



Arizona's Forest Products Industry and Timber Harvest, 2021

The University of Montana's Bureau of Business and Economic Research (BBER), in conjunction with the Interior West Forest Inventory and Analysis (IW-FIA) Program of the US Forest Service, conducted a census of Arizona's timber processors operating during calendar year 2021. Through a written questionnaire, phone, email, or in-person interview, timber-processing and residue-utilizing facilities provided information about their calendar year 2021 operations, including:

- Plant location, production, capacity, and employment
- Volume of raw material received, by county and ownership
- Species of timber received and live/dead proportions
- Finished product volumes, types, sales value, and market locations
- Volume, uses, and sales of manufacturing residue

This research traces the flow of Arizona's 2021 timber harvest through the primary wood products industry and characterizes the structure, condition and economic contributions of Arizona's forest products industry sectors. Historical changes in the forest products industry, as well as trends in timber harvest, milling capacity and production, mill residuals and sales value of products and residues are presented. Employment and worker earnings in the state's primary and secondary forest products industries are also discussed. Periodic survey data collected from the forest products industry provides detailed information on Arizona's timber sources, wood utilization and the economic contributions of the industry to the state economy through time. A comprehensive report is currently being prepared that will include these tables along with historical information and current industry trends. This is the sixth analysis conducted by BBER for Arizona. All BBER reports on Arizona's forest products industry can be found at: https://www.bber.umt.edu/FIR/S_AZ.asp

As we continue to finalize the reports, we would like to provide this "core" information to our data users and other interested individuals. We encourage you to contact us if you have any additional questions about the data. However, firm-level data are confidential and will not be released.

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Arizona 2021 Wood Products Industry Highlights

- The Arizona census identified 18 primary wood products facilities operating during 2021, a decrease from the 23 facilities found active during the 2016 mill census. Arizona had:
 - 10 sawmills,
 - 4 residual related producers,
 - 2 firewood producers, and
 - 2 post/pole/ piling and viga/latilla producers.
- The total Arizona timber harvest during 2021 was 77.9 million board feet (MMBF) Scribner.
- National Forests in Arizona accounted for 87 percent (67.4 MMBF Scribner) of timber harvested during 2021, an increase from 63.2 percent (48.2 MMBF Scribner) in 2016.
- Tribal timberland in Arizona accounted for 13.3 percent (10.3 MMBF Scribner) of timber harvested in 2021, a decrease from 33.8 percent (25.8 MMBF Scribner) in 2016.
- Apache and Coconino counties were the largest contributors to Arizona's total harvest in 2021. Combined, these counties accounted for 78 percent of the total statewide harvest volume.
- In 2021, Arizona had a net outflow of 696 thousand board feet (MBF) Scribner of timber products.
- Arizona facility's primary wood product sales (finished products and mill residues) were \$112.7 million; \$110.5 million from primary wood products, and \$2.2 million from mill residues. Of those sales, 39 percent were within Arizona, and 29 percent of sales were outside of the United States.
- Timber-processing capacity for Arizona facilities was 106,119 MBF Scribner with a utilization rate of 61 percent.
- Approximately 8,647 workers were employed in Arizona's forest industry sectors during 2021. Secondary wood product and paper manufacturers accounted for 7,825 (90%) of these workers. Total income of Arizona's forest industry workers was \$643 million during 2021.

Table A1 — Arizona timberland¹ by ownership class
(source: U.S. Department of Agriculture, Evalidator 2023).

Ownership class	Thousand acres	Percentage of timberland
National Forest	2,099	71
Private	812	27
Other public	45	2
Total	2,955	100

[1] Timberland: Forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as timberland are capable of producing at least 20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.).

Table A2 — Proportion of Arizona timber harvest by ownership class, select years (sources: Hayes et al. 2012, 2021; Keegan et al. 2001a; Morgan et al. 2006; Sorenson et al. 2016).

Ownership Class	1998	2002	2007	2012	2016	2021
	<i>Percentage of total</i>					
Public	37	16	41	96	65	87
National Forest	37	16	40	96	63	87
State lands	—	—	1	0	2	0
Private and tribal	63	84	59	4	35	13
Private	3	2	51	1	1	0
Tribal	60	83	8	3	34	13
All owners	100	100	100	100	100	100

— Denotes value less than 1.

