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PENNSYLVANIA TIMBER INDUSTRIES – A PERIODIC ASSESSMENT OF TIMBER OUTPUT

by James T. Bones
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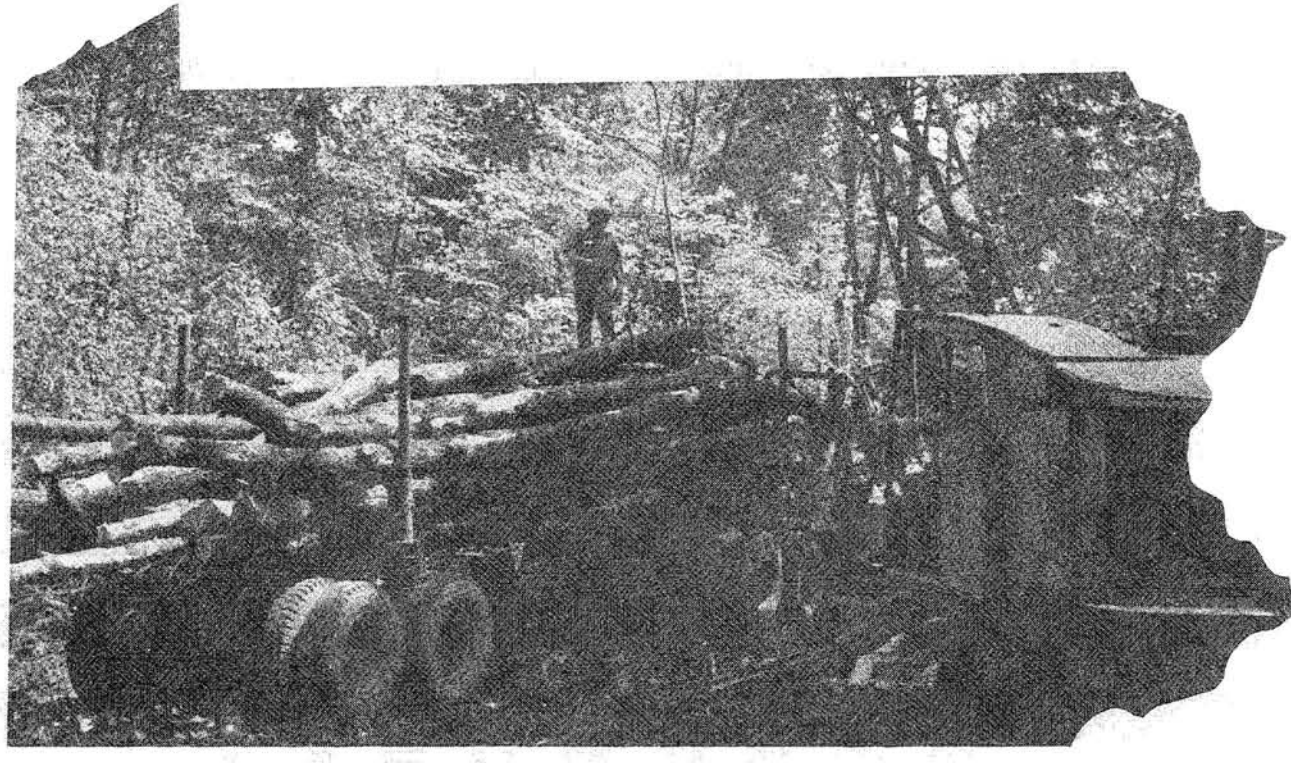

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Abstract

A periodic evaluation of statewide industrial timber output based on a survey of the primary wood-manufacturing plants in Pennsylvania. Contains statistics on the industrial timber harvest and plant wood-receipts in 1976, and the production and disposition of the manufacturing residues that resulted. The 166 million cubic feet of industrial wood produced in 1976 represented a 12-percent increase in production since 1969 when the previous survey was made. Although sawlog and pulpwood production increased during the period, cooperage log and mine timber production decreased. Other trends in industrial product output and use of manufacturing residue are presented along with 20 statistical tables.

PENNSYLVANIA TIMBER INDUSTRIES – A PERIODIC ASSESSMENT OF TIMBER OUTPUT

CONTENTS

HIGHLIGHTS

The 1976 timber-industry survey in Pennsylvania showed that since 1969:

- Total timber output has increased 12 percent to 166 million cubic feet.
- Sawlog production has increased 19 percent to 644 million board feet.
- Pulpwood production has increased 7 percent to 625 thousand cords.
- The number of operating sawmills has risen from 684 to 740.

Round timber conversions for major products:

Softwood logs: M bd ft (Int. ¼-inch) = 164.91 ft^3 = 4.67 m^3
Hardwood logs: M bd ft (Int. ¼-inch) = 160.64 ft^3 = 4.55 m^3
Pulpwood: 1 Standard cord = 85 ft^3 = 2.41 m^3

BACKGROUND

THE USDA FOREST SERVICE conducts continuing forest surveys of all states to provide up-to-date information about the timber and other related resources of the Nation. In the 14-state region served by the Northeastern Forest Experiment Station, all states have been surveyed at least twice. Pennsylvania has now been inventoried for the third time. The latest survey included a reevaluation of the State's timber industries to determine the current output of timber products and the volume and disposition of primary wood-product manufacturing residues.

This report is the result of a 100-percent canvass of all primary wood-product manufacturers but sawmills. Since Pennsylvania sawmills had previously been contacted for 1974 sawlog receipts statistics, a representative sample of sawmills were contacted in order to update the 1974 statistics to 1976. Pulpwood and veneer log production data were gathered as part of the Station's product survey program for the entire Northeast. Pennsylvania's Department of Environmental Resources was a major cooperator during the survey. It furnished an updated list of primary manufacturers and assisted by contacting wood processors who failed to respond to our information request.

This report deals for the most part with statistics for 3 years: 1976, the calendar year of the current timber industry evaluation, and 1964 and 1969, the calendar years of the previous complete industry surveys. The reader is reminded that these years may or may not be representative for the various Pennsylvania timber industries covered in this report. When documented production statistics were available for individual timber products for previous or intervening years, they were included for comparison.

Long-term production trends may be indicated by repeated industry surveys in the future. Until a data base is built up over time, the reader is cautioned to use the current statistics prudently.

CURRENT INDUSTRY TRENDS

Pennsylvania timberlands support a variety of valuable hardwood species such as black cherry, white ash, red and white oaks, and hard maple. In the past it was the practice to harvest high-value individual trees of these species and leave trees of less desirable species and those with poor form and low value. This type of harvesting has become very expensive, and typically leaves large numbers of residual trees and logging debris per unit of volume recovered. Immediately after harvesting, these residual stands have no further economically feasible use, and they are visually and environmentally unacceptable.

A primary goal for industry should be to provide for the complete and highest use of the State's timber resources. This means that more wood fiber should be recovered and channeled to the wood-using industry best suited to convert each class of roundwood from each forested acre. Such newly developed equipment as rubber-tired skidders and total-tree systems are well suited for harvesting hardwood timber stands, but this equipment represents a substantial investment.

Prospects are high for an increase in demand for Pennsylvania timber products by coal-mining and rail-transportation industries. Heavy industry and public utilities are committed to decreasing their dependence on petroleum through increased use of coal. As more underground coal is extracted to meet the increase in demand, greater quantities of wood will be needed for shoring, bracing, and other miscellaneous support materials.

Pennsylvania tie-treating plants that are responding to the Federal program for revitalizing and upgrading the long-neglected eastern rail system have not been able to attract the volume of ties they require. Demand for ties is expected to be high for many years to come.

During the last decade, as public concern for the environment grew and pollution-abatement laws were enforced with more vigor, many woodpulp companies have been forced to either commit huge sums of capital to sometimes old, low-production facilities or discontinue operations. Three such low-production pulpmills were closed in Pennsylvania during the period, but one innovative company came up with a unique compromise. Hammermill Paper Company closed its Lock Haven soda pulpmill but continued to operate its papermaking facilities there by shipping woodpulp from the Company's Erie pulpmill in a "unit train." By using special high-capacity gondola cars the train hauls enough woodpulp to satisfy the papermill's requirement at Lock Haven and backhauls pulpwood bolts and chips to the Erie pulpmill, completing the cycle twice a week.

