = \$400	\$817.55
Labor for Actual Burn (5 people for 1.5 days plus meals)	\$740.00
Total Cost	\$2,080.67
Total Acres Burned	<u>5,976</u>
Total Cost/Acre	\$.035/ac



Post oak (Quercus stellata) scarred by winter burning. Leaves were the main sources of fuel load.

Ranch cost figures do not include grazing loss costs.

Cost Comparisons

It is interesting to note the cost per acre on the two Stuart Ranches as compared to the Coffey Ranch. This easily demonstrates that as the size (acres) increases, the cost per acre decreases. Therefore, the size (acres) of the burn should be a major consideration when determining costs. Topography and vegetation types are other factors that can influence the costs associated with prescribed burning. Still, the cost increase due to topography and vegetation can be diluted if the number of acres burned is large enough.

Liability of Prescribed Burning

One item of concern for many ranchers considering prescribed burning as a management tool is liability. Even with the best of burn plans, proper equipment and materials, and appropriate preparations and labor, there is always the possibility that a fire can escape. This possibility is unfortunate for all parties involved, but a rancher can protect his property and any potential 'claimants' with proper insurance. In fact, most basic Farm Owner's Policies cover the legal liability aspects of prescribed burning if negligence is involved. Policy limits may range from \$25,000 for a basic farm owner's policy to \$500,000 for a complete umbrella farm owner's policy. Since most ranchers already have in place this type of coverage, it is just a simple matter of checking with the insurance company issuing the policy before planning the prescribed burn and determine the limits on liability coverage.

Ranchers utilizing prescribed burning are also encour-

aged to keep a detailed record of the preparations before and during the burn. This information should include fire-guard preparation, the climatic conditions at the setting of the prescribed burn, and relevant events during the prescribed burn. A successful prescribed burning program history could prove valuable from a liability standpoint should this unfortunate situation occur.

The following are two good sources for burning supplies:

Forestry Suppliers, Inc.

P.O. Box 8397
Jackson, MS 39284-8397
Sales Dept. 1-800-647-5368

Ben Meadows Company

3589 Broad Street
Atlanta, GA 30341
Sales Dept. 1-800-241-6401

Authors are wildlife and range specialist, forage specialist, Stuart Ranch manager & Noble Foundation cooperator, research technician and Coffey Ranch manager, respectively.