



Typical brushland at the Ranchita Range Study area in San Luis Obispo County before conversion (left photo), as compared with appearance a year later after the brush had been crushed and burned (right photo)—and good forage grass cover that followed (photo opposite page).

# A 10-year range study shows... BRUSH CONVERSION COSTS AND RETURNS in San Luis Obispo County

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The Ranchita Range Study in San Luis Obispo County demonstrated that the complete conversion of California brushland to grass and legumes using mechanical clearing methods can be economical, improve wildlife habitat, lower fire hazards, and increase aesthetic values. By concentrating on the more productive sites, annual beef production amounted to 60 to 160 lbs per acre, and investment costs were recovered in five to 10 years.

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**F**OR YEARS western cattlemen have been clearing brush to grow more forage. Reports of converting a dense stand of brush 10 to 15 feet high to grass and legumes producing 60 to 160 pounds of beef per acre per year are not unusual. But the costs of the conversion methods used and the amount of increased income have not usually been recorded accurately. The Ranchita Range Study, near

Arroyo Grande in San Luis Obispo County, conducted cooperatively by the California Division of Forestry, the Ranchita Cattle Company, and the University of California Agricultural Extension Service has provided 10 years of detailed information on the costs of converting brush to grass and the resulting income from cattle grazing.

This study was conducted at altitudes ranging from 650 to 1,200 ft. Rainfall averaged 20 inches per season. The four fenced plots originally included 275 acres, from which selected areas in each plot were treated. The aspect of all plots was generally east with slopes averaging 30 to 35 per cent. The soil (San Timoteo sandy loam) was from 12 to 24 inches in depth. Brush vegetation was typical of the Central Coast chaparral type, with chamise and ceanothus dominating.

Two effective brush clearing methods were compared in this study: 1) crushing and burning and 2) disking and burning. Before comparing costs, it

should be understood that each of these methods has a place in range improvement and the costs do not tell the whole story. It was found in one of the Ranchita plots, for example, that young sparse stands of brush did not crush well but were easily disked. Burning the residue from the first disking and then disking a second time removed most of the surface debris and brush sprouts leaving a clean seedbed. Disking is also advantageous in the tall, green brush which grows on benches, swales and north slopes where the deep, productive soils are usually located.

## Crushed plot

Brush on about 45 acres of the Ranchita Study was crushed with an anchor chain pulled by two TD-18 tractors in 1960. An average of eight acres per hour was crushed on rolling topography and four acres per hour on the steeper slopes. Figuring an average time of 0.21 hours per acre, driver's wages at \$2.50 per hour



Forage grass on disked plot at Ranchita range, following brush conversion.

and an operation and partial ownership cost of \$10.50 per hour for each of the two tractors, the expense of brush crushing added up to \$5.47 per acre.

#### After crushing

After crushing, the brush was dried and burned. The cost of constructing a fireline was \$1.48 per acre and the burning and patrol cost was \$11.13 per acre, for a total of \$12.61. This cost is unrealistic, however, because of the small amount of acreage burned (45 acres). Most control burning on rangeland is done more economically because large acreages are burned and volunteer members of a range improvement association usually provide most of the labor. The cost of fireline construction and burning was therefore reduced to \$6 per acre in this analysis. Seeding with a rangeland drill (5 lbs per acre) with a mixture of perennial ryegrass, Hardinggrass and milo cost \$8 per acre, and fertilization added another \$11 per acre. This brought the total first-year cost of brush clearing and seeding to \$30.47 per acre.

To obtain full control of brush sprouts and seedlings, the treated area was sprayed with spot applications of a mixture of 2,4-D and 2,4,5-T in 1962 and 1964. A cost of \$6.75 per acre each year was charged to the spray operations: labor was \$2.50, the chemicals cost \$3, and fuel and repairs were \$1.25. Using an interest rate of 7%, the total interest on the improvement expenses until 1969 (when grazing returns paid off the debt) was \$14.72. This brings the total expense to \$58.69 per acre (\$30.47 initially, plus

\$13.50 for chemical treatment, plus \$14.72 interest).

This cost seems quite high until the amount of beef produced is considered on this 45-acre field during the 10 grazing seasons from 1962 to 1971. Monthly weighings of stocker steers showed a total production of 664.3 lbs of beef per acre or 66.4 lbs annually. Using a conservative value of 12½ cents per-pound-of-gain would give a return of \$83.04 per acre for the 10-year period. Future gains will return nearly 100% profit (at 12½ cents per pound) since very little brush encroachment is expected. Range fertilization will be the major management practice needed to keep production at a high level, and will usually increase profits.

#### Disked plot

For the disking trials, a 9-ft brush disk was pulled by a D-6 tractor. It was demonstrated that heavy brush can be effectively removed by a single disking with limited use of fire, and that a second disking will remove brush sprouts and seedlings. At an average rate of 1.30 hours per acre, the first disking cost \$3.25 per acre for the driver's time and \$15.60 for the tractor and disk (\$12 per hour). The second disking took 0.75 hours per acre and cost \$1.88 for labor and \$9 for the tractor and disk. The total expense for the two diskings was therefore \$29.73.

Fireline construction and spot burning costs were \$2.17 per acre, seed and seeding with a rangeland drill cost \$11.34,

fertilization was \$10, and miscellaneous expenses were \$2.70. This brought the first-year cost to \$55.94 per acre. Two chemical spot sprayings two and three years after the burn cost \$6.75 each.

The interest (at 7%) on the improvement expenses during the six years from 1965 to 1971 was \$22.27 per acre. The cost breakdown, therefore, was \$55.94 initially, \$13.50 for the chemical spraying and \$22.27 interest for a total of \$91.71 per acre.

#### 1971 season

At the end of the 1971 grazing season, 608.7 lbs of beef per acre (121.7 lbs annually) had been produced in only five grazing seasons. Gains reached as high as 159.7 lbs per acre in 1969 and 147.3 lbs per acre in 1971, which was a dry year. The value of 608.7 lbs of gain at 12½ cents per pound was \$76.09 which left only \$15.62 of the investment unpaid. The greater gain on this acreage, as compared with the crushed plot, was due mainly to a better soil on which a good stand of Hardinggrass and annual clovers was established by seeding with a rangeland drill.

#### Other advantages

Other advantages of clearing these fields of brush are not so readily evaluated. A walk through these plots, however, will reveal the marked contrast between the openness of the cleared areas and the dense brush surrounding them. Some of the brush was piled in gullies and now provides cover for many quail. Deer are often seen in the fields which were previously too thick for deer or hunters. The fire hazard has been reduced, which is important since a new road now passes along-side the plots and a new public lake and recreation area is nearby.

Such marked improvement of rangeland may also increase property taxes (which was not considered in this analysis). However, productive land is certainly a greater asset than idle land—which contributes nothing toward the annual tax bill. Income tax advantages for most landowners might also make these improvement practices even more attractive.

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