As concerns over high energy costs continue and new technology is developed, the forests will be used to a greater extent as a source of supplemental energy. Multiproduct logging in Pennsylvania hardwood stands is being translated into greater product recovery and an increase in the total volume of wood that reaches the processing plant. Much of this additional wood fiber and bark is only suitable to be substituted for oil or gas as boiler fuel. Numerous mill operators, however, have installed scragg mills to process the increasing volume of small sawlogs more efficiently. In many cases, headsaws are being used to square two sides of the log only, before it is passed to a system of edgers or a gang saw for final breakdown into lumber, dimension, or pallet parts.

In the wood-manufacturing industry, growth can be facilitated by consolidating producers of a diversity of products. Some of Pennsylvania's most successful veneer and lumber manufacturers have merged with other local, regional, and national enterprises during the past decade, adding an additional element of flexibility to their operations and assuring that the financial resources needed for future expansion will be available. In Ridgeway, for example, a veneer plant has recently been purchased and converted from a slicing to a rotary-peeling operation. The new plant, with an 80-million-square-foot capacity, will create an additional outlet for local veneer-quality hardwood logs.

A favorable exchange rate for European purchasers of United States goods has stimulated demand for quality hardwood lumber. At the same time, new low-cost dehumidifier kilns have made it profitable for medium-production hardwood sawmills in Pennsylvania to install these lumber dryers in order to take advantage of the increase in the export trade.

INDUSTRIAL TIMBER HARVEST

Timber industries used over 166 million cubic feet of timber from the forests of Pennsylvania in 1976. About 93 percent of this volume was from hardwood trees. Sawlogs were the major timber product, accounting for more than 62 percent of the total harvest. Pulpwood production ranked second in volume, accounting for 32 percent of the total. Other timber products that made up a minor portion of the harvest were veneer and cooperage logs, mine timbers, bat and handle stock, posts, charcoal wood, and wood fiber products.

Overall, the timber harvest in Pennsylvania has increased by 12 percent since the last industry survey was made in 1969, and by 10 percent since 1964 when the last complete reinventory of the state's forest resources was carried out. The two major timber products—sawlogs and pulpwood—were responsible for the gain in timber harvest between 1969 and 1976. Although veneer-log production varied little during the period, all other products registered production declines ranging from 21 percent for mine timbers to 58 percent for cooperage logs.

Virtually the entire production gain was due to an increase in the harvest of Pennsylvania hardwoods for sawlogs and pulpwood. In fact between 1969 and 1976, when the pulpwood harvest from hardwoods increased

by 11 percent, the harvest from softwoods decreased by 34 percent from 4.7 million cubic feet to 3.1 million cubic feet.

In 1976 most of the industrial timber harvest came from Pennsylvania's north-central region (Fig. 1). This region alone accounted for 43 percent of the entire harvest. Since 1969, the harvest has increased in all regions of the state but the south-central. This region registered a 9-percent decline, even though the sawlog harvest increased by 25 percent during the period. A 49-percent decline in the pulpwood harvest was responsible for the overall production loss. The largest percentage harvest gain was registered in the northeastern region. Production increased by 31 percent, from 15.9 million cubic feet in 1969 to 20.9 million cubic feet in 1976. Most of the gain was due to a 68-percent increase in the pulpwood harvest within the region.

Pennsylvania's north-central region had the largest sawlog and pulpwood harvest in 1976. The sawlog harvest of 39.6 million cubic feet represented 38 percent of the state total and the pulpwood harvest, 30.1 million cubic feet, represented 57 percent of the state total. Over half of the minor products harvested in Pennsylvania came from the state's western region.

LUMBER AND SAWLOGS

Pennsylvania has been an important lumber-producing state for over a century. In 1860 the state reported the Nation's highest lumber production; however, this was based mainly on softwood production. During the census years 1889 and 1899, when total lumber production peaked in Pennsylvania, more than 1.8 billion board feet of softwood lumber

Figure 1.—Harvest of industrial timber in Pennsylvania, by geographic region and major product, 1976.

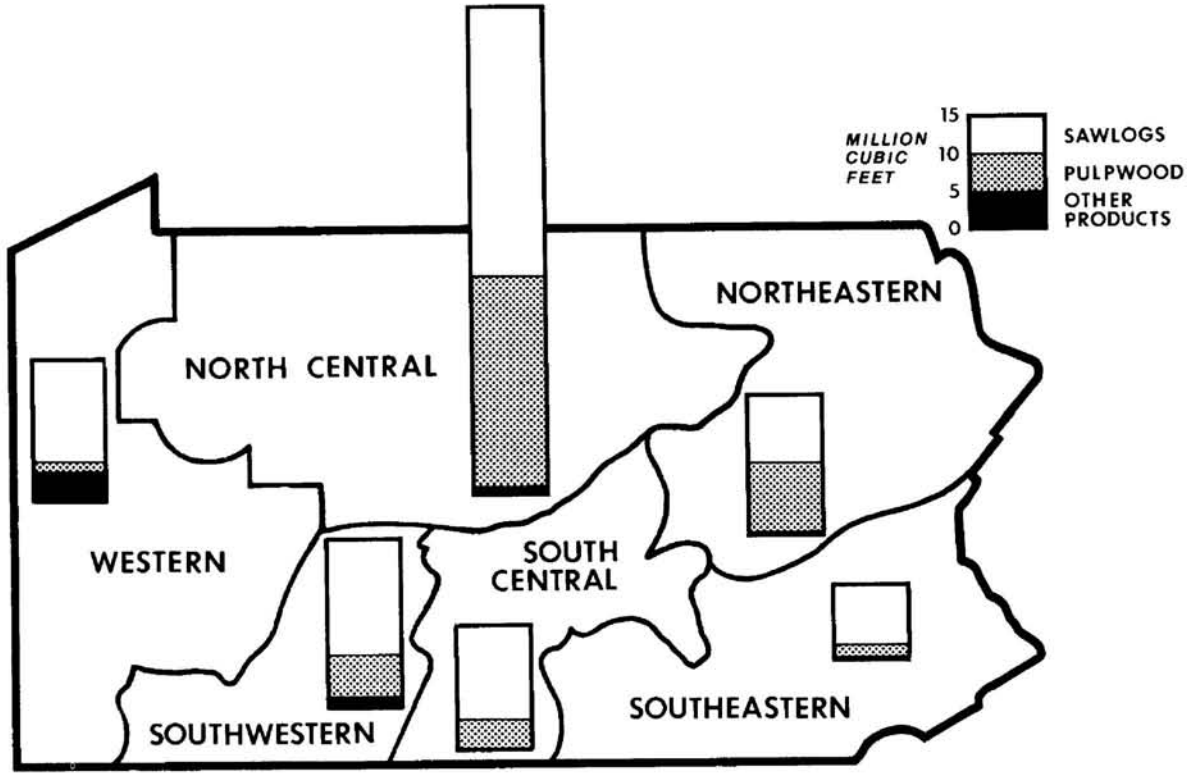
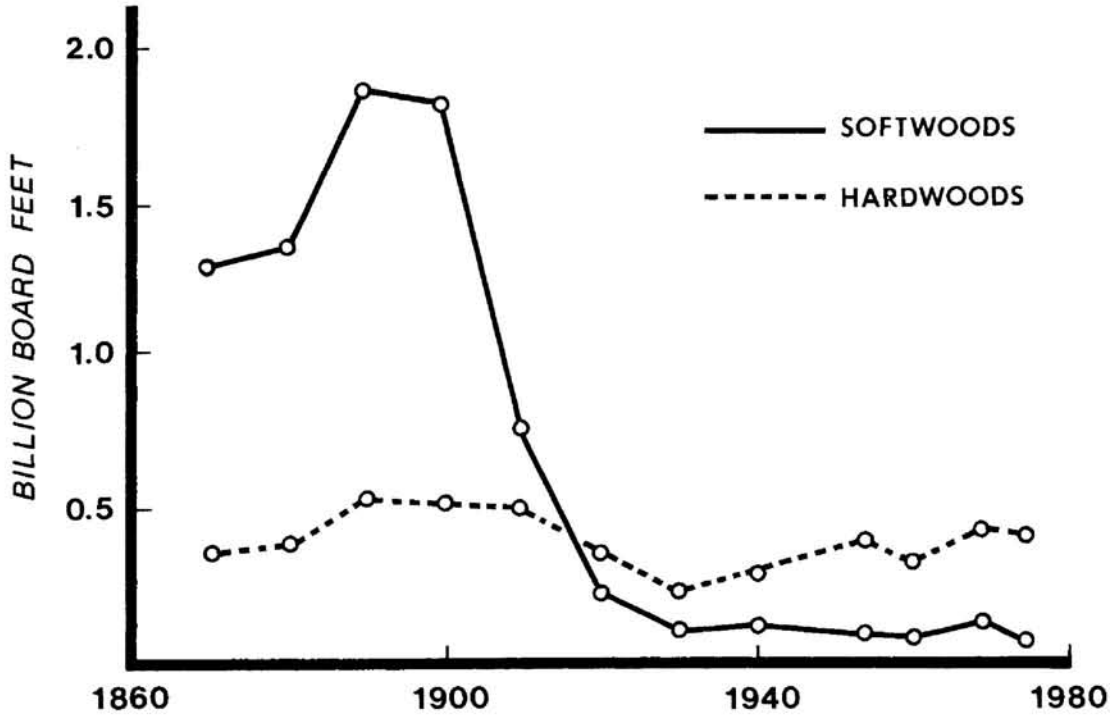


