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HIGH YIELDS FROM YOUNG-GROWTH PONDEROSA PINE

By

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A ponderosa pine stand growing at a net rate of 618 board feet per acre per year may be rather amazing to foresters accustomed to the proverbial slow growth of this species in the virgin forest. Yet that is the average increment for the last 6 years of a 102-year-old even-aged stand on Lookout Mountain in the Pringle Falls Experimental Forest in central Oregon. During the same period an adjacent stand from which 25 percent of the merchantable volume was thinned in 1938 grew at the rate of 566 board feet per acre per year. At this rate, by 1949 the thinned stand will have regained the volume removed in cutting.

In this study of second-growth management, thinning was done on a 40-acre tract well stocked with a 94-year-old, even-aged stand. The stand was thinned from above, that is, trees selected for cutting were mostly of the larger sizes (12 - 25 inches d.b.h.) in the dominant or codominant crown classes. Results of the thinning have been measured on five permanent sample plots for the period 1940-46. The original stand on the thinned plots had a volume of 6,711 cubic feet or 24,581 board feet, Scribner scale, per acre. Two unthinned check plots had a slightly greater volume, 7,019 cubic feet, or 26,044 board feet. The thinning removed 23 trees per acre, having a volume of 1,256 cubic feet, or 6,123 board feet. Annual growth and mortality of the reserve stand and of the check plots in the unthinned stand are shown in the following table:

Table 1.--Periodic Annual Growth and Mortality Per Acre,
1940-46, on Thinned and Unthinned Stands

Treatment	Gross increment		Mortality		Net increment	
	Cu. ft.	Bd. ft.	Cu. ft.	Bd. ft.	Cu. ft.	Bd. ft.
Thinned	97.6	582	20.4	16	77.2	566
Unthinned	104.8	641	23.2	23	81.6	618

As of 1946, when the stand was 102 years old, the mean annual increment on the thinned plots, including the volume removed and utilized by thinning, was 70 cubic feet or 271 board feet, Scribner scale. That on the unthinned plots was 74 cubic feet or 291 board feet. Trees on the thinned area grew an average of 0.52 inches in diameter in 6 years, compared to 0.45 inches for the unthinned stand, even though many of the largest, fastest growing trees had been cut.

Rate of loss by death of trees was 12 percent lower in cubic volume or 30 percent in board-foot volume on the thinned than on the unthinned area. The loss caused by barkbeetles and suppression was about twice as heavy in the unthinned stand as in the thinned, but the reverse was true of breakage of trees by snow. Net annual growth in the natural stand amounted to 2.4 percent of the board-foot volume present at the start of the growth period; that on the thinned plots amounted to 3.1 percent, or 29 percent greater.

Eighteen percent of the periodic annual increment consisted of trees that moved up into the merchantable diameter class between 1940 and 1946. That leaves a net growth of 462 board feet for the thinned plot and 506 board feet for the unthinned plot on trees measured at both examinations.

Conclusions drawn from these figures should be tempered with a full knowledge of conditions: The original stand was well stocked, slightly above normal, and the site (a low III or site index 89) is a little better than the site IV prevailing in the region. In addition, the measured growth occurred in a better than average climatic cycle. Nevertheless the test demonstrates favorable possibilities of realizing high yields from well-stocked second-growth pine and of making thinnings that provide early returns and maintain volume and quality increment at a high level. At the time this cutting was made in 1938 the logs did not quite pay their way to the mill, but under present conditions the operation would yield a substantial profit.

There is already evidence that this stand is ripe for inroads by barkbeetles. It is likely that these insects will reduce both growth and volume of this highly productive stand to that of the older, unmanaged virgin forest in the vicinity, unless thrift can be maintained by successive thinnings.

Such cuts at short intervals are planned for this stand. Starting next year thinnings will be made on the experimental forest on a larger commercial scale. The objective is to determine which of a variety of cutting methods is most effective in maintaining or improving the present high rate of growth for as long as possible. Plan is to test light and medium to heavy thinnings applied to favor the growth of the best trees in the stand for the final crop, and to salvage or avert as much tree mortality as possible. Operations will be conducted by commercial timber sale, and records of monetary costs and returns, as well as silvicultural results, will be obtained.

The mean annual growth rate at Lookout Mountain, both in the thinned and in the natural stand, is increasing rapidly. Clear cutting of such a forest would indeed be as shortsighted as killing the goose that lays the golden eggs.