# Brush Range Improvement

## preliminary report on postburn seeding and management demonstrations in Shasta and San Diego counties

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**Techniques** in brush range improvement are being tested in Shasta and San Diego counties.

The ultimate objective of the program—which will include all major brush types and climatic zones in California—is to increase the yield of the land in terms of animal products in a manner consistent with wise use of all natural resources together with a satisfactory return to the operator.

The first two co-operative projects were started in the fall of 1950 and have every indication of being successful in ultimately contributing toward general application of seeding and grazing management practices recommended by research. The main co-operative units in each case are:

1. A livestock rancher with interest in permanent range improvement.
2. The local Farm Advisor.
3. The California Division of Forestry in cases where fire is used.

### Reseeding in Shasta County

The site of the first demonstration is the Blue Mountain control burn in eastern Shasta County. Parts of two co-operating ranches were included in this burn of August 10, 1950, which was one of the largest—9,700 acres—and most successful controlled burns conducted in California. Its success was due largely to the advance planning and preburn preparation. The fire was held to the predetermined area with a very effective kill of much of the woody vegetation within the fire lines.

The dense brush areas—the only sites that warrant seeding—totaled 4,420 acres. A mix of annual ryegrass, perennial ryegrass, burnet, smilo and rose clover was broadcast by airplane in late August at the rate of 5½ pounds per acre.

Two 50-acre trial plots were seeded with a mixture of Hardinggrass, orchardgrass, tall fescue, mountain brome, Harlan brome, prairie brome, rose clover and yellow sweet clover at about six pounds per acre. The seed for half of each of the 50-acre plots was dyed yellow and treated with 1080 to protect it from birds, ants, rodents and other animals.

Results in the spring of 1951 were encouraging on the acreage seedings as well as the trial plots. Good to excellent stands were established and growth was sufficient to retard establishment of unwanted brush seedlings. Outstanding species on the trials which were not in the acreage mix include Hardinggrass, orchardgrass, tall fescue and the seeded bromes. Numerous other species show promise but need observations over a longer period to determine their staying qualities.

Grazing was rather light before the control burn on the two demonstration ranches, thus dry grass fuel aided the burn. One ranch was not grazed on seeded areas during the fall, winter or spring following seeding. On the other ranch, a small number of cattle grazed for about 50 days in March and April on the seeded area. The cattle grazed largely upon rapid growing ryegrasses and resident annuals growing in unseeded open areas.

Late summer and early fall grazing of seeded areas is included in the plan. At this time the perennial grass will be dry and dormant and will be little injured by grazing. Cattle will also trample seed into the soil and browse to some extent upon brush seedlings and sprouts, thus aiding development of the forage stand and retarding reinvasion of brush.

After one to three years it is planned that grazing will again be very light to permit an accumulation of dry grass to conduct a reburn. The reburn is expected to kill more of the brush that escaped the first fire and a majority of the subsequent brush seedlings.

In each of the demonstration ranches a concerted effort is to be made to obtain a measurement of costs and returns. Where possible, returns will be expressed as animal products such as pounds of beef or pounds of mutton and wool. Since the project is only one year old no generalizations on costs can be made as costs are influenced by topography, brush type, size of area, availability of stock water, seed prices and many other factors.

An accurate record of the costs involved in the Blue Mountain burn show a total cost of 60¢ per acre for conducting the controlled burn. On the 4,420 acres seeded the cost of seed and seeding was $2.55, making the total $3.15 per acre.

