

# Michigan Primary Mill Survey 2021



Michigan Department of Natural Resources - Forest Resources Division

## Contents

Introduction .....	2
Definitions .....	2
Roundwood Receipts .....	3
Number of Mills .....	4
Regional Receipts and Processing of Roundwood .....	5
Species Processed .....	7
Finished Products Produced .....	9
Mill residues .....	10
Residue Uses .....	11
Biomass Energy Plants .....	12
Contact .....	12

## Introduction

Michigan primary mills were surveyed in 2022 as part of a periodic census conducted by the Michigan Department of Natural Resources, in cooperation with the United States Department of Agriculture Forest Service. Mills were canvassed to determine the status and composition of the industry, volume of wood receipts, production of timber from Michigan forest lands, interstate movement of industrial roundwood, types of finished products produced, and the amount and use of mill residues. Data from the survey has been summarized in this report and will be used in the 2021 Timber Product Output report to be prepared by the USDA Forest Service. See the forthcoming TPO report for a full analysis of roundwood production and mill receipt volumes. Individual mill volume responses will be kept confidential. Only primary mills were canvassed – those that process roundwood in the form of pulpwood, bolts, posts, poles, cabin logs, sawlogs, or that receive wood chips directly from the forest. Seventy-four percent of mills identified participated in the survey; twenty-six percent, or 96 mills, could not be contacted or declined to participate.

## Definitions

**Production:** Total roundwood volume harvested within the state (both processed in the state and unprocessed wood exported).

**Receipts:** Total roundwood volume processed by mills in the state (both in-state harvests, and imports from other states/countries).

