EASTERN UNITED STATES HARDWOOD SAWTIMBER RESOURCES AND EXPORT POTENTIAL

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Abstract. --To look at the export potential of the Eastern hardwood sawtimber resources, including the Southern and Northern regions, hardwood resource data were compiled from USDA Forest Service state resource evaluation reports on a set of select export species. The species are the select oaks, yellow birch, hard maple, black walnut, black cherry, and the ashes. These species were chosen on the basis of their importance to the export market. Resource data are presented on standing hardwood sawtimber (inventory, growth, and removals) of the select export species, and on all hardwood sawtimber. Estimates of standing sawtimber for 1985 are presented along with projections for 1990, 1995, and 2000 for the Eastern United States and the Northern and Southern regions.

The relative export potential of the hardwood resources by state was determined by the Preferred Available eXport species (PAX) ranking system. In this system, we first order the first 25 states by total quantity of select export species. Next, we evaluate these 25 states with an Export Index formula. The formula uses data on the quantity and quality of the standing sawtimber in the select export species. A premium is placed on select oak sawtimber because about two-thirds of the hardwood product exports are oak. A premium also is placed on grade 1 log sawtimber material because many of these logs are exportable; and if processed in the United States, they contain sizeable amounts of exportable high-grade lumber or veneer. The PAX rankings are presented for the top 25 states in eight groupings. Note that other factors could be considered that could change these results.

Keywords: Hardwood exports, sawtimber resources, select hardwood species, sawtimber quality

INTRODUCTION

The United States has become a major player in the export side of the world marketplace for hardwood logs, lumber, and veneer. For the last 10 years, U.S. exports of these products have been growing, and the future looks bright. The increased exports have generated many questions on our ability to continue to supply our export markets with highly demanded top-grade material, The questions have addressed sawtimber locations, quantities, qualities, and whether we are using more of the major hardwood export species than we are growing each year.

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The major hardwood species highly demanded on the export market are the select red and white oaks, yellow birch, hard maple, black walnut, black cherry, and the ashes. We will refer to this group as the select export species. The select oaks make up about two-thirds of U.S. hardwood product exports. The remaining select export species make up a large portion of the remaining one-third of our hardwood exports. A complete presentation on U.S. hardwood log, lumber, and veneer exports by species to our major customers can be found in Araman and Hansen (1987).

With U.S. hardwood exports centered around this group of species, several questions arise that need answers to assure demanders that we have adequate supplies of these species. If recent wood use trends continue, can the U.S. continue to supply the export market--can our exports increase? Are these resources being depleted? Which states have the best combinations of adequate supplies and good-quality material when considering these species?

To answer these questions, we will take a look at the estimated 1985 sawtimber volumes for the East and by region (North and South) (Figure 1), with projections for 1990, 1995, and 2000. Next, the relative export potential of the top 25 states in the East will be presented using a ranking system called the Preferred Available eXport species or PAX ranking. Note that other ranking systems that include more factors than we have used in our analysis could produce different rankings.
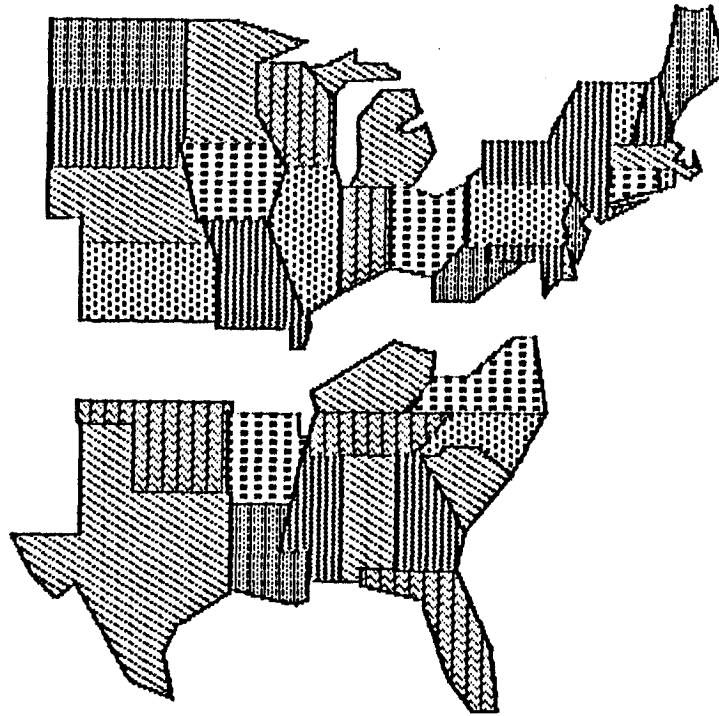

