

Brush Control in Ponderosa Pine

technics of prescribed burns to encourage growth of desirable game browse in second-growth timber

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Fire as a tool in the multiple-use management of second-growth ponderosa pine is under study in California.

The primary purpose of the studies is to find ways to manipulate brush for game range improvement, but it is impossible and undesirable to separate detailed recognition and study of the several other benefits and effects.

Study Areas

Two study areas were selected—one is in the North Coast Range and the other is in the central Sierra Nevada. The North Coast area is at Hobergs in southern Lake County where the elevation is 3,000' and the annual average precipitation is 60". Ponderosa pine is the dominant tree, with small amounts of sugar pine, black oak, and Douglasfir present. Common and white-leaf manzanita—both nonsprouting shrubs—comprise most of the brush, although small, pure stands of deerbrush and occasional western mountain mahogany and flowering dogwood plants are present.

The Sierra Nevada study area is in the Teaford Forest near North Fork in Madera County—elevation 4,000', precipitation 35". Here ponderosa pine is dominant, with incense cedar, sugar pine, and black oak trees infrequent. The nonsprouting Mariposa manzanita and wedgeleaf ceanothus and the deerbrush, are the most abundant shrubs. Gooseberry also occurs.

Characteristically, both areas consist of fully stocked stands of ponderosa pine about 60 years old, with nearly impenetrable understories of living and dead manzanita and scattered openings of almost pure brush. The forest site is rated as No. 2, or better, for timber production.

Prescribed burning, as used in forestry, means that fire is used for certain definite reasons, and the conditions for firing are carefully planned in advance. In the Hobergs and Teaford forests, two steps—broadcast burning followed by cleanup burning—were involved in the operation.

Broadcast Burning

Broadcast burning is done by raking a trail and igniting the pine needles on the edge. The broadcast burning is done after enough rain has fallen to wet the duff to the mineral soil—not before. The top needles dry in a day or two after rain and burn readily. The burning is best done when the relative humidity is above 20%. However, it is possible to do broadcast burning successfully with the humidity as low as 15%, or higher than 90%. Temperatures should be below 65° to prevent excessive scorching of needles. The soil is always moist or wet. Best results are obtained by burning downhill because the fire proceeds slowly and applies more heat on one spot for a given period of time. Thus it consumes more coarse debris, has lower flames, and

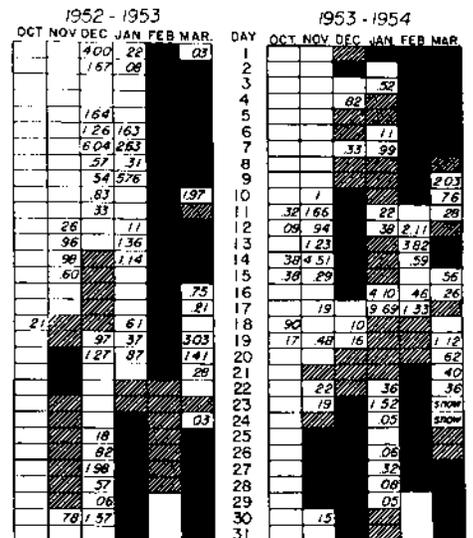


Dead brush and other heavy fuel has been prescribed burned, thus reducing the fire hazard.

is easier to control. The wind should not be high, but slight movement is desirable to keep the flames down. Broadcast burning at Hobergs has usually been stopped early in April but is safe about a month longer at the greater elevation near North Fork.

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Graph showing distribution of days when broadcast—black—and cleanup burning—shaded—were possible at Hobergs. Rain is shown by the figures. All the days suitable for broadcast burning were also satisfactory for cleanup burning, but the days suitable for only cleanup were either too wet or too dry for broadcast burning.



Left. Before prescribed burning in second-growth ponderosa pine. Right. The same area after prescribed burning. This treatment permits more light to reach the forest floor for the growth of forage plants.



LIVESTOCK

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rates are frequently of major importance in the purchases and sales of meat products between areas.

