FOREST FIRE PROTECTION

Showing From Actual Experience at What Small Outlay Effective Measures May Be Taken To Guard Against the Nemesis of Timbermen

Almost invariably the first step toward a wise use of the forest is its protection from fire. This is particularly true of the forests of the Sierras in California. Here the fire danger is unusually great, and fires have been so prevalent that they have come to be regarded almost as a necessary evil.

The Forest Service in 1904 made a thorough study of forest conditions and their relation to fire on the tract of the McCloud River Lumber Company, in Siskiyou County. The object of the study was primarily to devise a practical scheme of fire protection, particulary for the logged lands on which fire is most prevalent. Its results, upon which the plan outlined in this report was based, show: (1) That by proper care and the execution of certain measures it is possible to decrease, or even to eliminate, the danger from forest fires; (2) that such protective measures may be carried out at a reasonable cost; and (3) that the results in most cases will fully justify the necessary expenditures. After the preparation of the plan, its execution was undertaken by the Service in cooperation with the company.

The lands of the McCloud River Lumber Company are situated in Siskiyou County, Cal., near the town of McCloud. The tract is on a level plateau at the base of Mount Shasta, at an elevation of about 3,000 feet. Its era is approximately 300,000 acres. The rainfall during the period between the last of September and the middle of May amounts to about 40 inches. On the other hand, practically no rain falls during the summer months, and these constitute the season of fire danger. The tract has been logged for the past seven years, and about 43,000 acres have been cut over.

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The Forest.

There are two distinct classes of forest on the tract whose occurence is determined by moisture and the composition of the soil. The following description, though true in large part of the entire tract, applies more specifically to that portion of it later referred to as the experimental era.

The Pine Type.

On the dryer lands, or where gravel occurs, the original forest is pure yellow pine with a slight admixture of white fir, red fir, or sugar pine. The oldest pine is of excellent quality, but grows in rather open stand, a result of ancient Indian fires. Within the last sixty years, however, fires have done little damage in the virgin timber, although prevalent on the cut-over lands since lumbering began. A heavy seeding of about fifty-five years ago brought a large number of trees into the forest, which are at present from 12 to 18 inches in diameter. Besides the young trees scattered among the old ones, several openings were seeded up to dense stands, which at present average about sixteen inches in diameter. Another series of heavy seedings began from ten to fifteen years ago, and resulted in a large number of dense thickets in the openings of the old forest. Some of these are of considerable size, one covering more than a section. Except in the thickets the ground cover is chaparral, mainly buck brush (**Ceanothus cordulatus**), with a considerable mixture of manzanita (**Arctostaphylos glauca**). It is not dense enough however, to prevent the pine seedlings from coming through it, and they have rapidly overtopped it in height. Logging has left practically all the timber which has come in during the last sixty years, together with some of the smaller stuff of the old stand. Remarkably little damage was done in felling, and practically all the young growth was left intact. The ground, however, was left covered with debris. On areas where fire has not occurred since logging, the pole timber is in excellent condition, and the seedlings are well above the chaparral.

The Fir Type.

This type of forest occurs on the moister and deeper soils. It is composed of white and red fir, cedar, a small percentage of sugar pine, and a slight amount of yellow pine. The trees are of large size, particularly the red fir and yellow pine, and the forest is very dense. Fires have not been prevalent for many years in this type, and there is a dense undergrowth of white fir. Logging removes all the sugar pine and the best red and white fir and cedar, leaving all the undesirable large trees and the poles of all species under 18 inches. In so dense a forest, timber felling naturally has caused some damage, but as a whole the trees left are not badly injured, and are now doing well in the increased light which they receive.

Logging debris is very heavy in this type, but the greater part has miraculously escaped destruction by fire.

Fire.

From the preceding description of the forest, the danger of fire should be fully apparent. The time of greatest danger is, of course, the dry season, when every bit of debris and brush becomes like so much tinder. The danger is further emphasized by the presence of the inflammable chaparral areas and the vast quantities of slash on the logged lands. Fire on these areas is of the hottest character, and once started is extremely difficult and almost impossible to check. Not only is the forest threatened, but also the camps, railroad, and mills of the company, and even the town of McCloud itself. That the frequency of danger of fires is not exaggerated is shown by the fact that in 1903 the company expended $3,000 in fighting fire, and in 1904 $2,500.

Causes.

The causes of fire are manifold. Where the danger is as great as at McCloud the most trival carelessness is often sufficient to start a serious conflagration. Unextinguished camp fires and sparks from donkey engines or logging locomotives of the company are the commonest sources from which fires start.

Effect on the Forest.

