

332
PACIFIC

SOUTHWEST



FOREST & RANGE EXPERIMENT STATION

Berkeley, California

1966

Reference File No. 332

FORESTRY SCIENCES LIBRARY
ROCKY MT. EXPT. STATION
FLAGSTAFF

Disposal of Logging Slash, Thinnings, and Brush by Burying

HARRY E. SCHIMKE and RONALD H. DOUGHERTY

ABSTRACT: A feasibility study was conducted on the Stanislaus National Forest to find out if logging slash, thinnings, and brush could be disposed of by burying. This method of slash disposal shows promise and has some distinct advantages over disposal by chipping and burning.

Forest and wildland managers continually seek better logging slash and brush disposal methods. The slash and brush usually cannot be burned safely in summer because of fire danger. And in winter conditions often are too wet to permit burning. Brush has

been disposed of by burying in southern California.

To see if this method would be feasible, we conducted a study on the Stanislaus National Forest in central California. Slash was buried in various types of pits and trenches. The cost of burying slash compared favorably with other methods of slash disposal; it proved cheaper than chipping but somewhat costlier than piling and burning.

Method of Burying Slash

In the fall of 1964, we set out two 1-acre plots in a newly logged 10-acre clearcut block. One plot faced north, the other south. This virgin stand consisted of 75 percent ponderosa pine (*Pinus ponderosa*), 23-percent sugar pine (*P. lambertiana*), and 2 percent incense cedar (*Libocedrus decurrens*). These plots also were covered by a heavy stand of manzanita brush (*Arctostaphylos viscida* Parry). A total of 35,990 board feet of merchantable timber was logged from Plot 1 and 44,490 from Plot 2. The usual procedure after this type of logging operation is to bunch or windrow the undesirable logs, slash, and brush for future burning.

Several types of pits and trenches were dug in the process of determining which type was most suitable for burying the slash and brush. Some of these were positioned up and down the hill; others were dug on the contour. The trenches averaged 12 to 14 feet wide, 4 to 5 feet deep, and 30 to 60 feet in length. These plots required a pit or trench for each 1/4 acre of slash and brush. Digging larger trenches and moving the slash from areas larger than 1/4 acre slowed the operation. In most cases the trenches were dug first, then the slash and

brush were cleared and pushed into them in one operation. It was easier and faster to dig the trenches up and down the hill than on the contour. A tractor-bulldozer could push the slash into the pit from each side. At times slash can be deposited into the heads of draws and ravines and then covered with dirt.

Time Requirement

It took an average of 13 minutes to dig a trench 10 to 12 feet wide, 50 feet long, and 4 to 5 feet deep, and about 26 minutes to clear and push the slash and brush from 1/4 acre into it. An additional 11 minutes were required to cover the trench with dirt. There was enough dirt mixed with the slash to promote decomposition and help reduce settling depressions. The total time to clear and bury the slash on Plot 1 was 3 hours and 20 minutes, and 3 hours and 40 minutes on Plot 2.

Before burying, all slash material was measured and counted and a volume and weight calculation made. Slash weight tables for westside Sierra Nevada conifers¹ were used to determine the amount of slash remaining after the merchantable timber had been removed. The brush weights were determined by weighing numerous sample plants in all sizes, obtaining an average weight, and multiplying by the number of plants. The weight of slash and brush buried on the two plots was as follows:

	Plot 1	Plot 2
	- - (tons) - -	- -
Slash:		
Slash	15	20
Cull logs	6	5
Brush	18	18
Total	39	43

Relative Costs

The costs of burying slash in this feasibility study were as follows:

	Plot 1	Plot 2
	Costs ¹	
	(dollars)	
Unit:		
Per acre	67.16	73.87
Per M bd. ft. of timber cut	1.87	1.66
Per ton of buried slash	1.72	1.72

¹Based on tractor rental of \$17.00 per hour, including operator's wages, maintenance, and operation; rates for supervisor-swamper at \$3.15 per hour (GS-7 permanent grade, U.S. Forest Service, Calif. Region rates, 1964).

¹Chandler, Craig C. Slash weight tables for westside mixed conifers. U.S. Forest Serv. Pacific SW. Forest & Range Exp. Sta. Tech. Paper 48, 21 pp. 1960.

If all the buried material on the two plots could have been chipped, the chipping cost would be \$108.03 for Plot 1, and \$119.11 for Plot 2.² Because much of the material exceeded 4 inches diameter, it was considered too large to chip. All brush could have been chipped.

In 1964, the cost per acre for clearing slash by tractor averaged \$42.70 on the Stanislaus National Forest (contract prices for this work ranged from \$32.50 to \$49.90); for burning slash, \$15; or an average total cost of \$57.70 per acre.

In addition, some random burying tests were made while constructing fuel-breaks in heavy manzanita brush and in heavy pine reproduction stands which had been thinned by tractors. Costs for burying the brush averaged \$102 per acre. The cost for burying the thinned material averaged \$103 per acre.

Discussion

There are both advantages and disadvantages in disposing of slash by burying. Some objections to burying slash are:

1. Slash cannot be buried in rocky areas.
2. Slash cannot be buried on steep ground. Generally, though, if the slash can be mechanically cleared, it can be buried.
3. Large cull logs and snags are difficult to bury, primarily because they are too long. They could be cut in two or three lengths and then buried, but often can be left on the ground. Scattered isolated logs are usually not a serious fire hazard nor a deterrent to regeneration.
4. On certain slash projects, such as clearing for road right-of-way, finding room to bury the slash may be difficult.

Among the advantages of burying slash are:

1. Slash can be buried immediately after it has been created. This situation would enable timber sales to be closed sooner.
2. There is no slash burning job to be done, with its inherent problems of planning, patrol, mop-up, and possible fire escape.
3. The ground is immediately available for planting or other purposes.
4. The area looks better because scorched areas and "skeletons" of old burned piles are not present. This advantage is especially important in roadside and recreation zones.
5. Early deep snows often prevent the burning of slash in higher elevation logged areas. Burying the slash in summer eliminates this problem entirely.
6. Burying slash may be desirable on many fuel-break areas where burning would have to be done in confined areas under varied conditions.

²Based on the cost of \$2.77 per ton for chipping green slash. See Schimke, Harry E. Chipping of thinning slash on fuel-breaks. U.S. Forest Serv. Pacific SW. Forest & Range Exp. Sta. Res. Note 58, 4 pp. 1964.

7. A combination of burying-burning may be advantageous on many land clearing projects. The control lines could be widened and strengthened by burying the slash in areas difficult to burn. On some disposal jobs the slash could be buried on the better areas and used as control lines; slash on rocky or steep ground could then be burned.

Inasmuch as this was only a feasibility study, it did not cover all conditions normally encountered in logging and fuel-break clearing operations. The study was, however, conducted under most conditions common to these operations. Further study would test slash burying under a wider range of conditions and seek to develop techniques and methods which would promote efficiency and reduced costs.

The Authors

are forestry research technicians with the fire research staff. HARRY E. SCHIMKE, formerly with the Calaveras Ranger District, Stanislaus National Forest, joined the Station staff in 1962. RONALD H. DOUGHERTY transferred to the Station in 1965, after service on the Sequoia, Sierra, and Stanislaus National Forests in California.