Timber Industry OPPORTUNITIES

in selected areas of West Virginia

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Introduction

FIRMS in the major wood-using industries are constantly searching for new plant locations. Industrial development and promotion agencies play an important role in this search by providing firms with information about various locations.

Just as the firm can choose among various locations for its new plant, the development agencies can choose among locations and industries at which they will direct their efforts. In order to do this, the development agency must have some basic information about location requirements and the availability of these requirements at different locations.

The purpose of this report is twofold. First, to provide location information for industrial development and promotion agencies in West Virginia to help them in attracting plants in the major wood-using industries. Second, to provide an evaluation of the relative suitability of five selected areas in West Virginia so that the development agencies can direct their major efforts at the better opportunities.

The relative suitability of the selected areas was determined through a comparison of the cost and availability of important location requirements in each area. Comparisons were made for representative plants in four major wood-using industries, although not all industries were compared in each area.

It was found necessary for analytical purposes to limit the number of industries and locations that were compared. Those used in this evaluation were chosen because they are representative; the fact that some locations and industries were not chosen for comparison does not imply that they are unsuitable. The information provided for specific locations and industries applies broadly to surrounding areas and to similar wood-using industries.

The four wood-using industries chosen for comparison are the lumber, particle-board, woodpulp, and furniture industries. These provide an interesting range of alternatives for analysis. The comparisons in each industry are made for average-size plants, which range from small in the lumber industry to fairly large in the woodpulp industry. Raw-material requirements for these plants differ in type: sawlogs for the lumber industry, pulpwood or wood residues for the woodpulp and particle-board industries, and lumber for the furniture industry. But each of four industries is representative of a basic group of wood-using industries.

The areas chosen for comparison are representative of West Virginia conditions. Each area is identified by a central city: Beckley[1] in the southeastern part of the state, Elkins in the northeastern part, Huntington in the southwestern part, Parkersburg in the west, and Richwood, which lies between Beckley and Elkins (fig. 1).

The evaluations are based on specific assumptions, indicated in the body of this report. These assumptions, which concern plant size, location of markets, and other factors important in location decisions, are realistic. However, others that might change the results of the evaluations could have been used. This point should be considered by users of this report. In a similar sense, better-than-average managers may do well at poorer-than-average locations. Thus, while this evaluation suggests that some

[1] Because Beckley has no substantial river or stream, Hinton, a nearby city on the New River, is considered as the central location for the Beckley area in the woodpulp industry comparisons.

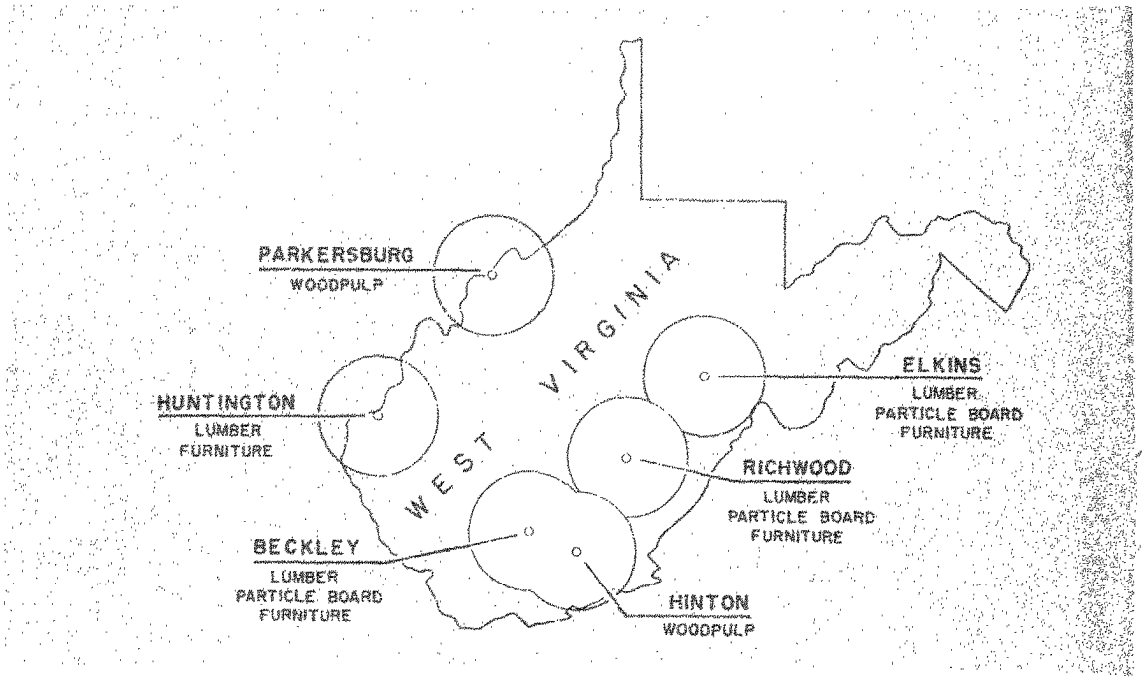

Figure 1.—The central locations studied, and the industry comparisons made at each location.

locations are better than others, it does not suggest that industrial opportunities are absolutely bad at the poorer locations.

The availability of timber resources plays an important part in the location decision for the primary wood-using industries—lumber, particle-board, and woodpulp. This report contains the latest Forest Survey statistics for the State of West Virginia. These data are based on a sampling scheme designed to get reasonably accurate data for areas smaller than the entire State. They are current as of January 1961.

What Is a Good Location?

The manager of a firm choosing a new plant location has certain criteria in mind. Perhaps the most important criterion is economic; a new plant location must be at least competitive with existing and alternative locations. Other criteria, such as a good climate and the availability of cultural, social, and recreational amenities, may also be important (Hagenstein 1962). This report is concerned primarily with the economic criteria used in choosing plant locations in the wood-using industries.

To be competitive, a plant location must have the required raw materials, labor services, and transportation services all available at a total cost that is competitive with other locations. All of these requirements must be available in quantities sufficient to sustain an industrial plant. Clearly, the exact quantities required vary with plant size. It is important for the reader to keep in mind that, while specific quantities of each requirement are necessary for a plant of a given size, the total cost of the requirements is important in judging suitability of locations. In other words, a location where one requirement is costly may be competitive if other requirements are cheap.

The quantities of the various requirements that are available place a physical limit on the expansion of industrial activity at a location. If some requirements are not available, then the location must be judged unsuitable. If substantial quantities of all the necessary requirements are present, then a sizable expansion in activity is possible.

The cost of the requirements determines the likelihood of industrial expansion. It is obvious that the locations with the necessary requirements at the lowest cost are most likely to be attractive to firms searching for new plant locations. For this

reason, comparisons only of physical quantities of resources available at locations are insufficient for indicating locations at which expansion is most likely. Both the quantities of location requirements and their cost will be judged in this report.

The importance of clearly noneconomic criteria used in choosing plant locations should not be minimized. They will not be discussed in this report because of the problems involved in evaluating them. However, users of this report should consider the impact of amenities and their implication for the results of this study.

How Are Location Comparisons Made?

The firm looking for a new plant location knows what its requirements are. It has a model or set of standards that it uses in judging alternative locations. The industrial-development agency requires similar information to compare locations systematically. Of special importance to these agencies is knowledge of the particular requirements of plants in various industries.

These location requirements are much the same from one firm to the next within an industry. That is, a new plant in an industry will use about the same quantity of raw materials, labor, and transportation services per unit of output regardless of the firm that builds the plant. This means that industrial-development agencies can use a standard model for comparing the suitability of locations for an industry.

An earlier analysis of the location decision for the four wood-using industries considered in this report will serve as the model for this evaluation (Hagenstein 1964). Economic factors that affect the location decision were identified in that report for each of the industries, and the relationships among the impacts of the various factors were quantified.

It was shown that those inputs whose costs vary among locations are important in the location decision. Nine such location factors were shown to be of varying degrees of importance for the wood-using industries. Of these, certain factors are clearly more important than others. Wood, labor, and transportation of the finished product to markets are the most important factors for all four of the industries.

For wood-using industries, a number of other factors were shown to modify the impact of the economic considerations on

the location decision. Wood requirements for the primary industries are of special importance. Both economic considerations and special requirements of each industry will be involved in this evaluation of selected areas in West Virginia.

The models used in evaluating the selected locations consist of a set of the required production factors for a plant of specified size in each industry (table 1). Obviously, greater quantities of inputs are required for larger plants and less for smaller plants. The plant sizes specified here were chosen as being efficient for conditions in the northern Appalachian area.

The type of plant chosen for the comparisons in each industry is well suited for using the hardwood timber resources of West Virginia. With one exception, the average plants in the models are typical of plants being built in these industries today. The exception is the woodpulp industry. Woodpulp plants built today are normally integrated with paper or paperboard plants. While the assumed semichemical woodpulp plant of the model would probably be built together with a paper or paperboard plant, the comparisons are for a woodpulp plant only.

Two types of comparisons must be made in evaluating locations. First, quantities of available production factors at a location must be compared with plant requirements to determine if plant location is feasible. Second, the costs of the required production factors must be compared to determine if the location is economically competitive. Comparisons of these two types constitute the bulk of the remainder of this report.

Are Location Requirements Available?

The major location requirements or production factors indicated in the models are available at all of the locations that have been selected for comparison.

There is some similarity in the location requirements for the four wood-using industries considered here. Each of the industries requires wood; each also requires transportation services, labor services, electric power, and industrial sites. On the other hand, the type of input in each of these broad classes may vary. For example, the lumber industry requires sawlogs, while the woodpulp industry requires pulpwood. And although there are adequate quantities of these requirements at all locations, there

Table 1.—*Models for average plants in four selected wood-using industries in West Virginia*

Item	Lumber	Particle-board	Woodpulp	Furniture
Output:				
1. Size of plant.	20,000 board feet of lumber/day (5,000,000 board feet/year).	20,000,000 square feet (¾-inch basis)/year.	200 tons/day.	Annual sales of $5,000,000.
2. Type of output.	Rough graded hardwood lumber.	Medium-quality flakeboard made largely of soft hardwood and softwood particles.	Neutral-sulfite semichemical pulp made largely from hardwoods.	Medium-quality wooden furniture (case goods).
3. Selling price/unit of product.	$90/1,000 board feet of lumber.	$130/1,000 square feet (¾-inch basis) of particle board.	$140/ton of woodpulp.	No definable units.
Operating rates:				
1. Days/year.	250 days/year.	300 days/year.	325 days/year.	275 days/year.
2. Hours/day.	8 hours/day.	22 hours/day.	24 hours/day.	8 hours/day.
Inputs:				
1. Specific.	1. Logs: 20,000 board feet/day.	1. Wood: 75 cords/day.	1. Pulpwood: 280 cords/day.	1. Lumber: 14,500 board feet/day.
	2. Labor: 3 skilled, 5 semiskilled, 4 unskilled.	2. Labor: 35 skilled, 35 semiskilled, 30 unskilled.	2. Labor: 32 skilled, 16 semiskilled, 16 unskilled.	2. Labor: 75 skilled, 150 semiskilled, 75 unskilled.

	3. Transportation: highway connections required.	3. Transportation: highway connections; rail connections for noncaptive plants.	3. Transportation: rail and highway connections required.	3. Transportation: rail and highway connections required.
	4. Electricity: 750 kwh./day.	4. Electricity: 15,500 kwh./day.	4. Electricity: 55,000 kwh./day.	4. Electricity, 5,800 kwh./day.
	5. Industrial site: 20 acres.	5. Industrial site: 20 acres.	5. Industrial site: 100 acres.	5. Industrial site: 20 acres.
	6. Plant and equipment: $150,000.	6. Plant and equipment: $2,500,000.	6. Plant and equipment: $10,000,000.	6. Plant and equipment: $2,500,000.
2. General.	1. Nature of hardwood timber determines markets that will be entered. Graded lumber requires good species and high-grade logs.	1. Supply of light, soft-textured hardwood or softwood usually required for plants whose product is to be sold in open market.	1. Site on a river usually required for waste disposal and water supply; quantity of water required for disposal varies depending on regulations of water commissions and nature of streamflow.	1. Labor force skilled in furniture manufacture must be available or readily developed.

are differences in both the quantity and quality of major requirements at the various locations.

The availability of wood requirements at each location deserves special attention here, since this is a limiting factor in plant location for all of the industries except the furniture industry. Water-supply and waste-disposal requirements are also limiting for the woodpulp industry. In addition, the availability of labor and transportation services varies substantially from one area to the next. The availability of each of the requirements will be discussed in turn.

To make estimates of the quantities and costs of inputs available at each location, some assumptions of a definitional nature are required. The extent of timber sheds and labor market areas must be defined, and probable markets for goods must be assigned. The necessary assumptions about wood supply, markets, and types of transportation used are indicated in table 2. Quantitative estimates of the cost and availability of the necessary inputs at each location are indicated in the appendix.

WOOD REQUIREMENTS

Species availability, timber quality, timber size, volumes per acre, and competition for the available timber are all important in comparing the availability of wood requirements at the various locations. Interpretation of data describing these factors depends on the industry being considered. Therefore, the availability of wood requirements will be considered separately for the lumber industry, for the woodpulp and particle-board industries, and for the furniture industry.

Information about the availability of timber is presented in this report for areas surrounding the central locations. The areas around each location are defined as the counties within 25 miles of the central location (25-mile area) and the counties between 25 and 50 miles of the central location (25-to-50-mile area).

For the Lumber Industry

Trees of sawtimber size (9 inches and larger in diameter at breast height for softwoods and 11 inches and larger for hardwoods) are the basic raw material for the lumber industry. But not all trees of this size are of equal value to a new sawmill. A firm hoping to compete in markets for graded hardwood lumber must be able to obtain its raw material from a timber supply of the more valuable species and of the better grades.

Table 2.—*Assumptions about wood supply and transportation used in calculating cost advantages*

Industry requirements	Industry			
	Lumber	Particle-board	Woodpulp	Furniture
Wood	1. Source: 25-mile area—75% 25-to-50-mile area—25% 2. Species: Red oak —40% White oak —25% Yellow-poplar —20% Maple —10% Beech — 5%	Source 25-mile area—100%	1. Source: 25-mile area—75% 25-to-50-mile area—25%	1. Source: 25-mile area—75% 25-to-50-mile area—25% 2. Species: Yellow-poplar —60% Maple —15% Red oak —10% White oak — 5% Black Cherry — 5% Beech — 5% 3. Grade: #1 Common.
Transportation	1. Destination: Hickory —50% Roanoke —20% Winchester —10% Charleston —20% 2. Type: 100% truck. 3. Weight: 3,400 lbs./1,000 board feet.	1. Destination: *Truck* *Rail* Hickory 10% 10% Thomasville 20% 20% Roanoke 10% 10% Winchester 10% — Charleston 10% — 2. Weight: 2,600 lbs./1,000 sq. ft. (¾-inch).	1. Destination: *Truck* *Rail* New York — 20% Philadelphia — 20% Pittsburgh 20% — Cleveland 10% 10% Cincinnati 10% 10%	1. Destination: New York —20% Philadelphia —20% Pittsburgh —20% Cleveland —20% Cincinnati —20% 2. Type: 100% truck.

Modest increases in the cut of the better sawtimber species are feasible in West Virginia. However, the degree of competition is stronger in some of the areas than in others. Competition is particularly strong for high-value timber such as black cherry, yellow birch, and maple, and for the soft-textured hardwoods such as yellow-poplar and basswood. Competition is less strong for the oaks, and not strong at all for most other hardwoods, such as beech, hickory, and elm.