Figure 2.—Lumber production in Pennsylvania for selected years between 1869 and 1975.



was produced (Fig. 2). During the next 3 decades softwood lumber production slumped, and by 1920 more hardwood lumber was produced than softwood. Softwood lumber production has continued to decrease and hardwood lumber production has stabilized at between 400 and 500 million board feet annually.

The number of sawmills operating in Pennsylvania has generally followed fluctuations in lumber production. At the turn of the century, more sawmills were operating than at any other time; 1,501 sawmills operated in 1899. As production dwindled over the years, the number of sawmills dropped to a low of 211 in 1932. When lumber demand rose during the 1940's, the number of sawmills in operation rose to a record high of 2,745 in 1947.

Since then lumber production and the number of operating sawmills has dropped. Our industry study shows that 740 sawmills operated during 1976. This total is considerably less than the 999 sawmills operating in 1964, but more than the 684 sawmills that were operating during the last industry survey in 1969.

Since 1964 the number of low-production sawmills (producing less than .5 million board feet annually) has dropped from 667 to 388, while the number of high-production sawmills (producing over 1 million board feet annually) has risen from 167 to 206. This trend is consistent with most other regions of the country; low-production, portable, and part-time sawmills are being replaced by full-time, high-production stationary units.

Five of the six geographic regions of Pennsylvania show an increase in the number of sawmills operating between 1969 and 1976, while all regions registered a decrease in the number of sawmills operating between 1964 and 1969. The southeastern region shows a decrease in number for both periods; from 117 in 1964 to 81 in 1969 and 77 in 1976. This drop in number of operating sawmills was due entirely to a loss of low-production sawmills.

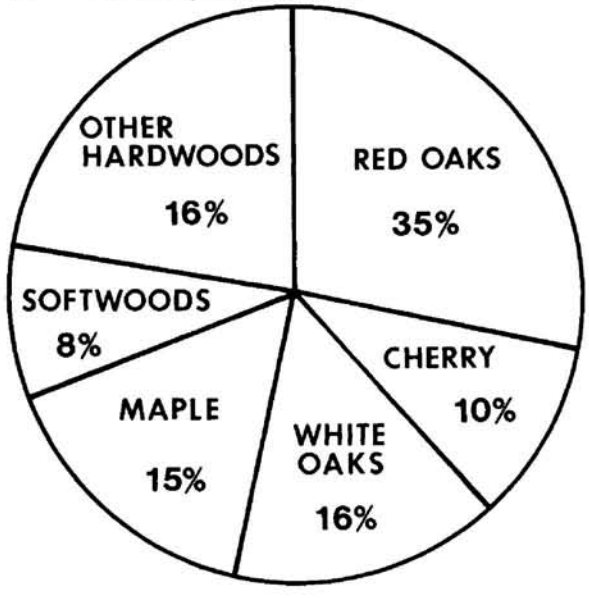
Sawlog production in 1976 was 644 million board feet, a 19-percent increase over 1964 and 1969. The north-central region, which registered a 9-percent decline in production

between 1964 and 1969, led the state between 1969 and 1976 with a 28-percent increase in production. Pennsylvania's south-central region, which showed the greatest production increase between 1964 and 1969, continued to increase production from 68 million board feet in 1969 to 85 million board feet in 1976, a 26-percent increase.

Ninety-two percent of the total sawlog production in 1976 was from hardwood trees. Red oaks accounted for 35 percent of the total volume and white oaks accounted for an additional 16 percent (Fig. 3). Other important hardwood species included hard and soft maple, and black cherry. Major components of the softwood sawlog production were white pine and hemlock.

In 1976 the western, north-central, and southeastern regions were net exporters of sawlogs and the southwestern, northeastern, and south-central regions were net importers. Most of the exports were interregional transfers rather than out-of-state shipments. Statewide, Pennsylvania was a net importer of sawlogs, shipping only 2.2 million board feet of logs to manufacturers in other states, while receiving 28.7 million board feet of sawlogs from log processors in other states. Most of the imported logs—11.5 million board feet—came from New York. Pennsylvania timber harvesters shipped more sawlogs to West Virginia for manufacture than to any other state.

Figure 3.—Pennsylvania sawlog production, by species, in percent, 1976.



PULPWOOD

More than 625 thousand cords of pulpwood were harvested from Pennsylvania timberlands in 1976, and in addition, more than 284 thousand cord equivalents of pulp chips were recovered from the primary wood-product manufacturing plants of the state (Fig. 4). Although the volume of wood from plant residues is again approaching the record high level of 309 thousand cords of 1974, the total roundwood harvest is down 84 thousand cords from 1973, when 709 thousand cords of roundwood were harvested. Four percent of the 1976 pulpwood production came from softwoods, 65 percent from hardwoods, and 31 percent from manufacturing residues (Fig. 5). Most of the softwood harvest was pine. Oaks and hickory represented 38 percent of the total round timber harvest. Yellow-poplar, hard and soft maple, beech, and birch made up the remainder of the pulpwood harvest.

Since 1690 when the first papermill in the United States was started in Roxborough, Pennsylvania, the state has always been an important pulp producer. Between 1899 and 1927 the state ranked among the first five states in pulpwood consumption and woodpulp production. In 1904, the 243 thousand cords of pulpwood consumed by Pennsylvania mills represented 8 percent of the United States total. Sixteen years later the consumption of 490 thousand cords again represented 8 percent of the national total. During this period, the state maintained its dominance by importing large quantities of pulpwood from the South and from Canada. Then, as pulp industries developed in the South and West, Pennsylvania's percentage of the Nation's woodpulp production dropped from 6.3 percent in 1923 to only 1.8 percent in 1952. In recent years, the local woodpulp industry has continued to grow mainly by adding production capacity to existing mills. The daily pulping capacity of Pennsylvania pulpmills has risen from 1,163 tons in 1955, to 2,102 tons in 1968, and finally to 2,545 tons in 1976. This represents a 6-percent average

Figure 4.—Pulpwood production in Pennsylvania, by source, 1967-1976.