Another controlled burn of 3,000 acres in Butte County was conducted at a cost

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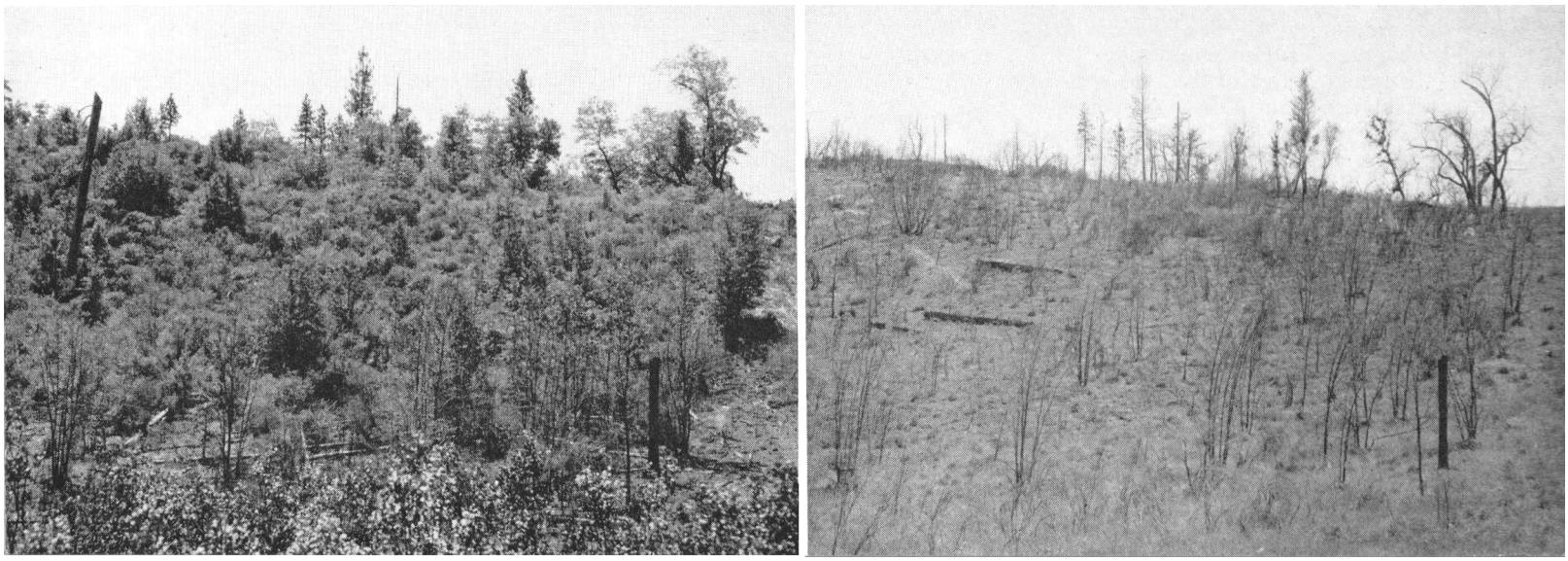
***Left:*** **Dense brush before control burn, August 9, 1950.** ***Right:*** **Same site after burning and seeding. Photo taken June 5, 1951.**



## QUARANTINE

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sealing, and an entry system through an anteroom. The heating, cooling, air circulating, and sterilizing units are all self-contained within the quarantine wing. The laboratory equipment is assigned permanently to these quarters. The quarantine wing is kept locked at all times, and access to the wing is restricted.

The characteristic habits of insects are taken into consideration. A trap light device is incorporated into the entry system. Utilizing the phototropic responses of insects, this device operates as an additional precaution to prevent the escape of any individual insect.

As all material in the laboratory is caged in some manner, it is unlikely that an insect would ever be free in the quarantine room. Even if it were, it would have no opportunity to escape to the outside.

The second requirement of a quarantine unit is that it be functional. The facilities at Albany are designed to speed up or retard the rate of development of the insects by individual temperature controls in each room. This is at times a factor in the handling of insects from the southern hemisphere which are conditioned to seasons just the opposite of those existing in California upon their arrival. Temperature controls for growth regulating are also useful in the breeding of insects with complex life histories.

Since the testing of weed insects is becoming increasingly important to California agriculture, the quarantine rooms are designed for this type of work, offering conditions favorable for plant growth.

When tests are completed, all the imported material that has not been proved to be completely beneficial is sterilized and destroyed within the quarantine unit. Sterilization is accomplished by autoclaving which not only disposes of insect material but plant diseases as well. A small stock of each beneficial species is retained for breeding and for ultimate release against pests in agricultural areas.