A comparison of estimated growth with estimated lumber production in each area indicates that the degree of competition for the more desirable species is strongest in the Richwood area. Competition is somewhat less strong in the Beckley and Elkins areas, although the difference between estimated growth and lumber production is small when compared to annual sawmill production (table 3).

Table 3.—*Estimated sawtimber growth and lumber production for selected species groups, by location*[1]

Item	Oaks	Yellow-poplar, basswood, cucumber	Maples, cherry, yellow birch	Other[2] hardwoods	Softwoods
Beckley:					
Growth, M board feet	114	50	35	69	11
Cut, M board feet	54	41	22	22	16
Ratio	2.1	1.2	1.6	3.1	0.7
Elkins:					
Growth, M board feet	83	27	31	50	17
Cut, M board feet	36	23	15	15	6
Ratio	2.3	1.2	2.1	3.3	2.8
Huntington:					
Growth, M board feet	26	4	4	14	2
Cut, M board feet	7	6	1	3	1
Ratio	3.7	0.7	4.0	4.7	2.0
Richwood					
Growth, M board feet	83	32	31	51	15
Cut, M board feet	47	36	28	18	15
Ratio	1.8	0.9	1.1	2.8	1.0

[1] Annual sawtimber growth estimated as 2½ percent of 1961 sawtimber inventory. Lumber production estimates from Frank 1965. Growth and cut estimates are for counties within 50-mile areas surrounding the selected locations.

[2] Includes hickory, beech, ash, and black walnut.

Table 4.—*Selected forest resource statistics, by location, 1961*[1]

Item	Beckley		Elkins		Huntington		Richwood	
	25-mile area	25-to-50-mile area	25-mile area	25-to-50-mile area	25-mile area	25-to-50-mile area	25-mile area	25-to-50-mile area
				Percent				
Area forested	81	84	76	69	71	81	80	77
				Thousand acres				
Area of commercial forest land	1,324	2,859	1,042	2,113	558	407	1,630	1,438
Area in hardwood sawtimber stands	658	1,449	532	1,034	246	175	832	731
Area in hardwood sawtimber stands of more than 5,000 board feet/acre	218	484	172	334	79	56	282	237
				Million board feet				
Total hardwood sawtimber volume	3,360	7,349	2,549	5,081	1,122	813	4,185	3,676
Sawtimber volume in—								
Oaks	1,449	3,120	1,096	2,240	620	437	1,711	1,604
Yellow poplar, basswood	574	1,263	338	656	97	72	611	537
Maple, cherry, yellow birch, walnut, ash	423	969	534	1,035	129	92	798	632
Hardwood sawtimber volume in grade 1 and grade 2 logs	1,078	2,348	703	1,406	349	252	1,261	1,070
Hardwood sawtimber volume in diameter classes 16 inches and larger	2,167	4,742	1,490	2,962	660	479	2,568	2,233

[1] Statistics are for counties within 25 miles and between 25 and 50 miles of central locations. Specific areas are shown in appendix.

In absolute terms, the Beckley area has greater volumes of timber in all species groups than any of the other areas. The Huntington area has by far the smallest total volume of timber; it is considerably smaller than any of the other three areas because it includes only the West Virginia portions of a 50-mile ring around the city. Data for forest resources in the Ohio and Kentucky parts of the Huntington area were not included in this report.

All of the areas have substantial volumes of timber in sawtimber stands of more than 5,000 board feet per acre, in grade 1 and grade 2 logs, and in timber 16 inches and over in diameter at breast height (table 4). Differences in average timber quality among the areas do not appear to be very important, as shown in the following tabulation of total hardwood sawtimber volume by log grades:

Area[2]	*Grade 1 (percent)*	*Grade 2 (percent)*	*Grade 3 (percent)*	*Tie-and-timber (percent)*
Beckley	10.8	21.2	42.7	25.3
Elkins	10.1	17.5	47.0	25.4
Huntington	10.8	20.3	39.5	29.4
Richwood	10.4	19.2	45.0	25.4

[2]For 25-mile area, plus the 25-to-50-mile area.

It is not possible here to determine the extent to which the sawtimber cut should be changed. Substantial sawtimber volumes of the oak and the other hardwood group (hickory, beech, and minor species) could be removed in all areas. On the other hand, it appears that only modest increases in the cut of the better species could be sustained in the long run in the Beckley and Elkins areas. In the Huntington and Richwood areas, increases in the cut of the better species might result in unfavorable growth-drain ratios.

For the Woodpulp and Particle-Board Industries

The woodpulp and particle-board industries use pulpwood and sawmill residues for their primary wood requirements. Semi-chemical woodpulp mills can use practically all commercial hardwood species. Particle-board plants, on the other hand, are generally restricted to using the soft hardwoods (basswood, yellow-poplar, and the like) or softwoods.

At present only small quantities of pulpwood are being cut

Table 5.—*Volume of growing stock, by location and major species group, 1961*[1]

(In thousands of standard cords)[2]

Location[3]	Softwoods	Oaks	Yellow-poplar, basswood	Maple, beech, yellow birch	Other hardwoods	Total
Beckley:						
25-mile area	611	6,126	2,715	2,671	4,134	16,257
25-to-50-mile area	1,410	13,795	5,879	6,299	8,992	36,375
Total	2,021	19,921	8,594	8,970	13,126	52,632
Elkins:						
25-mile area	1,000	5,094	1,498	3,309	3,135	14,036
25-to-50-mile area	1,911	10,519	3,001	6,357	6,230	28,018
Total	2,911	15,613	4,499	9,666	9,365	42,054
Huntington:						
25-mile area	279	2,570	465	625	1,525	5,464
25-to-50-mile area	206	1,794	357	508	1,154	4,019
Total	485	4,364	822	1,133	2,679	9,483
Parkersburg:						
25-mile area:	316	3,394	591	741	1,879	6,921
25-to-50-mile area	355	3,588	644	856	2,031	7,474
Total	671	6,981	1,235	1,597	3,910	14,395
Richwood:						
25-mile area:	1,490	8,069	2,871	5,114	5,425	22,969
25-to-50-mile area	1,045	7,058	2,459	3,891	4,356	18,809
Total	2,535	15,127	5,330	9,005	9,781	41,778

[1] Growing stock includes all merchantable trees of commercial species, 5.0 inches and larger in diameter at breast height.

[2] Estimated by using factor of 80 cubic feet of wood inside bark per standard cord.

[3] Volume estimates are for counties within 25 miles and between 25 and 50 miles of central locations. Specific areas are shown in appendix.

Table 6.—*Estimated annual growth of growing stock, by location and species group*[1]

(In thousands of cords)

Location[2]	Softwoods	Oaks	Yellow-poplar, basswood	Maple, beech, yellow birch	Other hardwoods	Total
Beckley	98	618	382	202	476	1,776
Elkins	141	484	200	218	337	1,380
Huntington	24	136	36	25	97	318
Parkersburg	33	216	55	36	141	481
Richwood	123	469	237	203	352	1,384

[1] Growth estimates were obtained by applying statewide growth percents for indicated species groups to inventory of growing stock at each location.

[2] For 25-mile plus 25-to-50-mile areas.

in West Virginia and shipped to woodpulp mills in the surrounding states. Some hardwood sawmill residues are being used, but substantial quantities are still available (Frank 1963). A large expansion in either the woodpulp or particle-board industry could be sustained by pulpwood produced in West Virginia. The volume of the growing stock (merchantable trees over 5 inches in diameter at breast height) is greatest in the Beckley, Elkins, and Richwood areas, but is also substantial in the Parkersburg and Huntington areas (table 5).

There is now considerable drain on these volumes of standing timber. A good part of the larger trees goes into lumber production, and in some areas a part goes into pulpwood and minor products. This still leaves substantial volumes of timber in the smaller size classes that could be removed without lowering the growth potential of the forest.

A woodpulp plant of the size indicated in the location model has annual pulpwood requirements of just over 90,000 cords. The particle-board plant requires 22,500 cords. A comparison of these figures with estimated total annual growth of growing stock shows that growth in any of the areas is sufficient to sustain one or more woodpulp mills or particle-board plants, even if half the total growth were used for other purposes (table 6).

The differences in growth among species groups are important—especially for the particle-board industry. The annual growth of soft hardwoods and softwoods is considerably less than that of the hard hardwood species groups. However, the

growth figures indicate sufficient volumes of the soft species to sustain substantial particle-board production. Among the areas compared as particle-board plant locations (Beckley, Elkins, Richwood), the annual growth of both soft hardwoods and softwoods is roughly equal.

The availability of sawmill residues is also of some importance to these industries. The volume of chippable soft hardwood residues produced in the Beckley area is just sufficient to sustain a particle-board plant of the indicated size. In the Elkins and Richwood areas, there are enough of these residues to cover half of the wood requirements of such a plant (Frank 1963).

The quantity of available sawmill residues is greater in the Beckley area than in the Parkersburg area, although neither Beckley nor Parkersburg has enough available sawmill residues to support a woodpulp mill. The residues that are available could serve as an important source of perhaps one-fourth of the wood requirements of a woodpulp mill.

Competition for sawmill residues at present is increasing. More are being utilized now than at any time in past years.

For the Furniture Industry

Lumber and dimension stock used in furniture manufacture are commonly shipped long distances to furniture plants. Thus hardwood lumber is more or less ubiquitously available. However, since shipping costs are an important component of the total cost of lumber, total furniture-production costs can be reduced somewhat by locating plants close to supplies of the required lumber species and grades.

Sufficient lumber is produced in all of the selected areas to supply all of the requirements of several good-sized furniture plants (Frank 1963). More lumber is produced in the Beckley and Richwood areas than in the Elkins and Huntington areas, as shown in the following tabulation (from Frank 1963) of lumber production in 1960 (in millions of board feet):

Location[3]	*Oaks*	*Poplar, basswood, cucumber*	*Maple, cherry, birch*	*Other hardwoods*
Beckley	54	41	22	22
Elkins	36	23	15	15
Huntington[4]	18	16	3	7
Richwood	47	36	28	18

[3] For counties within 50 miles of central locations.

[4] Includes lumber production in selected counties of Ohio and Kentucky within 50 miles of Huntington.

The largest volumes of desirable furniture lumber are produced in the Beckley and Richwood areas, but the other two areas also produce sizable volumes of maple, cherry, birch, and yellow-poplar. Other factors that affect the desirability of the lumber production in these areas were discussed in an earlier report (Frank 1963). Based on this information, the conclusion is that availability of lumber is satisfactory in all four areas.

LABOR REQUIREMENTS

It is difficult to specify the extent of the labor force that might be available to a new plant in an area. Much depends on current employment levels, relative wage rates, population density, and commuting patterns. One usable measure of the potentially available labor force is the number of unemployed workers in an area. This is the measure used in this report.

All of the selected areas have a sufficient number of unemployed workers to meet the requirements of one or more new plants in any of the selected industries. Huntington and Parkersburg have the largest total labor forces of the selected areas; but Beckley has a substantially larger unemployed work force than any of the other four, a reflection in part of the depressed conditions in coal-mining areas. Elkins has the smallest labor force. But even Elkins has enough unemployed workers to staff a good-sized plant in the furniture industry, which, of the four industries, requires the most labor per unit of output.

Labor is not a homogeneous factor, so not all of the labor force is equally well suited to employment in the wood-using industries. Skill classes, age, and education are all of some importance in defining labor-force quality. The three standard skill classes used in most labor-market reports are broad, and they include many particular skills that are not transferable among industries. On the other hand, they do indicate an ability to acquire skills. Labor in the upper skill classes is probably more readily trained for new jobs than labor in the lower skill classes. Age and education are also related to the ability to acquire new skills and handle new jobs.

Average skill, age, and education of unemployed workers vary somewhat among the five areas. Average skill levels are highest in the Elkins area and lowest in the Beckley area. Average education levels are highest in Parkersburg and Huntington and lowest in Beckley and Richwood. The average age of unemployed workers is somewhat greater in Elkins than in the other areas.

On the other hand, the total number of unemployed workers with a 12th grade education or better and in the upper skill class is greatest in absolute terms in the Beckley area. For the firm locating a new plant in West Virginia, these qualitative differences in the labor force are of some importance. With the possible exception of labor for the lumber industry, some form of training—probably on-the-job training—would be necessary at all locations.

Labor-training programs would be most important for the furniture industry. Some four-fifths of the employment in wood furniture plants in West Virginia is in the Huntington area (U. S. Bureau of the Census 1961); there is also some employment in furniture manufacture in the Elkins area. These areas provide a base on which to build and develop further furniture-making skills. Therefore training costs would probably be lowest at Huntington and highest at Richwood and Beckley.

TRANSPORTATION REQUIREMENTS

Both rail and truck transportation services are available at all locations. The relative availability of these services depends on the type of freight lines and highways serving the selected locations.

Three major rail systems cross West Virginia in an east-west direction (fig. 2). The Baltimore and Ohio main line crosses the northern part of the State, passing through Parkersburg, with connections to Elkins, Richwood, Charleston, and Huntington. The Chesapeake and Ohio main line passes through Huntington and Charleston and has a branch line to Beckley (the main line passes through Hinton in the Beckley area). The Norfolk and Western runs through southern West Virginia with connections to Beckley and Huntington. In addition, Elkins is on the main line of the Western Maryland, which connects parts of northeastern West Virginia with the Baltimore and Ohio main lines.

The present status and plans for the public highway system are important in evaluating the suitability of truck transportation. The present highway system in West Virginia is poor. However, it will be improved by the new national system of interstate and defense highways, now under construction (fig. 2).

Two important links of the interstate system pass through the portions of West Virginia being considered here. The first is a north-south highway from Cleveland, Ohio, through Parkersburg, Charleston, and Beckley to points in the industrial area of central-western North Carolina. About one-third of the Parkers-

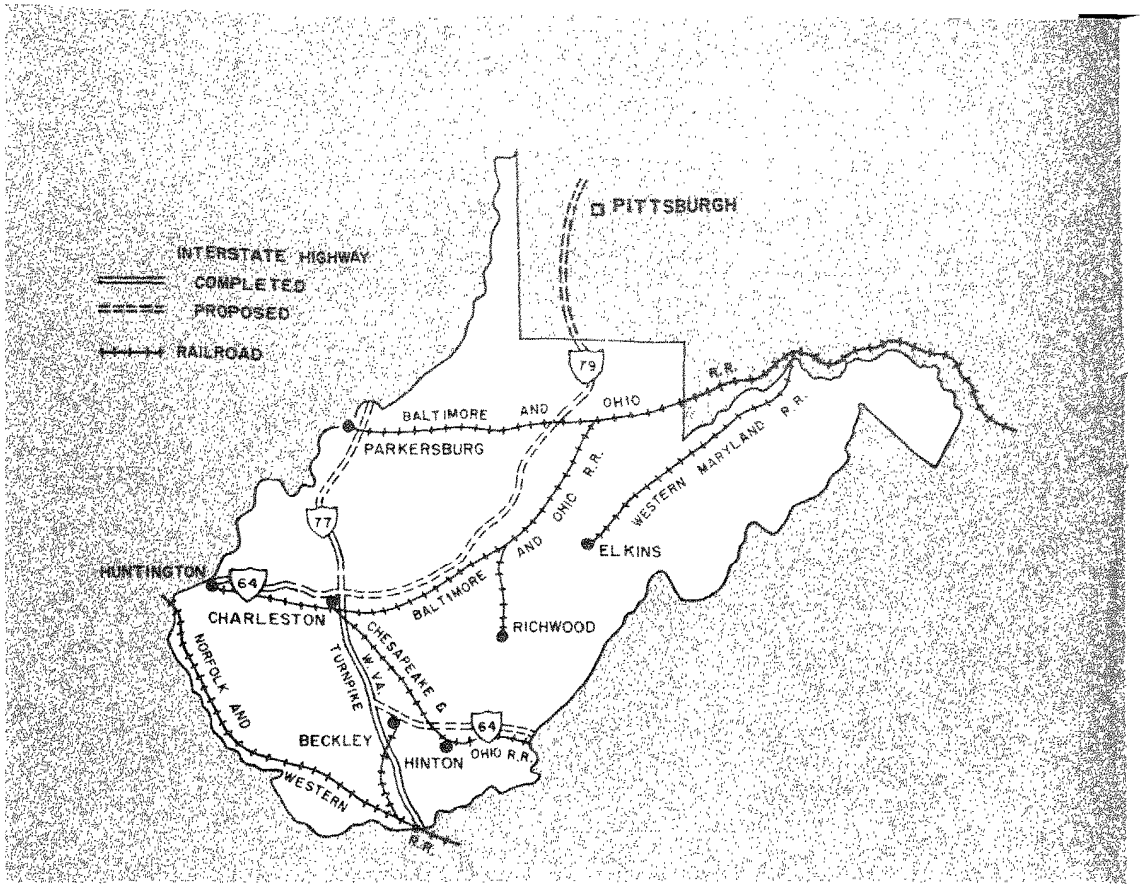

Figure 2.—The interstate highway and major railroad connections serving the selected locations in West Virginia.

burg-Charleston link is complete. The West Virginia Turnpike, which is to be a part of the interstate system, is complete from Charleston through Beckley to the southern edge of West Virginia. No work has been done on the connecting portions in Ohio and Virginia.

