THE USE OF FIRE IN RIGHT-OF-WAY MAINTENANCE[1]

by Dale H. Arner

Abstract: Prescribed burning as a maintenance technique on utility line rights-of-way (ROW) has largely been ignored. Research at Mississippi State University has shown that on ROW in extensively forested areas where plowing of fire lanes is feasible, fire can be economically competitive with those maintenance techniques now in common use. Plant communities of high value to upland game animals have been developed and maintained by fire on ROW in Alabama and Mississippi.

The feasibility of using prescribed burning on utility line rights-of-way (ROW) for developing desired plant communities and reducing ROW maintenance costs will be discussed. Although prescribed burning has been used for many, many years and for many different purposes, its use as a tool in ROW maintenance has been virtually ignored (Arner et al. 1976). This apparent disinterest probably stems from the lack of experience or training in fire ecology of ROW maintenance personnel. In addition, the Smokey Bear program of the United States Forest Service has emphasized nationally the theme of keeping fire out of the woods. The word *fire* usually evokes visions of catastrophic sheets of all-consuming flames, billowing clouds of smoke, blackened, smouldering trunks of trees, and charred carcasses of animals. While this concept may sometimes be true of wildfire, it is most definitely not true of prescribed burning.

North American Indians and early settlers used fire extensively to improve hunting and grazing conditions for livestock. Prescribed burning has been used and advocated as a technique to establish desirable quail food plants in the Southeastern United States since the 1930's (Stoddard 1936).

Fire has also been used to improve brood habitat in Mississippi for wild quail and turkey (Hurst 1972), increase deer browse in the chaparral country of California (Hendricks 1968), and increase winter elk food in the Northwestern United States (Moore 1976). Work in Pennsylvania showed that fire in cut over hardwoods had triple benefits to ruffed grouse in that it regenerated grouse food plants, cleaned up litter, and aided in prevention of disease of grouse food plants (Sharp 1970).

Foresters have for some time used fire to control the invasion and resurgence of hardwoods. Van Wagner (1970) noted that good control of hardwood brush in red and white pine stands was obtained by two consecutive annual fires. Fire has been used for a number of years in the Southeastern United States to set back hardwood growth in pine lands and improve grazing for livestock.

When fire is properly used it can increase production of desirable fruits such as blueberries, or when improperly used it can decrease fruit production and plant survival.

Use of prescribed burning

In contrast to wildfires, prescribed burning involves the controlled use of fire which is contained within a certain area by the use of plowed fire lanes under certain prescribed conditions of wind direction, and speed, soil moisture, humidity, and fuel moisture content.

In addition to the vision of widespread damage of fire escaping from its confined borders, there are three other frequent concerns of using fire on ROW by line maintenance personnel of utility companies. They are as follows: (1) The fear that smoke from ROW fires might add hazardous levels of pollutants to the atmosphere. (2) The danger of damage to suspended cables or wooden posts from excessive heat generated by the fire. (3) The danger of flashover, which is the jumping of an electrical charge from a low-hanging, high-voltage line to the ground, during the burning of vegetation under the ROW. The information available does not substantiate these fears. Let us discuss these expressed dangers in the order they were presented:

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1. Although the exact effect forest fire particulate matter may have on the gases of the atmosphere has not been ascertained, it is known that the site of deposition of such particulates and the size of the particulates can be influenced by the burning techniques used. The direction of smoke and fallout can also be controlled. Detailed information on this subject is given in the *Southern Forestry Smoke Management Handbook,* United States Department of Agriculture Forest Service General Technical Report SE-10, December, 1976, Southern Forest Fire Laboratory, Macon, Georgia. It has been noted by Cooper (1974) and others that no material originating from a grass or forest fire has been found in the atmosphere in quantities that could be considered harmful to the health of man.

