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CULTURAL CONTROL OF MOUNTAIN PINE BEETLE IN SECOND-GROWTH PONDEROSA PINE STANDS LOLO NATIONAL FOREST

Proceedings of a meeting held March 16, 1973
Forest Service Auditorium
Missoula, Montana

INTRODUCTION

The purpose of the meeting was to describe results of a thinning project on the mountain pine beetle population in ponderosa pine stands in the Ninemile area of the Lolo National Forest and set a direction, "Where do we go from here?"

The following discussion was presented by Mark McGregor on the thinning study on the Ninemile Ranger District:

Prior to 1931, virgin stands of ponderosa pine seldom suffered outbreaks of mountain pine beetle in the Northwest. Following the widespread logging of old-growth stands and subsequent conversion to second-growth stands, increased tree killing occurred as a result of mountain pine beetle infestations.

In 1965 in the Pacific Northwest Region the mountain pine beetle had infested 141,550 acres of second-growth ponderosa pine stands. This problem was expected to increase as more old-growth stands were converted to a younger age class and as these stands attained a susceptible age and size class. Entomologists felt the problem was definitely related to overstocking. In evaluating some stands, they found that infestations in second-growth ponderosa pine stands usually occurred on sites III through V lands, in trees between 60 to 80 years old, and were more prevalent in pure stands. Site III was better sites, site V poorer sites. The duration of outbreaks tended to be shorter on good sites and longer on poor sites.

On site class III stands, beetle-caused mortality constituted a natural thinning from below, removing the smaller diameter trees first. On site IV stands, tree killing was essentially indiscriminate, and on site class V beetle-caused mortality tended to be a thinning from above, killing larger diameter trees first. The general level of mortality was higher on poor sites. Dominate and codominate trees were more often killed than intermediate or suppressed ones. Likewise, larger diameter trees were more often killed. The relation of beetle-caused mortality to stand density is believed to occur because overcrowding reduces the vigor of ponderosa pine and allows the beetle to overcome a larger proportion of the trees, particularly in dense stands.

In the Pacific Northwest Region entomologists believed that severe tree killing could be prevented by thinning overstocked stands. A study was initiated in 1967 to find out what effect thinning would have in reducing the incidence of mountain pine beetle in second-growth stands. Within 3 years, these results were so favorable that it is now recommended as a silvicultural control for mountain pine beetle in second-growth ponderosa pine stands. Tree killing can be prevented for 25 to 30 years by thinning to reduce stand densities below:

Site class	Stem basal area/acre
III	160
IV	140
V	120

LOLO NATIONAL FOREST THINNING STUDY

Because of the favorable results in the Pacific Northwest, we decided to initiate a study on the Ninemile Ranger District to determine what effect thinning second-growth ponderosa pine stands would have on the incidence of mountain pine beetle. A cooperative study was started in 1971 with the Ninemile Ranger District. Four blocks were selected--two check blocks, each 200 acres, and two thinning blocks. One 200-acre block was to be commercially thinned; the other block was 630 acres and was to be precommercially thinned. The precommercial thinning block was thinned during spring of 1971. The commercial thinning block has not been done to date.

All areas were surveyed before and after thinning. A variable plot survey, BA factor 20, was used. Trees were tallied and recorded as follows:

0 = green
1 = 1972 attack
2 = 1971 attack
3 = 1970 or prior kill

During the 3-year period 1970-72 in the 1,230 acres surveyed, survey data showed 26,200 trees had been killed with a volume loss in excess of

370,000 board feet. Infestation levels ranged from as low as 0.2 of an infested tree/acre to as high as 59/acre in the Isaacs Creek check block. During the 3-year period 1970-72, an average of 12 trees/acre were killed. D.b.h. of infested trees ranged from 7 to 14 inches, average 9 inches.

Within the thinned area, which was 630 acres, there were three infested trees/acre prior to thinning. Since thinning, there is 0.2 of an infested tree/acre. In the adjacent 200-acre check block, there are currently 14 infested trees/acre.

It would have been desirable to have more than one area thinned to make the test definitive, but results are encouraging.

IMPACT SURVEY

Wayne Bousfield explained how the survey was conducted to determine where in the Ninemile drainage the problem exists. The purpose of the survey was to find out the numbers of trees and volume infested by year. Remote sensing with two levels of photography--1:15840 and 1:6000 true color--was used. The Division of Engineering flew the photography. A semi-controlled mosaic was made from the 1:15840 photos covering 30,000 acres of pine type, from which 2,600 acres were delineated as heavily infested. Interpretation was made from low-level 1:6000 photography and a grid with nine 1/2-acre plots on each photo. A computer program PPSORT was used to select ground truth plots from the 117 1/2-acre plots. The 20 ground plots selected were 100 percent cruised. All trees 5 inches d.b.h. and larger were examined for beetle attacks. Trees were classified as attacked in 1972, 1971, and 1970 or earlier. Over that period a loss of 592,469 board feet was sustained. Report No. 73-7, "Mountain Pine Beetle Impact Survey on the Ninemile District, Lolo National Forest, and Surrounding State and Private Lands," provides detailed information. Areas of heaviest infestation appear to be tied in with heavy stocking 60 to 80 years old and 200+ trees per acre. We feel that if photographs had been taken a month earlier, the interpretation error might have been less because some of the 1970 trees were starting to fade and may have been counted as 1971 attacked trees.