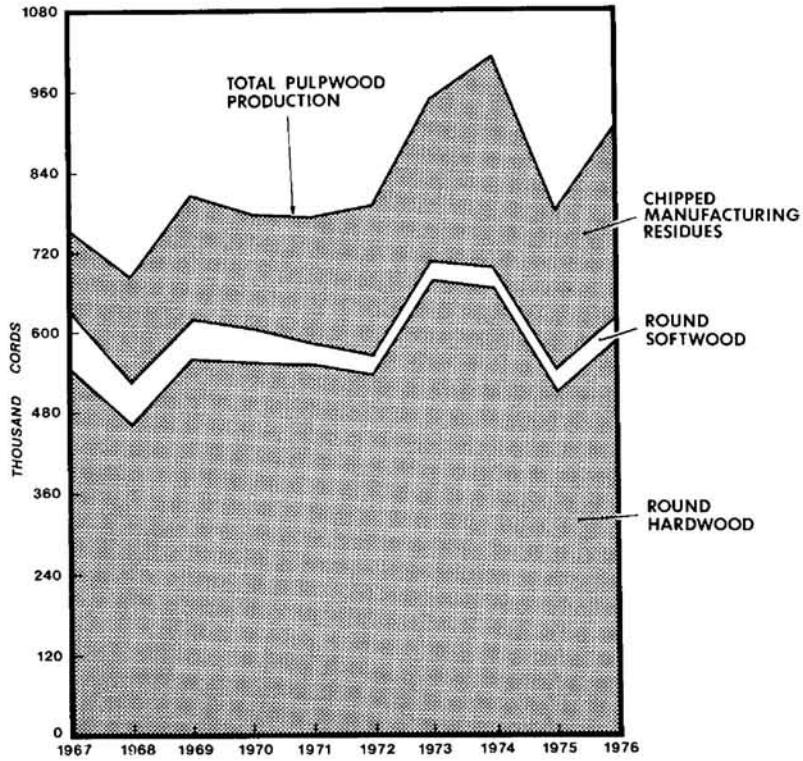
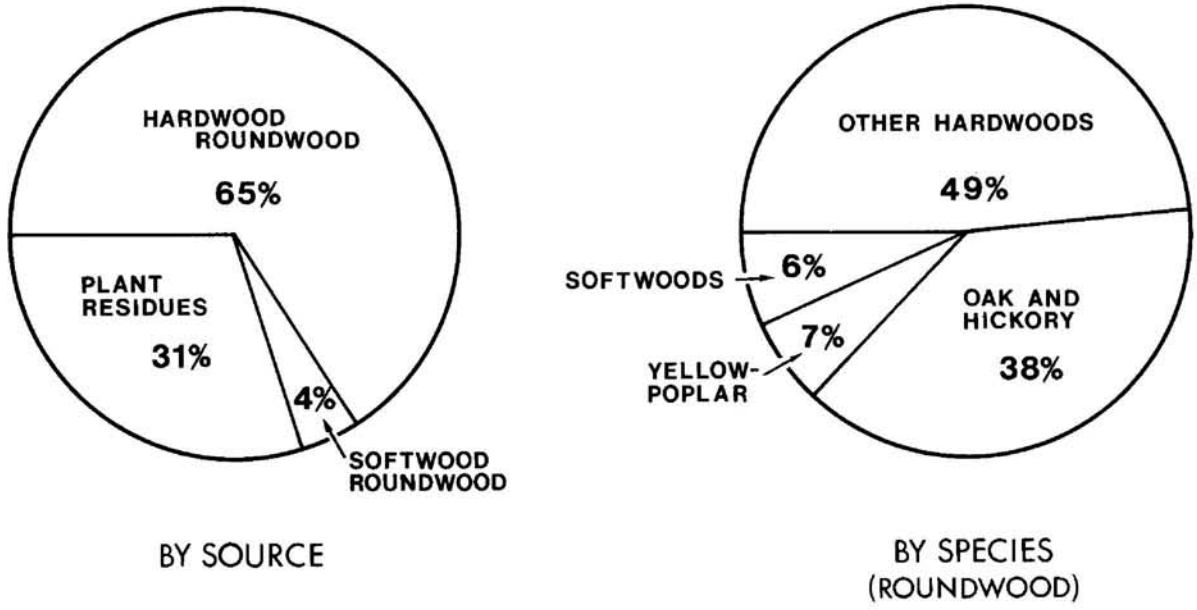


Figure 5.—Pennsylvania pulpwood production, in percent, 1976.



annual increase since 1955, while the number of operating pulpmills has dropped from 15 to 9.

About 6.1 million cords of pulpwood have been harvested from Pennsylvania timberlands during the last decade (Table 16). Most of it came from the north-central and northeastern regions. During 7 of the 10 years between 1967 and 1976, at least one Pennsylvania county has produced more than 50 thousand cords of pulpwood. The Clearfield County pulpwood harvest has exceeded 50 thousand cords during 5 years of the decade. The 326 thousand cords of production represented 10 percent of the total harvest during the 5 years.

During 1976 over 59 thousand cords of pulpwood harvested from Pennsylvania timberlands were shipped to other states for manufacture, however, Pennsylvania pulpmills received 105 thousand cords of softwoods and 38 thousand cords of hardwoods from other states and regions to satisfy their wood requirements.

OTHER TIMBER PRODUCTS

Veneer logs

Limited quantities of veneer have been manufactured in Pennsylvania for many years, but traditionally greater volumes of veneer logs have been shipped to other states for manufacture. Veneer-log production and receipts for selected years, in millions of board feet, International ¼-inch log rule, illustrate this:

Year	*Production*[a]	*Receipts*[a]
1954	4.6	0.5
1963	12.2	1.7
1968	16.5	4.8
1969	15.1	7.6
1972	12.3	7.4
1976	14.7	10.7

[a]Does not include veneer logs that passed directly through brokers or concentrators for overseas shipment.

The 14.7 million board feet of veneer logs harvested from Pennsylvania timberlands in 1976 represent a 20-percent increase over 1972, but an 11-percent decrease from the previous record high of 16.5 million board feet registered in 1968. Only 45 percent of the veneer-log harvest was retained in the state for manufacture. Over 8 million board feet was shipped for processing to plants in 10 other states and 1 Canadian province. Virginia and West Virginia were the major recipients; black cherry and red oak were the major species shipped. Red oak was also the major species of veneer logs retained by local manufacturers, making up 86 percent of the volume retained.

In addition to the locally harvested veneer logs, Pennsylvania veneer manufacturers received logs from seven other states in 1976. Most of the incoming shipments were from West Virginia. Red oak constituted 80 percent of the incoming volume.

Bats and handles

Although white ash is a minor species in Pennsylvania's most important forested regions, it is the mainstay of one of its most stable wood-using industries—bat and handle manufacturing. Ten plants were operating in 1976, and 8.7 million board feet of ash were harvested that year from timberlands within the State. This compares with 12 plants and 12.8 million board feet in 1964 and 15 plants and 13.7 million board feet in 1969. In addition, 4 million board feet of ash were shipped in from other states for processing in 1969 and about 2 million board feet were imported in 1976. Most of the ash for bats and handles was harvested in the north-central region in 1976.

Cooperage

Cooperage-log production is another relatively stable component of the Pennsylvania timber harvest. In 1954, six cooperage plants processed more than 2 million board feet of white oak. Ten years later, production had climbed to over 5 million board feet, and in 1969 production reached a high of 9.7 million board feet. In 1976, the three operating plants in Pennsylvania processed 4.2 million board feet of white oak, 3.7 million board feet of which were harvested from local timberlands.

Mine timbers

Over the years, the coal mines of Pennsylvania have depended upon the local timberlands as a source of mine props and shoring material. The increased concern over mine safety has no doubt stimulated demand. The 4.6 million cubic feet of local wood used as round and split mine timbers in underground coal mines in 1976 is 21 percent less than was required in 1969, when more coal was being produced.

MANUFACTURING RESIDUES

As energy costs continue to climb, and dependable and readily available sources of pulp chips become more important, primary manufacturing residues increase in utility and value. Stringent air- and water-pollution laws in the State have discouraged wood-product manufacturers from open burning or dumping their residues, and have encouraged them to seek pulpmills and other markets for these surplus materials.

More than 73 million cubic feet of residues were generated by the primary wood-product manufacturers of Pennsylvania in 1976. Of this, 60 million cubic feet was woody material and 13 million cubic feet was bark. Some 38 million cubic feet of the woody residue was suitable for conversion into chips for fiber products. Seventy-nine percent of all residues—58 million cubic feet—was used. While 72 percent of the bark residue was recovered and used, 81 percent of the wood residue was used.

When the results of the 1976 study in Pennsylvania were compared with the previous study (Bones and Sherwood 1972) made in 1969, some important trends were identified (Fig. 6).