2. The aspect of damage to the high-voltage lines by prescribed burning has also not been substantiated from temperature measurements taken at heights of 12 feet over prescribed fires on ROW of grass and light brush in Mississippi. Maximum-minimum thermometers did not record temperatures exceeding 150°F. on these burns (Arner 1966). Burning a ring six to ten feet around wooden posts will reduce the possibility of a head fire sweeping up wooden posts. We have not had fire sweeping up a wooden post since we started ringing the posts. It must be acknowledged, however, that if ROW brush was allowed to grow in excess of six feet, the heat generated by the burn might prove hazardous to cables and wooden posts. ROW with brush heights exceeding six feet should be mowed during the summer and then burned in the late winter or early spring months.

3. Personal communication with Paul B. Jacobs, Professor and Associate Head of the Department of Electrical Engineering at Mississippi State University, reveals that flashover due to the burning of light brush and herbaceous material on ROW is virtually impossible unless the burning is coupled with extraordinary circumstances, such as a dense accumulation of resinous material burning on a windless day underneath the sag of low-hanging cables of high voltage.

It is essential that those ROW maintenance personnel who have not had previous experience with prescribed burning actually participate in a prescribed burn under the supervision of trained, experienced people. The confidence such an experience builds is necessary to a person who undertakes a burning program of his own. The basic precautions needed for safe burning are well recognized; however, the technique needed to minimize particulate fallout, to maximize kill of undesirable vegetation and to maximize desirable herbaceous vegetation comes only with a great deal of experience.

Procedures and precautions in ROW burning

Based on over 24 years of prescribed burning on ROW in the Southeastern United States, I have found the following procedures effective on Alabama and Mississippi ROW for establishing and maintaining upland game food plants and reducing brush:

1. For the Southeastern United States, burning should take place in late winter, December 1 to March 1, or in the springtime when leaves are three-fourths to full size (possible effect on nesting game birds must be taken into consideration in selection of burning time).

2. State forestry personnel should be notified of the area and the time of the burn.

3. Since ROW dries out faster than forested areas, burning should take place one to four days after a one-fourth inch rainfall and four to eight days after a one-half inch rainfall.

4. Burning should take place when relative humidity is between 25 and 50 percent.

5. Burning should take place with a steady wind of one to six miles per hour down the ROW.

6. A single plowed furrow will usually suffice as a fire lane, with cross furrows at one-fourth to one-half mile intervals. In case of heavy fuel situations, two or three furrows may be advisable. The fire lanes should be located as far back from the overhead lines as possible so that maximum ROW acreage can be obtained (see Figure 1).

7. The burning should be initiated into the wind with two men starting from the center of a fire lane crossing the ROW at a right angle. Each man should have a drip torch and proceed from the center spot to the plowed flanks of the ROW with one going to the right flank and the other to the left

flank. Each burner should try to keep apace of the man opposite him.

8. One man equipped with fire flapper or back water pump should patrol behind each torch man to insure the fire does not escape. Particular attention should be paid to vines or vegetation lying across the plowed fire lanes.

9. Plowed fire lanes on steep, rough areas should be seeded and fertilized to prevent soil erosion.

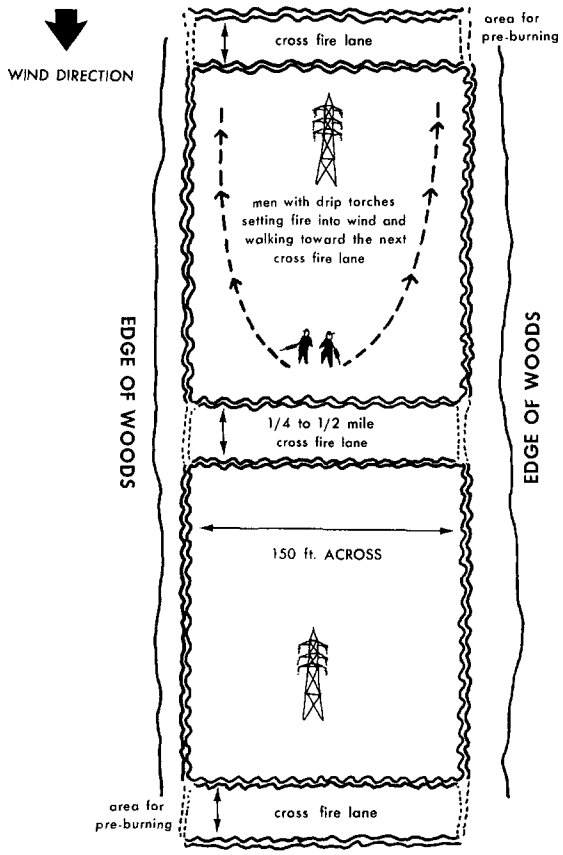

fig. 1 Burning Procedure

It would be well for the beginning burner to familiarize himself with *A Guide for Prescribed Fire in Southern Forests* by Mobley et al. (1977), United States Forest Service, Atlanta, Georgia.

