
EASTERN WHITE PINE AS A TIMBER TREE IN ILLINOIS

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The lumber industry in the United States was founded on eastern white pine, *Pinus strobus* L. White pine lumber from the Lake States played a leading role in the rapid development of the Middle West. The treeless prairies of Illinois took tremendous quantities of white pine lumber for their development.

From a period extending from shortly after the Civil War to approximately the beginning of the twentieth century the Lake States produced more lumber than any other region in the United States. This production was made possible by its extensive stands of virgin white pine. Many of these stands contained trees 200 to 300 years old, 150 to 200 feet high, and 4 to 7 feet in diameter. Today the Lake States produce about 3 per cent of the country's lumber production.

King white pine was the name given to this tree by a group of New York foresters to emphasize the inherent qualities of this species and to put it, so to speak, in a class by itself. It has been called the wood of a thousand uses. White pine has been put to a greater variety of uses than any other species. It has a uniform texture, possesses a straight grain, kiln dries well, shrinks little, and is easy to work with tools. It can be glued readily and does not

split easily when nailed. The wood is light in weight, moderately soft, and holds paint well. Although moderately weak, this is not a limiting factor in its many uses. White pine lumber is ideally suited to the construction of almost any part of a house. Handsome houses built of white pine in New England some 200 years ago are still in excellent condition. In the past when the supply was abundant, its principal use was construction. The second-growth material now found on the markets comprises the lower grades and is used largely in box construction. The more exacting demands of the pattern and casting industry utilize the best grades. Knotty pine is used extensively for interior trim. Other uses are for sash, doors, toys, finish trim, flooring, car construction, woodenware, caskets and signs.

Eastern white pine is native to northern Illinois. The southern limit of its range in this area was represented by a two-acre stand on the west bank of the Spoon River in Knox County. These trees have been cut. A few scattered trees occur on the banks of the Illinois River in LaSalle County, in the Apple River Canyon in Joe Daviess County and on the banks of the Mississippi River in northwestern Illinois. The largest single natural stand comprises the

TABLE 1.—EASTERN WHITE PINE

Plot No.	Age from seed	Trees per acre	Av. Ht. & codom. trees	Site index	Av. D. B. H.			Basal area*	Volume per acre		Mean annual growth		Cu. Ft.
					Dom. & codom.	All trees	Range		Trees 2' and over	Trees 8' and over	Ht. dom. codom. trees	d. b. h. dom. & codom. trees	
	Years	No.	Feet	Feet	Inches	Inches	Inches	Sq. Ft.	Cu. Ft.	Bd. Ft.	Feet	Inches	
113	32	552	47	77	8.6	7.6	5-14	176	3,933	15,392	1.47	0.27	123
115	31	700	44	77	8.0	7.0	3-12	188	4,008	12,300	1.42	0.26	129
114	32	732	44	73	7.4	6.3	3-11	172	3,773	10,388	1.37	0.23	118
116	36	592	47	68	8.6	7.6	3-15	184	4,115	16,788	1.30	0.24	114
104	58	236	60	52	12.2	11.4	7-15	167	4,498	27,834	1.03	0.21	64
76	82	52	67	45	20.5	18.6	10-26	98	2,683	18,568	0.82	0.25	33
C3	72	196	61	44	12.4	11.3	7-18	137	3,716	22,849	0.85	0.17	52
60	81	113	59	40	17.8	16.4	11-24	165	4,220	27,124	0.73	0.22	52
Plot No.	County	No. of trees measured	Orig. spacing (ft.)	Soil number and type	Gen. agr. crop rating	Adaptability to site	Remarks						
113	Ogle	138	.....	53 Plainfield fine sand	9	Very good	Thrifty, well developed, artificially pruned						
115	Ogle	175	.....	53 Plainfield fine sand	"	Very good	Thrifty, well developed, artificially pruned						
114	Ogle	183	.....	53 Plainfield fine sand	"	Very good	Thrifty, well developed, artificially pruned						
116	Ogle	148	.....	53 Plainfield fine sand	"	Good	Thrifty, well developed, artificially pruned						
104	Grundy	118	.....	88 Hager fine sand	"	Fair	Some trees cut						
76	Lee	87	.....	41 Muscatine silt loam	2	Poor	Remnants of an overmature plantation						
C3	Champaign	204	4 x 4	152 Drummer clay loam	1	Poor	Badly wind-thrown, flat-topped, poorly developed						
60	Lee	71	.....	52 Caledonia silt loam	2-5	Poor	Flat-topped						

* Basal area is the total cross sectional area in square feet of all trees at 4 1/2 feet from the ground.