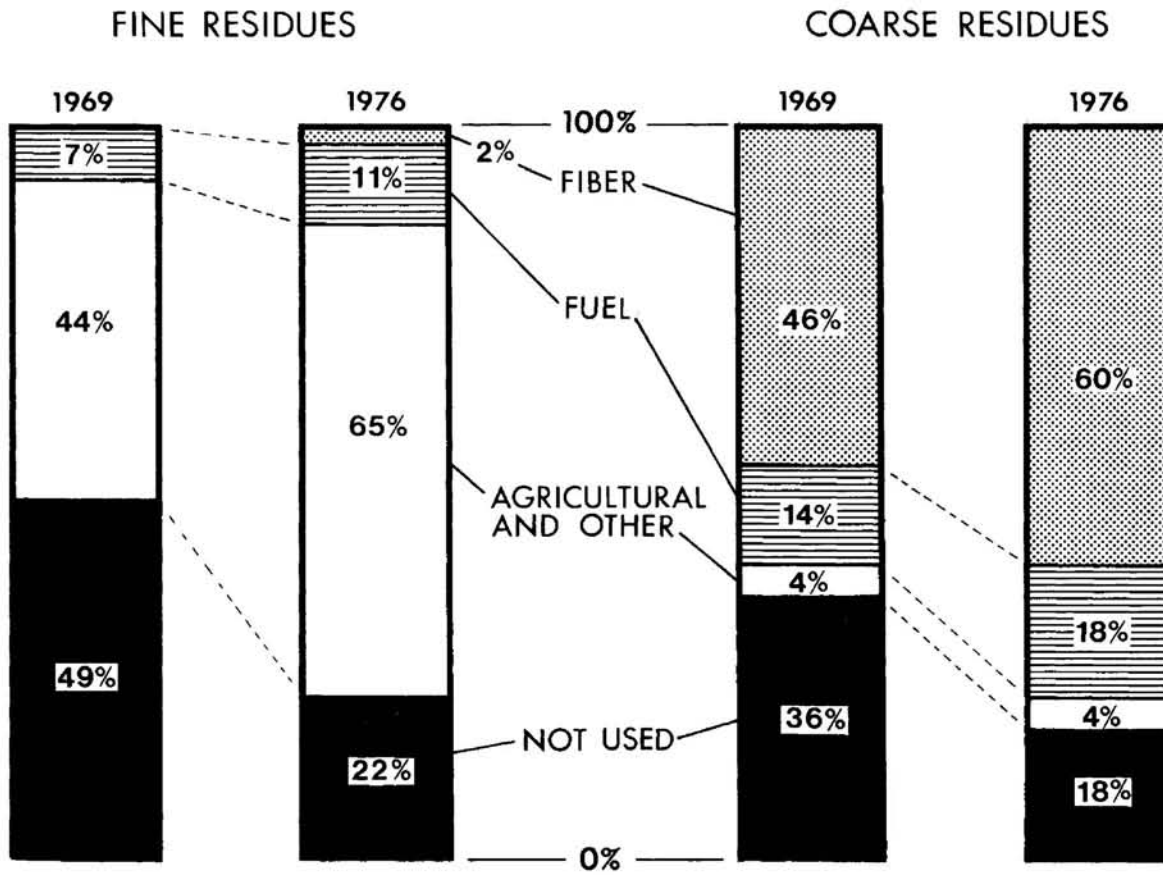


Figure 6.—Use of wood residue in Pennsylvania, in percent, 1969 and 1976. (See Table 19 for definition of terms.)

- A 27 percent greater volume of fine wood residues and an 18 percent greater volume of coarse wood residues were being used in 1976 than in 1969.
- A 14 percent greater volume of coarse residues was being used for fiber-product chips in 1976 than in 1969. Fine residues were being used in fiber products for the first time in Pennsylvania.
- A 4 percent greater volume of wood residues was being used for fuel in 1976 than in 1969.
- A 21 percent greater volume of fine residues was being used for such products as livestock bedding, horticultural mulch, and charcoal in 1976 than in 1969.

The use of bark residues grew rapidly in Pennsylvania between 1969 and 1976. In 1969, only a third of the bark accumulating at the state's primary wood-manufacturing plants was being used. It presented a tremendous solid-waste disposal problem.

In 1976, nearly 72 percent of the bark residue was used. Most of the increase can be attributed to the development of markets for bark mulch. Many state highway departments and private landscaping contractors are using hardwood bark as a mulch for landscaping and reseeding projects. In addition, with the high cost of energy, many wood-manufacturing plants are switching to bark and other residues as boiler fuel.

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DEFINITION OF TERMS

Species

Softwoods. Coniferous trees, usually evergreen with needles or scalelike leaves.

Hardwoods. Dicotyledonous trees, usually broad-leaved and deciduous.

Harvest

Timber products output. Includes roundwood (round timber) products harvested from growing stock on commercial forest land; from other sources, such as cull trees, salvable dead trees, limbs and tops, and saplings; from trees on noncommercial and nonforest lands; and from manufacturing plant byproducts.

Industrial timber harvest. Total production of round timber for conversion into wood products.

Logging residues. The unused portions of trees harvested or killed in the process of logging.

Manufacture

Primary wood-manufacturing plant. A plant that converts round timber to wood products such as woodpulp, lumber, veneer, cooperage, and dimension.

Roundwood products. Logs, bolts, and other round timber generated from harvesting trees for industrial or consumer uses.

Sawlog. A roundwood product, from which products such as lumber are sawn, and which meets certain minimum standards of diameter, length, and defect, including a minimum 8-foot length and combinations of size and defect specified in regional standards.

Pulpwood. Roundwood or plant byproducts cut (into 4- or 5-foot lengths or chipped) and prepared for manufacture into woodpulp.

Residues

Manufacturing plant residues. Wood materials that are generated when round timber (roundwood) is converted into wood products; includes slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screenings.

Plant byproducts. Wood products, such as pulp chips, recycled from manufacturing plant residues.

Unused manufacturing residues. Plant residues that are dumped or destroyed and not recovered for plant byproducts.

Coarse residues. Manufacturing residues suitable for chipping, such as slabs, edgings, and veneer cores.

Fine residues. Manufacturing residues not suitable for chipping, such as sawdust and shavings.

INDEX TO TABLES

Table 1.—Volume of industrial timber, by product harvested, Pennsylvania, 1976

Product	Volume in standard units				Roundwood volume		
	Standard units	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
					Thousand cubic feet		
Sawlogs	M board feet[a]	644,158	52,846	591,312	103,703	8,715	94,988
Pulpwood	Standard cords	625,203	35,890	589,313	53,143	3,051	50,092
Veneer logs	M board feet[a]	14,739	—	14,739	2,073	—	2,073
Cooperage logs	M board feet[a]	4,224	—	4,224	538	—	538
Mine timbers	M cubic feet	4,561	163	4,398	4,561	163	4,398
Misc. products[b]	M cubic feet	2,036	125	1,911	2,036	125	1,911
Total	—	—	—	—	166,054	12,054	154,000

[a]International 1/4-inch rule.
[b]Includes bat and handle stock, posts, charcoal wood and wood fiber products.

Table 2.—Change in timber products output in Pennsylvania between 1969 and 1976

Product	All species			Softwoods			Hardwoods		
	1969	1976	Change	1969	1976	Change	1969	1976	Change
	Million cubic feet		*Per-cent*	*Million cubic feet*		*Per-cent*	*Million cubic feet*		*Per-cent*
Sawlogs	87.5	103.7	+19	8.6	8.7	+ 1	78.9	95.0	+20
Pulpwood	49.7	53.2	+ 7	4.7	3.1	−34	45.0	50.1	+11
Veneer logs	2.1	2.1	(a)	—	—	—	2.1	2.1	—
Cooperage logs	1.2	.5	−58	—	—	—	1.2	.5	−58
Mine timbers	5.8	4.6	−21	.2	.2	(a)	5.6	4.4	−21
Misc. products[b]	2.6	2.0	−23	(c)	.1	—	2.6	1.9	−27
Total	148.9	166.1	+12	13.5	12.1	−10	135.4	154.0	+14

[a]Less than 0.5 percent.
[b]Includes handle and bat stock, posts, charcoal wood, and wood fiber products.
[c]Less than 50,000 cubic feet.