Figure 1.--Eastern state locations and the Southern
and the Northern regions.

EASTERN RESOURCES AND REGIONAL RESOURCE COMPARISONS

The base resource data used in this paper were compiled from USDA Forest Service state resource evaluation reports. We compiled data on all hardwood sawtimber and on the group of species that we had previously defined as select export species. Survey years for the state resource reports ranged from 1975 to 1986 for the South and 1972 to 1987 for the North. Some data were collected directly from the Experiment Station inventory analysis units for recently resurveyed states, or recent inventory updates.

By state, we started with the hardwood sawtimber inventory, growth, removals, and quality data for the reported survey year. The inventory, growth, and removals data were then used to determine by state the current percent oompound annual inventory changes for each of the select export species, the combined select export species, and all commercial hardwoods. Based on the percent compound annual inventory ohanges, the inventory data for each state were adjusted to a base year of 1985. The state data were then combined to generate the Eastern and then the Southern and Northern regional data shown in Table 1 (data on individual states are available from the author).

The Eastern results show that 32 percent or 233 billion board feet (International l/4-inch rule) of the 1985 estimated 'sawtimber inventories are in the select export sawtimber species demanded on the export market. Of that total, 59 percent are select oaks, 18 percent hard maple, 19 percent ashes, walnut and cherry, and 4 percent yellow birch. The review also revealed that the select export species are increasing slightly faster than all commercial hardwood sawtimber inventories (2.4 vs 2.2 percent). The hard maple and the combined ash, walnut, and cherry resources also are increasing much faster than the select oaks and yellow birch inventories.

On a regional basis, the 1985 estimates show that the South has 14 percent more commercial hardwood sawtimber and that the annual change rates are the same (2.2 percent). However, when considering only the select export species, the North has 89 percent more sawtimber than the South, and the North's annual change is slightly higher (2.4 vs 2.3 percent). The percent annual changes are higher for the South except for the combined ash, walnut, and cherry species. The volume of select oak resources in the South is close to the North's, but the North has far greater quantities of the other select export species.

Using the 1985 estimates and the percent annual inventory changes and assuming the continuation of past resource-use trends, we estimated sawtimber volume projections for 1990, 1995, and 2000 (Table 2). The projections show positive inventory growth for the East and in both regions for all categories, By the year 2000, 33 percent of Eastern sawtimber could be in the select export species--up slightly from 1985. By region in 2000, 46 percent of the Northern sawtimber will be in the select export species versus 21 percent for the South. Further, by the year 2000, the Eastern select export species sawtimber resources may have increased by 42 percent (43 percent for the North and 41 percent for the South).

Individual species groupings results show two different trends. For the select oaks, the South has been achieving higher growth rates. For this reason, the quantities of select oak resources in the South should be the same as the North's in 1995 and exceed the North's beyond 1995. For all other select export species, the North will continue to have a large resource advantage. In 2000, the North will have approximately a 13 to 1 hard maple advantage; a 3 to 1 ash, walnut, and cherry advantage; and a 40 to 1 yellow birch advantage.

Table 1.--Estimated Eastern sawtimber volumes for 1985 and percent compound annual inventory changes, in billion board feet (International 1/4-inch rule).