The second link is an east-west highway from Richmond, Virginia, through Charleston and Huntington to Louisville, Kentucky. A major part of the Huntington-Charleston section has been completed. However, the remainder of the West Virginia portion and the connecting sections in Virginia and Kentucky have not yet been started. A third link in the interstate system will connect the Charleston area with Pittsburgh, but little progress has been made on this link.

In sum, Beckley, Huntington, and Parkersburg are favorably

located on east-west main line railroads; Elkins and Richwood are connected to these main lines. But none of these locations has good north-south rail connections. Huntington and Parkersburg have good highway connections with markets in the Midwest, but poor connections with markets in the East and South. The other three locations have poor highway connections in all directions. When completed, the interstate system will help Beckley, Huntington, and Parkersburg considerably, but it will be of less help to Elkins and Richwood.

WATER-SUPPLY AND WASTE-DISPOSAL REQUIREMENTS

Water-supply and waste-disposal requirements can be critical in their impact on the location decision for the woodpulp industry. Water requirements for use in the production process are generally less critical than requirements for waste disposal.

Records of waterflow for major sources of surface water in the Beckley area and at Parkersburg indicate that any one of the rivers at these locations has sufficient low-water flow for use in production, with the possible exception of the Little Kanawha River at Parkersburg. The quality of the water in the Beckley area and in the Little Kanawha is such that only simple filtering and settling would be required prior to use. A somewhat more costly and complex system might be required if Ohio River water were to be used at Parkersburg.

The effluent from a 200-ton-per-day semichemical pulpmill totals about 7,000,000 gallons per day, with about 3 to 4 tons of suspended solids and a BOD (biochemical oxygen demand) of 40,000 to 80,000 pounds per day (California State Water Pollution Control Board 1957). The amount of water required to dilute this effluent and maintain stream conditions within qualitative limits required by pollution-control agencies depends on (1) the requirements that must be met and (2) the nature of the stream into which the effluent is dumped.

The West Virginia Water Resources Commission does not have its requirements for woodpulp-effluent control fully specified. Since there are no pulpmills in the State, the Commission has never had to deal directly with the problem of pulpmill effluent. However, the Commission has stated that a pulpmill would have to remove roughly 90 percent of the suspended solids prior to discharge. Furthermore, a minimum of 3 to 5 parts per million of available oxygen would have to be maintained in the stream below the point of discharge.

Without waste treatment, a 200-ton-per-day semichemical mill would require a waterflow of about 1,360 cubic feet per second (cfs.) to maintain the oxygen level at 5 parts per million at 75°F. in the New River, Greenbrier River, or Little Kanawha River. For other types of pulpmills, these waterflow requirements would be lower: about 340 cfs. for unbleached cold soda, 120 cfs. for bleached cold soda, and 340 cfs. for bleached sulfate. If the requirements for a semichemical mill are compared with the minimum flows in any of the three rivers, it is apparent that some form of waste treatment would be required, and that more facilities would be required for the Greenbrier and Little Kanawha Rivers than for the New River. Settling basins to remove solids would be required at all locations.

Since minimum flows in the Ohio River are considerably greater than those in the other streams being considered, location on the Ohio River appears to be more feasible from the waste disposal requirement aspect than a location on any of the other rivers. Treatment facilities for wastes would be required, but it is likely that greater leeway would be afforded at Parkersburg than in the Beckley area.

Unfortunately, from the point of view of the firm, there is considerable uncertainty surrounding waste-disposal requirements in most areas of the United States. It is difficult to specify facilities required to meet a specific set of standards because of variation in streamflows over time; and lack of engineering data presents another difficulty. As a result, regulatory commissions commonly are unwilling to guarantee firms that a given investment in disposal facilities will be sufficient to meet the commission's requirements.

Faced with such uncertainty, the firm is forced to choose among three unsatisfactory alternatives. It can look for other locations where the uncertainty is less but where other costs may be higher. It can provide disposal facilities with costly safety margins. Or it can provide minimum disposal facilities and face the prospect of being forced to make costly additions in the future to protect its investment in the remainder of the plant. Solution of the problem would require careful study of effluent characteristics for mills of different types and development of specific treatment facilities for specified conditions.

What Do the Cost Comparisons Show?

The relative economic suitability of the selected locations wa established by comparing costs likely to be incurred at eac location for the important production factors. The comparison make it possible:

- To identify the better locations for each industry.
- To identify the production factors that are most favorable an most unfavorable at each location.

To do this, the selected locations were viewed much as wood-using firm might view them when selecting a new plan location. The firm evaluates the overall impact of those requirements whose cost varies among locations. The costs of six these requirements for each industry were evaluated here:

- Wood costs.
- Labor costs.
- Cost of transporting finished product to market.
- Local property taxes.
- Electric power costs.
- Cost of industrial sites.

The cost comparisons were made for each industry in term of daily and annual cost advantages that accrue to each locatio as compared with the other locations. Daily cost advantages fo each location were measured relative to the highest cost locatio for each location requirement.

The type of quantitative cost comparison used here was chose because it is well suited to determining the impact of the vario location requirements at various locations. Although the co comparisons may appear unfamiliar and cumbersome, they c be duplicated easily for other locations if cost information available. The daily cost advantage for a requirement at a loc tion is simply the per-unit cost advantage times the number units required per day.

A summary of the daily cost advantages, by locations and i dustries, was made in terms of total annual cost advantage and these were compared with estimated total annual sales f plants in each industry. This comparison makes it possible judge the impact of daily cost advantages on the overall pe formance of the firm. Annual sales—rather than total investme

—were used because of the consistency this figure offers among industries of the type being examined here.

Some assumptions about the raw-material supply and transportation of the finished product to markets were required to establish specific cost levels for these production factors. The assumptions concern: (1) the quantity of raw material obtained from the 25-mile and 50-mile procurement areas around each

Table 7.—*Cost advantages for the lumber industry, by location and factor*[1]

Factor	Beckley	Elkins	Huntington	Richwood
Logs	$21.00	$69.00	—	$47.75
Labor	4.80	8.40	—	10.40
Transportation	43.60	6.80	—	23.20
Local taxes	—	2.93	—	2.21
Electricity	4.50	—	$4.50	—
Industrial site	1.20	1.20	—	2.40
Total	$76.10	$88.33	$4.50	$85.96
Daily advantage[2]	$71.60	$83.83	—	$81.46
Annual advantage[3]	$17,900.00	$20,957.50	—	$20,365.00

[1] Daily cost advantages for each factor are expressed as daily saving relative to the highest cost location for that factor.

[2] Advantage is expressed as total cost saving relative to the overall highest cost location.

[3] Annual cost advantage assumes 250 working days/year.

Table 8.—*Cost advantages for the particle-board industry, by location and factor*[1]

Factor	Beckley	Elkins	Richwood
Wood	—	$108.75	$45.00
Labor	—	26.00	40.00
Transportation	$208.97	48.56	—
Local taxes	—	44.33	33.42
Electricity	—	17.05	17.05
Industrial site	—	—	1.00
Total	$208.97	$244.69	$136.47
Daily advantage[2]	$72.50	$108.22	—
Annual advantage[3]	$21,750.00	$32,466.00	—

[1] Daily cost advantages for each factor are expressed as daily saving relative to the highest cost location for that factor.

[2] Advantage is expressed as total daily cost saving relative to the overall highest cost location.

[3] Annual cost advantage assumes 300 working days/year.

location; (2) species and grades of material used in the manufacturing process; (3) markets for products; and (4) the type of transportation used to ship products to markets.

Daily cost advantages were calculated, by industry, for each of the six location requirements (tables 7 to 10). Cost advantages

Table 9.—*Cost advantages for the woodpulp industry, by location and factors*[1]

Factor	Beckley	Parkersburg
Wood	$308.00	—
Labor	—	—
Transportation	—	$584.00
Local taxes	142.77	—
Electricity	—	110.00
Industrial site	18.45	—
Total	$469.22	$694.00
Daily advantage[2]	—	$224.78
Annual advantage[3]	—	$73,053.50

[1] Daily cost advantages for each factor are expressed as daily saving relative to the highest cost location for that factor.

[2] Advantage is expressed as total daily cost saving relative to the overall highest cost location.

[3] Annual cost advantage assumes 325 working days/year.

Table 10.—*Cost advantages for the furniture industry, by location and factor*

Factor	Beckley	Elkins	Huntington	Richwood
Wood[2]	$179.98	$ 88.45	$128.69	—
Labor	—	186.00	372.00	—
Transportation	—	133.82	100.07	$16.29
Local taxes	—	44.33	24.49	33.42
Electricity	29.00	—	29.00	—
Industrial site	1.10	1.10	—	2.20
Total	$210.08	$453.70	$654.25	$51.91
Daily advantage[3]	$158.17	$401.79	$602.34	—
Annual advantage[4]	$43,497.00	$110,492.00	$165,644.00	—

[1] Daily cost advantages for each factor are expressed as daily saving relative to the high cost location for that factor.

[2] Differences in wood costs among locations were estimated from unpublished data, Northeastern Forest Experiment Station, Upper Darby, Pa.

[3] Advantage is expressed as total daily cost saving relative to the overall highest cost locati

[4] Annual cost advantage assumes 275 working days/year.

for the various requirements were then summed, and the totals were compared with the location that had the lowest total cost advantage.

For any single location requirement, the magnitude of the economic advantage accruing to a location is measured directly by the cost advantage. This is also true for comparisons among location requirements. Thus, the comparisons can be used: (1) to indicate locations that have advantages in particular factors and, conversely, those that have disadvantages in particular factors; and (2) to indicate locations that are most advantageous for each industry.

The relative importance of the six production factors is brought out clearly in the cost comparisons. Differences in the cost of wood, labor, and transportation weigh most heavily in nearly all comparisons; but the relative importance of the factors differs among the industries. As investment in plant and equipment increases among the industries, local taxes increase in importance. Power costs also assume greater importance for the industries, such as woodpulp, that have large power requirements.

The impact of these cost advantages can be judged from the comparisons of total annual cost advantage as a percent of total annual sales (table 11). The percentage figures indicated for each industry are relative to the highest cost location; they indicate the part of annual sales available for covering costs and for profit above that available at the highest cost location.

The differences shown for the lumber and furniture industries are substantial; for both, the cost advantages of the better locations over the poorest are in the neighborhood of annual profits as a percent of sales being made by average firms in these industries. The differences for the particle-board industry are only moderate, while those for the woodpulp industry are somewhat less. Thus, these cost comparisons give a strong basis for selecting

Table 11.—*Annual cost advantages as a percent of total annual sales, by location and industry*[1]

Industry	Beckley	Elkins	Huntington	Parkersburg	Richwood
Lumber	3.98	4.66	—	—	4.53
Particle-board	.84	1.25	—	—	—
Woodpulp	—	—	—	0.80	—
Furniture	.87	2.21	3.31	—	—

[1] Estimated annual sales for the average plants are: lumber, $450,000; particle-board, $2,600,000; woodpulp, $9,100,000; furniture, $5,000,000

locations for the lumber and furniture industries, a less strong basis for the particle-board industry, and a fairly weak basis for the woodpulp industry.

The cost comparisons indicate the following:

- *Lumber.* — Elkins, Richwood, and Beckley all have substantial cost advantages over Huntington. Elkins and Richwood have slight cost advantages over Beckley.
- *Particle-board.* — Elkins and Beckley have modest cost advantages over Richwood.
- *Woodpulp.* — Parkersburg has a modest cost advantage over Beckley.
- *Furniture.* — Huntington has substantial cost advantages over Beckley and Richwood and modest cost advantages over Elkins. Elkins has a substantial cost advantage over Richwood and a modest cost advantage over Beckley.

The cost comparisons have pointed up the magnitude of differences in profits that can be obtained through careful location decisions. The overall impact of these comparisons must now be considered in light of timber-resource characteristics and other important requirements.

Which Opportunities Are Most Favorable?

The comparisons indicate that at least one of the selected locations is better than the others for each industry. They also indicate that each location is better than others for at least one industry.

The fact that some locations are considered better than others neither means that the best locations are ideal in all respects, nor that the poorest locations are wholly adverse. West Virginia's wood-using industries, with the exception of lumber, are relatively underdeveloped; this shows that there probably are some obstacles to plant location in most areas. These obstacles are likely to be less critical in the case of the best locations. It is also likely that less effort would be required to make the best locations truly attractive.

The results of the overall comparisons of costs and availability of wood, labor, and other requirements at the selected locations

indicate locational advantages among locations ranging from substantial to slight (table 12).

For the lumber industry, the importance of timber availability was sufficient to modify somewhat the results of the cost comparisons. Advantages of water-supply and waste-disposal requirements strengthen the results of cost comparisons for the woodpulp industry. The availability of labor skilled in furniture manufacture strengthens the results of cost comparisons for the furniture industry.

Table 12.—*Comparison of locational advantages by industry, for selected locations in West Virginia*

Location	Advantage over poorest location	Major cost advantages	Remarks
		LUMBER INDUSTRY	
Elkins	Substantial	Wood costs.	Best timber resource.
Beckley	Modest	Transportation costs for products.	Moderately good timber resources.
Richwood	Modest	Wood and transportation costs for products.	Strong competition for better species of timber.
Huntington	—	—	—
		PARTICLE-BOARD INDUSTRY	
Elkins	Modest	Wood costs.	—
Beckley	Modest	Transportation costs for products.	Best rail and truck connections to important markets.
Richwood	—	—	—
		WOODPULP INDUSTRY	
Parkersburg	Modest	Transportation costs for products.	Water supply and waste disposal requirements favorable.
Beckley	—	Wood costs.	—
		FURNITURE INDUSTRY	
Huntington	Substantial	Labor, wood, and transportation costs.	Best labor for furniture manufacture.
Elkins	Substantial	Transportation and labor costs.	Fairly good labor for furniture manufacture.
Beckley	Slight	Wood costs.	—
Richwood	—	—	—

No comparisons were made with locations outside West Virginia. In addition, no analyses of specific markets were made; the relative advantages of the selected locations were determined independent of purely market considerations. This is the view of industrial location that might well be taken by industrial-development groups within the State. This limited viewpoint would still enable development groups to concentrate their efforts on the better locations within the State.