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## BRUSH

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of 30¢ per acre for burning and a total cost of $2.95 per acre where seed and seeding were necessary.

### San Diego County Project

An extensive wildfire burned over many thousands of acres above El Capitan Reservoir in the late summer of 1950. A co-operative range improvement project was started in this area in the fall on a small ranch and adjacent Cleveland National Forest land in co-operation with the landowner, the Farm Advisor and the United States Forest Service.

Brush on the demonstration area was primarily chamise with lesser amounts of ceanothus and manzanita. Light sandy soils of granitic parent material prevail.

An area of about 400 acres was broadcast seeded in early December to a mixture of grasses and legumes. Half of the area was railed before seeding and the remainder railed following seeding. In general railing not only pulled out many chamise burls but also improved the seedbed for establishment of forage plants. Railing after seeding was much superior to railing before seeding.

The effect of seed coverage upon establishment of forage plants was investigated further by the Farm Advisor. Railing, disking and sheepfoot rolling were used to cover the seed following broadcast seeding. Observations indicate that on the sandy soils of this region and with the poorly distributed rainfall and drying winds of 1950–51 some type of seed coverage was usually necessary to produce a satisfactory stand of forage plants.

First year results indicate orchardgrass, Hardinggrass, smilo, rose clover and annual ryegrass to be among the most promising species. A small plot of veldtgrass looked good. Seed of this species is in limited supply and rather difficult to obtain.

Cattle were grazed in the demonstration seeding during the summer after the grasses became dry. Forage seed is being trampled into the soil and the cattle are browsing to some extent upon the chamise sprouts and brush seedlings.

### New Demonstration Areas

In addition to the two demonstration areas started in 1950 in Shasta and San Diego counties four additional ones are to be started in the fall of 1951. These areas represent four brush types and climatic zones not thus far represented:

1. Southern Humboldt County, representing chaparral of tan-oak, madrone, huckleberry and associated species in a high rainfall region.

2. Ventura County, representing the coastal sage type.

3. Tulare County, representing dense chaparral consisting of ceanothus, live oak and blue oak.

4. Modoc County, representing the Great Basin sage brush type.

It will take four to six additional ranges to adequately represent the major brush types throughout the state.

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## HIGH-YIELD

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of salt—expressed on a pounds per acre basis—was very low. However, in the deeper regions of the Porterville clay adobe soil high salt concentration was indicated. It is probable that in this exceedingly heavy soil the roots are confined largely to the surface, and hence the salt in the lower layers is not affecting the vigor of the tree.

Relatively high amounts of water-soluble potassium were found in the surface layer—apparently the result of the past and continued use of manures. Sodium tended to increase with depth but seldom accounted for 50% of the total bases. The amount of chloride was very low in all the orchards to even the four-foot depth. The amount of nitrate was rather uniform throughout the soil profile, reflecting the generally heavy nitrogen applications in these orchards.

### Soil Fungi and Nematodes

There was no significant difference in the fungal population of the soils of these top orchards as compared with old citrus soils generally. This implies that the mere presence of unfavorable organisms does not prevent excellent yields, though tree condition and yield might be better if fungi were absent.

No orchards were free of citrus root nematodes; substantial numbers were present in most cases.

The elements nitrogen, phosphorus, sulfur, chlorine, calcium, magnesium, potassium, and sodium were determined on leaf samples from these high performance orchards. The range of values found checked in most instances with the standards indicating ample but not excessive supplies.

From this preliminary report it is apparent that there is a low soil salinity condition in nearly all the high-yielding orchards, but a rather wide range of soil pH, free lime, texture, depth, and origin characteristics. Work is continuing on all phases of this project and will include an evaluation of the physical condition of the soil profiles. In addition, a comparison is being made with the soil conditions and management practices in a group of orchards where sizes and yields are poor. This study will in due course include lemon orchards.

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