Saw-timber Volumes	All Commercial Hardwoods	All Select Hardwoods	Select Oaks	Hard Maple	Ash, Walnut, Cherry	Yellow Birch
Eastern United States						
1985 Est.	727.9	233.0	136.9	43.4	44.0	8.8
% Change	2.2	2.4	1.8	3.2	3.0	1.5
Northern States						
1985 Est.	340.5	152.4	71.5	40.3	32.1	8.6
% Change	2.2	2.4	1.4	3.2	3.3	1.5
Southern States						
1985 Est.	387.4	80.6	65.4	3.1	11.9	.2
% Change	2.2	2.3	2.3	3.3	2.3	2.3

Table 2.--Estimated Eastern sawtimber volumes for 1985 with projections for 1990, 1995, and 2000, in billion board feet (International 1/4-inch rule).

Year	All Commercial Hardwoods	All Select Hardwoods	Select Oaks	Hard Maple	Ash, Walnut, Cherry	Yellow Birch
			Eastern United States			
1985	727.9	233.0	136.9	43.4	44.0	8.8
1990	811.5	261.9	149.9	50.8	51.0	9.5
1995	904.9	294.4	164.3	59.5	59.3	10.2
2000	1008.8	330.9	180.1	69.6	68.9	11.1
			Northern States			
1985	340.5	152.4	71.5	40.3	32.1	8.6
1990	379.6	171.6	76.6	47.2	37.7	9.3
1995	423.3	193.2	82.2	55.2	44.4	10.0
2000	471.9	217.5	88.1	64.6	52.2	10.8
			Southern States			
1985	387.4	80.6	65.4	3.1	11.9	.2
1990	431.9	90.3	73.3	3.6	13.3	.22
1995	481.6	101.2	82.1	4.3	14.9	.24
2000	536.9	113.4	92.0	5.0	16.7	.27

STATE COMPARISONS--THE PAX RANKINGS

The relative export potential of the hardwood resources by state is determined by the PAX ranking system. We start by ordering the first 25 states by total quantity of select export species sawtimber. Next, we evaluate these 25 states with an Export Index formula. Then we rank the states by their resulting Export Index values and add these rankings to the Resource Rankings and reorder the results, smallest value to highest value, to determine the PAX rankings. The PAX rankings are presented in eight groupings.

The total select export species sawtimber resources by state adjusted to a 1985 base are shown in Table 3. The top 25 states are then evaluated using the Export Index formula. Of these states, the top 10 are Pennsylvania, New York, Michigan, Virginia, Wisconsin, West Virginia, North Carolina, Tennessee, Ohio, and Kentucky.

The Export Index formula uses data on the quantity and quality of the standing sawtimber in the select export species as follows:

Export Index = 2xPSO + POSS + 2xPG1 + PG2

where: PSO = percent of select oak species sawtimber
POSS = percent of the "other" select export species sawtimber
PG1 = percent of grade 1 logs in select export species
PG2 = percent of grade 2 logs in select export species

A premium is placed on select oak sawtimber because about two-thirds of all hardwood exports are oak. A premium also is placed on the generally limited quantities of grade 1 log sawtimber material because many of these logs are exportable; and if processed in the United States, they contain sizeable amounts of exportable high-grade lumber or veneer (data for the select species by grade and state are available from the author). No attempts were made to predict changes in quality distributions when adjusting the resource data for each state to the 1985 base year estimates. The Export Index Ranking results (Table 3) show the first 10 states to be New Hampshire and Illinois (tied), Pennsylvania, Ohio, Connecticut, New York, Missouri, Indiana, Vermont, and West Virginia.