White Pine Forest State Park in Ogle County. These trees are approximately 100 years old, 100 feet high and the larger ones are close to 30 inches in diameter.

Eastern white pine is the most valuable conifer that can be grown for forest products in Illinois. It has lost some of its favor as a reforestation species in New England and Lake States because of its susceptibility to white-pine blister rust *Cronartium ribicola* Fischer, and white-pine weevil *Pissodes strobi* Peck. White-pine blister rust has not been found on white pine in Illinois. The intermediate stage of the rust has been found¹ on currants and gooseberries. Local eradication of these bushes from the protective zone of the pine stand will insure protection from the disease. The presence of the white-pine weevil in Illinois was reported for the first time September 1943 by Ernest D. Bergeson*, state leader of white-pine blister-rust control in Illinois. The specimen was identified by Dr. MacAloney, forest entomologist for Region 9 of the United States Forest Service.

If white-pine forests are to be made an important source of timber in this state through planting, it is essential to have the facts regarding the commercial possibilities of this tree. Table 1 presents a detailed tabular statement on the growth and yield of white pine in central and northern Illinois. The growth data for white pine indicate very definitely that it cannot be grown profitably on the heavier prairie soils i.e., clay and silt loams. The high land values of good prairie soils and the rapid decline in growth-rate of this species after 20 or 30 years are the limiting factors. With some 3,000,000 acres of land in Illinois of questionable

agricultural value and suited primarily for the growing of forest trees, there seems little justification to plant trees on the better prairie soils, except for windbreaks and farm woodlots of a highly specialized nature and subject to very intensive management. The young white pine plantations now growing on dune sands (No. 53 Plainfield fine sand and No. 54 Plainfield sand) in Mason, Henderson, and Bureau counties show excellent vigor and are growing rapidly. If this growth-rate is maintained in the older ages on these sites, it will be apparent that many acres of land too poor for agriculture can be planted to white pine as a valuable forest crop. Future development of young red, white, and jack pine plantations now growing on these dry sand areas may, however, prove that red and jack are better suited to these sites.

The growth data for plots Nos. 113, 114, 115 and 116 as found in Table 1 offer real encouragement for planting white pine in northern Illinois. These plots are growing on Plainfield fine sand and are located on the hilly area in the Sinnissippi Forest lying along Rock River in Ogle County. Heretofore, these dry ridges supported a very low-quality black oak, *Quercus velutina* Lamarek, producing less than 25 cords of fuelwood per acre at 60 years. None of these trees were of saw-log quality. Previously these areas had been grazed with degrading consequences. The site quality for the pine on the ridges is slightly better than 2 while the lower slopes are site quality of 1 or not quite so good.

Lumber yields of eastern white pine as given by Frothingham² are shown in Table 2.

The yield of 60,200 board feet per acre for site I at age 60 is equivalent to over 1,000 board feet per acre per

* By correspondence of September 1943.

TABLE 2.—YIELD PER ACRE IN LUMBER OF EVEN-AGED SECOND-GROWTH WHITE-PINE STANDS

Age Years	Lumber Yield Per Acre		
	Site Quality I	Site Quality II	Site Quality III
	Board Feet	Board Feet	Board Feet
20.....	4,500	.....	.....
25.....	8,400	5,400	.....
30.....	13,900	9,600	5,300
35.....	22,500	15,900	9,300
40.....	32,800	23,500	14,200
45.....	41,800	30,600	19,200
50.....	49,100	36,600	24,100
55.....	55,000	42,000	29,000
60.....	60,200	46,900	33,600
65.....	65,100	51,600	38,100
70.....	69,900	56,100	42,300

TABLE 3.—ESTIMATED COST OF GROWING EASTERN WHITE PINE IN NORTHERN ILLINOIS Planted in Ogle County, 1905

Items of Cost	Time of occurrence Years after planting	Compounded For years	Cost Per Acre	
			Cash invested	Accumulated to 60th year at 3%
Planting				
Stock, 1200 trees at \$12 per M	0	60	\$14.40	\$84.84
Transportation.....	0	60	2.00	11.78
Labor at 30 cents per hr. plus supervision.....	0	60	10.00	58.91
Pruning 200 trees per acre; 1st....	15	45	2.40	17.55
2nd....	18	42	2.00	11.49
3rd....	21	39	3.60	18.84
Protection				
Fire, Annual charge 5 cents....			3.00	8.15
White pine blister rust, Initial eradication \$2.00.....			2.00	11.78
White pine, Annual charge 6 cents.....			3.60	9.78
Administration, Annual charge 50 cents.....			30.00	81.53
Interest on land investment ¹	0	60	47.70 ²	233.33
Taxes \$.15 in 1905 to \$.26 in 1942 (Remaining est.).....	Annually	0-60	16.23	41.06
			\$136.93	589.04

¹ Land cost \$47.70 per acre in 1905.² Owner still possesses land after forest is removed.

