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HEAVY THINNINGS CAN INCREASE INCOME FROM EAST TEXAS LOBLOLLY PINE STANDS

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In 1956 a study was initiated in 17-year-old natural stands of loblolly pine (Pinus taeda L.) on lands of Southland Paper Mills, Inc. to observe the effects of thinning on growth and income. All plots were remeasured and further cuttings made in some plots in 1961 and 1966. The study was terminated in 1971 when all plots were remeasured and harvested.

Description of the Area:

Twelve of the 24 plots were in Polk County and the other 12 in Trinity County, Texas. The average site index for Polk County plots was 83, and for Trinity County, 88.

Soils supporting the stands were identified as Segno fine sandy loam in Polk County and Sawyer sandy loam in Trinity County. The Segno soil (a member of the fine loamy, mixed, thermic family of Plinthic Paleudalfs) contained a restricting layer approximately 24 inches below the surface. The Sawyer soil (a member of the fine-silty over clayey, mixed, thermic family of Aquic Paleudults) had a restrictive layer at about 40

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inches. In both areas the mean annual rainfall averages 47 inches. The mean January - July temperatures are 39 and 94 degrees Fahrenheit respectively. Both counties are heavily timbered and both provide an appreciable volume of timber for East Texas forest industries.

Treatments:

In each county, 12 one-tenth-acre plots were established, providing replicate plots for each of the 5 thinning treatments and an unthinned check. The treatments were randomly assigned to the plots. Crop trees were selected from among the best, well-spaced dominants and codominants; trees more than 4.5 inches d.b.h. were considered merchantable.

Treatment A. Twenty crop trees were selected and all other merchantable stems were cut. In 1966 the crop trees were reduced to 14 and all other merchantable stems were cut.

Treatment B. Thirty crop trees were selected and all other merchantable stems were cut. In 1961 the crop trees were reduced to 20 and all other merchantable stems were cut. In 1966 the crop trees were reduced to 14 stems.

Treatment C. Forty crop trees were selected and all other merchantable stems were cut. In 1961 the crop trees were reduced to 30 and all other merchantable stems were cut. In 1966 the crop trees were reduced to 20 and all other merchantable stems were cut.

Treatment D. Thirty crop trees were selected and all other stems, both merhcantable and unmerchantable, were cut. In 1961 the crop trees were reduced to 20, and in 1966 to 14 stems.

Treatment E. The best dominant, co-dominant, and intermediate trees were released by cutting those trees judged to be interfering with their growth. In 1961 further cutting (0.3 cord per plot) removed most of the intermediate trees. In 1966 the best 30 trees were selected for crop trees and all other merchantable stems were cut.

Treatment F. No thinning. All merchantable trees were measured in 1961 and 1966, and were measured and harvested in 1971.

Measurements on all plots were confined to merchantable trees. Since stands in 1956 contained nu-

merous trees less than 4.5 inches in diameter, such trees remained standing after the establishment cut on all plots except treatment D. Such residual small trees which had become merchantable were removed and measured in subsequent cuts.

Computations.

Volumes were put on a per acre basis and recorded in the year of cutting. For comparability, all volumes were reported in cords; part of the 1971 cut, however, was harvested for sawtimber, and evaluated at sawtimber stumpage values. Stumpage prices per cord for pulpwood were $3.25 in 1961, $3.75 in 1966, and $4.25 in 1971. Sawtimber was sold in 1971 for $27.50 MBF (Doyle). Incomes, and expenses such as taxes, fire protection, management, and marking costs were carried to the same point in time (1971) at the following rates of interest: 1956-1960 – 7%, 1961-1965 – 7.5%, 1966-1971 – 8%.

Marking costs were estimated at $0.50 per cord in 1961 and $0.75 per cord in 1966. No marking was required for the 1971 harvest cut. Costs of cutting unmerchantable trees in 1956 on treatment D were carried forward from the year of installation; other establishment cuttings involved no net cost.

Annual costs were charged on a per acre basis as follows:

YEAR	TAXES	MANAGEMENT COSTS	P/L FIRE CONTROL	TOTAL ANNUAL COSTS
1957 - 61	$0.25	$0.75	$0.03	$1.03
1962 - 66	$0.42	$1.00	$0.04	$1.46
1967 - 71	$0.68	$1.25	$0.05	$1.98

Results.

Average annual growth on Polk county plots was 1.17 cords per acre, and on Trinity County plots 1.30 cords per acre (Table 1). In both counties growth in volume was greatest throughout the 15 year period on the unthinned plots. This is consistent with results from some other thinning studies in southern pine.

An evaluation of the thinning treatments in terms of income and costs has been prepared (Table 2). Treatment D, while averaging less growth than Treatments C, E and F, and involving the highest costs, produced the most net income over the 15-year period. Its economic superiority was due to the fact that sawtimber was harvested from these plots, while the growth on the denser treatments was largely pulpwood. Of the 16.11 cords produced on Treatment D, 3,302 bd. ft. (Doyle) was sold as sawtimber, while all the harvest from Treatment F was pulpwood.

The system of thinning that produced the largest average dbh over the span of the study (Table 3) was Treatment D, where thinning removed unmerchantable as well as merchantable trees. The other, less drastic, thinnings increased average diameter growth only slightly.

Table 1. Volumes, and growth in Texas loblolly pine stands, by treatment and county.

TREATMENT	*TRINITY COUNTY*			*POLK COUNTY*		
	VOLUME 1956	GROWTH 1956 - 1971	YEARLY AVERAGE GROWTH	VOLUME 1956	GROWTH 1956 - 1971	YEARLY AVERAGE GROWTH
	CORDS PER ACRE					
A	4.750	19.15	1.28	5.667	11.73	0.78
B	5.857	14.64	0.98	5.526	16.61	1.11
C	8.117	18.62	1.24	8.725	15.66	1.04
D	7.865	15.99	1.07	8.500	16.22	1.08
E	8.590	19.41	1.29	7.250	20.59	1.37
F	10.290	24.40	1.96	12.185	24.22	1.61

Table 2. Present value of income and expenses, by treatments, of natural loblolly pine stands in East Texas.

TREATMENT	GROSS INCOME	GROSS EXPENSES	NET INCOME
	DOLLARS PER ACRE		
A	135.95	42.25	93.70
B	152.23	44.25	107.98
C	164.42	43.64	120.78
D	187.66	46.27	141.39
E	128.32	41.19	87.13
F	161.70	35.45	126.25

Table 3. Diameter at breast height at the beginning and end of study on thinnings of natural pine stands in East Texas.

TREATMENTS	AVERAGE DBH 1956	AVERAGE DBH 1971
	INCHES	
A	5.5	9.3
B	5.2	9.5
C	5.2	9.1
D	5.5	10.2
E	6.1	9.1
F	5.7	8.3

Conclusions.

Thinnings at age 17 which removed only merchantable trees produced less total growth, and increased diameter growth only slightly above unthinned stands. A heavier thinning, removing all trees except selected crop trees accelerated diameter growth substantially.

After 15 years the latter treatment, despite less total growth, afforded enough sawtimber trees to produce a more valuable cut than that from any other treatment. The value difference was more than enough to defray the cost of the thinning plus interest.