Table 3.—Industrial timber harvest[a] in Pennsylvania, by geographic region, species group, and product, 1976

(In thousands of cubic feet)

Region and species group	Sawlogs	Pulpwood	Other products[b]	All products
Western				
Softwoods	526	102	133	761
Hardwoods	14,832	426	4,648	19,906
Total	15,358	528	4,781	20,667
North-Central				
Softwoods	4,106	433	—	4,539
Hardwoods	35,539	29,699	1,486	66,724
Total	39,645	30,132	1,486	71,263
Southwestern				
Softwoods	1,159	1,054	30	2,243
Hardwoods	15,837	5,100	1,367	22,304
Total	16,996	6,154	1,397	24,547
Northeastern				
Softwoods	1,872	323	—	2,195
Hardwoods	8,306	9,639	761	18,706
Total	10,178	9,962	761	20,901
Southeastern				
Softwoods	169	451	125	745
Hardwoods	7,597	1,403	340	9,340
Total	7,766	1,854	465	10,085
South-Central				
Softwoods	883	688	—	1,571
Hardwoods	12,877	3,825	318	17,020
Total	13,760	4,513	318	18,591
All regions				
Softwoods	8,715	3,051	288	12,054
Hardwoods	94,988	50,092	8,920	154,000
Total	103,703	53,143	9,208	166,054

[a]Does not include fuelwood or removals that are not manufactured into industrial products.

[b]Includes cooperage and veneer logs, mine timbers, bat and handle stock, posts, charcoal wood, and wood fiber products.

Table 4.—Number of operating sawmills in Pennsylvania, by geographic region and annual production class,[a] 1964, 1969, and 1976

Region	Production class											
	Less than ½ million board feet			½ million to 1 million board feet			Over 1 million board feet			All classes		
	1964	1969	1976	1964	1969	1976	1964	1969	1976	1964	1969	1976
Western	86	56	60	27	19	25	26	19	30	139	94	115
North-Central	161	111	99	53	39	49	75	58	66	289	208	214
Southwestern	88	45	45	29	23	18	33	29	41	150	97	104
Northeastern	128	65	61	17	16	16	15	16	27	160	97	104
Southeastern	96	64	53	11	10	14	10	7	10	117	81	77
South-Central	108	61	70	28	25	24	8	21	32	144	107	126
All regions	667	402	388	165	132	146	167	150	206	999	684	740

[a]Based on sawlogs receipts or reported annual lumber production capacity.

Table 5.—Sawlog production and receipts relationships in Pennsylvania, by geographic region, between 1969 and 1976

Region	Production			Receipts		
	1969	1976	Change	1969	1976	Change
	Million board feet[a]	*Million board feet*[a]	*Percent*	*Million board feet*[a]	*Million board feet*[a]	*Percent*
Western	85.9	95.6	+11	81.9	90.6	+11
North-Central	192.4	246.2	+28	182.3	230.6	+26
Southwestern	97.7	105.6	+ 8	120.4	141.7	+18
Northeastern	58.3	63.0	+ 8	58.2	74.3	+28
Southeastern	41.0	48.3	+18	34.9	43.3	+24
South-Central	68.1	85.5	+26	70.0	90.2	+29
All regions	543.4	644.2	+19	547.7	670.7	+22

[a]International ¼-inch rule.

Table 6.—Sawlog production for Pennsylvania, by species group, geographic region, and where received, 1976

(In millions of board feet, International ¼-inch rule)

Species group and region	Where received			Total production
	Within region	Within state	In other states	
Softwoods				
Western	2.8	0.4	—	3.2
North-Central	22.2	2.7	—	24.9
Southwestern	6.7	.3	—	7.0
Northeastern	11.0	.3	—	11.3
Southeastern	.9	.1	—	1.0
South-Central	5.1	.3	—	5.4
All regions	48.7	4.1	—	52.8
Hardwoods				
Western	74.1	18.3	—	92.4
North-Central	197.9	23.1	0.3	221.3
Southwestern	96.5	.5	1.6	98.6
Northeastern	47.9	3.8	—	51.7
Southeastern	39.1	7.9	.3	47.3
South-Central	73.3	6.8	—	80.1
All regions	528.8	60.4	2.2	591.4
All species	577.5	64.5	2.2	644.2

Table 7.—Sawlog receipts for Pennsylvania, by species group, geographic region, and where produced, 1976

(In millions of board feet, International ¼-inch rule)

Species group and region	Where produced			Total receipts
	Within region	Within state	In other states	
Softwoods				
Western	2.8	1.1	—	3.9
North-Central	22.2	.3	0.3	22.8
Southwestern	6.7	1.0	(a)	7.7
Northeastern	11.0	1.1	.9	13.0
Southeastern	.9	.2	(a)	1.1
South-Central	5.1	.4	—	5.5
All regions	48.7	4.1	1.2	54.0
Hardwoods				
Western	74.1	11.0	1.6	86.7
North-Central	197.9	6.8	3.1	207.8
Southwestern	96.5	24.7	12.8	134.0
Northeastern	47.9	5.9	7.5	61.3
Southeastern	39.1	1.4	1.7	42.2
South-Central	73.3	10.6	.8	84.7
All regions	528.8	60.4	27.5	616.7
All species	577.5	64.5	28.7	670.7

[a]Less than 50,000 board feet.

Table 8.—Sawlog production and receipts in the WESTERN REGION of Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International ¼-inch rule)

Species	Cut and retained in region	Out-shipments		Total production	In-shipments		Total receipts
		To other regions	To other states		From other regions	From other states	
Hemlock	2.3	0.3	—	2.6	0.7	—	3.0
White pine	.4	.1	—	.5	.4	—	.8
Other softwoods	.1	—	—	.1	—	—	.1
Total softwoods	2.8	0.4	—	3.2	1.1	—	3.9
Ash	3.6	0.4	—	4.0	1.0	0.4	5.0
Basswood	.8	.2	—	1.0	.1	(a)	.9
Beech	3.7	.3	—	4.0	.6	.3	4.6
Cherry	6.5	1.0	—	7.5	1.9	.1	8.5
Elm	.9	.3	—	1.2	(a)	.1	1.0
Hickory	1.3	.2	—	1.5	.1	.1	1.5
Hard maple	9.0	1.3	—	10.3	1.4	.4	10.8
Soft maple	6.7	.9	—	7.6	1.3	(a)	8.0
White oak	5.3	1.0	—	6.3	.7	(a)	6.0
Chestnut oak	2.1	.7	—	2.8	.1	—	2.2
Red and black oak	22.6	8.3	—	30.9	2.8	.1	25.5
Scarlet and pin oak	3.0	.7	—	3.7	.3	—	3.3
Yellow-poplar	7.0	2.6	—	9.6	.3	.1	7.4
Other hardwood[b]	1.6	.4	—	2.0	.4	(a)	2.0
Total hardwoods	74.1	18.3	—	92.4	11.0	1.6	86.7
All species	76.9	18.7	—	95.6	12.1	1.6	90.6

[a] Less than 50,000 board feet.

[b] Includes aspen, black walnut, yellow and black birch.

Table 9.—Sawlog production and receipts in the NORTH-CENTRAL REGION of Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International 1/4-inch rule)

Species	Cut and retained in region	Out-shipments		Total production	In-shipments		Total receipts
		To other regions	To other states		From other regions	From other states	
Hemlock	13.5	1.8	—	15.3	0.2	0.1	13.8
White pine	8.2	.9	—	9.1	.1	.2	8.5
Other softwoods	.5	(a)	—	.5	—	(a)	.5
Total softwoods	22.2	2.7	—	24.9	0.3	0.3	22.8
Ash	4.6	1.2	(a)	5.8	0.2	(a)	4.8
Aspen	1.0	.2	—	1.2	(a)	0.1	1.1
Basswood	3.1	.8	(a)	3.9	.2	.1	3.4
Beech	9.9	1.3	0.1	11.3	.2	.1	10.2
Yellow and black birch	1.8	.1	(a)	1.9	.1	(a)	1.9
Cherry	38.8	3.1	.1	42.0	.6	.1	39.5
Hard maple	18.2	2.7	(a)	20.9	1.2	1.0	20.4
Soft maple	28.0	2.9	(a)	30.9	.8	.3	29.1
White oak	15.1	1.9	.1	17.1	.5	.1	15.7
Chestnut oak	6.2	1.0	—	7.2	.7	—	6.9
Red and black oak	59.0	6.3	—	65.3	1.9	.8	61.7
Scarlet and pin oak	6.3	.6	—	6.9	.1	(a)	6.4
Yellow-poplar	3.9	.6	—	4.5	.1	(a)	4.0
Other hardwoods[b]	2.0	.4	—	2.4	.2	.5	2.7
Total hardwoods	197.9	23.1	0.3	221.3	6.8	3.1	207.8
All species	220.1	25.8	0.3	246.2	7.1	3.4	230.6

[a] Less than 50,000 board feet.