In the southeastern United States, ROW which has been maintained by herbicides for the past 15 years or more will usually require burning at least every three years. The majority of these ROW with a history of herbicide usage will frequently have a paucity of desirable herbaceous plants, particularly legumes. Legumes provide food for wild turkey, bobwhite quail, and doves in the form of seeds; the green leafy material is heavily used by deer and rabbit as a spring and summer food. I have found it necessary on ROW previously treated with herbicides to sow partridge pea (*Cassia nictitans*) at the rate of six to eight pounds per acre or an annual lespedeza at 20 pounds per acre. These seeds can be sown immediately after a January or February burn without additional soil scarification needed.

In soils with a low nutrient content, fertilizer such as 400 pounds of 0-14-14 or 2-12-12 per acre has been found essential in establishing legumes. In the southeastern United States where such seeding and fertilizing have been required for establishment of wildlife food plants on ROW, utility companies have been willing to cost share with landowners or hunting clubs.

ROW outside of the Lower Coastal Plain that have been maintained by mowing and that have never had herbicides applied, frequently will have desirable legumes growing on the ROW. Here winter burning will increase and continue to increase the coverage of legumes with each burn, and no seeding or fertilizing will be required. The major problem in the Southeastern United States on such ROW is controlling the sprouting hardwoods, particularly sweet gum (*Liquidambar styraciflua*), persimmon (*Diospyros virginiana*), and hickory (*Carya* spp.). It would be advisable to treat these areas with basal applications of 2,4,5-T or some other tested herbicide before using fire.

Burning is an economical technique in ROW maintenance. Costs of ROW burning for a six year period in Mississippi ranged from $0.60 to $1.60 per acre per year with burning required every two to three years. In some states the state forest agency will plow fire lanes and do the actual burning for a fee. In Mississippi the cost is $24.00 per hour for fire lane plowing (usually one mile of fire lane can be plowed per hour) and $1.00 per acre for burning. Mowing costs ranged from $7.74 to $15.00 per acre per year with mowing on a two to three year cycle. Herbicide use costs ranged from $16.00 to $25.00 per acre per year with

spraying on a three to four year rotation (Arner et al. 1976). Due to climate and soil conditions there is frequently a much faster resurgence of woody growth in the southeastern United States than in other parts of the United States.

To maximize wildlife benefits and minimize costs, prescribed burning is a technique with which every conscientious ROW maintenance man should familiarize himself. It should be understood, however, that vegetation diversity, which is the basis for wildlife habitat enhancement, will be best brought about on any extensive ROW by using more than one technique, such as using selective basal spraying of herbicides on hillsides and wet swales, and burning on more level areas.

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ABSTRACT

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Numerous foliage diseases are recognized on woody ornamentals. These can cause serious defoliation under certain climatic conditions resulting in unsightly plants for the homeowner. Reduced growth and plants of lower vigor may be a problem for the commercial nurseryman. An array of pathogens are involved, and each has its own special requirements for temperature, moisture, and host preference. In many cases, each organism produces certain symptom patterns that help identify the problem. Recognizing the symptoms and better yet, the climatic conditions most conducive to a disease outbreak, can make the task of prevention easier. Foliar diseases can be recognized by their symptom patterns on the leaves and how rapidly they spread. Anthracnose, a term often associated with a specific group of organisms, may begin as a leaf spot but often covers a larger area of the leaf tissue. Blights often kill young growing tissue, especially leaves and twigs, and may extend downward for a long distance in the woody tissue.