Percentages may not sum to 100 due to rounding.

Table A3 — Arizona timber products harvested by ownership class, 2021.

Ownership class	Sawlogs	Other products ^a	All products
	<i>Thousand board feet, Scribner</i>		
National Forest	55,289	12,160	67,448
Tribal timberland	10,000	375	10,375
Private timberland	61	20	81
Other public lands	35	—	35
All owners	65,385	12,555	77,940
	<i>Percentage of harvested product by ownership</i>		
National Forest	84.6	96.9	86.5
Tribal timberland	15.3	3.0	13.3
Private timberland	0.1	0.0	0.1
Other public lands	0.1	—	0.0
All owners	83.9	16.1	100

^a Other sectors includes producers of firewood, post and poles, vigas, latillas, biomass energy, animal bedding, and mulch.

Table A4 — Arizona timber harvest by county, select years (sources: Hayes et al. 2012, 2021; Keegan et al. 2001a; McLain 1988; Morgan et al. 2006; Sorenson et al. 2016;).

County	1984	1998	2002	2007	2012	2016	2021	1984	1998	2002	2007	2012	2016	2021
	<i>MBF Scribner</i>							<i>Percentage of harvest</i>						
Apache	171,128	15,641	6,350	31,610	23,916	18,067	35,668	45	20	5	59	33	24	46
Coconino	150,727	15,314	14,889	14,353	32,118	28,491	25,137	39	20	12	27	45	37	32
Gila	931	5,405	39,960	1,960	2,729	8,157	10,190	0	7	31	4	4	11	13
Graham	—	—	1,100	1,100	—	0.2	—	—	—	1	2	—	—	—
Greenlee	4,623	1,515	—	—	—	54	—	1	2	—	—	—	0	—
La Paz	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Maricopa	—	—	—	—	—	—	—	—	—	—	—	—	—	0
Mohave	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Navajo	52,745	38,384	64,027	3,094	8,938	18,032	4,625	14	50	50	6	13	24	6
Pima	—	33	—	—	12	50	0	—	—	—	—	a	0	0
Pinal	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Santa Cruz	—	—	—	48	120	50	0	—	—	—	0	0	0	0
Yavapai	2,220	20	1,895	1,612	3,585	3,531	2,268	1	—	1	3	5	5	3
Yuma	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	382,374	76,312	128,221	53,777	71,418	76,432	77,889	100	100	100	100	100	100	100

— Denotes value less than 1.

Percentages may not sum to 100 due to rounding.

Table A5 — Arizona timber harvest by species, select years (sources: Hayes et al. 2012, 2021; Keegan et al. 2001a; McLain 1988; Morgan et al. 2006; Sorenson et al. 2016).

Species	1984	1998	2002	2007	2012	2016	2021	1984	1998	2002	2007	2012	2016	2021
	<i>MBF Scribner</i>							<i>Percentage of harvest</i>						
Ponderosa pine	346,851	66,804	121,614	46,483	59,714	69,546	69,240	91	88	95	86	84	91	89
Douglas-fir	17,217	5,264	3,129	1,915	5,754	3,845	5,082	4	7	2	4	8	5	7
White fir	9,214	961	1,900	1,662	1,886	791	2,383	2	1	1	3	3	1	3
Engelmann spruce	8,667	2,340	1,551	2,948	1,010	898	412	2	3	1	5	1	1	1
Other species ^c	722	943	26	769	3,053	1,351	823	0	1	0	1	4	2	1
All species	382,671	76,312	128,220	53,777	71,417	76,431	77,940	100	100	100	100	100	100	100

^c Other species include Mesquite, Alligator Juniper, Twoneedle pinyon, Eucalyptus, and Aspen.

Percentages may not sum to 100 due to rounding.

Table A6 — Arizona timber harvest by species and product, 2021.

Species	Sawlogs	products ^a	All products
	<i>Thousand board feet, Scribner</i>		
Ponderosa pine	58,481	10,759	69,240
Douglas-fir	4,149	934	5,082
White fir	2,357	26	2,383
Engelmann spruce	348	64	412
Other species ^b	51	772	823
All species	65,385	12,555	77,940
	<i>Percentage of product by species</i>		
Ponderosa pine	89	86	89
Douglas-fir	6	7	7
White fir	4	0	3
Engelmann spruce	1	1	1
Other species ^b	0	6	1
All species	84	16	100

^a Other sectors includes producers of firewood, post and poles, vigas, latillas, biomass energy, animal bedding, and mulch.

