R&P Brush Control

THE MANIPULATION OF BRUSH COVERS*

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The manipulation of brush covers to improve conditions for livestock grazing, wildlife, and other uses is a broad subject. Among other things, it involves various objectives and degrees of removal, different kinds of brush covers, good and poor soils, and different means of removal and management. It is not wise to generalize. The results given in this paper are based on studies now under way and therefore this should be considered a progress report.

The subject of brush manipulation probably can be discussed most conveniently on the basis of type of cover. Among the cover types, three of the most important are: (1) Woodland-grass where brush has become abundant, (2) chaparral where chamise is the principal species, and (3) live oak and blue oak thickets. Other cover types of brush are found in the State also but as yet these have not been worked on enough to justify discussion. One of the most important things in all brush manipulation work, and one that should be emphasized, is that of careful planning. This applies to all brush cover types, and to any place where manipulation is to be attempted.

Woodland-Grass Brush Areas

Over much of the woodland-grass area of 7,500,000 acres brush and non-commercial trees have increased in recent years to such extent that they seriously interfere with the grazing and handling of livestock and with game production. This is particularly true along the west slope of the Sierras. As a rule, the lands there are productive and a majority of the brush areas can be opened up to good advantage. Probably the greatest opportunities for removing brush and improving conditions for livestock grazing are in this type of cover.

Brush plants in woodland-grass areas are chiefly non-sprouting. Some of the more abundant are manzanitas, wedgeleaf ceanothus, and chaparral whitethorn. However, these have a tendency to give way to sprouting species such as live oak and poison oak. Over much of the woodland-grass area digger pine has become abundant and seriously interferes with grazing.

It is normal plant succession for the brush and trees in this area to increase in abundance. Fire protection favors the increase. It is the good fire protection in recent years that has permitted the brush to increase to such proportions. Contrary to widespread opinion, heavy grazing is not necessarily responsible for the great increase in brush in recent years in woodland-grass areas. If anything, heavy grazing retards brush increase because several of the species are browsed and thereby are kept down. However, heavy grazing should never be resorted to as a brush control measure. It can weaken the forage cover and do other damage to the range.

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Probably the most economical and effective way of reducing the brush and tree cover in woodland-grass areas is through the wise use of fire, or controlled burning, supplemented perhaps by other means of removal such as bulldozing and hand clearing. Studies and experience thus far indicate the following points to be important in the planning and opening up of brush stands in woodland-grass areas.

Burn Before the Brush Reaches Full Density. Insofar as possible controlled burning in woodland-grass areas should be done before the brush becomes so dense that the grasses are choked out or that the seeds will be destroyed by intense fire in dense brush. Several reasons may be given for burning before the brush becomes excessively dense: (1) Fires in the less dense brush covers are relatively light and the grass seeds are not all destroyed by intense heat. The grass seeds germinate soon after the first fall rains and the new plants produce roots in the soil and form a protective cover over it. (2) Relatively few new brush plants appear and become established in competition with the grasses. A reasonable proportion of these die from competition with the grasses. However, in spots where the brush has reached nearly full density and the grasses were choked out previous to burning, or where the fire burns with very intense heat, brush seedlings will appear in great numbers. (3) Reseeding of grasses is not necessary in the less dense brush areas and is useless since the reseeded species will not successfully compete with the native or wild grasses. However, in any spots where the brush had reached about full density before burning it will be necessary to reseed. One of the principal reasons for reseeding is to grow fuel for a reburn. In many cases it may be desirable to seed to annual grasses for this fuel. (4) Since the fires are less intense than they are in a brush cover of full density, they are more easily controlled.

Save Fuel for Burning. For successful burning it is essential that enough grass fuel be on the ground to carry the fire into and under the brush plants. Otherwise the fire will not carry well and many brush plants will not be killed. Therefore, in the season previous to burning, grazing either should be very light or the range protected entirely in order to have enough fuel for an effective fire. Saving sufficient fuel for effective burning is probably the most costly phase of controlled burning in woodland-grass brush areas.

Burn with an Intense Fire. The firing should be done at a time when the fuel will burn with intense heat, the object being to kill as many of the brush plants and trees as possible. Probably July 15 to September 15 is the best period for burning, late season usually being preferred because the brush plants are drier and are more easily killed at this time. Strict care should be taken to avoid firing when the wind is high.