The effect of fire on virgin timber is not always at once apparent. The mature trees, particularly yellow pine are well adapted to resisting the effect of an ordinary ground fire, and apparently its chief effect upon the forest is the destruction of brush and litter. In reality, however, the trees are often seriously injured, particularly where fires follow one another short intervals. Growth is checked and the trees are weakened; and in at short intervals. Growth is checked low. In addition the trees are gradually eaten through at the base, and eventually die or are blown over. Openings thus made in the forest are effectually prevented by subsequent fires from coming up to young growth, while the chaparral, which sprouts from the roots and is not permanently eliminated, even though completely burned back, takes possession of the ground. On the cut-over lands the effect of fire is even worse. Here, because of the greater accumulation of debris, the fire is hotter, and the trees left after lumbering are more likely to be killed. If this goes on long enough, the entire area becomes a chaparral field, and in the absence of seed trees, little chance is left of a return of the forest.

Fire Lines.

In a region where fires are likely to occur and, when once started, are hard to check, some means must be found to confine fires to the smallest possible area, and to serve as a basis for fighting them. For this purpose it is recommended that five fires be constructed. It is doubtful whether, in a country such as this, fire lines will of themselves stop fires, but they will make it possible to hold a fire within fixed limits, and, in addition, they can readily be used to back-fire from. The lines should be from 200 to 300 feet in width, and on them everything inflammable should be burned, and, if necessary, tops and limbs should be piled. Old stubs should be felled and the ground cleared as far as possible. The lines may best be located along old tramroads or logging spurs. The best time for constructing such lines is in the fall or early spring, when the danger from burning is least Areas of greatest danger should have the greatest number of lines. Twenty miles of fire lines should suffice for an ordinary township, and their construction should cost from $12 to $15 per mile.

Patrol.

The chief point in fire protection is to discover and extinguish fires as soon as started, since very few fires are hard to handle in their first stage. For this purpose a patrol should be established.

One patrolman should cover an area of at least 40,000 acres daily. His route is chiefly laid out, and the topography of the tract, as at McCloud, makes possible a view of the entire area from all points, the area covered by one man might be much larger. If practicable, the patrol route should follow the higher elevations, from which the whole tract may be viewed. The length of the route should not be more than the patrolman can cover thoroughly once every day during the danger season. In this instance it should encircle the experimental aera.

The duties of the patrolman should be to detect and extinguish immediately all fires starting in his territory, and whenever the fires are beyond the control of one man, to immediately summon help and direct the fire-fighting. The patrolman should also exercise a general supervision in protecting the tract, by cautioning campers, hunters, and others against fires, and by watching carefully all places of especial danger, such as the neighborhood of logging operations and the camping sites of hunters and others.

The cost of the patrolman should not exceed $75 per month, including the keep of his horse. This would mean $300 or $400 per year, according to the length of the danger season.

Tool Stations.

In order that tools may be quickly obtainable in case of fire, tool houses should be placed at places readily accessible, preferably along the patrol route. Two such stations on the aera covered by this plan should be ample. The stations may be simply chests furnished with rakes, shovels, axes, and the like.

Telephone Lines.

In order to summon help readily and to get men to the scene of any fire at short notice, a telephone line connecting with headquarters should be erected. Telephone boxes should be located along the patrol route, at the logging camps, and at other frequented spots. A line along the logging tramroad already exists, and the expense of slightly extending this should be small.

Additional Measures for Protection.

To call the attention of campers, hunters, and the like to the fire danger, warning notices should be posted in frequent places on the tract. Every effort should be made by the patrolman and the officers of the company to enlist the interest of the local inhabitants, on or about the tract, in the prevention of fires. Public sentiment is often one of the strongest factors in any protective effort.

If the accumulation of debris on cut-over lands were disposed of, the danger from fire would be greatly reduced, and any fires that started could be far more easily controlled. The cost of piling and burning slash may, however, prove prohibitive, and it is only by experiments that its feasibility can be determined.

Cost of Protection.

The following estimate of the cost of portection for the first year is believed to be conservative. In actual practice many of the expenses can probably be reduced.

Fire lines—20 miles per township, at $15	$300.00
Patrol—one patrolman, at $75 per month for four months	300.00
Three tool stations with tools at $15 each	45.00
Cost per township	645.00
Cost per acre	.03

In the above estimate no account is taken of tlephone lines, since their cost will vary greatly. One patrolman is charged to a township, but in actual practice should cover nearly two, and this should, in some measure, balance the cost of the telephone.

The fire-protection plan just outlined was put in operation by the Forest Service in cooperation with the McCloud River Lumber Company in the summer of 1895. The general execution of the plan was in the hands of an agent of the Forest Service.

Construction of Fire Lines.