^b Other species include mesquite, alligator juniper, two-needle pinyon, eucalyptus, and aspen.

Percentages may not sum to 100 due to rounding.

Table A7 — Timber product flow into and out of Arizona, 2021.

Timber Product	Log flow in	Log flow out	Net inflow (net outflow)
-----Thousand board feet, Scribner-----			
Sawlogs		726	(726)
Other products ^a	30		30
All products	30	726	(696)

^a Other sectors includes producers of firewood, post and poles, vigas, latillas, biomass energy, animal bedding, and mulch.

Table A8 — Ownership of timber products received by Arizona forest products industry, select years (sources: Hayes et al. 2012, 2021; Keegan et al. 2001a; Morgan et al. 2006; Sorenson et al. 2016).

Ownership class	1998	2002	2007	2012	2016	2021	1998	2002	2007	2012	2016	2021
-----MBF Scribner-----						-----Percentage of total-----						
Public	19,510	18,006	20,427	66,988	54,365	66,788	29	24	39	96	67	86
National Forests	19,510	18,006	20,427	66,858	52,867	66,753	29	24	39	96	65	86
State Lands	—	—	—	130	1,498	35	—	—	—	0	2	0
Private and tribal timberland	48,102	58,108	31,706	2,623	26,644	10,456	71	76	61	4	33	14
Tribal	45,964	56,150	4,400	2,220	25,847	10,375	68	74	8	3	32	13
Private	2,138	1,958	27,306	403	797	81	3	3	52	1	1	0
All owners	67,612	76,114	52,133	69,611	81,009	77,244	100	100	100	100	100	100

— Denotes value less than 1.

Percentages may not sum to 100 due to rounding.

Table A9 — Timber received by Arizona forest products industry by ownership class and product, 2021.

Ownership class	Sawlogs	Other products ^a	All products
-----Thousand board feet, Scribner-----			
Public timberland	54,598	12,190	66,788
National Forest	54,563	12,190	66,753
State lands	35	—	35
Other public	—	—	0
Private and tribal timberland	10,061	395	10,456
Private	61	20	81
Tribal	10,000	375	10,375
All owners	64,659	12,585	77,244
-----Percentage of product by owner-----			
Public timberland	84	97	86
National Forest	100	97	86
State lands	0	—	0
Other public	—	—	—
Private and tribal timberland	16	3	14
Private	0	0	0
Tribal	99	95	99
All owners	84	16	100

^a Other sectors includes producers of firewood, post and poles, vigas, latillas, biomass energy, animal bedding, and mulch.

— Denotes value less than 1.

Percentages may not sum to 100 due to rounding.

Table A10 — Active Arizona primary wood products facilities by county and product, 2021 (sources: Hayes et al. 2012, 2021; Keegan et al. 2001a; Morgan et al. 2006; Sorenson et al. 2016).

County	Lumber	Other products	Total
Apache	1	1	2
Coconino	3	—	3
Maricopa	1	2	3
Navajo	3	3	6
Pima	1	—	1
Pinal	—	1	1
Santa Cruz	1	—	1
Yavapai	—	1	1
2021 Total	10	8	18
2016 Total	14	9	23
2012 Total	14	11	25
2007 Total	8	9	17
2002 Total	11	12	23
1998 Total	6	7	13

^a Other sectors includes producers of firewood, post and poles, vigas, latillas, biomass energy, animal bedding, and mulch.

— Denotes no mills.

Table A11 — Finished product sales¹ of Arizona's primary wood products sectors, select years (sources: Hayes et al. 2012, 2021; Morgan et al. 2006; Sorenson et al.

Sector	2002	2007	2012	2016	2021
	-----Thousands of 2021 dollars ^a -----				
Sawmills	32,994	24,388	35,382	47,564	69,684
Other sectors ^b	8,575	19,165	56,122	58,181	40,803
Total	41,569	43,553	91,504	105,745	110,487

¹ Excludes mill residual sales

^a All sales are reported f.o.b. the manufacturer's plant.

^b Other sectors includes producers of firewood, post and poles, vigas, latillas, biomass energy, animal bedding, and mulch.