**Roundwood:** Wood harvested from forests in the form of sawlogs, cabin logs, posts, poles, bolts, pulpwood, or chips.

## Roundwood Receipts

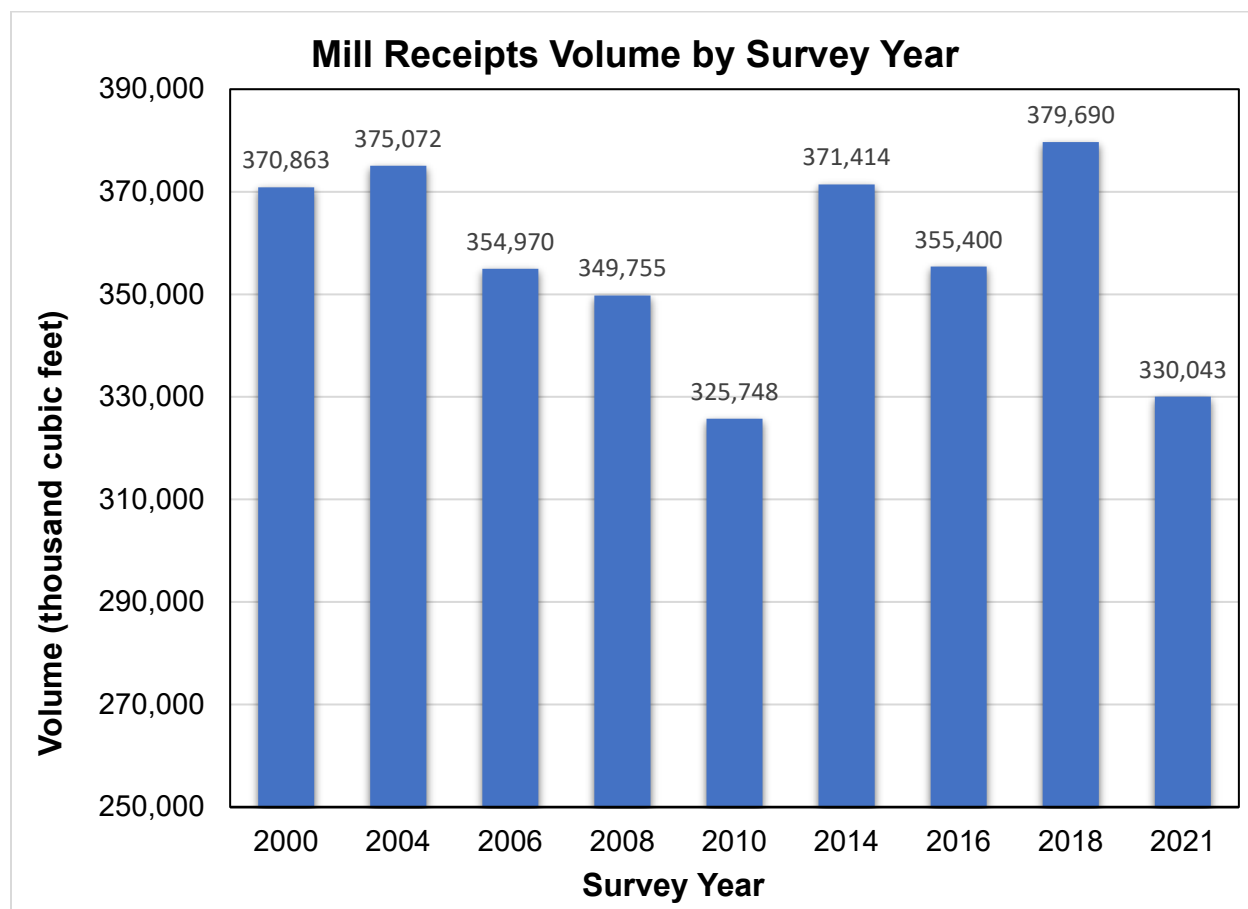
Many Michigan mills reported decreases in 2021 roundwood receipts volume over 2018 survey levels. On average, respondents reported a 3% decrease in roundwood receipt volume, with 75 mills reporting volume decreases in 2021 compared to 2018. The total volume of roundwood receipts decreased by approximately 13%, from 379 million cubic feet in 2018 to 330 million cubic feet in 2021. The reduction in total roundwood receipt volume is likely due to a lower response rate, which was near 90% for 2018 and 74% for 2021. Due to the COVID-19 pandemic, fewer site visits were conducted in 2021 than in previous years, which contributed to a reduced response rate. The response rate was also impacted by reported labor shortages in 2021. Administrative staff were disproportionately affected, this affected survey response since administrative employees often fill out the survey responses. Difficulty in hiring employees and employee retention was a common issue in 2021. Workforce difficulties were experienced not only by primary mills but by the logging and secondary wood products industries as well. These difficulties adversely affected the supply of wood products to and from primary mills.

Table 1. Industrial roundwood receipts in thousand cubic feet, by mill type and survey year.

Mill Type	2000	2004	2006	2008	2010	2014	2016	2018	2021
Sawmills	131,773	137,672	139,324	112,338	128,538	128,134	141,462	146,893	115,285
Veneer mills	9,372	6,431	6,378	5,947	5,091	4,038	3,683	3,294	1,615
Pulp & composite board mills	215,123	214,303	175,544	190,956	164,045	197,978	170,490	183,551	185,043
Industrial fuelwood	8,870	10,088	27,359	31,105	19,563	26,362	24,708	24,817	19,592
Post, pole, piling mills	3,841	4,395	5,731	7,380	6,174	5,111	6,014	6,636	3,356
Other products	1,884	2,183	634	2,030	2,337	9,792	9,043	14,499	5,152
<b>Total</b>	<b>370,863</b>	<b>375,072</b>	<b>354,970</b>	<b>349,755</b>	<b>325,748</b>	<b>371,414</b>	<b>355,400</b>	<b>379,690</b>	<b>330,043</b>

Notes: This table is adapted from Haugen, David E. 2016. Michigan timber industry, 2010. Resource Update FS-78. Newtown Square, PA: USDA FS, NRS. 5 p. The pulp & and composite board mill type includes paper, corrugated media, OSB, composite siding, and hardboard/high-density fiberboard mills. Industrial fuelwood includes woody biomass energy plants, and residential heat pellet and biochar mills. Other products include cabin logs, mulch, shavings, commercial firewood, and other miscellaneous product mills.