The PAX group rankings for the top 25 states are presented in the last column In Table 3. These rankings were determined by adding the Resource and Export Index Rankings and reordering the results (lowest to highest). The groupings were made to cover possible sampling and estimation errors. Pennsylvania and New York are in the first group followed by Virginia, Ohio, Wisconsin, West Virginia, and Illinois in the second group and Michigan, Indiana, and New Hampshire make up the third group. The fourth group includes North Carolina, Vermont, Tennessee, and Kentucky. The fifth group includes Arkansas and Connecticut and the sixth contains Missouri, South Carolina, Maine, and Massachusetts. The seventh group includes Mississippi, Georgia, and Alabama and Minnesota and Louisiana are in the last group.

Table 3.--Top 25 states according to their select export species sawtimber resources, resource ranking, export index and ranking, and PAX group rankings.

State/ Region	All Select Export Species Resources (MMBF)	(1) Resource Ranking	Export Index	(2) Index Ranking	(1+2) Combined Rankings	PAX Group Rankings
PA (N)	26350	1	134	1	2	1
NY (N)	18272	2	131	4	6	1
VA (S)	13652	4	112	10	14	2
OH (N)	9884	9	127	5	14	2
WI (N)	12622	5	112	10	15	2
WV (N)	11558	6	116	9	15	2
IL (N)	7233	13	132	2	15	2
MI (N)	16267	3	106	15	18	3
IN (N)	7500	12	121	7	19	3
NH (N)	4948	19	132	2	21	3
NC (S)	11264	7	102	16	23	4
VT (N)	5933	16	120	8	24	4
TN (S)	10425	8	98	18	26	4
KY (S)	9485	10	102	16	26	4
AR (S)	7571	11	89	20	31	5
CT (N)	2769	25	126	6	31	5
MO (N)	6460	21	107	14	35	6
SC (S)	3809	22	108	13	35	6
ME (N)	7059	14	86	22	36	6
MA (N)	2873	24	111	12	36	6
MS (S)	6359	15	80	23	38	7
GA (S)	5650	17	87	21	38	7
AL (s)	4902	20	96	19	39	7
MN (N)	5316	18	70	25	43	8
LA (S)	3478	23	80	23	46	8

Other Eastern States

MD (N)	2648	OK (S)	680
TX (S)	2321	DE (N)	322
IA (N)	1800	RI (N)	275
FL (S)	1036	NE (N)	255
KS (N)	1007	ND (N)	199
NJ (N)	827	SD (N)	49

SUMMARY AND CONCLUSIONS

The Eastern United States has substantial quantities of select export species, and these resources are increasing and not decreasing as some fear. By the year 2000, our inventories of select export species sawtimber could increase by 42 percent to 331 billion board feet (International 1/4-inch rule). From this standpoint, we have the resources to continue as major players in the world hardwood market for log, lumber, and veneer products, and to Increase our exports of further processed hardwood products.

On a regional comparison based on our analysis, the North has the most total select export species sawtimber; and with present trends, the North will continue to lead in 1990, 1995, and 2000--primarily because the export market is demanding many hardwood species that are predominate in the North. If major changes in species demanded on the export market occur in the future, then the South will most likely be the major beneficiary. Otherwise, the major bright spot for the South is that its select oak inventories will equal the North's by 1995 and surpass the North's shortly after 1995 due to greater compound annual growth rates.

On a state-by-state analysis using the PAX ranking system, the top 10 states are Pennsylvania, New York, Virginia, Ohio, Wisconsin, West Virginia, Illinois, Michigan, Indiana, and New Hampshire. The next four states are North Carolina, Vermont, Tennessee, and Kentucky. Again, note that these rankings are based on a system that we developed. Updated Inventory data, consideration of different species, major shifts In species demanded on the export market, declines or increases in resources growth rates, changes in demand for solid hardwoods, and other factors such as resource accessibility could result in different conclusions.

EPILOGUE

Even with the optimistic outlook for our hardwood resources, the following would be required for the United States to substantially increase hardwood product exports now and in the future:

1. More export demands for many of our abundant nonoak species.

2. More value added export products made from currently abundant and nonexportable hardwood materials such as medium- and low-grade resources.

LITERATURE CITED

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