Table A12 — Arizona sawmills by production size class, select years (sources: Hayes et al. 2012, 2021; Keegan et al. 2001a; Morgan et al. 2006; Sorenson et al. 2016).

Year	Under 10 MMBF ^a	Over 10 MMBF ^a	Total number of mills	Total lumber production MBF ^b	Average production per mill MMBF ^a
2021	5	5	10	84,109	8.4
2016	14	c	14	62,228	4.4
2012	14	c	14	49,336	3.5
2007	8	c	8	54,860	6.9
2002	9	2	11	82,658	7.5
1998	2	4	6	80,970	13.5

^a Size class is based on reported lumber production. MMBF denotes million board feet lumber tally.

^b MBF = thousand board feet lumber tally.

^c All mills were included in <10 MMBF to avoid disclosing individual operations.

Table A13 — Active Arizona sawmills, lumber production capacity, lumber production, and capacity utilization by size class, 2021.

Production capacity size class	Annual capacity				Annual production			
	Number of mills	Capacity MBF ^a	Percentage of total capacity	Average mill capacity by size class	Production MBF ^a	Percentage of total production	Average mill production by size class MBF ^a	Percentage of capacity utilization
10 + MMBF ^b	5	125,605	93	25,121	77,826	93	15,565	62
Less than 10 MMBF ^b	5	9,866	7	1,973	6,283	7	1,257	64
Total	10	135,471	100	13,547	84,109	100	8,411	62

^a MBF = Thousand board feet lumber tally.

^b MMBF = Million board feet lumber tally.

Table A14 — Production and disposition of Arizona mill residuals, 2021.

Residue type	Total utilized	Energy	Mulch/ bedding	Unspecified use	Unused	Total produced
-----Bone-dry units ^a -----						
Coarse	58,614	39,931	—	18,683	2	58,616
Fine	21,980	3,515	18,465	0	1	21,981
<i>Sawdust</i>	<i>20,251</i>	<i>2,328</i>	<i>17,923</i>	<i>0</i>	<i>1</i>	<i>20,252</i>
<i>Planer Shavings</i>	<i>1,729</i>	<i>1,187</i>	<i>542</i>	<i>—</i>	<i>0</i>	<i>1,729</i>
Bark	18,822	10,516	8,306	0	2	18,824
Total	99,415	53,961	26,771	18,683	5	99,420
----- Percentage of residue type -----						
Coarse	100	68	—	32	—	59
Fine						22
<i>Sawdust</i>	<i>100</i>	<i>11</i>	<i>88</i>	<i>—</i>	<i>—</i>	<i>20</i>
<i>Planer Shavings</i>	<i>100</i>	<i>69</i>	<i>31</i>	<i>—</i>	<i>—</i>	<i>2</i>
Bark	100	56	44	—	—	19
Total	100	54	27	19	0	100

^a Bone-dry unit = 2,400 lb oven-dry wood.

— Denotes value less than 1.

Table A15 — Arizona sawmill residual factors, select years (sources: Hayes et al. 2012, 2021; Morgan et al. 2006; Sorenson et al. 2016).

Type of residue	2002	2007	2012	2016	2021
-----BDU/MBF lumber tally ^a -----					
Coarse	0.44	0.68	0.65	0.71	0.70
Sawdust	0.15	0.17	0.18	0.20	0.24
Planer shavings	0.14	0.12	0.00	0.01	0.02
Bark	0.23	0.25	0.24	0.21	0.22
Total	0.96	1.22	1.07	1.13	1.18

^a Bone-dry unit (BDU = 2,400 lb oven-dry wood) of residual generated for every 1,000 board feet of lumber manufactured.

Table A16 — Destination and sales value of Arizona's primary wood products and mill residuals, 2021.

Product	Four Corners ^a			North Central ^d		North East ^f	Pacific Rim		Canada	Other ^g	Grand Total
	Arizona	Corners ^a	Far West ^b	Rockies ^c	South ^e	East ^f	Rim				
-----Thousand 2021 dollars-----											
Lumber, timbers and other sawn products	16,467	3,854	12,012	1,462	1,758	2,178	375	22,448		8,074	68,629
Other products ^h	27,311	10,598	2,666	1,877					128	1,530	44,110
Total	43,779	14,451	14,678	3,340	1,758	2,178	375	22,448	128	9,604	112,738
-----Percentage of product sales by region-----											
Lumber, timbers and other sawn products	24	6	18	2	3	3	1	33	0	12	61
Other products ^h	62	24	6	4	0	0	0	0	0	3	39
Total	39	13	13	3	2	2	0	20	0	9	100

^a Four Corners includes Colorado, New Mexico, and Utah.