However, these groups might also be interested in the prospects for expanded production by the wood-using industries in West Virginia. This added information would enable them to concentrate efforts on industries with better growth prospects in West Virginia.

How Good Are Expansion Prospects?

Statewide industrial development in the wood-using industries depends on two factors. First, it depends on the extent and character of national growth in the wood-using industries themselves. Second, it depends on the State's competitive advantages and disadvantages with respect to other areas for these industries (Perloff *et al.* 1960). Both factors are important for an evaluation of prospects for expansion of the wood-using industries in West Virginia.

United States production of forests products has been changing at varying rates for the four industries considered here. Annual hardwood lumber production has been decreasing slowly since World War II. The production of woodpulp and furniture have been increasing at about the same rate of growth as the whole economy. Particle-board production has been increasing at a very rapid rate, although total production in the industry is still at a low level compared with that of the other three industries.

In the near future—say the next 5 to 10 years—it is likely that new plants will be built in all of the industries. In the three industries in which production is increasing, most of these plants will be built to meet the increased demands for production. In the hardwood lumber industry, new plants will be built mostly to obtain lower costs for a relatively constant level of production.

For West Virginia, this means that prospects for new plants in the woodpulp, particle-board, and furniture industries are good

if the State gets its share of the national growth in these industries. For new plants in the hardwood lumber industry, prospects based solely on national growth of the industry are not likely at the present time.

No direct comparisons were made in this report of the competitive position of West Virginia relative to other states for the four selected industries. But the present status of the wood-using industries in the State does throw some light on the competitive position of West Virginia.

Of the four industries, only the hardwood lumber industry, which ranked tenth in production in the United States in 1962 (U. S. Bureau of the Census 1963), has achieved any level of importance in the State. It appears that West Virginia is likely to maintain its position as an important producer of hardwood lumber and sawmill products. It has a good timber resource base and is reasonably close to many important hardwood lumber markets.

The development of the woodpulp and particle-board industries in West Virginia has been restricted because the bulk of the State's timber resource is in hardwood timber. Neither industry has obtained a major part of its raw material from hardwoods. However, a lack of softwoods is becoming less of an obstacle to the location of these industries. It seems likely that West Virginia will get an increased share of the plants that can utilize hard woods in these industries. The pulpwood resources of the State have hardly been tapped and the State is reasonably close to important markets. Prospects for woodpulp plants are somewhat better than for particle-board because the woodpulp industry is larger and can effectively use a greater variety of timber species.

Prospects for the furniture industry seem somewhat less good than those for the other three industries. Because of the importance of labor skills and exchange of information about styles, centers of furniture manufacturing tend to be self-perpetuating (Hagenstein 1964). The wooden furniture industry tends toward greater concentration in certain areas, and this tendency may work to West Virginia's disadvantage. On the other hand, it seems likely that West Virginia will increase in importance as a manufacturer of furniture parts and dimension stock.

Summary

This evaluation of five selected areas in West Virginia shows that all have sufficient quantities of the necessary production factors for new plants in four wood-using industries. The comparisons among the areas indicate that some areas are better for the selected wood-using industries than others and that each area has at least moderate advantages for one industry over the other areas. It was shown that:

- Elkins, Richwood, and Beckley have advantages for the lumber industry.
- Elkins and Beckley have advantages for the particle-board industry.
- Parkersburg has advantages for the woodpulp industry.
- Huntington and Elkins have advantages for the furniture industry.

In addition to the comparisons among locations in West Virginia, prospects for increased levels of wood use in West Virginia in the near future were considered. It appears that prospects for new lumber, dimension stock, furniture parts, and woodpulp mills are somewhat better than for new furniture and particleboard plants. These considerations are based in part on the expected increases in production nationwide in these industries and in part on the comparative advantages of West Virginia for these industries.

The methods used in this report for comparing costs in each industry could be extended to other areas in the eastern United States. The comparisons show that both costs for important location requirements and the availability of timber resources, labor, water, and transportation services are important in evaluating plant locations for the wood-using industries.

Literature Cited

California State Water Pollution Control Board.
1957. WASTE TREATMENT AND DISPOSAL ASPECTS. Calif. Water Pollution Control Bd. Pub. 17, 75 pp. Sacramento.

Frank Robert M.
1963. A SURVEY OF SAWMILL RESIDUES AND LUMBER AS RAW MATERIALS FOR WOOD-USING INDUSTRIES IN WEST VIRGINIA. U. S. Forest Serv. Res. Paper NE-3, 20 pp., illus. Northeast. Forest Expt. Sta., Upper Darby, Pa.

Hagenstein, Perry R.
1962. THE LOCATION DECISION FOR PRIMARY WOOD-USING INDUSTRIES IN THE NORTHERN APPALACHIANS. Univ. Mich. Ph.D. Diss., 190 pp., illus. Ann Arbor.

Hagenstein, Perry R.
1964. THE LOCATION DECISION FOR WOOD-USING INDUSTRIES IN THE

NORTHERN APPALACHIANS. U. S. Forest Serv. Res. Paper NE-16, 36 pp., illus. Northeast. Forest Exp.t Sta., Upper Darby, Pa.

Perloff, Harvey S., Edgar S. Dunn, Jr., Eric E. Lampard, and Richard F. Muth. 1960. REGIONS, RESOURCES, AND ECONOMIC GROWTH. 716 pp., illus. Resources for the Future, Inc., and Johns Hopkins Press, Baltimore.

United States Bureau of the Census. 1961. LOCATION OF MANUFACTURING PLANTS BY INDUSTRY, COUNTY, AND EMPLOYMENT SIZE. 1958 Census of Manufactures, part 3. Lumber and Wood Products, Furniture and Fixtures; Spec. Rpt. MC58(S)-2.3. 90 pp.

United States Bureau of the Census. 1963. LUMBER PRODUCTION AND MILL STOCKS 1962. U. S. Bur. Census Cur. Indust. Rpts. M24(62)-1. 9 pp.

Appendix

I

AVAILABILITY AND COST OF WOOD INPUTS

(Tables 13 to 52)

The information in this appendix about the availability of timber supplies in the five selected areas of West Virginia was developed in the forest survey conducted by the Northeastern Forest Experiment Station in West Virginia in 1961. The results of this survey are based on a sampling scheme designed to give greater accuracy than that normally required by Forest Survey. In other words, reasonable confidence can be placed in the accuracy of the data presented in these tables.

The information here is organized to bear on plant-location decisions in the four selected wood-using industries. Because the availability of wood supplies to a plant depends in large part on the distance between the timber and plant, the timber-supply information is presented for counties falling roughly within a 25-mile radius and between a 25-mile and 50-mile radius of the central location.

The areas used in presenting the forest-inventory data are defined by the counties in the 25-to-50-mile areas. They are as follows:

	25-mile area	*25-to-50-mile area*	
Beckley:	Fayette	McDowell	Mingo
	Raleigh	Logan	Boone
	Wyoming	Kanawha	Clay
	Mercer	Nicholas	Greenbrier
	Summers	Monroe	
Elkins:	Barbour	Preston	Taylor
	Randolph	Harrison	Lewis
	Tucker	Braxton	Webster
	Upshur	Pocahontas	Pendleton
		Grant	
Huntington:	Mason	Lincoln	Putnam
	Cabell		
	Wayne		
Parkersburg:	Jackson	Calhoun	Doddridge
	Pleasants	Gilmer	Roane
	Ritchie	Tyler	
	Wirt		
	Wood		
Richwood:	Greenbrier	Fayette	Clay
	Nicholas	Braxton	Upshur
	Webster	Randolph	
	Pocahontas		

The forest-resource data for these areas follow in tables 13 to 52. Forest-survey data for the State as a whole and for individual counties are available in *The Timber Resources of West Virginia*, recently published by the Northeastern Forest Experiment Station (U. S. Forest Resource Bulletin NE-2, 123 pp., 1964).

In addition to differences in the kind of timber that is available in the selected areas, there are differences in logging costs for both sawlogs and pulpwood. These differences are based primarily on differences in topography, average distance from timber stands to the central location, and timber volumes. Estimates of logging-cost differentials among the selected areas are shown in table 53. For the 25-to-50-mile areas these cost differences include estimated additional hauling costs to the central location of $2.50 per 1,000 board feet for sawlogs and $1.00 per standard cord for pulpwood.

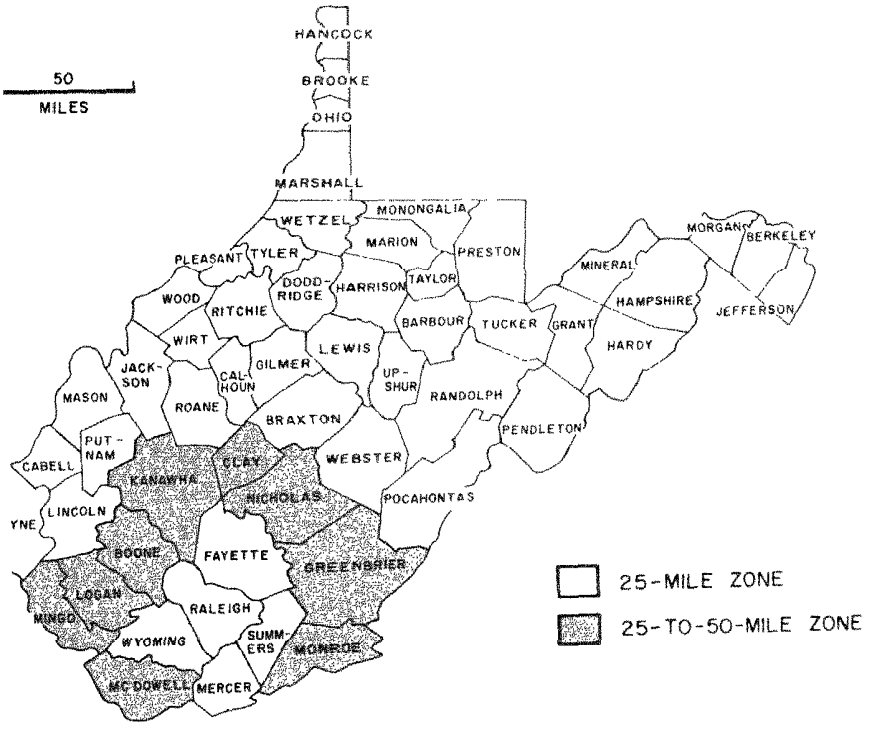

Figure 3.—The Beckley area of West Virginia, showing the counties in the two zones considered.

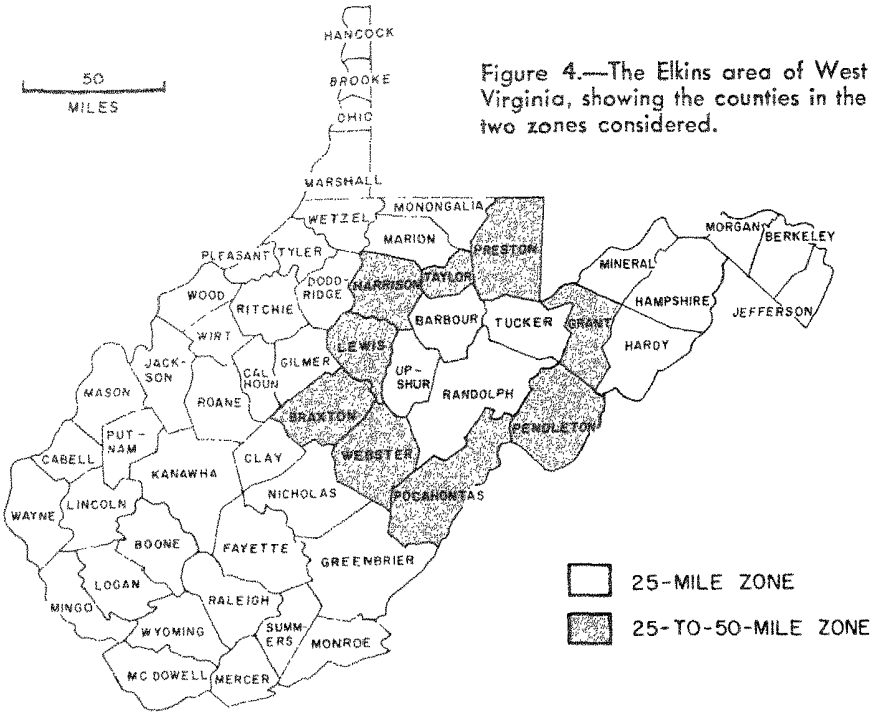

Figure 4.—The Elkins area of West Virginia, showing the counties in the two zones considered.

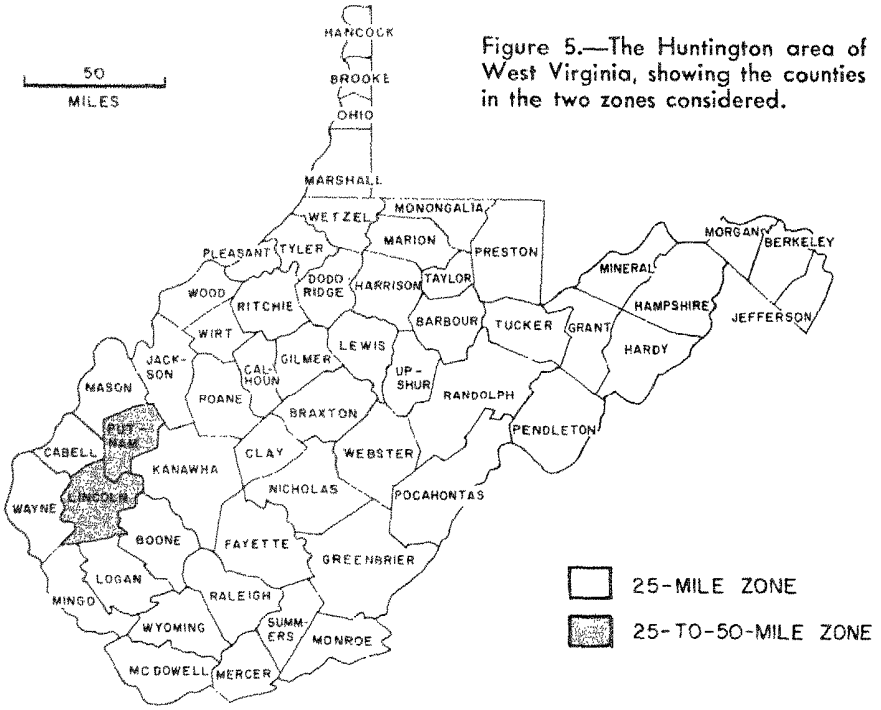

Figure 5.—The Huntington area of West Virginia, showing the counties in the two zones considered.

