

## THINNING RETURNS FROM AN EASTERN WHITE PINE PLANTATION IN OGLE COUNTY

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Early thinnings that can be made to pay their way or show a profit will put the management of forest plantations on a sound basis. As a general rule, thinning is usually delayed until the financial return will equal the expense of performing the operation. In plantation management the original spacing should be so chosen as to allow for proper development of planted trees without excessive competition with one another up to an age and size which will permit a profitable thinning. Utilization practices within a given area will determine the spacing. Even though not immediately profitable, early thinnings may be justified on the basis of over-all stand improvement and the fact that they will increase the increment of quality wood on pruned crop trees. It has been proved that the increment on pruned trees will return a profit at the time of harvest. Since a group of relatively few trees of large diameter on an area will yield much more lumber than numerous trees of small diameter, the advantage of concentrating growth on a small number of trees is evident. Forty-seven percent of the total yield and 35 percent of the total value of a pine-spruce stand in central Sweden was removed in the form of thinnings (3).

Four one-quarter acre permanent sample plots were established in a 32-year-old white pine plantation on Sinnissippi Forest, Ogle County, in 1939. These plots serve for thinning and pruning studies. Periodic measurements provide growth and yield information. The first thinning was made in the fall of 1941 at the age

of 34. An earlier thinning would have resulted in better development and increased growth of the final crop trees. A second thinning was made in the fall of 1946 at the age of 39. Stand conditions before and after thinning, together with material removed, are summarized in Table 1. In two plots the desired stocking was reduced by a severe wind storm, a plane crash and the death of several crop trees. Although the primary cause of death was not determined, the red-turpentine beetle *Dendroctonus valens*, was always associated with the dying trees.

The main purpose of the thinnings was to provide the pruned crop trees with sufficient growing space for their optimum development. Trees removed were principally in the codominant crown class with some in the dominant. Diameter growth of the intermediate-crown class was low, and the suppressed trees showed no growth for the five-year period. The suppressed trees were removed if large enough to yield a post. Their small undeveloped crowns aided little in site protection.

Sinnissippi Forest operates its own sawmill and a semicommercial treating plant for the preservation of fence posts (2). Some 2 to 3 thousand fence posts are treated annually. They are cold-soaked 48 hours in a 5-percent solution of pentachlorophenol in light fuel oil. The financial success of these thinnings was largely due to the ready sale of treated posts and rough lumber at near-by markets. Lumber and treated fence posts are retailed at the mill yard. Special orders are

TABLE 1—COMBINED DATA FOR FOUR ONE-QUARTER ACRE PLOTS  
 Eastern White Pine Thinning and Pruning Plots  
 Sinissippi Forest, Ogle County

Age Years	Trees per acre	Basal area	Av. Height		Site index	Av. D. B. H.		Diam. range	Stand density	Volume per acre:	
			All trees	Dom. and codom.		All trees	Dom. and codom.			Trees 2" and over	Trees 8" and over
	No.	Sq. ft.	Feet	Feet	Feet	Inches	Inches	Inches	Index	Cu. ft.	Bd. ft.
34	636	181	42	46	Stand before thinning 72	Stand before thinning 7.2	8.2	3-15	375	3942	13,665
34	148	38	40	..	Material removed in thinning ..	Material removed in thinning 6.9	..	3-12	..	821	2,742
34	488	143	43	46	Stand after thinning 72	Stand after thinning 7.3	8.2	4-15	294	3121	10,923
39	452	161	49	53	Stand before thinning 70	Stand before thinning 8.2	8.9	3-16	329	3937	17,869
39	132	30	44	..	Material removed in thinning ..	Material removed in thinning 6.5	..	3-14	..	683	1,746
39	320	131	51	53	Stand after thinning 70	Stand after thinning 8.7	8.9	4-16	256	3254	16,123

<sup>a</sup> Volumes from Harvard Forest Bulletin No. 13, Form class 65.

TABLE 2.—POST AND LUMBER YIELDS FROM FOUR ONE-QUARTER ACRE SAMPLE PLOTS

Plot No.	Select		No. 1		No. 2		Total		Board feet <sup>a</sup>	
	Age 34	Age 39	Age 34	Age 39	Age 34	Age 39	Age 34	Age 39	Age 34	Age 39
	113.....	7	15	64	94	28	41	99	150	476
114.....	5	16	43	94	19	51	67	161	142	205
115.....	10	8	91	51	39	23	140	82	486	135
116.....	6	6	56	39	24	15	86	60	530	166
Per acre.....	28	45	254	278	110	130	392	453	1,634	861

<sup>a</sup> International log rule (sawkerf 3/4 inch).  
 Post specifications: Minimum top D.I.B. of 6 inches for select, 4 inches for No. 1 and 3 3/4 inches for No. 2.

delivered to Oregon and Rockford markets. Data on cost of growing these pine plantations with expected returns were published in 1944 (1).

All posts were graded for this study. The choice of post grades was arbitrary, although selected from the standpoint of farm demand. Lumber and post yields, together with specifications by grades, are listed in Table 2. In 1941 all graded posts were sold in mixed lots for 55 cents each. In 1946 they were sold by grade only. Select, No. 1 and No. 2 grades sold for 85, 75 and 65 cents respectively. The rough pine lumber was sold largely in the form of two-by-fours and inch boards. One specific order included finished knotty-pine boards for interior decoration.

Table 3 illustrates the method used to figure net stumpage appraisals for treated posts and lumber.

TABLE 4.—THINNING YIELDS AND NET STUMPAGE RETURNS PER ACRE

Age 34	391 fence posts @ 10c.	\$ 39.10
	1,634 bd. ft. @ \$23.00/M	37.58
	Total .....	\$ 76.86
Age 39	453 fence posts @ 20c.	\$ 90.60
	861 bd. ft. @ \$37.00/M	31.86
	Total .....	\$ 122.46
Total net stumpage returns....		\$ 199.14

The light sandy soils supporting these pine plantations are considered too poor for general farm use. Therefore, the total net stumpage returns of \$199.14 per acre from these two thinnings is very encouraging from the standpoint of plantation management. It is possible that all costs of raising these pine plantations, including 3 percent compound interest, may be entirely liquidated by the next thinning.

TABLE 3.—STUMPAGE APPRAISALS FOR TREATED POSTS AND LUMBER  
 Eastern White Pine Thinning and Pruning Plots  
 Sinnissippi Forest, Ogle County

	Age 34 in 1941	Age 39 in 1946
Average selling price per post.....	\$ .550	\$ .720
Production costs		
Cutting.....	\$.101	\$.136
Peeling.....	.094	.138
Hauling.....	.020	.015
Treating solution.....	.120	.116
Treating labor.....	.025	.019
Equipment and depreciation.....	.015	.010
Total of direct cost and depreciation.....	.375	.434
Plus 20% of cost for profit and risk.....	.075	.087
Total cost and margin.....	.450	.520
Indicated stumpage value per post.....	.100	.200
Average mill-run selling price		
1,634 bd. ft. at \$65.00 in 1941.....	\$106.21	
861 bd. ft. at \$85.00 in 1946.....		\$73.18
Logging and milling cost plus depreciation.....	\$57.19	\$34.44
Plus 20% of cost for profit and risk.....	11.44	6.89
Total cost and margin.....	68.63	41.33
Indicated stumpage value.....	37.58	31.86
Indicated stumpage value per M.....	23.00	37.00

## LITERATURE CITED

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