GENERAL DISCUSSION

The following points were raised for consideration:

1. What is the hazard of Ips in this type of situation? We know that if we thin stands and increase the slash, we provide breeding sites for *Ips pini*.

2. What are the opportunities for commercial thinning as a means of managing stands where the hazard of mountain pine beetle is present?

3. What is the fire hazard due to increased slash on the ground?

4. Do we have adequate marking guides for thinning ponderosa pine?

Ips are very cyclic, and it is difficult to predict years of Ips damage. The problem could be greatly enhanced if we remove overstory, thin behind, and leave the slash as a reservoir for breeding of Ips population. The best method of preventing an Ips outbreak is to destroy the slash.

Ips have not been a problem in the Black Hills stands that have been recently thinned to reduce mountain pine beetle populations. However, ponderosa pine stands with mountain pine beetle problems tend to be somewhat older. The question was raised as to what is the relationship of Ips to mountain pine beetle in second-growth ponderosa pine stands, and should a study be initiated to determine this?

The time of year for thinning to minimize Ips damage was discussed. Results are vaiable, and a good indicator to know whether thinning at different times of the year will keep Ips populations at a tolerable level is not available. Ips infested slash should be piled and burned before the beetles emerge to overwinter in the duff.

How can second-growth ponderosa pine stands be economically managed to maintain bark beetle populations at tolerable levels?

Thinning should be done while trees are small instead of waiting until we have beetle problems. It might be best to pay someone to thin these stands and remove the slash, which would also eliminate the Ips hazard.

If thinning materials cannot be utilized, what can be done with it?

Most of these stands are of precommercial size. A thinning contractor has never been paid to dispose of slash. The cost of this could be extremely high.

Mills only want roundwood when the lumber market is poor. There are two alternatives for slash disposal--handpiling and burning or fuel breaks. Both are too expensive. Compulsory slash disposal would be ideal, but it is very expensive for an operator. Although this hasn't been tried in the past, we should develop ways to make it work.

Industry is developing equipment that will utilize 3-inch diameter materials. They are planning for eight machines for the first production run and expect to have a market for at least 800 units. Logging systems to compensate the machine need to be developed to make it pay. We need to encourage utilization of our logging residues for fuel and try to interest people to utilize wood to augment fossil fuels. This is an opportunity to test commercial equipment; and it would be an ideal area to set up some demonstrations of new equipment.

There are plans now to demonstrate new equipment in July 1973. A study that Intermountain Forest and Range Experiment Station has plans for will be conducted this summer at Coram Experimental Forest. Methods of removing logs with skyline systems--clearcutting, partial cutting, and shelterwood cutting--will be included in the study. All residues 3 to

5 inches in diameter will be removed, but we are not sure what they are going to do with it.

Do we have thinning standards in second-growth ponderosa pine stands?

Sartwell at Pacific Northwest Forest and Range Experiment Station says they are unable to find any tree characteristics which might predict susceptibility to mountain pine beetle. Some of this information might be obtained from surveying natural stands that have never been infested. The photographic evidence available from the Ninemile survey shows open stands are not as susceptible.

It was suggested that thinning studies can be done on a commercial and precommercial sale that could be laid out in such a way as to carry out a study on effects of thinning at different spacings.

We need to go to the people who can do the job--the Ranger on the ground has to be in agreement. We need the feeling of the District people or the land manager. Can we add to what we have to date, and what happens if we do nothing?

If the Ninemile District does nothing toward thinning their second-growth stands, a considerable volume of additional timber will be killed by mountain pine beetle. Should the rest of the spring and summer continue like it already has with warm, dry weather, it could develop into a more serious problem from the Ips standpoint. Portions of the Ninemile infestation appear to be decreasing, but there are other susceptible stands in the immediate area.

It was suggested that if thinning is done, the District require the operator to chip or burn slash. This could be written into the contract.

In a precommercial thinning job in the Blackfoot River drainage, all trees were brought in to a central processing area. There were some limbs left on the ground, but they were not concentrated. Very little material was left for Ips buildup or fire hazard. An operator should be sought that could use the material, then negotiate with him to do the work when it should be done rather than put it out as a sale. Considerable leg work should be done in approaching loggers to see if they are interested. With a little publicity, we could find someone interested in commercial thinnings.

The thinning study should continue with the limits more clearly defined. The scope should be broadened to include a variety of conditions. Key points brought out were:

1. Define Ips-mountain pine beetle relationship.

2. Broaden study to include a variety of stand conditions.

3. Continue study for 4 or 5 years.

4. Explore opportunities for commercial thinning of small diameter trees by service contract.

5. Reduce slash by tree-length logging.

6. Develop marking guides if thinning is successful.

7. Develop standards for slash disposal.

The Lolo indicated they could initiate a sale if finances were available. We need to pursue the possibility of getting interested companies out to look at possible areas to be thinned. Entomologists from the Division of State and Private Forestry will be available to evaluate results. Fire Control should be asked for their input on the disposal of slash.

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