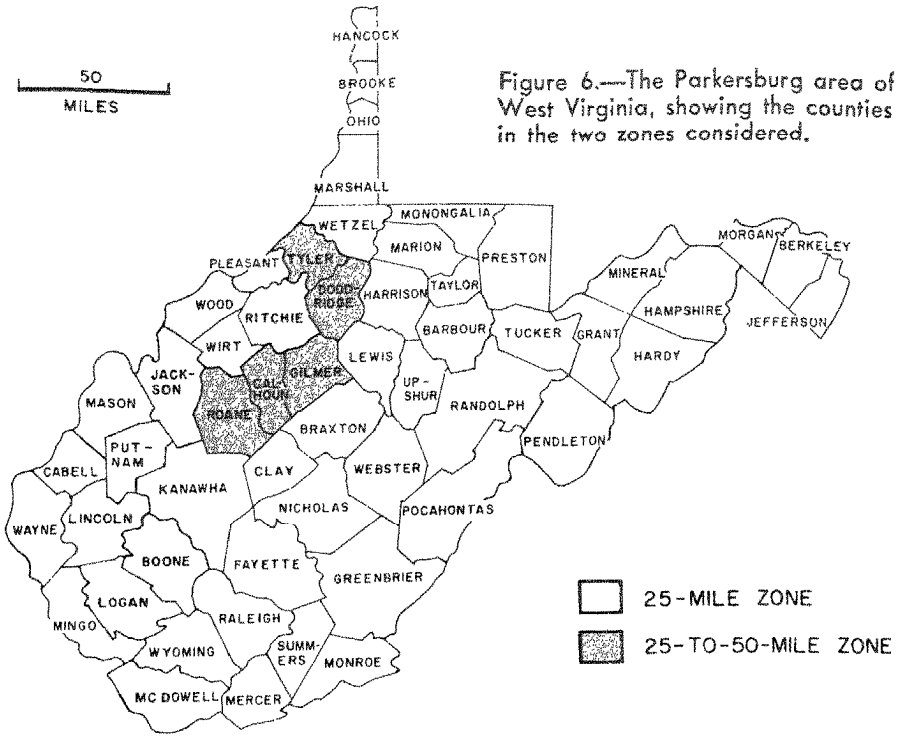

Figure 6.—The Parkersburg area of West Virginia, showing the counties in the two zones considered.

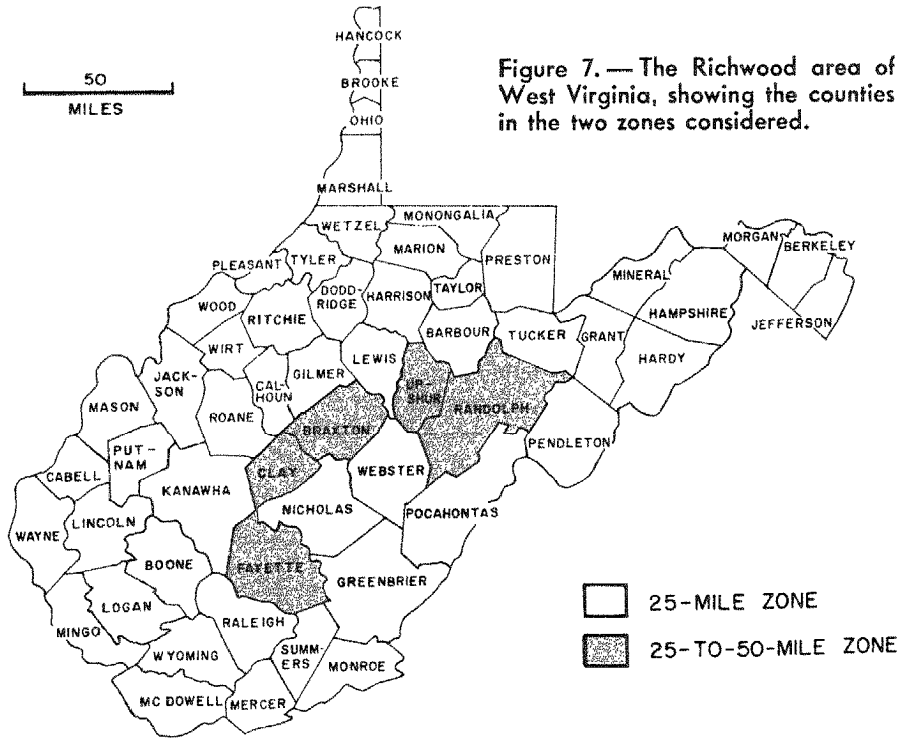

Figure 7.—The Richwood area of West Virginia, showing the counties in the two zones considered.

II

AVAILABILITY AND COSTS OF NONWOOD INPUTS

(Tables 53 to 65)

The tables in this appendix contain information about the availability and cost of nonwood inputs for the selected locations in West Virginia. This information was obtained from a number of sources; all had to be evaluated and combined into consistent form. This required certain assumptions for some inputs.

The assumption made concerning destinations for products of the four industries are evident from appendix tables 54 to 57; for each industry the indicated destinations seemed most probable although others might be used. The labor force estimates were made using an assumed maximum one-way commuting distance of 20 miles; data were collected for counties falling almost entirely within a 20-mile radius of the central location.

Average hourly wage rates do not include fringe benefits paid by employers because these are difficult to estimate and do not appear to vary importantly among locations in West Virginia. Electricity rates for the four industries were estimated by using power-rate schedules and estimates of power required for plants in each industry.

All estimates made in this appendix have been checked through consultation with sources and with agency personnel in West Virginia for consistency with reality. However, any errors of fact or interpretation are the responsibility of the author.

Table 13.—*Beckley area: land area by class of land, 1961*
(In thousands of acres)

Land class	25-mile area	25-to-50-mile area
Forest:		
Commercial	1,323.7	2,858.6
Noncommercial	4.8	6.5
All forest land area	1,328.5	2,865.1
Nonforest	299.2	533.8
All land	1,627.7	3,398.9

Table 14.—*Beckley area: area of commercial forest land, by ownership group and size-of-holding class, 1961*

(In thousands of acres)

Ownership group	25-mile area	25-to-50-mile area
Public	15.6	146.9
Forest industries:		
Less than 50,000 acres	26.0	52.3
50,000 acres and more	33.1	66.6
Total	59.1	118.9
Farmer-owned and miscellaneous private:		
Less than 100 acres	364.7	757.1
100 to 500 acres	214.8	446.0
500 to 50,000 acres	372.2	772.6
50,000 acres and more	297.3	617.1
Total	1,249.0	2,592.8
All ownerships	1,323.7	2,858.6

Table 15.—*Beckley area: area of commercial forest land, by forest types, 1961*

(In thousands of acres)

Forest type	25-mile area	25-to-50-mile area
White pine	14.9	32.4
Loblolly-shortleaf pine	26.7	57.2
Oak types	961.8	2,035.2
Maple, beech, birch	236.9	568.2
Yellow-poplar	29.3	56.7
Other hardwood types	54.1	108.9
All types	1,323.7	2,858.6

Table 16.—*Beckley area: area of commercial forest land by stand-volume classes, for sawtimber and other stand-size classes, 1961*

(In thousands of acres)

Stand volume/acre, in board feet[1]	All stands	Sawtimber stands	Other stands
	25-MILE AREA		
Less than 1,500	549.2	61.6	487.6
1,500 to 5,000	556.1	378.3	177.8
More than 5,000	218.4	218.4	—
All classes	1,323.7	658.3	665.4
	25-TO-50-MILE AREA		
Less than 1,500	1,164.1	131.2	1,032.9
1,500 to 5,000	1,210.9	834.1	376.8
More than 5,000	483.6	483.6	—
All classes	2,858.6	1,448.9	1,409.7

[1] Net volume, International ¼-inch rule.

Table 17.—*Beckley area: area of commercial forest land and volume of sawtimber and growing stock, by stand-size classes, 1961*

Stand-size class	25-mile area			25-to-50-mile area		
	Area	Sawtimber[1]	Growing stock	Area	Sawtimber[1]	Growing stock
	Thousand acres	*Million bd. ft.*	*Million cu. ft.*	*Thousand acres*	*Million bd. ft.*	*Million cu. ft.*
Sawtimber	658.3	2,922.9	881.2	1,448.9	6,487.3	2,010.1
Poletimber	363.6	438.5	297.1	797.1	970.9	690.7
Other	301.8	125.8	122.3	612.6	204.7	209.2
Total	1,323.7	3,487.2	1,300.6	2,858.6	7,662.9	2,910.0

[1] International ¼-inch rule.

Table 18.—*Beckley area: volume of sawtimber and growing stock on commercial forest land, by species, 1961*

Species	25-mile area		25-to-50-mile area	
	Sawtimber	Growing stock	Sawtimber	Growing stock
	Million bd. ft.	*Million cu. ft.*	*Million bd. ft.*	*Million cu. ft.*
Softwoods:				
Yellow pines	51.7	16.9	129.5	39.3
Hemlock	44.6	18.9	100.5	38.4
Other softwoods	28.3	13.1	83.7	35.1
Total	127.6	48.9	313.7	112.8
Hardwoods:				
White oak	191.1	83.3	413.2	178.8
Northern red oak	389.4	144.0	868.9	318.9
Chestnut oak	364.3	127.6	787.8	282.3
Other oaks	503.7	135.2	1,049.6	323.6
Hickory	390.3	144.5	819.7	313.0
Yellow birch	47.0	10.9	122.3	43.5
Sugar maple	143.8	59.3	318.9	130.8
Red maple	153.1	69.2	328.1	162.6
Beech	216.7	74.3	497.3	167.0
Basswood	148.8	51.2	302.8	107.6
Yellow-poplar	425.6	166.0	960.1	362.7
Ash, walnut, cherry	79.3	37.6	199.7	94.1
Other hardwoods	306.5	148.6	680.8	312.3
Total	3,359.6	1,251.7	7,349.2	2,797.2
All species	3,487.2	1,300.6	7,662.9	2,910.0

Table 19.—*Beckley area: volume of sawtimber on commercial forest l by species and quality classes, 1961*[1]

(In millions of board feet)

Species	All classes	Standard lumber logs		
		Grade 1	Grade 2	Grade 3
25-MILE AREA				
Softwoods:				
Yellow pines	54.7	15.6	14.4	24.7
White pine	25.0	5.4	8.3	11.3
Other softwoods	47.9	*	*	*
Total	127.6	21.0	22.7	36.0
Hardwoods:				
Select red and white oaks	580.5	63.9	117.2	256.0
Other red and white oaks	868.0	118.9	212.7	307.3
Hickory	390.3	26.9	85.9	178.8
Beech	216.7	19.7	45.5	102.1
Sugar maple	143.8	6.0	29.3	55.4
Ash, walnut, cherry	79.3	12.3	14.8	42.0
Yellow-poplar	425.6	54.9	68.5	181.7
Other hardwoods	655.4	61.2	139.9	306.9
Total	3,359.6	363.8	713.8	1,430.2
All species	3,487.2	384.8	736.5	1,466.2
25-TO-50-MILE AREA				
Softwoods:				
Yellow pines	129.5	35.4	33.8	60.3
White pine	57.0	12.3	17.3	27.4
Other softwoods	127.2	*	*	*
Total	313.7	47.7	51.1	87.7
Hardwoods:				
Select red and white oaks	1,282.1	141.5	259.0	564.5
Other red and white oaks	1,837.4	251.3	448.7	651.0
Hickory	819.7	56.6	180.2	375.2
Beech	497.3	44.8	102.7	235.2
Sugar maple	318.9	13.9	63.8	124.8
Ash, walnut, cherry	199.7	29.7	38.8	106.0
Yellow-poplar	960.1	123.8	154.6	410.1
Other hardwoods	1,434.0	133.7	304.8	672.4
Total	7,349.2	795.3	1,552.6	3,139.2
All species	7,662.9	843.0	1,603.7	3,226.9

[1] International ¼-inch rule.

[2] Meet minimum specifications for tie-and-timber logs but not for standard-lumber logs.

* Not applicable: spruce, hemlock, and miscellaneous softwoods were not graded into lumber logs.

Table 20.—*Beckley area: volume of sawtimber on commercial forest land, by species and broad diameter classes, 1961*

(In millions of board feet[1])

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
	25-MILE AREA			
Softwoods:				
Yellow pines	54.7	31.8	15.3	7.6
White pine	25.0	20.9	4.1	—
Hemlock	44.6	18.4	22.6	3.6
Other softwoods	3.3	3.3	—	—
Total	127.6	74.4	42.0	11.2
Hardwoods				
White oak	191.1	76.0	47.0	68.1
Northern red oak	389.4	127.9	122.4	139.1
Chestnut oak	364.3	93.6	104.3	166.4
Other oaks	503.7	153.7	190.3	159.7
Hickory	390.3	176.4	134.1	79.8
Yellow birch	47.0	7.8	12.4	26.8
Sugar maple	143.8	34.3	34.1	75.4
Red maple	153.1	55.3	40.6	57.2
Beech	216.7	74.8	60.5	81.4
Basswood	148.8	64.8	40.8	43.2
Yellow-poplar	425.6	187.0	164.0	74.6
Ash, walnut, cherry	79.3	34.6	22.6	22.1
Other hardwoods	306.5	106.9	109.9	89.7
Total	3,359.6	1,193.1	1,083.0	1.083.5
All species	3,487.2	1,267.5	1,125.0	1,094.7
	25-TO-50-MILE AREA			
Softwoods:				
Yellow pines	129.5	75.2	36.2	18.1
White pine	57.0	47.6	9.4	—
Hemlock	100.5	41.5	50.8	8.2
Other softwoods	26.7	26.7	—	—
Total	313.7	191.0	96.4	26.3
Hardwoods:				
White oak	413.2	164.5	101.5	147.2
Northern red oak	868.9	285.3	273.2	310.4
Chestnut oak	787.8	202.4	225.5	359.9
Other oaks	1,049.6	320.3	396.5	332.8
Hickory	819.7	370.3	281.7	167.7
Yellow birch	122.3	20.3	32.3	69.7
Sugar maple	318.9	76.1	75.7	167.1
Red maple	328.1	118.5	87.1	122.5
Beech	497.3	171.8	138.9	186.6

CONTINUED

Table 20, Continued

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
Basswood	302.8	131.8	83.1	87.9
Yellow-poplar	960.1	421.9	369.9	168.3
Ash, walnut, cherry	199.7	87.1	56.8	55.8
Other hardwoods	680.8	237.4	244.2	199.2
Total	7,349.2	2,607.7	2,366.4	2,375.1
All species	7,662.9	2,798.7	2,462.8	2,401.4

[1] International ¼-inch rule.

Table 21.—*Elkins area: land area by class of land, 1961*

(In thousands of acres)

Land class	25-mile area	25-to-50-mile area
Forest:		
Commercial	1,042.2	2,112.8
Non-commercial	19.2	35.0
All forest land area	1,061.4	2,147.8
Nonforest	311.4	929.3
All land	1,372.8	3,077.1

Table 22.—*Elkins area: area of commercial forest land, by ownership group and size-of-holding class, 1961*

(In thousands of acres)

Ownership group	25-mile area	25-to-50-mile area
Public	256.4	485.7
Forest industries:		
Less than 50,000 acres	28.6	60.6
50,000 acres and more	36.4	77.1
Total	65.0	137.7
Farmer-owned and miscellaneous private:		
Less than 100 acres	314.3	649.4
100 to 500 acres	261.7	540.6
500 to 50,000 acres	130.4	269.6
50,000 acres and more	14.4	29.8
Total	720.8	1,489.4
All ownerships	1,042.2	2,112.8

Table 23.—*Elkins area: area of commercial forest land, by forest types, 1961*

(In thousands of acres)

Forest type	25-mile area	25-to-50-mile area
White pine	17.3	30.2
Loblolly-shortleaf pine	49.7	106.8
Oak types	648.1	1,337.5
Maple, beech, birch	288.9	556.0
Yellow-poplar	3.6	6.7
Other hardwood types	34.6	75.6
All types	1,042.2	2,112.8

Table 24.—*Elkins area: area of commercial forest land by stand-volume classes for sawtimber and other stand-size classes, 1961*

(In thousands of acres)

Stand volume/acre, in board feet[1]	All stands	Sawtimber stands	Other stands
25-MILE AREA			
Less than 1,500	429.4	23.8	405.6
1,500 to 5,000	440.5	335.8	104.7
More than 5,000	172.3	172.3	—
All classes	1,042.2	531.9	510.3
25-TO-50-MILE AREA			
Less than 1,500	907.1	46.3	860.8
1,500 to 5,000	871.4	652.9	218.5
More than 5,000	334.3	334.3	—
All classes	2,112.8	1,033.5	1,079.3

[1] Net volume, International ¼-inch rule.