Figure 1. Michigan industrial roundwood receipts in thousand cubic feet, by survey year.



### Number of Mills

The number of active mills increased by 2 facilities in 2021, to 307 facilities. Of those, 18 mills were new, established in 2019, 2020 or 2021. An additional 36 mills were idle, and 27 mills closed that had been active or idle in 2018. Of the active mills, 211 mills responded to the survey and 96 mills declined to participate or did not respond. The number of sawmills decreased from 2018 while veneer mills, particle board mills, and other product mills increased. However, the number of mills can be misleading, as new mills discovered each survey cycle is a product of effort put into site visits.

Table 2. Number of active primary mills by mill type and survey year.

Mill Type	1990	1992	1994	1996	1998	2000	2004	2006	2008	2010	2014	2016	2018	2021
Sawmills	344	323	288	287	287	262	233	242	235	216	213	233	257	249
Veneer mills	7	7	5	4	5	5	4	4	4	4	6	5	4	5
Pulp mills	6	6	6	6	6	6	6	4	4	3	3	3	3	3
Particleboard mills	5	5	5	6	6	6	6	4	4	4	4	4	4	5
Industrial fuelwood	8	7	9	5	4	5	4	6	6	6	8	8	9	7
Post, pole, piling mills	19	7	7	10	13	12	10	12	13	12	11	9	10	10
Other products	16	11	9	14	15	13	13	14	17	18	14	20	18	28
<b>Grand Total</b>	<b>405</b>	<b>366</b>	<b>329</b>	<b>332</b>	<b>336</b>	<b>309</b>	<b>276</b>	<b>286</b>	<b>283</b>	<b>263</b>	<b>259</b>	<b>282</b>	<b>305</b>	<b>307</b>

Table 3. Number of active sawmills by sawmill size class and survey year.

Sawmills	1990	1992	1994	1996	1998	2000	2004	2006	2008	2010	2014	2016	2018	2021
Large	26	30	35	28	36	36	37	37	33	37	40	48	48	43
Medium	107	106	101	96	94	82	65	69	58	47	54	59	77	81
Small	211	187	152	163	157	144	131	136	144	132	119	126	132	125
<b>Total</b>	<b>344</b>	<b>323</b>	<b>288</b>	<b>287</b>	<b>287</b>	<b>262</b>	<b>233</b>	<b>242</b>	<b>235</b>	<b>216</b>	<b>213</b>	<b>233</b>	<b>257</b>	<b>249</b>

Mills were asked to estimate the percentage of their roundwood receipts that came from urban areas – cities, rights-of-way, and utility line trimming. Of all active mills that responded, 9 sawmills, most of which were small, estimated that they sourced 50% or more of their roundwood from urban areas. Two mulch mills sourced greater than 50% of their wood from urban areas. Additionally, mills were asked to estimate the percentage of their roundwood receipts that came from salvaged dead trees. Seven active mills estimated that they sourced greater than 10% of their roundwood from salvaged dead trees, 6 of these were small sawmills, and the remaining mill is a producer of other wood products.

### Regional Receipts and Processing of Roundwood

Approximately 68% of the 2021 roundwood receipt volume was from hardwood species, which is slightly lower than the 2018 value of 73%. This decrease could be a product of the survey response rate, as most of the softwood-using mills responded to the survey and a few of the larger hardwood mills did not. About 90% of wood processed by Michigan mills came from Michigan. The additional 10% of roundwood was imported, with Wisconsin representing the largest supplier of imported roundwood at 8%. These percentages were similar to 2018 and 2016 values.

Table 4. Roundwood receipts volume by major species group and state or country of origin, in standard cords.

