Brush Control and Reseeding for Range Improvement in Central California

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Keith Ranches are located in the north central portion of Tulare County in California. This 6,700-acre ranch operation is on foothill land (600-1,000 feet elevation; 11 inches annual rainfall) and on land of intermediate elevations (3,000-3,500 feet, average annual rainfall of 35 inches) along the west side of the Sierra Nevada mountain range. The ranch headquarters of the mountain range is located in Eshom Valley and is surrounded by 300 acres of arable land. One hundred and twenty acres are irrigated tall fescue-Ladino clover pasture and the remaining 180 acres appear as a natural meadow of tall fescue-perennial ryegrass and resident annual clovers.

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Woodland—Annual Grass Range

At the present time, the ranches are grazing a herd of 220 cows and calves, 204 yearling steers and heifers, and 15 bulls. Future plans are to increase to a 300-cow breeding herd when additional range improvements are accomplished. So far the principal efforts to increase carrying capacities have been concentrated on formerly dense brushland of the mountain ranch. Brush to grass is the goal. Before range improvements, this summer range required 45 acres to the animal unit on a yearlong basis. Controlling the brush and seeding perennial grasses increases the grazing capacity to 12 acres to the animal unit.

From September to May, the cattle are kept on the foothill range, a typical oak woodland-annual grass type. It will carry one animal unit to ten acres the year around. The principal forage is soft chess, wild oats, ripgut, bur clover, and alfilaria. Mild winters afford an excellent area for calving. Bulls are turned in with the cows on February 1. The cows start to calve by the middle of October and are through in December. The calf crop is consistently above 90 percent.

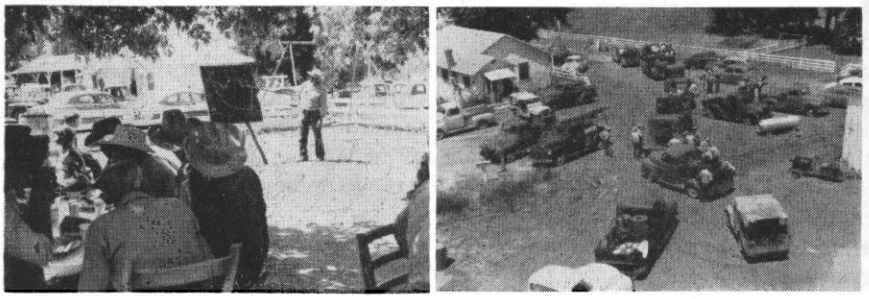
Calves are marked and branded before the 22-mile trek to the mountains. The herd is vaccinated for blackleg and the heifers are inoculated for Bang's disease. By using a calf squeeze there have never been any losses at branding time.

The weaners are winter-fed a free-choice salt mix of cottonseed meal and ground alfalfa. Some alfalfa hay and barley is also fed. The cows receive alfalfa hay until the green grass starts to grow.

The move to the mountains begins in May. Yearlings are trucked and cows and calves are trail driven. They are all returned to the lower ranch by the middle of September. Thus the 3,300-acre foothill range carries the herd seven months and the 3,400-acre mountain range five months.

Brush Improvement

Brush range improvement in our country means control-burning the existing brush, reseeding with



Preparations for control burning. (*Left*) Keith Manley, fire boss, explaining the day's fire plan to volunteer rancher crew at lunch prior to operations. (*Right*) Sixty ranchers and their equipment awaiting the signal to move out for the control burn operation.

perennials, and possible reburns or chemical brush spraying to clean up the sprouting species.

Controlled Burning

The control burns require a great deal of planning and preparation. The control burning program is conducted under permit from the California Division of Forestry and the legal responsibilities of the fire remain with the land owner. In order to get better planning and utilize the experience of a large number of people, ranchers have organized local Range Improvement Associations. The Tulare County Range Improvement Association (of which Keith Ranches is a member) participates in a season-long schedule of weekly control burns. Advance schedules for the season, which is from late July to late September, are sent to all ranchers in the group. The burns are usually held on Saturday with 50 to 100 persons attending. Most of the ranchers have fire-fighting equipment, which include 100- to 200-gallon water spray rigs that are easily loaded into pickups. Fire tools, such as McClouds, shovels, drip torches and rakes are brought to the fire.