Table 25.—*Elkins area: area of commercial forest land and volume of sawtimber and growing stock by stand-size classes, 1961*

Stand-size class	25-mile area			25-to-50-mile area		
	Area	Sawtimber[1]	Growing stock	Area	Sawtimber[1]	Growing stock
	Thousand acres	*Million bd. ft.*	*Million cu. ft.*	*Thousand acres*	*Million bd. ft.*	*Million cu. ft.*
Sawtimber	531.9	2,380.0	764.2	1,033.5	4,717.4	1,556.1
Poletimber	314.3	350.1	305.3	643.4	711.8	589.2
Other	196.0	59.0	53.3	435.9	107.9	96.2
Total	1,042.2	2,789.1	1,122.8	2,112.8	5,537.1	2,241.5

[1] International ¼-inch rule.

Table 26.—*Elkins area: volume of sawtimber and growing stock on commercial forest land by species, 1961*

Species	25-mile area		25-to-50-mile area	
	Sawtimber	Growing stock	Sawtimber	Growing stock
	Million bd. ft.	*Million cu. ft.*	*Million bd. ft.*	*Million cu. ft.*
Softwoods:				
Yellow pines	91.8	34.4	174.9	70.6
Hemlock	66.8	18.9	128.1	32.5
Other softwoods	81.3	26.7	153.2	49.8
Total	239.9	80.0	456.2	152.9
Hardwoods:				
White oak	234.6	85.5	436.5	158.4
Northern red oak	355.4	129.7	680.5	246.0
Chestnut oak	305.6	133.1	671.1	289.9
Other oaks	199.9	59.2	451.8	147.2
Hickory	153.4	68.0	310.4	139.7
Yellow birch	57.1	32.9	108.1	60.3
Sugar maple	189.9	79.4	344.2	159.2
Red maple	101.7	73.6	200.7	144.3
Beech	219.4	78.8	394.3	144.8
Basswood	93.2	33.6	178.0	64.7
Yellow-poplar	244.7	86.2	477.8	175.4
Ash, walnut, cherry	185.0	84.8	381.6	162.6
Other hardwoods	209.3	98.0	445.9	196.1
Total	2,549.2	1,042.8	5,080.9	2,088.6
All species	2,789.1	1,122.8	5,537.1	2,241.5

Table 27.—*Elkins area: volume of sawtimber on commercial forest land, by species and quality classes, 1961*

(In millions of board feet)[1]

Species	All classes	Standard lumber logs			Tie-and-timber logs[2]
		Grade 1	Grade 2	Grade 3	
25-MILE AREA					
Softwoods:					
Yellow pines	91.8	11.7	22.9	57.2	*
White pine	27.7	6.1	9.1	12.5	*
Other softwoods	120.4	*	*	*	*
Total	239.9	17.8	32.0	69.7	*
Hardwoods:					
Select red and white oaks	590.0	68.1	103.8	272.1	146.0
Other red and white oaks	505.5	57.5	92.4	211.3	144.3
Hickory	153.4	11.8	24.9	68.2	48.5
Beech	219.4	17.1	35.9	112.3	54.1
Sugar maple	189.9	11.3	29.1	91.9	57.6
Ash, walnut, cherry	185.0	20.1	44.5	102.7	17.7
Yellow-poplar	244.7	34.2	37.3	105.2	68.0
Other hardwoods	461.3	37.3	77.2	236.6	110.2
Total	2,549.2	257.4	445.1	1,200.3	646.4
All species	2,789.1	275.2	477.1	1,270.0	646.4
25-TO-50-MILE AREA					
Softwoods:					
Yellow pines	174.9	22.0	43.7	109.2	*
White pine	56.1	12.2	18.5	25.4	*
Other softwoods	225.2	*	*	*	*
Total	456.2	34.2	62.2	134.6	*
Hardwoods:					
Select red and white oaks	1,117.0	129.0	197.1	514.4	276.5
Other red and white oaks	1,122.9	127.5	204.7	470.3	320.4
Hickory	310.4	23.8	50.3	138.1	98.2
Beech	394.3	30.8	64.9	201.1	97.5
Sugar maple	344.2	20.5	53.1	165.7	104.9
Ash, walnut, cherry	381.6	41.5	91.8	212.0	36.3
Yellow-poplar	477.8	66.9	72.8	205.3	132.8
Other hardwoods	932.7	75.2	155.6	478.7	223.2
Total	5,080.9	515.2	890.3	2,385.6	1,289.8
All species	5,537.1	549.4	952.5	2,520.2	1,289.8

[1] International ¼-inch rule.

[2] Meet minimum specifications for tie-and-timber logs but not for standard-lumber logs.

* Not applicable: spruce, hemlock, and miscellaneous softwoods were not graded into standard-lumber logs.

Table 28.—*Elkins area: volume of sawtimber on commercial forest land, by species and broad diameter classes, 1961*

(In millions of board feet)[1]

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
25-MILE AREA				
Softwoods:				
Yellow pines	91.8	76.0	11.4	4.4
White pine	27.7	12.3	9.9	5.5
Hemlock	66.8	25.4	20.0	21.4
Other softwoods	53.6	39.9	13.4	0.3
Total	239.9	153.6	54.7	31.6
Hardwoods:				
White oak	234.6	109.2	63.1	62.3
Northern red oak	355.4	118.1	123.4	113.9
Chestnut oak	305.6	138.9	81.3	85.4
Other oaks	199.9	70.5	66.0	63.4
Hickory	153.4	65.2	44.5	43.7
Yellow birch	57.1	19.8	15.2	22.1
Sugar maple	189.9	59.3	51.3	79.3
Red maple	101.7	47.7	30.9	23.1
Beech	219.4	87.0	69.4	63.0
Basswood	93.2	28.5	31.0	33.7
Yellow-poplar	244.7	116.1	85.7	42.9
Ash, Walnut, cherry	185.0	96.8	57.3	30.9
Other hardwoods	209.3	101.8	60.0	47.5
Total	2,549.2	1,058.9	779.1	711.2
All species	2,789.1	1,212.5	833.8	742.8
25-TO-50-MILE AREA				
Softwoods:				
Yellow pines	174.9	147.4	20.5	7.0
White pine	56.1	24.8	20.1	11.2
Hemlock	128.1	49.0	38.5	40.6
Other softwoods	97.1	72.5	24.2	0.4
Total	456.2	293.7	103.3	59.2
Hardwoods:				
White oak	436.5	203.2	117.4	115.9
Northern red oak	680.5	225.9	235.8	218.8
Chestnut oak	671.1	306.6	177.6	186.9
Other oaks	451.8	159.3	149.2	143.3
Hickory	310.4	131.9	90.0	88.5
Yellow birch	108.1	37.3	28.8	42.0
Sugar maple	344.2	107.3	93.9	143.0

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Table 28, Continued

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
Red maple	200.7	93.7	61.0	46.0
Beech	394.3	156.9	128.1	109.3
Basswood	178.0	54.5	59.2	64.3
Yellow-poplar	477.8	226.3	167.4	84.1
Ash, walnut, cherry	381.6	199.8	117.8	64.0
Other hardwoods	445.9	216.5	127.7	101.7
Total	5,080.9	2,119.2	1,553.9	1,407.8
All species	5,537.1	2,412.9	1,657.2	1,467.0

[1] International ¼-inch rule.

Table 29.—*Huntington area: land area by class of land, 1961*
(In thousands of acres)

Land class	25-mile area	25-to-50-mile area
Forest:		
Commercial	557.9	406.8
Noncommercial	.1	0
All forest land area	558.0	406.8
Nonforest	225.4	96.8
All land	783.4	503.6

Table 30.—*Huntington area: area of commercial forest land, by ownership group and size-of-holding class, 1961*

(In thousands of acres)

Ownership group	25-mile area	25-to-50-mile area
Public	25.9	5.7
Forest industries:		
Less than 50,000 acres	6.2	4.7
50,000 acres and more	7.8	6.0
Total	14.0	10.7
Farmer-owned and miscellaneous private:		
Less than 100 acres	243.5	183.5
100 to 500 acres	220.1	165.9
500 to 50,000 acres	54.4	41.0
50,000 acres and more	—	—
Total	518.0	390.4
All ownerships	557.9	406.8

Table 31.—*Huntington area: area of commercial forest land by forest types, 1961*

(In thousands of acres)

Forest type	25-mile area	25-to-50-mile area
White pine	2.8	1.8
Loblolly-shortleaf pine	55.5	38.6
Oak types	346.3	253.3
Maple, beech, birch	84.2	61.6
Yellow-poplar	14.6	9.2
Other hardwood types	54.5	42.3
All types	557.9	406.8

Table 32.—*Huntington area: area of commercial forest land by stand-volume classes for sawtimber and other stand-size classes, 1961*

(In thousands of acres)

Stand volume/acre, in board feet[1]	All stands	Sawtimber stands	Other stands
	25-MILE AREA		
Less than 1,500	292.0	16.6	275.4
1,500 to 5,000	187.3	151.2	36.1
More than 5,000	78.6	78.6	—
All classes	557.9	246.4	311.5
	25-TO-50-MILE AREA		
Less than 1,500	216.4	11.8	204.6
1,500 to 5,000	134.5	107.6	26.9
More than 5,000	55.9	55.9	—
All classes	406.8	175.3	231.5

[1]Net volume, International ¼-inch rule.

Table 33.—*Huntington area: area of commercial forest land and volume of sawtimber and growing stock by stand-size classes, 1961*

Stand-size class	25-mile area			25-to-50-mile area		
	Area	Sawtimber[1]	Growing Stock	Area	Sawtimber[1]	Growing Stock
	Thousand acres	*Million bd. ft.*	*Million cu. ft.*	*Thousand acres*	*Million bd. ft.*	*Million cu. ft.*
Sawtimber	246.4	937.2	304.2	175.3	674.2	220.5
Poletimber	134.6	150.0	112.5	97.6	110.1	85.1
Other	176.9	90.8	20.4	133.9	69.4	15.9
Total	557.9	1,178.0	437.1	406.8	853.7	321.5

[1]International ¼-inch rule.

Table 34.--*Huntington area: volume of sawtimber and growing stock on commercial forest land by species, 1961*

Species	25-mile area		25-to-50-mile area	
	Sawtimber	Growing stock	Sawtimber	Growing stock
	Million bd. ft.	*Million cu. ft.*	*Million bd. ft.*	*Million cu. ft.*
Softwoods:				
Yellow pines	49.6	20.2	36.1	14.9
Hemlock	2.4	1.0	2.0	.9
Other softwoods	4.2	1.1	2.7	.7
Total	56.2	22.3	40.8	16.5
Hardwoods:				
White oak	161.9	61.9	113.3	44.1
Northern red oak	145.0	51.4	109.7	36.4
Chestnut oak	98.9	32.4	73.2	24.1
Other oaks	213.8	59.9	140.4	38.9
Hickory	88.2	47.6	60.8	35.1
Yellow birch	1.2	.5	1.0	.6
Sugar maple	45.3	16.8	33.5	12.4
Red maple	14.0	10.2	9.6	7.7
Beech	72.9	22.5	62.4	19.9
Basswood	15.0	6.1	11.0	5.6
Yellow-poplar	82.4	31.1	61.3	23.0
Ash, walnut, cherry	68.5	28.4	48.2	20.7
Other hardwoods	114.7	46.0	88.5	36.5
Total	1,121.8	414.8	812.9	305.0
All species	1,178.0	437.1	853.7	321.5

Table 35.—*Huntington area: volume of sawtimber on commercial forest land by species and quality classes, 1961*

(In millions of board feet)[1]

Species	All classes	Standard lumber logs			Tie-and-timber logs[2]
		Grade 1	Grade 2	Grade 3	
25-MILE AREA					
Softwoods:					
Yellow pines	49.6	6.8	11.0	31.8	*
White pine	4.2	1.2	1.2	1.8	*
Other softwoods	2.4	*	*	*	*
Total	56.2	8.0	12.2	33.6	*
Hardwoods:					
Select red and white oaks	306.9	37.1	73.1	114.8	81.9
Other red and white oaks	312.7	40.7	65.0	99.7	107.3
Hickory	88.2	7.8	19.0	34.3	27.1
Beech	72.9	5.4	11.2	33.8	22.5
Sugar maple	45.3	3.9	6.0	20.7	14.7
Ash, walnut, cherry	68.5	6.9	16.7	34.5	10.4
Yellow-poplar	82.4	8.5	15.0	37.0	21.9
Other hardwoods	144.9	10.7	22.4	67.2	44.6
Total	1,121.8	121.0	228.4	442.0	330.4
All species	1,178.0	129.0	240.6	475.6	330.4
25-TO-50-MILE AREA					
Softwoods:					
Yellow pines	36.1	4.9	8.0	23.2	*
White pine	2.7	.8	.8	1.1	*
Other softwoods	2.0	*	*	*	*
Total	40.8	5.7	8.8	24.3	*
Hardwoods:					
Select red and white oaks	223.0	27.0	53.1	83.4	59.5
Other red and white oaks	213.6	27.8	44.4	68.1	73.3
Hickory	60.8	5.3	13.1	23.7	18.7
Beech	62.4	4.6	9.6	29.0	19.2
Sugar maple	33.5	2.9	4.4	15.3	10.9
Ash, walnut, cherry	48.2	4.9	11.8	24.2	7.3
Yellow-poplar	61.3	6.3	11.2	27.5	16.3
Other hardwoods	110.1	8.2	17.0	51.1	33.8
Total	812.9	87.0	164.6	322.3	239.0
All species	853.7	92.7	173.4	346.6	239.0

[1] International ¼-inch rule.

[2] Meet minimum specifications for tie-and-timber logs but not for standard-lumber logs.

* Not applicable: spruce, hemlock, and miscellaneous softwoods were not graded into standard-lumber logs.