[b] Includes elm, hickory, and black walnut.

Table 10.—Sawlog production and receipts in the SOUTHWESTERN REGION of Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International ¼-inch rule)

Species	Cut and retained in region	Out-shipments		Total production	In-shipments		Total receipts
		To other regions	To other states		From other regions	From other states	
Hemlock	3.6	0.1	—	3.7	0.5	(a)	4.1
White pine	2.2	.2	—	2.4	.5	(a)	2.7
Other softwoods	.9	—	—	.9	(a)	—	.9
Total softwoods	6.7	0.3	—	7.0	1.0	(a)	7.7
Ash	1.9	(a)	—	1.9	0.7	0.3	2.9
Basswood	1.4	—	0.1	1.5	.2	(a)	1.6
Beech	2.5	(a)	.1	2.6	.4	(a)	2.9
Cherry	10.3	(a)	—	10.3	1.4	.1	11.8
Hickory	1.6	(a)	.1	1.7	.2	(a)	1.8
Hard maple	7.0	(a)	.2	7.2	.7	.1	7.8
Soft maple	7.4	(a)	.1	7.5	1.1	.2	8.7
White oak	10.1	(a)	.2	10.3	2.1	.7	12.9
Chestnut oak	6.6	.1	.2	6.9	.9	.2	7.7
Red and black oak	36.5	.2	.4	37.1	11.7	3.0	51.2
Scarlet and pin oak	4.4	.1	.1	4.6	1.0	(a)	5.4
Yellow-poplar	5.7	.1	(a)	5.8	2.9	(a)	8.6
Black walnut	.2	—	.1	.3	.8	.5	1.5
Other hardwoods[b]	.9	—	—	.9	.6	7.7	9.2
Total hardwoods	96.5	0.5	1.6	98.6	24.7	12.8	134.0
All species	103.2	0.8	1.6	105.6	25.7	12.8	141.7

[a] Less than 50,000 board feet.

[b] Includes aspen, black and yellow birch, and elm.

Table 11.—Sawlog production and receipts in the NORTHEASTERN REGION of Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International ¼-inch rule)

Species	Cut and retained in region	Out-shipments		Total production	In-shipments		Total receipts
		To other regions	To other states		From other regions	From other states	
Hemlock	6.4	0.1	—	6.5	0.8	0.6	7.8
White pine	4.5	.2	—	4.7	.3	.3	5.1
Other softwoods	.1	—	—	.1	—	—	.1
Total softwoods	11.0	0.3	—	11.3	1.1	0.9	13.0
Ash	1.6	0.1	—	1.7	(a)	0.2	1.8
Basswood	1.6	.1	—	1.7	0.4	.5	2.5
Beech	3.2	.1	—	3.3	.6	.8	4.6
Cherry	3.0	.3	—	3.3	.6	.4	4.0
Hard maple	6.3	.2	—	6.5	1.0	1.0	8.3
Soft maple	4.6	.4	—	5.0	.9	.5	6.0
White oak	4.8	.4	—	5.2	.3	1.1	6.2
Chestnut oak	3.9	.8	—	4.7	.2	.4	4.5
Red and black oak	14.1	1.2	—	15.3	1.6	2.5	18.2
Scarlet and pin oak	1.5	(a)	—	1.5	.1	.1	1.7
Yellow-poplar	1.4	.1	—	1.5	.1	(a)	1.5
Other hardwoods[b]	1.9	.1	—	2.0	.1	—	2.0
Total hardwoods	47.9	3.8	—	51.7	5.9	7.5	61.3
All species	58.9	4.1	—	63.0	7.0	8.4	74.3

[a] Less than 50,000 board feet.

[b] Includes aspen, elm, hickory, black walnut, yellow and black birch.

Table 12.—Sawlog production and receipts in the SOUTHEASTERN REGION of Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International ¼-inch rule)

Species	Cut and retained in region	Out-shipments		Total production	In-shipments		Total receipts
		To other regions	To other states		From other regions	From other states	
Hemlock	0.3	(a)	—	0.3	0.1	—	0.4
White pine	.5	0.1	—	.6	.1	—	.6
Other softwoods	.1	—	—	.1	—	(a)	.1
Total softwoods	0.9	0.1	—	1.0	0.2	(a)	1.1
Ash	0.9	0.1	(a)	1.0	(a)	(a)	0.9
Beech	.3	—	(a)	.3	—	(a)	.3
Yellow and black birch	.2	—	—	.2	(a)	(a)	.2
Cherry	.1	—	—	.1	(a)	—	.1
Elm	.1	(a)	—	.1	(a)	—	.1
Hickory	1.3	.3	—	1.6	0.1	0.1	1.5
Hard maple	.1	.2	—	.3	—	—	.1
Soft maple	.7	.3	—	1.0	.1	(a)	.8
White oak	3.4	1.2	0.1	4.7	.2	.1	3.7
Chestnut oak	2.7	1.9	—	4.6	.2	.2	3.1
Red and black oak	15.8	1.6	.1	17.5	.5	.7	17.0
Scarlet and pin oak	2.1	1.7	—	3.8	.1	.2	2.4
Yellow-poplar	10.9	.3	.1	11.3	.2	.4	11.5
Black walnut	.2	.3	—	.5	(a)	—	.2
Other hardwoods[b]	.3	—	(a)	.3	—	(a)	.3
Total hardwoods	39.1	7.9	0.3	47.3	1.4	1.7	42.2
All species	40.0	8.0	0.3	48.3	1.6	1.7	43.3

[a] Less than 50,000 board feet.

[b] Includes aspen and basswood.

Table 13.—Sawlog production and receipts in the SOUTH-CENTRAL REGION of Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International ¼-inch rule)

Species	Cut and retained in region	Out-shipments		Total production	In-shipments		Total receipts
		To other regions	To other states		From other regions	From other states	
Hemlock	1.2	0.1	—	1.3	0.1	—	1.3
White pine	3.3	.2	—	3.5	.3	—	3.6
Other softwoods	.6	—	—	.6	(a)	—	.6
Total softwoods	5.1	0.3	—	5.4	0.4	—	5.5
Ash	0.7	0.2	—	0.9	0.1	—	0.8
Aspen	.2	—	—	.2	—	—	.2
Basswood	.4	(a)	—	.4	(a)	—	.4
Cherry	(a)	.1	—	.1	—	—	(a)
Elm	.1	(a)	—	.1	(a)	—	.1
Hickory	2.1	.1	—	2.2	.3	(a)	2.4
Hard maple	.7	.1	—	.8	.2	—	.9
Soft maple	1.7	.1	—	1.8	.4	—	2.1
White oak	12.4	1.0	—	13.4	1.7	(a)	14.1
Chestnut oak	16.3	.5	—	16.8	2.9	0.1	19.3
Red and Black oak	29.3	3.7	—	33.0	2.8	.5	32.6
Scarlet and pin oak	5.5	.3	—	5.8	1.8	.1	7.4
Yellow-poplar	3.6	.3	—	3.9	.4	.1	4.1
Black walnut	.1	.4	—	.5	(a)	—	.1
Other hardwoods[b]	.2	(a)	—	.2	—	—	.2
Total hardwoods	73.3	6.8	—	80.1	10.6	0.8	84.7
All species	78.4	7.1	—	85.5	11.0	0.8	90.2

[a] Less than 50,000 board feet.

[b] Includes beech, and black and yellow birch.