The crowd gathers at ranch headquarters where the fire plan for the day is discussed by the fire boss. The firebreaks around the burn are inspected twice before the actual burning day by a committee in cooperation with the local State Forest Ranger. A blackboard is set up, and the day's firing program is outlined; crews are assigned specific tasks. Lunch is provided before the crews move out; generally the burns are started in the afternoon because humidity and temperature are more favorable at this time. After the fire, everyone eventually returns to the ranch headquarters for supper. The ranchers' wives help with the feeding. There is hard work involved in the operation, but a community spirit prevails over the group, making the job easier. Each burn is on a volunteer basis, with the rancher paying fuel, feed and other incidental costs on his ranch. It is essential to have enough manpower to keep the fire confined to the area being burned. This task is made easier by advance planning and preparation. Part of this preparation includes mashing or crushing the heavy brush to concentrate the fuel. A large crawler tractor can do this job at an average cost of ten dollars per acre. An efficient equipment operator can average an acre per hour. There are many advantages to brush crushing that make it advisable in this area:

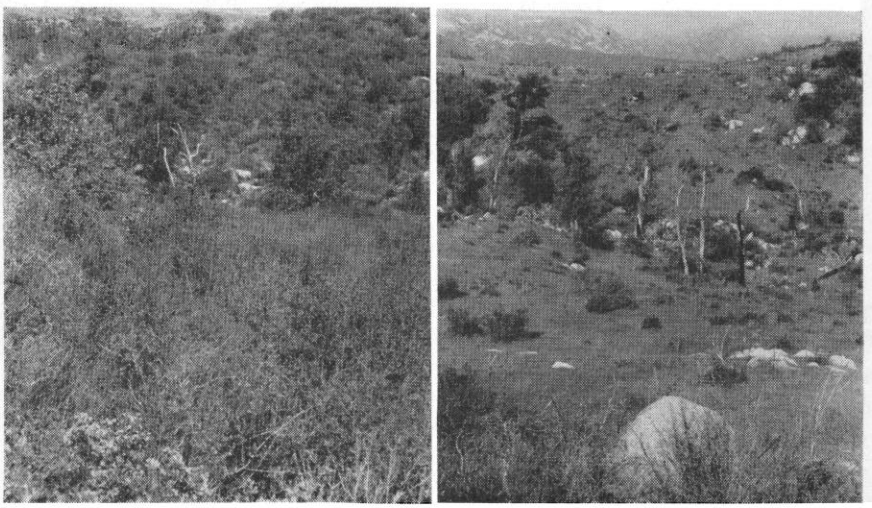
1. The burn is easier to handle because actual burning time is shortened.
2. Burns are possible under higher humidity and lower temperature conditions.
3. If the brush is mashed the previous spring, a large number of the sprouting species are killed by the fire.
4. It leaves a cleaner seed bed of good white ash.

Reseeding Burns

On areas that have not had an annual grass cover, perennial grasses and legumes are seeded at ten pounds to the acre. Because of frost heaving and rodent and quail depredation the higher seeding rate is practical. It is desirable to get a good first year stand to control soil erosion and keep brush seedling development to a minimum. The sprouting brush can be controlled with chemical herbicides.

Brush to Grass on 300 Acres

A 300-acre former brush pasture has been part of the Range Demonstration project of University of



Conversion of brushland to grassland. Before and after photographs on the 300-acre pasture in 1951 prior to burning and 5 years later with much of the brush replaced by grass.

California at Davis since 1951. Conducted with the Agricultural Extension Service in Tulare County, this project has provided a large testing area for grass and legume varieties, brush control techniques and fertilizer trials. Permanent line transects and photo stations have been established to record vegetational trends.