Pork and Hogs

Fresh pork movements are generally restricted to those cuts that are predominantly consumed in fresh form, namely, spareribs, butts, and loins. The high-value parts of the carcass—hams, picnics or shoulders, and bacon—are generally consumed in cured form. With transportation rates lower on cured meat than on fresh meat, it is reasonable that a packing house would process prior to shipment instead of at destination. However, this processing may only proceed to an incomplete stage, such as pickling or dry salt, with smoking and packaging being accomplished at the receiving market.

The historical rate picture—with reference to trends in California's local hog

supply, in shipments of live hogs, and in shipments of pork products—is striking evidence of the comparative advantage of the Midwest in livestock-finishing operations.

Beginning in 1945, local hog supply dropped from 26% to about 16%, in shipments of live hogs dropped slightly from 28% to about 26%, but in shipments of pork products rose from 46% to 60% of California's consumption. Since then, live hog in shipments have held up to about 28% to 30% of the consumption in spite of the fact that the transportation rate change in 1945 was such as to favor the in shipment of pork products to California.

Prior to 1945, the western states of Colorado, Idaho, and Texas contributed to the dominant supply coming to California from Nebraska. Since 1945, those three states have greatly curtailed their shipments to California, while Iowa and Missouri have expanded their shipments. This is in contradiction to the relative rate change in 1945, which should have favored live animal shipments from the

western states and pork product shipments from the Midwest. It is possible that the perishable nature of loins might make it difficult for Midwest supply to arrive satisfactorily and that meat wholesalers having slaughter facilities would shift to shipping in live hogs instead. Wholesalers would have to reach into the Midwest to obtain this supply if the western states found it more profitable to slaughter their hogs and ship fresh pork by means of modern rapid trucking facilities.

A serious lack of information on all movements of livestock and livestock products—especially with respect to form of product, type of carrier, and origin and destination—hinders the businessman and the researcher in appraising the significance of changes in transportation costs, in demand, in the technology of feeding and processing, and in the distribution of livestock and livestock products.

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PONDEROSA PINE

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Cleanup burning consists of piling and burning dead brush, slash, felled dead trees, and prunings after the area has been broadcast burned. The procedure is to start the fire and gradually pile on the dead material as it burns. One person can frequently keep a half dozen or so brush piles burning. The dead brush is not piled and left before it is burned at a later date.

Cleanup burning can be done under a wider range of conditions than broadcast burning. The current study has shown that brush piles can be safely burned with the humidity as low as 11%. On the other extreme, piles can be effectively burned during light rains. Wind is less important than with broadcast burning. Piles are placed so that tree trunks, especially of timber crop trees, will not be

damaged. Under the conditions specified, fire seldom creeps from the brush piles if the area has been broadcast burned just prior to the cleanup.

From the time of the first rain of one inch or more and up to April 1 of the past two winter seasons at Hobergs, there were 51 and 55 days where conditions for broadcast burning were satisfactory, and 75 and 87 days for cleanup burning. There were 42 and 43 days during which either rain or snow was falling, and only 23 and 12 additional days for 1952-53 and for 1953-54 in which no burning was practical.

Role of Prescribed Fire

The role played by prescribed burning in brush manipulation and game range improvement is complex. It kills seedlings and the thin-barked mature manzanita bushes, and consumes the wood; it stimulates the germination of brush seeds and later becomes the tool with which to eradicate them; the ashes and reduction of litter provide a seedbed for the artificial or natural establishment of desirable browse species. Fire encourages the stump-sprouting of such palatable plants as black oak, dogwood, western mountain mahogany, and deerbrush. Burning stimulates the growth of legumes, many of which are palatable as forage and may increase soil nitrogen. Finally, the investment in the improved and managed area is protected by fire hazard reduction. Experimental work on each of these items is in progress.

The effects of prescribed burning on

the forest itself and on other land uses are also being studied. The studies include the use of fire in improving composition of forest stands and the effects on forest tree growth; the preparation of seedbeds and the effect on forest reproduction; the effect of fire on seed-eating rodents, on soil fertility, water yield, and recreation; and on the economics of the practice of prescribed burning in land management.

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New sprouts of western mountain mahogany, a fairly shade-tolerant species and a valuable browse for game and livestock.

The first step in prescribed burning. This operation is carried out during the fall and winter months when the soil is wet but the top pine needles are dry.