Major Species Group	Michigan	Wisconsin	Ontario, Canada	Other States	Total
Hardwood	2,556,654	249,665	70,557	15,501	2,892,377
Softwood	1,271,362	105,475	1,316	14	1,378,167
<b>Total</b>	<b>3,828,015</b>	<b>355,139</b>	<b>71,873</b>	<b>15,515</b>	<b>4,270,543</b>
<b>Percentage of Total</b>	<b>90%</b>	<b>8%</b>	<b>2%</b>	<b>0%</b>	<b>100%</b>

Mills located in the Northern Lower Peninsula processed the greatest proportion of total roundwood received at 44%. Second was Michigan's Western Upper Peninsula at 31%. The lowest volume was processed in the Southern Lower Peninsula. These values are similar to those from 2018.

Table 5. Receipts volume by geographic location of mill, in thousand cubic feet, thousand board feet, standard cords, and percentage of total standard cords.

Region	Thousand Cubic Feet	Thousand Board Feet	Standard Cords	Percentage of Total Standard Cords
Western Upper Peninsula	105,687	170,721	1,344,985	31%
Eastern Upper Peninsula	56,859	69,063	780,456	18%
Northern Lower Peninsula	145,909	426,624	1,867,068	44%
Southern Lower Peninsula	21,589	95,647	278,034	7%
<b>Total</b>	<b>330,044</b>	<b>762,055</b>	<b>4,270,543</b>	<b>100%</b>

When examined by the origin of wood, the largest percentage of roundwood received from Michigan sources came from forests in the Northern Lower Peninsula, followed by the Western Upper Peninsula. Most of the imported roundwood volume was received by mills located in the Upper Peninsula.

Table 6. Receipts volume by source of wood in thousand cubic feet, thousand board feet, standard cords, and percentage of total standard cords.

Region	Thousand Cubic Feet	Thousand Board Feet	Standard Cords	Percentage of Total Standard Cords
Western Upper Peninsula	73,859	92,251	988,444	23%
Eastern Upper Peninsula	59,732	139,315	769,056	18%
Northern Lower Peninsula	133,376	408,897	1,706,060	40%
Southern Lower Peninsula	27,791	84,585	358,524	8%
Imported	35,286	37,007	448,459	11%
<b>Total</b>	<b>330,044</b>	<b>762,055</b>	<b>4,270,543</b>	<b>100%</b>

### Species Processed

Aspen, red pine, hard maple, soft maple, and red oak comprised 70% of the total volume processed in 2021. Among sawlog receipts, species comprising the most volume were red pine, hard maple, red oak, aspen, and soft maple. In total volume, hardwood species accounted for 68%, and softwood species 32%.

Receipts for ash peaked around 2017 and have been rapidly declining since, accounting for 8% of the total volume in 2016 and 2018, and 2% of the total volume in 2021. Red oak receipts have also declined, accounting for 5% of the total volume as opposed to 9% and 8% in 2016 and 2018 respectively. Increases have occurred in red pine and jack pine compared to 2018 volumes. While white pine comprises a small portion of the total volume processed, the percentage of total volume it represents among all species has been steadily climbing. Among all species, aspen has consistently represented the greatest volume processed. All other species have remained steady.

Table 7. Softwood species roundwood receipts, total volume in standard cords, and sawlog volume in thousand board feet, International ¼ rule.

Species	Total volume (standard cords)	Percentage of total volume	Volume of Sawlogs* (thousand board feet)	Percentage of total sawlog volume
Red Pine	751,336	18%	303,366	40%
Balsam Fir	54,898	1%	3,890	1%
Spruce	104,514	2%	21,445	3%
White Pine	133,601	3%	22,225	3%
Northern White-Cedar	85,797	2%	28,444	4%
Hemlock	68,487	2%	43	0%
Jack Pine	136,852	3%	22,297	3%
Other softwood	42,681	1%	2,031	0%
<b>Softwood subtotal</b>	<b>1,378,167</b>	<b>32%</b>	<b>403,742</b>	<b>53%</b>

\*Volume of sawlogs includes roundwood types: veneer logs, sawlogs, and bolts.

Table 8. Hardwood species roundwood receipts, total volume in standard cords, and sawlog volume in thousand board feet, International ¼ rule.