The initial control burn in 1951 was not a good burn. The many large areas of brush left unburned were crushed with a bulldozer prior to the reburn in 1954. Therefore, the reburn was in effect the first burn on parts of the area, thus making further seeding necessary. The species that have done well in the pasture are: intermediate wheatgrass, mountain brome, Alta fescue, Harding grass, orchard grass, perennial ryegrass, rose clover, smilo, alfalfa, and narrowleaf trefoil.

Brush crushing, fire line construction, burning, seeding and fence repair in 1951 and again for the reburn in 1954 cost a total of $3,094.28 or about $10.00 per acre. Before initial range improvements the carrying capacity was approximately 74 animal unit months per season. The actual use in A. U. M. obtained following the control burn in 1951 and the increase in carrying capacity are given in the following table:

Year	Actual Use (*A. U. M.*)	Increase in Carrying Capacity (*A. U. M.*)
1952	100	26
1953	288	214
1954	86	12
1955	184	110
1956	395	321
		683 Total

The total increase of 683 A. U. M. for the five years represents an average yearly increase of 136 A. U. M. in carrying capacity.

Using a value of $2.50 per A. U. M. the average annual increase in carrying capacity resulting from range improvements is $340.00 or about 11 percent annual return on the investment. The costs were calculated from the average going rates for labor, equipment, and materials. Carrying capacity should continue at about the 1956 level which will increase the percent return on investment. In 1952 and 1955 the pasture was not grazed until after perennial grasses had set seed. Light grazing in 1954 saved fuel for the reburn.

A 200-gallon fire-fighting sprayer is being utilized to spray the sprouting brush in the 300-acre pasture. Dr. Oliver Leonard of the Botany Department at Davis suggested the following formula for the mixed chaparral type using high-volume low-pressure application.

1 gallon of 1:1 mixture of low-volatile esters of 2,4-D and 2,4,5-T.
1 gallon diesel.
98 gallons water.

Several hundred oak trees have been killed with the cut-surface treatment. Axe cuts in the base of the trees are filled with 2,4-D amine. Costs of this chemical work are not included in the economic study.

Prior to control burning the primary spring in the pasture was dry by late August. After the burns and chemical control of oaks along watercourses, there are now live streams sufficient for watering stock year-long in two major draws.

Fertilizers

Exploratory fertilizer plots on the irrigated pasture indicated rather marked response from a combination of nitrogen and sulphur. On the strength of these findings one half of the irrigated pastures were fertilized with 300 pounds per acre ammonium sulphate this past February. Yield clippings taken in May indicated a benefit of 3,000 pounds of dry matter per acre. The fertilizer program will include all of the arable land next year.

Rather extensive fertilizer exploratory trials and rate tests are being conducted on the hill pastures. Aerial application of ammonium sulphate and measurement of benefit in terms of weight gain on cattle is a possibility for the future.

1000-Acre Pasture

Successes and failures experienced with improvements of the 300-acre pasture guide the improvement operation on a 1,000-acre pasture that is to be control burned in August, 1956. The value of crushing brush has been fully realized. Brush has now been walked-down wherever it was possible to operate a crawler.

The value of getting a good initial burn cannot be overemphasized. A few dollars spent on crushing brush and leaving dry grass to carry a fire are an excellent investment. A good hot initial burn is essential for efficient management and operation from then on. Seeding, reburning, spraying or fertilizing can be done in one operation, alleviating the necessity for special treatment of unburned areas.

Grazing management has been aimed at late summer use the first year after seeding brush burns, thus permitting perennial grasses to mature seed. A rotating program of early grazing when poorer species are relatively palatable and late grazing after the better species have seeded promotes better feed conditions on our ranges. Regardless of season, a large number of cattle in a given pasture for a short time forces the stock to eat some of the worst along with the best. Even a cowpoke knows we've got lots of the worst and need more of the best.

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