^b Far West includes Alaska, California, Hawaii, Oregon, and Washington.

^c Rocky Mountains includes Idaho, Montana, Nevada, and Wyoming.

^d North Central includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

^e South includes Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

^f Northeast includes Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

^g Other areas consist of products being shipped outside the U.S. to unspecified destinations.

^h Other products include vigas, latillas, erosion control products, wood pellets, shavings, mulch, firewood, clean chips, and mill residuals.

— Denotes value less than 1.

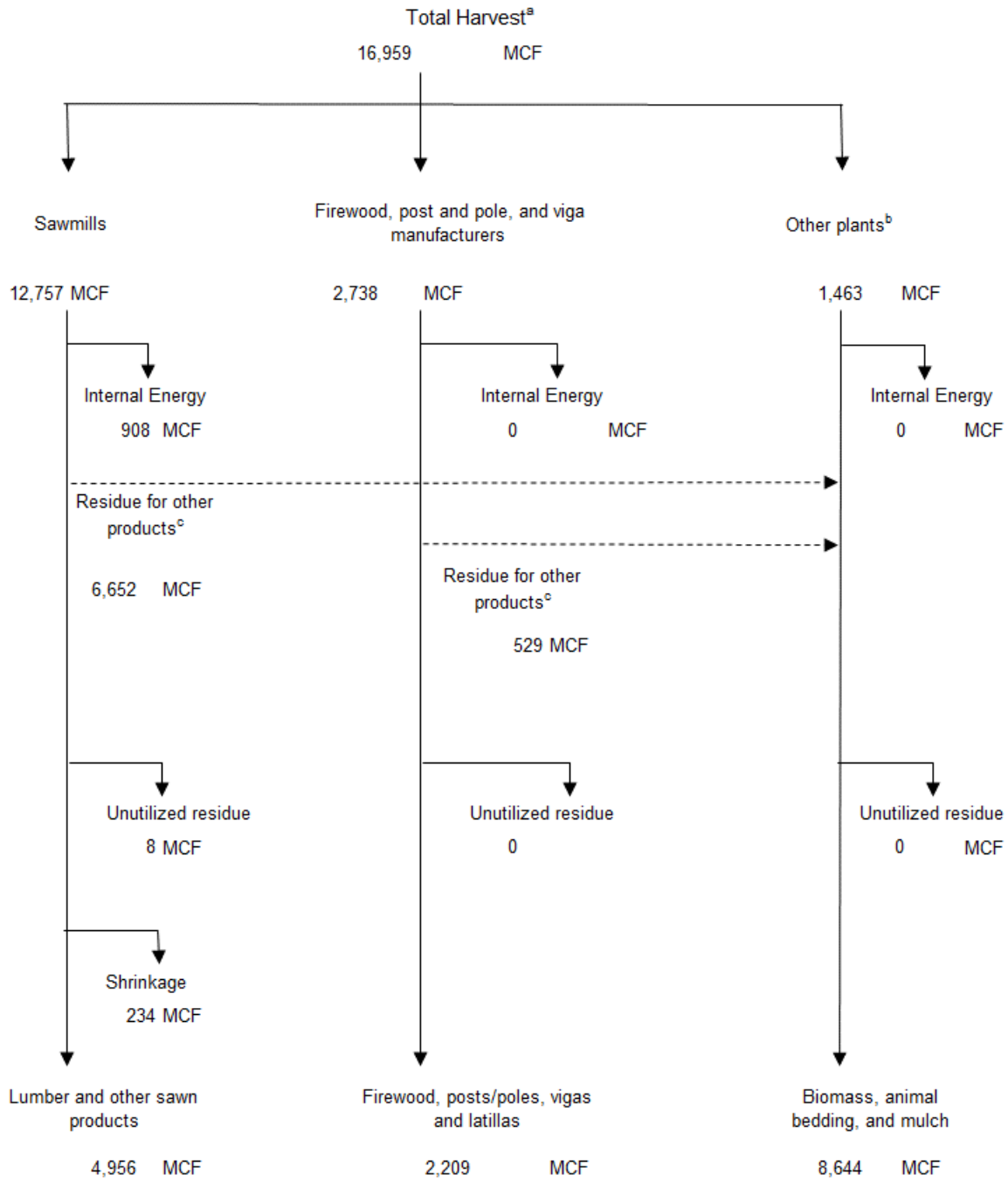
Percentages may not sum to 100 due to rounding.

