S ANGELES COUNTY FIRE DEPARTMENT

S. DEPARTMENT OF AGRICULTURE
PACIFIC SOUTHWEST FOREST AND RANGE
EXPERIMENT STATION
FOREST SERVICE, REGION 5

FUEL-BREAK REPORT NO. 5

HOW MUCH DOES IT COST TO SPRAY BRUSH ON SOUTHERN CALIFORNIA FUEL-BREAKS?

How much does it cost? This is one of the most common questions asked of FUEL-BREAK researchers--and until now one of the toughest to answer. We are able to tell how a job is done, but cost information has usually been hard to obtain because of the many variables and the hard-to-measure "contributed time" involved.

Now, after three years FUEL-BREAK experience in southern California and some careful record-keeping by our cooperators, we have some useful and reliable cost estimates on broadcast chemical spraying of fuel-breaks and type conversion projects. Although costs per acre are quite variable, the average figures can be used as reliable estimating guides by wildland managers. For example, we found that for the 1958-1960 period the average cost per acre of spraying mixed chaparral brush by helicopter was about $21.00. This figure includes both the "paid for" and contributed costs for applying 6 pounds, acid equivalent, of a 50/50 brushkiller mixture of 2,4-D and 2,4,5-T in 20 gallons of emulsion per acre. This amount was applied in two flights of 10 gallons each. To do the same job in the chamise-sage type, where only 2,4-D was used, the average cost was about $18.50.

Breakdown of the costs for helicopter spraying was:

	Chamise-sage	Mixed chaparral
Materials	$5.50 (2,4-D)	$8.00 (50/50 brushkiller)
Transport	1.00	1.00
Operation	8.00	8.00
Manpower	4.00	4.00
Total	$18.50	$21.00

Material costs will be higher than those shown above if chemicals are bought at retail rather than at government bid price or if improper supervision leads to excessive rate of application. Material costs could be lowered by developing spraying techniques which are effective at lower rates per acre.

Transport costs per acre depend almost entirely on distance to the job and the size of the area to be sprayed. Our costs have been as low as 56 cents per acre on a 90-acre job where the helicopter was hauled in by truck, and as high as $21.78 per acre on a 10-acre experimental area where the helicopter had to be flown to the site.

Operation costs depend to a large extent on the availability of water. Water hauling and equipment mileage to remote areas has raised our operational costs to as high as $9.42 per acre. On the other hand, we got by with $4.51 per acre on an exceptionally accessible job. This figure is little more than actual cost of the helicopter flying.

Manpower costs will vary with the efficiency of planning and supervision and, to some extent, with the size of the area. Our costs have varied from $1.90 to $6.25 per acre. Manpower costs, as well as operational costs, could be cut nearly in half if we were to develop an effective single-pass spraying technique for helicopter.

For tractor-boom spraying, applying 4 pounds, acid equivalent, of chemical in 20 gallons emulsion per acre with a single pass, the average costs were:

	Chamise-sage	Mixed chaparral
Materials	$ 4.00	$ 6.00
Transport	1.00	1.00
Operation	4.50	4.50
Manpower	3.50	3.50
Total	$13.00	$15.00

Costs of materials and transport will vary much as they do for helicopter spraying. Operation and manpower costs will increase markedly on steep slopes or rocky areas. On a couple of our jobs these costs were 2 to 4 times the average.

The decision on whether to use copters or tractors will depend largely on the factors governing tractor operation. We prefer the more positive application by tractors, but if they can't be used efficiently, the helicopter will be cheapest.

So far, we have only a few large hand spraying jobs, inadequate to develop accurate cost estimates. The costs have ranged from about $25.00 to $50.00 an acre. We feel certain that hand spraying will always be much more expensive than either tractor or helicopter work. However, for some particularly hard-to-kill species, we know of no substitute for saturation spraying of individual plants by hand.

Costs have been rather high in this pioneering work on spraying of brush in southern California. So far, we have concentrated on developing consistently effective methods rather than cheap methods. We expect that in the future the costs can be lowered by improved techniques and large-scale operation.