The fire lines at McCloud were constructed in the fall of 1894 and in the spring of 1895, when the slash was not too wet to burn readily and yet the forest was not too dry for safety. In accordance with the plan, they followed the wagon roads, tramroads and spurs, though it was not found necessary to construct lines along all of these. Where the slash was heavlest and the danger from fire greatest the compartments or segregated areas were made smaller than where the danger was less. The lines varied in width from 200 to 400 feet for the same reasons . The fire line along the railroad track now in use was made 400 feet wide, since here the danger from sparks is great. Where the slash and chaparral were not abundant, lines 200 feet in width were sufficient. To clear the lines, the men were divided into small crews of 6 to 12, under the supervision of a responsible man. Each crew was divided into two groups, one on each side of the road or spur. One or two men from each group preceded the rest to gather the tops and debris into piles. The rest of the crew followed, setting fire to the piles of brush and debris, firing back from the outer edges of the fire line towards the center, and taking precaution not to let the fire spread beyond the boundaries of the fire line.

Piling the debris is not, as a rule, necessary, since the slash on the logged lands is usually bunched. This is due to the logging method in use. The level country permits the use of logging wheels, and, to give space for operating these, the slash has to be removed from around the felled trees. This results in throwing the slash together sufficiently for burning.

Fifteen miles of fire line were burned in 1905 in the above manner, at an average cost of $15 per mile. These 15 miles afford protection to about 15,000 acres of cut-over land, at a cost of 1½ cents per acre.

The Patrol.

A patrol route was laid out at the beginning of the season of 1905. This route was 25 miles in length and practically encircled the experimental area. It passed through those parts of the tract where fire danger is greatest, in places following the fire lines, but usually skirting the higher elevations.

A mounted patrolman covered the route daily for the four months of greatest fire danger, from June to September, inclusive. It was found that he could in this way look after 70,000 acres. He was given authority to employ and organize crews for fire fighting, and had, in short, direct control of the fire protection. The cost of the patrol, including maintainence of a horse, was $75 per FOREST FIRES 4 month—$300 for the season. This made the cost per acre but one-half cent.

Tool Stations.

Three tool stations were located on the tract. Two of these were on the patrol route, in places where fire was most likely to occur, and where they would be quickly accessible in an emergency; the third was located at the slaughter house about 1½ miles from McCloud. These tool stations were boxes or chests provided with locks, and large enough to contain the 6 long-handled shovels, 2 axes, and 2 iron rakes with which each was provided. Their cost, including tools was $10 apiece.

Telephone Lines.

A telephone line provided with frequent call boxes follows the railroad which crosses the tract, and a private line connects McCloud with the

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PUBLIC COLUMN

EDITOR COOS BAY TIMES:

There has been a great deal of feeling aroused in the past few weeks regarding the bridging of Coos Bay, at Pony Inlet, and I would like to have just a little space in your valuable paper for the purpose of setting forth one or two concrete facts, which it is impossible for any right thinking person, government official or layman, to dispute.

Will the government allow this bay to be bridged if it can be proven that any bridge put across it will be a menace to navigation? I am of the opinion it will not. Can it be proven? Most assuredly. It is a known fact that there are times during the winter when it is absolutely impossible for any of the steamers coming to this port to dock at Empire, on account of the fact that if the vessel were stopped for a moment she would not mind her helm and be driven to the beach or mud flat.

Can any draw bridge be operated, or rather are any draw bridges operated, so promptly at all times that vessels never have to wait for the draw after they whistle for them to open? If there are any the writer has been unable to learn of them. During the rough weather any steamer having to wait for the draw of the best operated draw bridge in existence would be damaged before the captain could turn his vessel.

Recently the steamer Plant in coming up the bay one stormy night carried away quite a lot of the Glasgo wharf, it being absolutely impossible to steer the vessel away from the wharf. What would have happened had the wharf been a well constructed draw bridge?

When the weather and the current are both bad on the lower bay it would be absolutely impossibe for the captain of the tug boat to stop even for an instant with a vessel or vessels in tow. What would be the result of a wait of a few minutes or even an instant for a draw bridge to open? Why, then, are some either of the opinion or at least seem to be of the opinion that a draw bridge across this harbor would not be a detriment in fact an absolute menace to navigation.

This harbor is not a river and neither is the lower bay protected as most rivers are.

Probably the government can so fix the bridge that it will not shoal the bay, though that is impractical but the fact remains that the government nor any one else on this earth can control the rough weather on the lower bay. Neither can any one acquainted with the conditions truthfully say that a vessel can wait for a draw of any bridge to open. Neither can it be said that any draw bridge ever built could always be opened just at the proper moment without causing delay to the vessel wishing to pass through.

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