Table 36.—*Huntington area: volume of sawtimber on commercial forest land, by species and broad diameter classes, 1961*

(In millions of board feet)[1]

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
	25-MILE AREA			
Softwoods:				
Yellow pines	49.6	41.1	6.8	1.7
White pine	4.2	1.7	2.5	0
Hemlock	2.4	1.7	.7	0
Total	56.2	44.5	10.0	1.7
Hardwoods:				
White oak	161.9	73.2	39.7	49.0
Northern red oak	145.0	55.9	36.0	53.1
Chestnut oak	98.9	44.3	29.1	25.5
Other oaks	213.8	78.4	65.2	70.2
Hickory	88.2	42.8	20.9	24.5
Yellow birch	1.2	.9	.3	0
Sugar maple	45.3	14.2	12.1	19.0
Red maple	14.0	7.5	4.6	1.9
Beech	72.9	21.8	22.7	28.4
Basswood	15.0	9.6	4.1	1.3
Yellow-poplar	82.4	34.9	27.7	19.8
Ash, walnut, cherry	68.5	30.0	24.4	14.1
Other hardwoods	114.7	48.1	31.8	34.8
Total	1,121.8	461.6	318.6	341.6
All species	1,178.0	506.1	328.6	343.3
	25-TO-50-MILE AREA			
Softwoods:				
Yellow pines	36.1	29.9	5.0	1.2
White pine	2.7	1.1	1.6	0
Hemlock	2.0	1.5	.5	0
Total	40.8	32.5	7.1	1.2
Hardwoods:				
White oak	113.3	51.2	27.8	34.3
Northern red oak	109.7	42.3	27.2	40.2
Chestnut oak	73.2	32.8	21.5	18.9
Other oaks	140.4	51.5	42.8	46.1
Hickory	60.8	29.5	14.4	16.9
Yellow birch	1.0	.8	.2	0
Sugar maple	33.5	10.5	9.0	14.0
Red maple	9.6	5.1	3.2	1.3
Beech	62.4	18.7	19.4	24.3
Basswood	11.0	7.0	3.1	.9

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Table 36, Continued

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
Yellow-poplar	61.3	26.0	20.6	14.7
Ash, walnut, cherry	48.2	21.1	17.2	9.9
Other hardwoods	88.5	37.1	24.5	26.9
Total	812.9	333.6	230.9	248.4
All species	853.7	366.1	238.0	249.6

[1] International ¼-inch rule.

Table 37.—*Parkersburg area: land area by class of land, 1961*

(In thousands of acres)

Land class	25-mile area	25-to-50-mile area
Forest:		
Commercial	696.5	765.4
Noncommercial	1.4	2.0
All forest land area	697.9	767.4
Nonforest	356.2	308.3
All land	1,054.1	1,075.7

Table 38.—*Parkersburg area: area of commercial forest land, by ownership group and size-of-holding class, 1961*

(In thousands of acres)

Ownership group	25-mile area	25-to-50-mile area
Public	0.1	0
Forest industries:		
Less than 50,000 acres	7.5	8.6
50,000 acres and more	9.5	11.0
Total	17.0	19.6
Farmer-owned and miscellaneous private:		
Less than 100 acres	319.3	350.5
100 to 500 acres	288.8	317.0
500 to 50,000 acres	71.3	78.3
50,000 acres and more	—	—
Total	679.4	745.8
All ownerships	696.5	765.4

Table 39.—*Parkersburg area: area of commercial forest land, by forest types, 1961*

(In thousands of acres)

Forest type	25-mile area	25-to-50-mile area
White pine	3.6	3.1
Loblolly-shortleaf pine	69.4	75.6
Oak types	426.6	471.2
Maple, beech, birch	111.0	119.9
Yellow-poplar	19.8	19.4
Other hardwood types	66.1	76.2
All types	696.5	765.4

Table 40.—*Parkersburg area: area of commercial forest land, by stand-volume classes for sawtimber and other stand-size classes, 1961*

(In thousands of acres)

Stand volume/acre, in board feet[1]	All stands	Sawtimber stands	Other stands
25-MILE AREA			
Less than 1,500	351.9	21.8	330.1
1,500 to 5,000	241.6	198.3	43.3
More than 5,000	103.0	103.0	—
All classes	696.5	323.1	373.4
25-TO-50-MILE AREA			
Less than 1,500	396.8	23.2	373.6
1,500 to 5,000	259.4	210.3	49.1
More than 5,000	109.2	109.2	—
All classes	765.4	342.7	422.7

[1] Net volume, International ¼-inch rule.

Table 41.—*Parkersburg area: area of commercial forest land and volume of sawtimber and growing stock by stand-size classes, 1961*

Stand-size class	25-mile area			25-to-50-mile area		
	Area	Sawtimber[1]	Growing stock	Area	Sawtimber[1]	Growing stock
	Thousand acres	*Million bd. ft.*	*Million cu. ft.*	*Thousand acres*	*Million bd. ft.*	*Million cu. ft.*
Sawtimber	323.1	1,208.3	396.1	342.7	1,311.4	427.4
Poletimber	164.3	173.4	129.8	176.4	189.7	143.5
Other	209.1	124.2	27.8	246.3	120.9	27.0
Total	696.5	1,505.9	553.7	765.4	1,622.0	597.9

[1] International ¼-inch rule.

Table 42.—*Parkersburg area: volume of sawtimber and growing stock on commercial forest land by species, 1961*

Species	25-mile area		25-to-50-mile area	
	Sawtimber	Growing stock	Sawtimber	Growing stock
	Million bd. ft.	*Million cu. ft.*	*Million bd. ft.*	*Million cu. ft.*
Softwoods:				
Yellow pines	57.6	22.6	64.2	25.1
Hemlock	2.9	1.3	2.9	1.9
Other softwoods	5.2	1.4	4.6	1.4
Total	65.7	25.3	71.7	28.4
Hardwoods:				
White oak	211.3	79.4	223.1	84.6
Northern red oak	187.5	70.9	212.1	75.3
Chestnut oak	126.7	41.4	135.7	45.8
Other oaks	285.4	79.8	290.1	81.3
Hickory	117.8	60.3	126.2	65.7
Yellow birch	1.1	.5	1.6	.7
Sugar maple	58.0	20.9	64.0	22.3
Red maple	20.0	13.6	20.3	14.7
Beech	83.8	24.3	102.8	30.8
Basswood	20.8	10.1	22.0	10.8
Yellow-poplar	100.9	37.2	111.1	40.7
Ash, walnut, cherry	90.8	35.4	92.7	37.2
Other hardwoods	136.1	54.6	148.6	59.6
Total	1,440.2	528.4	1,550.3	569.5
All species	1,505.9	553.7	1,622.0	597.9

Table 43.—*Parkersburg area: volume of sawtimber on commercial forest land by species and quality classes, 1961*

(In millions of board feet)[1]

Species	All classes	Standard lumber logs			Tie-and-timber logs[2]
		Grade 1	Grade 2	Grade 3	
25-MILE AREA					
Softwoods:					
Yellow pines	57.6	7.8	12.8	37.0	*
White pine	5.2	1.5	1.5	2.2	*
Other softwoods	2.9	*	*	*	*
Total	65.7	9.3	14.3	39.2	*
Hardwoods:					
Select red and white oaks	398.8	48.2	94.9	149.2	106.5
Other red and white oaks	412.1	53.6	85.7	131.5	141.3
Hickory	117.8	10.4	25.4	45.8	36.2
Beech	83.8	6.2	12.9	38.9	25.8
Sugar maple	58.0	5.0	7.7	26.5	18.8
Ash, walnut, cherry	90.8	9.2	22.1	45.7	13.8
Yellow-poplar	100.9	10.4	18.4	45.3	26.8
Other hardwoods	178.0	13.2	27.5	82.5	54.8
Total	1,440.2	156.2	294.6	565.4	424.0
All species	1,505.9	165.5	308.9	604.6	424.0
25-TO-50-MILE AREA					
Softwoods:					
Yellow pines	64.2	8.7	14.3	41.2	*
White pines	4.6	1.4	1.3	1.9	*
Other softwoods	2.9	*	*	*	*
Total	71.7	10.1	15.6	43.1	*
Hardwoods:					
Select red and white oaks	435.2	52.6	103.6	162.8	116.2
Other red and white oaks	425.8	55.4	88.6	135.8	146.0
Hickory	126.2	11.1	27.3	49.1	38.7
Beech	102.8	7.6	15.8	47.7	31.7
Sugar maple	64.0	5.5	8.4	29.3	20.8
Ash, walnut, cherry	92.7	9.4	22.6	46.6	14.1
Yellow-poplar	111.1	11.4	20.2	49.9	29.6
Other hardwoods	192.5	14.3	29.7	89.3	59.2
Total	1,550.3	167.3	316.2	610.5	456.3
All species	1,622.0	177.4	331.8	653.6	456.3

[1] International ¼-inch rule.

[2] Meet minimum specifications for tie-and-timber logs but not for standard-lumber logs.

*Not applicable: spruce, hemlock, and miscellaneous softwoods were not graded into standard-lumber logs.

Table 44.—*Parkersburg area: volume of sawtimber on commercial forest land by species and broad diameter classes, 1961*

(In millions of board feet)[1]

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
	25-MILE AREA			
Softwoods:				
Yellow pines	57.6	47.7	7.9	2.0
White pine	5.2	2.1	3.1	0
Hemlock	2.9	2.1	.8	0
Total	65.7	51.9	11.8	2.0
Hardwoods:				
White oak	211.3	95.5	51.8	64.0
Northern red oak	187.5	72.3	46.5	68.7
Chestnut oak	126.7	56.7	37.3	32.7
Other oaks	285.4	104.7	87.0	93.7
Hickory	117.8	57.1	27.9	32.8
Yellow birch	1.1	.8	.3	0
Sugar maple	58.0	18.2	15.5	24.3
Red maple	20.0	10.7	6.5	2.8
Beech	83.8	25.1	26.1	32.6
Basswood	20.8	13.3	5.8	1.7
Yellow-poplar	100.9	42.8	33.9	24.2
Ash, walnut, cherry	90.8	39.8	32.4	18.6
Other hardwoods	136.1	57.0	37.7	41.4
Total	1,440.2	594.0	408.7	437.5
All species	1,505.9	645.9	420.5	439.5
	25-TO-50-MILE AREA			
Softwoods:				
Yellow pines	64.2	53.1	8.9	2.2
White pine	4.6	1.8	2.8	0
Hemlock	2.9	2.1	.8	.0
Total	71.7	57.0	12.5	2.2
Hardwoods:				
White oak	223.1	100.9	54.7	67.5
Northern red oak	212.1	81.8	52.6	77.7
Chestnut oak	135.7	60.7	40.0	35.0
Other oaks	290.1	106.4	88.4	95.3
Hickory	126.2	61.2	29.9	35.1
Yellow birch	1.6	1.2	.4	0
Sugar maple	64.0	20.1	17.1	26.8
Red maple	20.3	10.9	6.6	2.8
Beech	102.8	30.8	32.0	40.0
Basswood	22.0	14.1	6.1	1.8

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Table 44, Continued

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
Yellow-poplar	111.1	47.1	37.3	26.7
Ash, walnut, cherry	92.7	40.6	33.1	19.0
Other hardwoods	148.6	62.3	41.2	45.1
Total	1,550.3	638.1	439.4	472.8
All species	1,622.0	695.1	451.9	475.0

[1] International ¼-inch rule.

Table 45.—*Richwood area: land areas by class of land, 1961*

(In thousands of acres)

Land class	25-mile area	25-to-50-mile area
Forest:		
Commercial	1,629.7	1,437.5
Noncommercial	24.2	13.1
All forest land area	1,653.9	1,450.6
Nonforest	374.2	409.4
All land	2,028.1	1,860.0

Table 46.—*Richwood area: area of commercial forest land, by ownership group and size-of-holding class, 1961*

(In thousands of acres)

Ownership group	25-mile area	25-to-50-mile area
Public	485.0	177.2
Forest industries:		
Less than 50,000 acres	30.9	36.7
50,000 acres and more	39.3	46.7
Total	70.2	83.4
Farmer-owned and miscellaneous private:		
Less than 100 acres	367.7	439.1
100 to 500 acres	256.4	329.0
500 to 50,000 acres	276.4	273.2
50,000 acres and more	174.0	135.6
Total	1,074.5	1,176.9
All ownerships	1,629.7	1,437.5

Table 47.—*Richwood area: area of commercial forest land, by forest types, 1961*

(In thousands of acres)

Forest type	25-mile area	25-to-50-mile area
White pine	32.4	18.9
Loblolly-shortleaf pine	63.3	53.0
Oak types	990.6	968.8
Maple, beech, birch	476.4	325.3
Yellow-poplar	17.5	18.5
Other hardwood types	49.5	53.0
All types	1,629.7	1,437.5

Table 48.—*Richwood area: area of commercial forest land, by stand-volume classes for sawtimber and other stand-size classes, 1961*

(In thousands of acres)

Stand volume/acre, in board feet[1]	All stands	Sawtimber stands	Other stands
25-MILE AREA			
Less than 1,500	657.7	53.6	604.1
1,500 to 5,000	690.3	496.5	193.8
More than 5,000	281.7	281.7	—
All classes	1,629.7	831.8	797.9
25-TO-50-MILE AREA			
Less than 1,500	591.3	45.9	545.4
1,500 to 5,000	609.3	448.5	160.8
More than 5,000	236.9	236.9	—
All classes	1,437.5	731.3	706.2

[1] Net volume, international ¼-inch rule.

Table 49.—*Richwood area: area of commercial forest land, and volume of sawtimber and growing stock by stand-size classes, 1961*

Stand-size class	25-mile area			25-to-50-mile area		
	Area	Saw timber[1]	Growing stock	Area	Saw timber[1]	Growing stock
	Thousand acres	*Million bd. ft.*	*Million cu. ft.*	*Thousand acres*	*Million bd. ft.*	*Million cu. ft.*
Sawtimber	831.8	3,904.9	1,303.8	731.3	3,334.5	1,036.1
Poletimber	496.4	558.0	442.8	406.5	477.4	375.0
Other	301.5	79.8	90.9	299.7	108.2	93.6
Total	1,629.7	4,542.7	1,837.5	1,437.5	3,920.1	1,504.7

[1] International ¼-inch rule.

Table 50.—*Richwood area: volume of sawtimber and growing stock on commercial forest land by species, 1961*

Species	25-mile area		25-to-50-mile area	
	Saw-timber	Growing stock	Saw-timber	Growing stock
	Million bd. ft.	*Million cu. ft.*	*Million bd. ft.*	*Million cu. ft.*
Softwoods:				
Yellow pines	110.9	37.6	96.6	36.2
Hemlock.	120.0	34.8	69.0	20.9
Other softwoods	127.3	46.8	79.0	26.5
Total	358.2	119.2	244.6	83.6
Hardwoods:				
White oak	258.7	106.1	297.4	110.3
Northern red oak	541.6	199.8	473.7	170.1
Chestnut oak	480.3	199.0	427.1	169.9
Other oaks	430.2	140.6	405.4	114.3
Hickory	338.9	139.4	310.0	122.7
Yellow birch	113.5	54.8	63.6	29.3
Sugar maple	256.1	112.8	228.0	95.8
Red maple	184.8	116.1	151.2	90.5
Beech	348.3	125.4	280.3	95.7
Basswood	159.6	60.0	149.6	51.6
Yellow-poplar	451.6	169.7	387.4	145.1
Ash, walnut, cherry	243.3	109.1	189.4	86.5
Other hardwoods	377.6	185.5	312.4	139.3
Total	4,184.5	1,718.3	3,675.5	1,421.1
All species	4,542.7	1,837.5	3,920.1	1,504.7

Table 51.—*Richwood area: volume of sawtimber on commercial forest land, by species and quality classes, 1961*

(In millions of board feet)[1]

Species	All classes	Standard lumber logs			Tie-and-timber logs[2]
		Grade 1	Grade 2	Grade 3	
25-MILE AREA					
Softwoods:					
Yellow pines	110.9	20.2	27.9	62.8	*
White pine	39.2	8.6	12.9	17.7	*
Other softwoods	208.1	*	*	*	*
Total	358.2	28.8	40.8	80.5	*
Hardwoods:					
Select red and white oaks	800.3	90.9	154.2	356.3	198.9
Other red and white oaks	910.5	116.4	200.4	343.4	250.3
Hickory	338.9	24.2	69.1	153.5	92.1
Beech	348.3	29.3	64.7	170.1	84.2
Sugar maple	256.1	13.7	44.7	112.2	85.5
Ash, walnut, cherry	243.3	29.4	55.1	131.9	26.9
Yellow-poplar	451.6	59.7	71.6	193.5	126.8
Other hardwoods	835.5	74.4	163.1	404.7	193.3
Total	4,184.5	438.0	822.9	1,865.6	1,058.0
All species	4,542.7	466.8	863.7	1,946.1	1,058.0
25-TO-50-MILE AREA					
Softwoods:					
Yellow pines	96.6	15.4	24.4	56.8	*
White pine	37.9	8.2	12.5	17.2	*
Other softwoods	110.1	*	*	*	*
Total	244.6	23.6	36.9	74.0	*
Hardwoods:					
Select red and white oaks	771.1	87.6	140.7	352.3	190.5
Other red and white oaks	832.5	102.6	173.3	326.9	229.7
Hickory	310.0	22.6	59.3	140.1	88.0
Beech	280.3	22.9	49.7	140.5	67.2
Sugar maple	228.0	12.5	37.9	104.9	72.7
Ash, walnut, cherry	189.4	22.1	43.8	104.6	18.9
Yellow-poplar	387.4	52.5	60.4	166.0	108.5
Other hardwoods	676.8	57.7	124.7	336.3	158.1
Total	3,675.5	380.5	689.8	1,671.6	933.6
All species	3,920.1	404.1	726.7	1,745.6	933.6

[1] International ¼-inch rule.