Table A17 — 2021 Employment and Labor Income Contributions from Arizona's Forest Industry.

Sector	Direct Employment	Indirect and Induced Employment	Total Employment Contribution ^a	Direct Income	Indirect and Induced Income	Total Income Contribution
	-----thousand 2021 dollars-----					
Forestry and Logging	369	240	609	\$ 10,128	\$ 8,843	\$ 18,970.76
Forestry Support Activities	248	90	337	\$ 15,197	\$ 7,782	\$ 22,979.05
Wood Product Manufacturing	5,496	6,956	12,452	\$ 421,124	\$ 519,614	\$ 940,738
Primary Wood Product Mfg	205	260	466	\$ 10,419	\$ 14,570	\$ 24,988.67
Secondary Wood Product Mfg	5,291	7,506	12,797	\$ 410,705	\$ 505,044	\$ 915,749.18
Secondary Paper Manufacturing	2,534	4,434	6,968	\$ 196,656	\$ 270,205	\$ 466,861.34
Total Forest Industry	8,647	a	a	\$ 643,105	a	a

^a Indirect and induced employment and labor income should not be summed for multiple sectors due to some employment and income showing up as both direct contributions to their sector and indirect contributions to other sectors.

Figure A1 — Arizona timber harvest and flow 2021



^a Harvest volume does not include bark.

^b Other plants include wood pellet manufacturers, as well as residue-utilizing facilities including bioenergy, animal bedding and mulch producers.

^c Other products include residue sold for energy, landscape, mulch, animal bedding, and unspecified use.

Glossary

Bioenergy wood – Refers to wood used for firewood, fuel for the production of industrial heat and steam, as well as for products like wood pellets, charcoal, or liquid fuels.

Board foot – A unit of measure applied to lumber that is 1-ft long, 1-ft wide and 1-in thick (or its equivalent) and associated with roundwood as to its potential yield of such products.

Bone dry unit (BDU) – The amount of wood residue that weighs 2,400 lbs. (1,088 kg) at 0 percent moisture content. One BDU equals approximately 9.49 yd³ or 96 ft³ of solid wood.

Cubic foot – A unit of true volume that measures 1 ft. by 1 ft. by 1 ft. (30.48 by 30.48 by 30.48 cm).

House log – Roundwood timber used to construct log homes. Products manufactured from house logs can be sawn, scribed by hand, notched, or milled by lathe to meet customer construction needs. House log timber is often dead prior to harvesting.

Kerf – The width of the cut made by a saw blade.

Lumber tally – the volume of sawn products, usually expressed in board feet.

MBF – thousand board feet

MMBF – million board feet

Production capacity – The potential volume of output a facility can produce on a shift or annual basis, assuming firm market demand for products, sufficient supply of raw materials, and ordinary downtime for maintenance.

Recovery – The volume of output from a facility per unit of input, a measure of mill efficiency

Residue – The wood-fiber or bark by-product remaining after timber processing of a primary product like lumber, plywood, posts and poles, house logs, etc. Three types of residues are generally generated:

Coarse – chips, edgings, slabs, trim, and log ends

Fine – sawdust, and planer shavings

Bark.

Sawlog – A log that meets minimum regional standards of diameter, length, and defect; intended for sawing.

Scribner – A diagram log scale rule originating in the 1840s, designed to estimate the net yield of lumber from a log; it assumes 1-in (2.54 cm) boards and .25-in (0.64 cm) in kerf, and is based on diameter at the small end of the log.

Timber-processing capacity – The volume of timber reported in MBF Scribner that could be processed, given sufficient supplies of raw material, firm market demand for products, and ordinary down-time for maintenance. Timber-processing capacity is estimated for each facility and gauges the volume of timber that could be used annually if the facility operated at its self-reported production capacity. A facility's timber-processing capacity is calculated by dividing its production capacity by its product recovery.