Reburn in Two to Four Years. One of the most important steps in a controlled burning program is a reburn soon after the first fire. The reburn destroys new seedlings that appear after the first fire, and also gets rid of dead material. In all cases a reburn should be made before any new brush plants that come in after the first fire produce seed. Where brush seedlings are thick, the reburn should be made two years after the first fire. Otherwise, competition from the brush seedlings may become great enough to reduce the grasses and lessen the effect of the second fire. In other cases, it may be just as effective to burn on the third or fourth year. Usually it is advantageous to burn on years of high forage production when fuel is abundant.

Where the brush has become dense it may be necessary to burn three times. The second fire about two years after the first burn, and the third burn about four years after the second burn. After this it may not be necessary to burn again for

many years. A properly executed controlled burning program does not necessitate a burn every three or four years as some people think it might. In general, as little burning as possible should be done, but plans should be made to do a good job each time fire is used.

Burn Fairly Large Acreages. A fairly large burn usually can be carried out more effectively and with less expense per acre than a small one. Therefore, it is usually desirable to burn rather large acreages. Except in special cases, perhaps not less than 200 to 300 acres should be burned at one time. The upper limit in size of area to burn might be 3,000 to 5,000 acres. The optimum might be about 1,000 acres. Always the plan should be to complete a burn within a day. Several things will determine the size of an area to be burned at one time: (1) The amount of range a rancher can protect from grazing to produce fuel. (2) Natural barriers to the fire such as State, County, and ranch roads; areas burned earlier in the season; and creeks. By taking full advantage of natural barriers it might be easier and safer to burn several thousand acres than it would be to burn several hundred acres without the barriers. To take full advantage of barriers it may be necessary for several ranchers to get together for a burn. (3) The acreage to burn will vary with the size of crew and men available to patrol borders.

Reseed where Necessary. Reseeding will be necessary only in areas where the grasses were choked out before burning, or where the fire burns with such great intensity as to destroy the grass seed. Among the several reasons for reseeding such areas, two of the chief are: (1) to grow grass to compete with the brush seedlings, and (2) to have fuel for a reburn. Therefore, the object should be to grow dense stands of grasses in such places.

Follow up with Bulldozing or Hand Clearing. After the brush and non-commercial trees are thinned by controlled burning it finally becomes more economical further to clear undesirable species by bulldozer or hand. In some cases it may be desirable to crush the brush in spots with a bulldozer before the first burn to assure greater success.

If only two burns are necessary to control the brush on an area it may be desirable to do some bulldozing or hand clearing after the birst burn. The dead material will then be consumed in the second fire. If three burns are necessary the clearing should be done after the second fire. After a series of 2 or 3 burns it may be more economical to clear the young plants of undesirable species by hand than to save fuel for additional burns.

Practice Conservative Grazing. Usually one can expect that the grazing capacity of a range will be increased by controlled burning. However, one should be slow in increasing numbers of grazing animals. Enough forage should be left on the ground each year so that a mulch will accumulate. Conservative grazing is an important step in successful brush removal.

Chaparral where Chamise is the Principal Species

Chamise predominates on about 7,300,000 acres covered by pure stands of chaparral in California. Usually the brush occurs in dense, nearly impenetrable stands and in this condition it may be of little use for livestock or game. Chamise lands greatly vary in soil type and productivity but are mostly poor. Some of the poorness probably is due to the cover of chamise itself. There is good reason to believe that the soil beneath chamise gradually deteriorates, especially with occasional uncontrolled burning and other lack of management. Therefore, the longer an area is in chamise, everything else being equal, the less productive it is apt to become.

Chamise lands also greatly vary in topography. Some are very steep.

Beneath a cover of chamise the soil is nearly bare of herbaceous vegetation. In fact, herbs are so scarce that few new plants may become established after burning. Therefore, on fresh burns not reseeded the ground may be nearly bare the next winter. Because of lack of herbaceous vegetation beneath chamise and the general bareness following fire, it is reasonably certain that chamise forms a poor watershed cover compared to grass. Under chamise some erosion seems to take place each year.

Chamise is a sprouting species and comes back vigorously following fire. However, it is rated non-aggressive and seldom spreads into surrounding grasslands except after occasionall uncontrolled wild fires where other more aggressive species such as manzanitas pave the way.

For domestic livestock grazing, chamise lands are usually more valuable for sheep than cattle because of rough topography, and the fact that sheep are better browsers than cattle. However, many chamise lands appear better suited to game and should be managed with that in view.

Probably the most economical and effective way of opening up areas of chamise is through the wise use of fire supplemented by other treatment.