[2] Meet minimum specifications for tie-and-timber logs but not for standard-lumber logs.

* Not applicable: spruce, hemlock, and miscellaneous softwoods were not graded into standard-lumber logs.

Table 52.—*Richwood area: volume of sawtimber on commercial forest land by species and broad diameter classes, 1961*

(In millions of board feet)

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
	25-MILE AREA			
Softwoods:				
Yellow pines	110.9	77.3	21.8	11.8
White pine	39.2	21.8	11.6	5.8
Hemlock	120.0	44.8	37.3	37.9
Other softwoods	88.1	65.6	22.1	.4
Total	358.2	209.5	92.8	55.9
Hardwoods:				
White oak	258.7	114.2	66.5	78.0
Northern red oak	541.6	177.8	176.3	187.5
Chestnut oak	480.3	171.2	135.9	173.2
Other oaks	430.2	138.3	155.4	136.5
Hickory	338.9	152.9	109.7	76.3
Yellow birch	113.5	28.0	29.0	56.5
Sugar maple	256.1	72.4	70.2	113.5
Red maple	184.8	69.3	55.1	60.4
Beech	348.3	134.5	120.1	93.7
Basswood	159.6	64.3	47.0	48.3
Yellow-poplar	451.6	210.4	166.5	74.7
Ash, walnut, cherry	243.3	121.0	80.7	41.6
Other hardwoods	377.6	162.0	122.7	92.9
Total	4,184.5	1,616.3	1,335.1	1,233.1
All species	4,542.7	1,825.8	1,427.9	1,289.0
	25-TO-50-MILE AREA			
Softwoods:				
Yellow pines	96.6	76.3	14.5	5.8
White pine	37.9	20.8	11.7	5.4
Hemlock	69.0	27.3	24.9	16.8
Other softwoods	41.1	31.2	9.7	.2
Total	244.6	155.6	60.8	28.2
Hardwoods:				
White oak	297.4	132.9	78.4	86.1
Northern red oak	473.7	157.0	160.3	156.4
Chestnut oak	427.1	167.4	115.3	144.4
Other oaks	405.4	132.9	143.9	128.6
Hickory	310.0	135.4	98.7	75.9
Yellow birch	63.6	18.8	17.1	27.7
Sugar maple	228.0	66.9	58.5	102.6
Red maple	151.2	65.9	42.9	42.4

CONTINUED

Table 52, Continued

Species	All classes	Diameter class (in inches)		
		14 or less	16 and 18	20 or more
Beech	280.3	105.5	81.3	93.5
Basswood	149.6	52.8	46.4	50.4
Yellow-poplar	387.4	176.9	141.7	68.8
Ash, walnut, cherry	189.4	96.4	56.4	36.6
Other hardwoods	312.4	133.9	98.2	80.3
Total	3,675.5	1,442.7	1,139.1	1,093.7
All species	3,920.1	1,598.3	1,199.9	1,121.9

[1] International ¼-inch rule.

Table 53.—*Estimated logging costs for sawtimber and pulpwood for selected areas in West Virginia*[1]

Area	Logging cost	
	Sawlogs,/1,000 board feet	Pulpwood,/Standard cord
Beckley:		
25-mile	$32.50	$15.00
25-to-50-mile[2]	34.15	15.70
Elkins:		
25-mile	28.35	13.55
25-to-50-mile[2]	37.00	16.50
Huntington:		
25-mile	34.20	15.35
25-to-50-mile[2]	33.25	15.15
Parkersburg:		
25-mile	36.30	16.05
25-to-50-mile[2]	38.50	16.95
Richwood:		
25-mile	31.00	14.40
25-to-50-mile[2]	33.30	15.40

[1] Estimates of logging costs are based on West Virginia Forest Products Market Information reports, published by U. S. Dept. of Agriculture and West Virginia Dept. of Agriculture, and analysis of regional factors affecting logging costs (author's estimates).

[2] Includes allowance for additional hauling distance to central location of $2.50/1,000 board feet for sawlogs and $1.00/standard cord for pulpwood.

Table 54.—*Estimated truck and rail freight rates for lumber, from selected locations in West Virginia to major market centers*

(In cents/100 pounds)

Destination	Origin							
	Beckley		Elkins		Huntington		Richwood	
	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail[1]
Hickory, N. C.	36.0	51.5	45.0	61.5	43.0	45.5	42.0	84.0
Thomasville, N. C.	33.0	47.5	41.0	54.5	42.0	45.5	41.0	78.0
Roanoke, Va.	23.0	28.5	28.0	36.5	36.0	34.5	25.0	42.5
Winchester, Va.	40.0	34.5	25.0	31.5	43.0	42.5	36.0	36.5
Charleston, W. Va.	21.0	23.5	28.0	28.5	21.0	18.5	21.0	—

Source: Rail rates: Transportation and Storage Service Division, Commodity Stabilization Service, U. S. Department of Agriculture. Truck rates: Motor Tariff Bureau of West Virginia, Inc.

[1] Given as rates for particle-board.

Table 55.—*Estimated truck and rail freight rates for particle-board from selected locations in West Virginia to major market centers*

(In cents/100 pounds)

Destination	Origin					
	Beckley		Elkins		Richwood	
	Truck	Rail	Truck	Rail	Truck	Rail
Hickory, N. C.	36.0	54.5	45.0	76.0	42.0	84.0
Thomasville, N. C.	33.0	49.5	41.0	70.0	41.0	78.0
Roanoke, Va.	23.0	28.5	28.0	36.5	25.0	42.5
Winchester, Va.	40.0	34.5	25.0	31.5	36.0	36.5
Charleston, W. Va.	21.0	—	28.0	—	21.0	—

Source: Rail rates: Transportation and Storage Services Division, Commodity Stabilization Service, U. S. Department of Agriculture. Truck rates: Motor Tariff Bureau of West Virginia, Inc.

Table 56.—*Estimated truck and rail freight rates for paper (wrapping) from selected locations in West Virginia to major market centers*

(In cents/100 pounds)

Destination	Origin			
	Beckley		Parkersburg	
	Truck	Rail	Truck	Rail
New York, N. Y.	94.0	61.5	96.0	62.5
Philadelphia, Pa.	86.0	57.5	86.0	58.5
Pittsburgh, Pa.	82.0	51.5	49.0	30.5
Washington, D. C.	72.0	41.5	90.0	47.5
Cincinnati, Ohio	85.0	41.5	56.0	33.5
Cleveland, Ohio	95.0	41.5	56.0	33.5

Source: Rail rates: Transportation and Storage Services Division, Commodity Stabilization Service, U. S. Department of Agriculture. Truck rates: Motor Tariff Bureau of West Virginia, Inc.

Table 57.—*Estimated truck and rail freight rates for furniture from selected locations in West Virginia to major market centers*

(In cents/100 pounds)

Destination	Origin							
	Beckley		Elkins		Huntington		Richwood	
	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail
New York, N. Y.	222	127	192	111	236	—	222	127
Philadelphia, Pa.	202	117	175	102	218	—	206	117
Pittsburgh, Pa.	184	106	137	80	149	—	155	87
Washington, D. C.	170	99	159	87	192	—	192	104
Cincinnati, Ohio	158	92	174	102	116	—	179	104
Cleveland, Ohio	179	104	158	92	145	—	170	99

Source: Rail rates. Transportation and Storage Service Division, Commodity Stabilization Service, U. S. Department of Agriculture. Truck rates: Motor Tariff Bureau of West Virginia, Inc.

Table 58.—*Number of unemployed male industrial workers by education and age classes, for selected locations in West Virginia*

Location and age class	Educational level		
	6th grade and under	7-11 grades	12th grade and over
Beckley:			
Under 45	328	1,548	547
45 and over	672	782	116
Total	1,000	2,330	663
Elkins:			
Under 45	27	149	77
45 and over	56	149	29
Total	83	298	106
Huntington:			
Under 45	140	839	439
45 and over	191	368	71
Total	331	1,207	510
Parkersburg:			
Under 45	31	342	245
45 and over	53	170	36
Total	84	512	281
Richwood:			
Under 45	115	515	211
45 and over	153	242	39
Total	268	757	250

Source: West Virginia Labor Force Bulletins, West Virginia Department of Employment Security.

Table 59.—*Number of unemployed male industrial workers by skill and age classes, for selected locations in West Virginia*

Location and age class	Skill class		
	Skilled	Semiskilled	Unskilled
Beckley:			
Under 45	463	724	1,236
45 to 64	511	368	689
Total	974	1,092	1,925
Elkins:			
Under 45	74	59	120
45 to 64	109	55	70
Total	183	114	190
Huntington:			
Under 45	400	397	621
45 to 64	286	152	192
Total	686	549	813
Parkersburg:			
Under 45	146	173	299
45 to 64	142	58	59
Total	288	231	358
Richwood:			
Under 45	235	214	389
45 to 64	186	99	148
Total	421	313	537

Source: West Virginia Labor Force Bulletins, West Virginia Department of Employment Security.

Table 60.—*Average hourly wage rates and ranges by skill class for the lumber and particle-board industries in selected locations in West Virginia*

(In dollars/hours)

Location	Skill class		
	Skilled	Semiskilled	Unskilled
Beckley:			
Average	1.80	1.50	1.35
Range	1.70-2.00	1.30-1.50	1.25-1.35
Elkins:			
Average	1.80	1.45	1.30
Range	1.70-2.10	1.30-1.55	1.25-1.35
Huntington:			
Average	1.85	1.55	1.40
Range	1.45-2.15	1.30-1.80	1.25-1.50
Richwood:			
Average	1.80	1.40	1.30
Range	1.65-2.00	1.35-1.50	1.25-1.40

Source: Estimates based on data obtained from the West Virginia Department of Labor and other sources in the State.

Table 61.—*Average hourly wage rates and ranges by skill classes for the woodpulp and furniture industries in selected locations in West Virginia*

(In dollars/hours)

Location	Skill class		
	Skilled	Semiskilled	Unskilled
Woodpulp:			
Average	3.50	2.75	1.75
Range	3.25-3.75	2.50-3.00	1.50-2.00
Furniture:[1]			
Average	1.90	1.50	1.30
Range	1.75-2.35	1.30-1.75	1.25-1.35

Source: Estimates based on data obtained from the West Virginia Department of Labor.

[1] Based on data for Huntington area. Hourly wage rates are estimated to be 10 percent higher for the Richwood and Beckley areas and 5 percent higher for the Elkins area to allow for higher training costs likely to be incurred in these areas.

Table 62.—*Ad valorem property tax rates in selected years for selected locations in West Virginia*

(In cents/$100 of assessed value)

Location	1960	1961	1962	1963
Beckley:				
Raleigh County	296.40	294.00	265.00	263.52
Summers County	181.40	190.00	190.00	190.00
Elkins:				
Randolph County	165.80	165.92	165.60	166.00
Huntington:				
Cabell County	209.64	209.64	209.64	209.64
Wayne County	241.80	241.80	241.80	241.80
Parkersburg:				
Wood County	291.80	288.20	286.20	282.80
Richwood:				
Nicholas County	190.00	190.00	190.00	190.00
Greenbrier County	195.90	150.00	150.00	150.00

Source: Twenty-eighth and twenty-ninth biennial reports of the Tax Commissioner of West Virginia.

Table 63.—*Estimated electricity rates for selected industries and locations in West Virginia*

(In cents/kilowatt-hour)

Industry	Beckley and Huntington	Elkins, Parkersburg, and Richwood
Lumber	[1]1.60	[2]2.20
Particle-board	[3]1.17	[4]1.06
Woodpulp	[5]1.10	[5] .90
Furniture	[1]1.66	[2]2.16

[1] Estimates by Appalachian Power Company, Charleston, W. Va., based on Rate Schedule CP.

[2] Estimate by Monongahela Power Company, Fairmont, W. Va., based on Rate Schedule C.

[3] Estimate by Appalachian Power Company, Charleston, W. Va., based on Rate Schedule CPO.

[4] Estimate by Monongahela Power Company, Fairmont, W. Va., based on Rate Schedule J.

[5] Estimates by author, based on published rate schedules for power companies serving the selected locations.

Table 64.—*Estimated cost/acre of industrial sites by industry, for selected locations in West Virginia*

Location	Industry	
	Lumber, particle-board, furniture	Woodpulp
Beckley	$400	$ 600
Elkins	400	—
Huntington	500	—
Parkersburg	500	1,000
Richwood	300	—

Source: Estimates by author, based on correspondence and discussions with industrial-promotion groups in West Virginia.

Table 65.—*Water characteristics for selected streams at selected locations in West Virginia*

Water characteristics	Beckley area		Parkersburg area	
	New River at Hinton	Greenbrier River at Alderson	Little Kanawha River at Parkersburg	Ohio River at Parkersburg
		DAILY DISCHARGE *cubic feet/second*		
Average	5,550	1,970	2,350	57,000
Maximum	232,000	77,500	46,300	440,000
Minimum	720	24	2	2,290
		ACIDITY *pH*		
Average	7.7	7.7	6.9	—
		TEMPERATURE *degrees F.*		
Average	60	56	68	—
Maximum	82	80	82	—
Minimum	39	33	32	—
		SUSPENDED MATTER *parts/million*		
Average	18	20	78	—
Maximum	44	49	250	—
		DISSOLVED OXYGEN *parts/million*		
Average	8.2	8.6	8.0	—
Minimum	7.0	7.7	6.0	—

urces: U. S. Geological Survey. Surface Water Supply of the United States, 1957. U. S. Geol. rvey Water Supply Paper 1505, 553 pp., 1959.

rguson-Gates, Consulting Engineers. Stream and effluent data on the Greenbrier and New vers. Report prepared for the West Virginia Economic Development Agency. 8 pp.

est Virginia State Water Resources Commission. Stream sampling data (unpublished.)