TABLE 4.—ESTIMATED RETURNS FROM GROWING EASTERN WHITE PINE IN NORTHERN ILLINOIS
Planted in Ogle County, 1905

Operation	Product and Quantity Obtained	Time of occurrence Years after planting	Interest compounded for yrs.	Returns per acre	
				Original	Accumulated to 60th yr. at 3%
1st thinning..	391 posts at 10 cents per post.....	34	26	\$ 39.10	\$ 84.32
	1634 bd. ft. at \$8.00 per M.....	34	26	13.07	28.19
2nd thinning..	270 posts at 10 cents per post.....	40	20	27.00	48.76
	1437 bd. ft. at \$10.00 per M.....	40	20	14.37	25.95
3rd thinning..	142 posts at 10 cents per post.....	45	15	14.20	22.10
	5813 bd. ft. at \$12.50 per M.....	45	15	72.66	113.20
4th thinning..	16 posts at 10 cents per post.....	50	10	1.60	2.15
	6160 bd. ft. at \$15.00 per M.....	50	10	92.40	124.18
5th thinning..	4750 bd. ft. at \$18.00 per M.....	55	5	85.50	99.12
Final cut.....	52,769 bd. ft. at \$20.00 per M.....	60	0	1055.38	1055.38
				\$1415.28	\$1,603.35

Gross receipts \$1,603.35
Total Cost 589.04
Net Profit \$1,014.31
\$16.91 per acre per year net profit

year. Intermediate cuttings in the form of thinnings should add another 20,000 board feet giving a gross yield of 80,000 feet. This goal can be achieved only with the application of intensive forest management. In addition to the lumber yield approximately 800 seven-foot fence posts will be obtained from the trees 4 through 9 inches in diameter.

Plots 113 through 116 in Ogle County were thinned at age 34. Bet-

ter development would have resulted from thinnings made 10 to 15 years earlier. All crop trees were pruned through the first 16-foot log. That a financial rotation from 60 to 70 years is suitable is suggested by the growth of old white pine on a somewhat similar site on the White Pine State Forest which lies 8 miles west of the Smississippi Forest.

Table 3 shows the estimated costs of growing white pine in Ogle County under conditions as outlined in the table. This land actually cost \$47.70 per acre in 1905. Tax statements for these lands during the

period from 1905 through 1942 were secured from the Ogle County Court House. The yield data secured in the first thinning at age 34 are actual. Subsequent yield data from thinnings and the final cut were carefully estimated from yield and stand tables for a comparable site. All cost data were carried from time of occurrence to the end of the 60 year rotation at 3 per cent compound interest. The largest single item of cost was \$233.33 which represents the interest on the land investment of \$47.70 for 60 years.

Table 4 gives the estimated returns from growing white pine on this same area. All cash returns were carried from time of occurrence to the end of the rotation at 3 per cent compound interest. The net profits at the end of 60 years were \$1,014.13 per acre. This is equivalent to a net profit of \$16.91 per acre per year. Sinnissippi Forest possesses its own sawmill. It has a ready market in nearby Oregon and Rockford for treated fence posts, fuelwood and all types of lumber sawed to specification. Additional revenue can be expected as a profit on logging, sawmilling and marketing of products manufactured by forest labor.

The remaining pine plots in Table 1 are typical forest plantations found on Illinois farms. For the most part they are overgrazed, either understocked or overstocked, and have had no care since they were set out. Under their present conditions they offer little chance of supplying badly needed lumber for the farm. From an investment standpoint they must be considered a failure.

Extensive areas of light sandy soils along Rock River in Ogle County are, at the most, now returning only small amounts of fuelwood and meager grazing of low forage value. The possibility of securing a net profit from growing white pine at \$16.91 per acre per year, in addition to 3 per cent on invested capital, affords an excellent opportunity for these areas.

BIBLIOGRAPHY

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2. Frothingham, E. H., White pine under forest management. U. S. Dept. Agr. Bul. 13, 1-70. 1914.