Studies and experience thus far indicate that chamise areas might be opened up in three different ways: (1) Controlled burning followed by heavy grazing of sheep and reburning, (2) controlled burning and reseeding followed by reburning, (3) bulldozing or rolling followed in one or two growing seasons by controlled burning.

Controlled Burning Followed by Heavy Grazing or Sheep or Goats and Reburning. This has proven to an effective way of opening up dense stands of chamise. After an area is controlled burned it is heavily grazed by sheep or goats for two seasons. The acreage to burn, therefore, will be determined largely by the number of animals available for heavy grazing. The grazing will set back or kill many of the sprouted plants and seedlings, and will permit grasses and other herbs to increase in abundance. The heavy grazing is then followed by about 2 years of light grazing, or none at all, and the grasses and herbs will continue to increase. The area is then reburned. The fire of the reburn will kill the 3- or 4-year-old brush seedlings and many of the remaining sprouts. Heavy browsing by deer will accomplish much the same thing, if the acreage is small.

Where sheep are used this method of brush removal usually results in an increase of yerba santa which is not browsed by these animals. This plant grows rapidly when freed from competition with other shrubs. However, a second reburn 2 or 3 years later will kill much of the yerba santa.

Once an area is cleared of chamise and a grass stand established, the return of chamise is slow and a reburn may not be needed for many years.

Controlled Burning, Reseeding, and Reburning. This method of brush removal has not yet been fully demonstrated. As to whether the method works depends largely on growing fuel for the reburn. Chamise areas probably can be opened up by a reburn in 1 to 4 years after the first burn, even in the absence of heavy browsing, but fuel must be grown for this reburn. Only on exceptionally good forage years will enough volunteer material be available for an effective reburn. Therefore, it becomes necessary to reseed to produce fuel for a second burn. A promising species for such

seeding is annual ryegrass. The seed is relatively cheap, germinates readily, and makes rapid growth. It may be found later that some of the wild grasses are better suited to this purpose. A heavy stand of grass will result in fewer and slower growth of brush seedlings and will also stunt sprout growth.

Bulldozing or Rolling Followed in One or Two Growing Seasons by Controlled Burning. This method has been demonstrated, on a small scale, to be successful. Areas of dense chamise may be opened up by bulldozing or rolling and burning one or two growing seasons later. Grazing by sheep or deer between the time of bulldozing or rolling and burning is helpful. Some reseeding may prove beneficial. This method can be used only where a bulldozer can go, of course. The method has one definite advantage over the others; it assures a residue on the ground as a cover in preventing erosion. Usually a fairly dense stand of grass will come in after the bulldozing for effective reburning.

Live Oak and Blue Oak Thickets

In the Sacramento Valley foothills, and elsewhere to some extent, live oak and blue oak have become abundant enough to interfere with forage production. As a rule, the lands there are fertile and great opportunity exists for increasing forage production.

Live oak is a vigorous sprouter and therefore difficult to kill by burning, especially since fires are often not intense enough to kill the tops. Blue oak, on the other hand, sprouts less vigorously and about 50 per cent of the plants in a stand are killed by an intense fire, if such a fire can be obtained.

Reducing Live Oak. The method described here has been used by ranchers and has proven highly satisfactory. The live oak is bulldozed and windrowed, and is then burned. As soon as the oak begins to sprout enough goats are placed on the area to keep the sprouts down. It is important to start goat browsing as soon as the plants begin to sprout. This may require one or more goats per acre. However, many of the oaks will be destroyed in bulldozing and the sprouts will not be as numerous as they otherwise would be. During the second year some of the sprouts will begin to die and it might be possible to reduce the number of goats. The bulldozing should be done with as little disturbance to the soil as possible, otherwise erosion is apt to follow.

Some ranchers have pushed over live oak with a bulldozer and have burned it without windrowing, but this has not proven as satisfactory as windrowing before burning. Not as many trees are destroyed in the bulldozing operation and more remain to be killed by goats. This calls for heavier stocking of goats and consequently more trampling and greater use of herbaceous forage.

Reducing Blue Oak. Blue oak can be reduced in the same way as live oak. Also, blue oak can be greatly reduced by two intense fires since it sprouts less vigorously than live oak. However, it may be difficult to burn with enough heat to kill blue oak; therefore, some bulldozing may be necessary.

CONCLUSION

It was pointed out that brush manipulation or control is a broad subject involving among other things various objectives and degrees of removal, different kinds of brush covers, good and poor soils, and different means of removal and management. However, if careful attention is given to purpose, planning and procedure, preliminary results indicate very definite possibilities and advantages in the wise or controlled use of fire and other means in handling brush covers.