Table 14. Sawlog production and receipts in Pennsylvania, by species and destination of shipment, 1976

(In millions of board feet, International ¼-inch rule)

Species	Cut and retained in state	Exported to			Total production	Imported from			Total receipts
		Maryland	New York	West Virginia		New York	West Virginia	Other states[b]	
Hemlock	29.7	—	—	—	29.7	0.7	—	(a)	30.4
White pine	20.8	—	—	—	20.8	.5	—	(a)	21.3
Other softwoods	2.3	—	—	—	2.3	(a)	—	(a)	2.3
Total softwoods	52.8	—	—	—	52.8	1.2	—	(a)	54.0
Ash	15.3	—	—	—	15.3	0.6	0.1	0.2	16.2
Basswood	8.4	—	—	0.1	8.5	.7	—	(a)	9.1
Beech	21.3	—	—	.2	21.5	1.1	(a)	.1	22.5
Cherry	63.2	—	0.1	—	63.3	.5	(a)	.2	63:9
Elm	2.3	—	—	—	2.3	—	—	.1	2.4
Hickory	8.1	—	—	.1	8.2	(a)	(a)	.2	8.3
Hard maple	45.8	—	—	.2	46.0	2.3	.1	.1	48.3
Soft maple	53.7	—	—	.1	53.8	.8	.1	.1	54.7
White oak	56.6	0.1	.1	.2	57.0	.9	.3	.8	58.6
Chestnut oak	42.8	—	—	.2	43.0	.3	.2	.4	43.7
Red and black oak	198.6	.1	—	.4	199.1	2.6	2.2	2.8	206.2
Scarlet and pin oak	26.2	—	—	.1	26.3	(a)	.1	.3	26.6
Yellow-poplar	36.5	.1	—	—	36.6	(a)	.1	.5	37.1
Other hardwoods[c]	10.4	—	—	.1	10.5	.5	7.9	.3	19.1
Total hardwoods	589.2	0.3	0.2	1.7	591.4	10.3	11.1	6.1	616.7
All species	642.0	0.3	0.2	1.7	644.2	11.5	11.1	6.1	670.7

[a] Less than 50,000 board feet.

[b] Includes Maryland, New Jersey, and Ohio.

[c] Includes aspen, yellow and black birch, and black walnut.

Table 15.—Pulpwood production in Pennsylvania, by species group, 1967-1976[a]

(In thousands of rough cords)

Year	All species	Softwoods	Hardwoods
1967	754.8	87.4	667.4
1968	685.8	69.8	616.0
1969	806.1	66.7	739.4
1970	777.4	58.2	719.2
1971	775.1	43.7	731.4
5-year total	3,799.2	325.8	3,473.4
1972	788.5	38.3	750.2
1973	952.4	46.0	906.4
1974	1,008.6	48.5	960.1
1975	783.1	41.7	741.4
1976	909.5	56.2	853.3
5-year total	4,442.1	230.7	4,211.4

[a]Includes production from roundwood and manufacturing residues.

Table 16.—Pulpwood harvest in Pennsylvania, by species group and geographic region, 1967-1976

(In thousands of rough cords)

Species group and region	Pulpwood harvest in:										All years
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	
Softwoods											
Western	0.9	0.4	1.8	2.2	1.5	0.7	2.4	0.5	1.3	1.2	12.9
Southwestern	13.7	11.7	10.2	6.6	8.8	8.2	8.7	9.2	10.0	12.4	99.5
North-Central	26.5	25.0	16.7	17.5	8.9	6.6	4.9	7.9	4.8	5.1	123.9
South-Central	35.2	22.1	25.0	18.8	12.7	9.5	11.4	10.5	7.9	8.1	161.2
Northeastern	6.6	2.6	1.3	2.4	1.0	1.2	.6	.5	.1	3.8	20.1
Southeastern	1.6	2.6	4.2	1.8	1.8	1.3	3.1	4.1	5.4	5.3	31.2
All regions	84.5	64.4	59.2	49.3	34.7	27.5	31.1	32.7	29.5	35.9	448.8
Hardwoods											
Western	12.2	12.6	13.0	9.8	12.9	13.7	11.0	9.6	19.9	5.0	119.7
Southwestern	89.4	88.1	71.8	56.0	63.6	59.6	66.2	67.4	60.5	60.0	682.6
North-Central	249.5	219.7	297.2	322.1	291.6	312.2	415.6	404.1	286.8	349.4	3,148.2
South-Central	128.5	79.4	85.0	69.5	55.4	44.9	57.3	54.4	39.4	45.0	658.8
Northeastern	48.5	38.9	72.8	81.5	111.2	98.3	111.2	117.3	88.9	113.4	882.0
Southeastern	18.2	23.8	22.9	18.9	16.3	10.0	16.9	14.3	14.0	16.5	171.8
All regions	546.3	462.5	562.7	557.8	551.0	538.7	678.2	667.1	509.5	589.3	5,663.1
All species	630.8	526.8	621.9	607.1	585.7	566.2	709.3	699.8	539.0	625.2	6,111.9

Table 17.—Veneer-log production in Pennsylvania, by species and consuming state, 1976
(In thousands of board feet, International ¼-inch rule)

Species	Cut and retained in Pennsylvania	Exported to:						Total production
		Maryland	West Virginia	Indiana	North Carolina	Virginia	Other states[a]	
Ash	—	38	14	221	23	297	67	660
Beech	38	—	—	—	—	—	—	38
Cherry	134	—	781	447	23	1,245	605	3,235
Hickory	513	—	13	—	—	—	—	526
Hard maple	—	57	—	—	—	—	—	57
Black oak	—	—	175	—	—	—	—	175
Red oak	5,635	38	906	—	23	204	1,161	7,967
White oak	152	246	138	294	—	310	192	1,332
Yellow-poplar	93	37	—	—	391	—	190	711
Other species[b]	7	6	—	15	—	—	10	38
All species	6,572	422	2,027	977	460	2,056	2,225	14,739

[a]Includes Iowa, Kentucky, New York, Tennessee, New Jersey, and Ontario, Canada.
[b]Includes basswood, elm, yellow birch, soft maple, and walnut.

Table 18.—Veneer-log receipts in Pennsylvania, by species and producing state, 1976
(In thousands of board feet, International ¼-inch rule)

Species	Cut and retained in Pennsylvania	Imports from:					Total receipts
		Maryland	New Jersey	New York	West Virginia	Other states[a]	
Beech	38	—	—	6	—	6	50
Yellow birch	7	—	—	2	—	—	9
Cherry	134	1	—	—	—	—	135
Hickory	513	133	10	12	468	69	1,205
Red oak	5,635	767	386	285	1,838	2	8,913
White oak	152	25	30	—	7	—	214
Yellow-poplar	93	18	31	—	—	3	145
All species	6,572	944	457	305	2,313	80	10,671

[a]Includes Ohio, North Carolina, Virginia.

Table 19.—Production and distribution of manufacturing residues, by type of residue, use, and industry source, Pennsylvania, 1976

(In thousands of cubic feet)

Source industry	Use	Type of residue			All types
		Bark	Coarse[a]	Fine[b]	
Lumber	Fiber	—	22,235	433	22,668
	Fuel[c]	2,473	6,197	1,950	10,620
	Agricultural[d]	1,237	—	13,429	14,666
	Other	5,069	1,461	1,082	7,612
	All uses	8,779	29,893	16,894	55,566
	Unused	3,587	6,559	4,765	14,911
Veneer	Fiber	—	—	—	—
	Fuel	69	323	470	862
	Agricultural	129	—	25	154
	Other	—	7	—	7
	All uses	198	330	495	1,023
	Unused	—	—	—	—
Other industries	Fiber	—	452	—	452
	Fuel	105	389	45	539
	Agricultural	9	—	240	249
	Other	100	10	—	110
	All uses	214	851	285	1,350
	Unused	53	117	96	266
All industries[e]	Fiber	—	22,687	433	23,120
	Fuel	2,647	6,909	2,465	12,021
	Agricultural	1,375	—	13,694	15,069
	Other	5,169	1,478	1,082	7,729
	All uses	9,191	31,074	17,674	57,939
	Unused	3,640	6,676	4,861	15,177

[a]Includes slabs, edgings, trimmings, veneer cores, and other material suitable for chipping.
[b]Includes sawdust, shavings, and other material considered unsuitable for chipping.
[c]Includes both domestic and industrial fuel.
[d]Includes livestock bedding and farm and horticultural mulch.
[e]Excludes the woodpulp industry.

Table 20.—Volume of unused sawmill residues, by geographic region, species group, and type of residue, Pennsylvania, 1976

(In thousands of cubic feet)

Region	All species			Softwoods			Hardwoods		
	Bark	Fine	Coarse	Bark	Fine	Coarse	Bark	Fine	Coarse
Western	466	943	813	31	31	27	450	912	786
North-Central	1,598	1,656	2,923	162	167	296	1,436	1,489	2,627
Southwestern	1,026	1,178	1,683	68	78	112	958	1,100	1,571
Northeastern	284	347	230	51	62	41	233	285	189
Southeastern	8	131	38	—	3	1	8	128	37
South-Central	205	510	872	13	32	55	192	478	817
All units	3,587	4,765	6,559	310	373	532	3,277	4,392	6,027

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