

## RANGE

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Cost analyses of 36 burns involving 38,410 acres in Shasta County show somewhat lower costs, averaging \$0.38 per acre in 1952 and \$0.54 per acre in 1953. In one instance a cost of \$5.00 per acre was indicated for crushing brush.

Studies in San Benito County indicate that the area receiving the most intensive—and expensive—treatment showed a profit about 50% greater than did the area given the least expensive treatment. Even more important, however, is the fact that the former is now practically cleared of brush, and its forage production is increasing, while the latter is reverting to brush, with a decline in forage quality.

Current research is directed toward assisting cattlemen to attain complete, permanent removal of brush and replacement with good forage species of high nutritive value.

### Chemical Control

Chemicals are widely used for control of undesirable woody species on lands which offer good potential for range feed production. The principal chemicals used are 2,4-D, 2,4,5-T, when used in accordance with label instructions, and the combination of the two, commonly referred to as brush-killer. Coyote brush, coast sagebrush, purple sage, white sage and mixed coastal brush are effectively controlled and suppressed by these materials, as are sprouting chamise and chamise seedlings. Old chamise and the chaparral, including the various manzanitas and ceanothus species, are not controlled by the now known chemicals until after burning. Sprouts and seedlings are then controllable by foliage application of 2,4-D, 2,4,5-T, or mixtures of the two.

More effective chemicals may be developed, which can be adapted to a wider range of species. Economic data on use of chemicals are somewhat meager, mainly because chemicals have not been

used so extensively as fire. Information available on injection of 2,4-D in species of oak indicates costs of about 3¢ to 5¢ for a 10' tree.

Costs per acre of chemical brush control range from less than \$5.00 to as high as \$50.00. Generally the cost of the chemical will range from \$2.00 to \$5.00 per acre per application, to which must be added the cost of applying the material, which will vary from \$1.00 to \$5.00 per acre if done by aircraft. Sagebrush—desert—was controlled for \$3.50 to \$5.00 per acre, materials and application. Excellent control has been obtained on several hundred acres in Sierra Valley from one aerial application.

#### Comparative Costs Per Acre of Various Methods of Brush Removal

CONTROLLED FIRE			
Northern California 1947-48, \$0.45 to \$2.95			
Shasta County:			
	Ave.	Low	High
1952 .....	\$0.38	\$0.15	\$3.33
1953 .....	\$0.54	\$0.14	\$5.52
San Benito County:			
Low .....			\$ 7.26
High .....			\$43.24
AVERAGE STATEWIDE, 1959:			
No preburn preparation, \$3.00 to \$4.00			
With preburn preparation, \$5.00 to \$12.00			
CHEMICALS			
Ranges from \$3.50 to \$50.00			
General:			
Material, \$2.00 to \$3.50			
Application, \$4.00 to \$5.00			
Desert sagebrush:			
\$3.50 to \$5.00			
MECHANICAL			
San Mateo and Santa Clara Counties:			
Low .....			\$8.00
High .....			\$50.00

Without proper application, two and sometimes three treatments may be necessary. Hand applications with the knapsack sprayer, on follow-up chemical treatment, seem invariably to result in a more satisfactory job. This is simply a matter of thoroughness in wetting. With hand applications, labor costs usually exceed the cost of the chemical.

### Mechanical Control

Mechanical control of brush has shown some increase during the past few years. This practice has always been most widely accepted in southern California,

where climatic conditions make burning less acceptable and where some of the brush problem occurs on areas which lend themselves readily to disking.

Costs of mechanical clearing vary from \$8.00 to \$50.00 per acre, for tractor and labor, and average approximately \$25.00 per acre in most instances.

Many operators prefer to leave the knocked-down material in place for two or three years and complete the clean-up job with a broadcast control fire during late summer or fall. This method helps later forage plant stand establishment because of the general distribution of ash. Other operators either windrow or stack the brush in isolated piles and leave it for from one to several years. The piled material is cleaned up by winter burning when fire restrictions are not in operation.

Excessive soil disturbance during tractor clearing operations often restricts establishment of seeded grasses and legumes. Mechanically cleared brushlands may present a serious erosion hazard.

The controlled burning of brush, followed where needed by chemical treatment of regrowth and seeding of improved forage plants, is converting brush areas to grass. Controlled burning, properly planned and managed, brings many benefits to everyone.

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## HEATING AND COOLING

### of dwellings under study

Investigations at Davis seek basic answers to the problems of making houses as efficient and economical as possible for heating and cooling. Among the chief objectives of the study are to assess the effects of solar radiation in occupied dwellings; to find the most desirable amounts of heat from the sun within houses in the various climatic environments of California; and to evaluate methods of control for shading openings to modify the effects of heat from the sun.

Tests are being conducted in actual tract houses and experimental structures including a trailer, cubicles, and panels.

—Richard D. Cramer, Dept. of Home Economics, Davis.

Cost Summary—Spring Dell Study Area, San Benito County, 1950-58\*

Treatment	Cost /acre	Lbs. beef/A	Value @ 21¢/lb.	Net profit/A
A Burn plus reburn .....	\$ 7.26	187.0	\$ 39.27	\$32.01
B Burn, seeded, reburn, seeded .....	15.37	218.4	45.86	30.49
C Burn, seeded, reburn, seeded .....	20.43	302.3	63.48	43.05
D Mashed, burned, seeded, chemicals 3x .....	43.24	476.4	100.04	56.80

\* Spring Dell Study area is one of the range improvement field studies conducted by the California Division of Forestry in cooperation with University of California.