Species	Total volume (standard cords)	Percentage of total volume	Volume of Sawlogs* (thousand board feet)	Percentage of total sawlog volume
Ash	81,113	2%	2,605	0%
Aspen	882,991	21%	61,644	8%
Basswood	130,091	3%	8,361	1%
Beech	70,554	2%	11,852	2%
Black Cherry	82,082	2%	11,432	2%
Black Walnut	28,488	1%	6,979	1%
Cottonwood	26,276	1%	917	0%
Hard Maple	632,897	15%	104,850	14%
Hickory	29,308	1%	3,712	0%
Paper Birch	53,783	1%	406	0%
Red Oak	201,109	5%	72,588	10%
Soft Maple	483,421	11%	46,704	6%
White Oak	67,361	2%	21,765	3%
Yellow Birch	61,132	1%	1,569	0%
Other Hardwood	61,769	1%	2,930	0%
<b>Hardwood Subtotal</b>	<b>2,892,377</b>	<b>68%</b>	<b>358,313</b>	<b>47%</b>

\*Volume of sawlogs includes roundwood types: veneer logs, sawlogs, and bolts.

Figure 2. Percent of the total receipt volume of selected species by survey year.

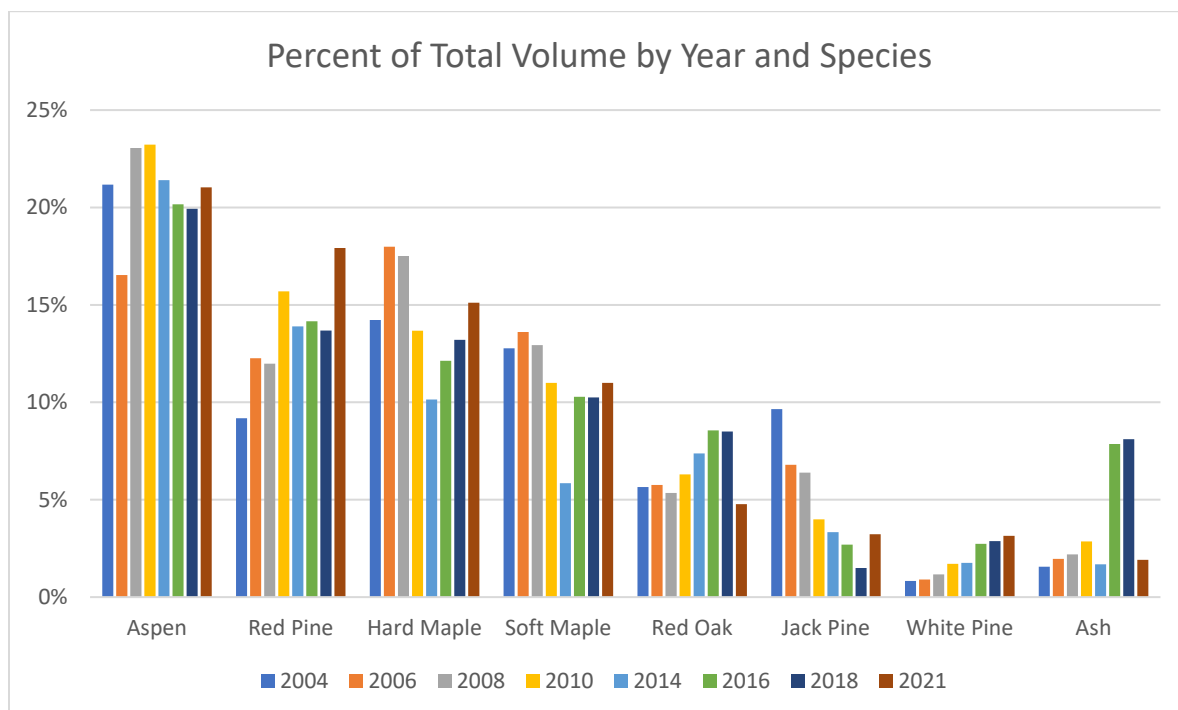
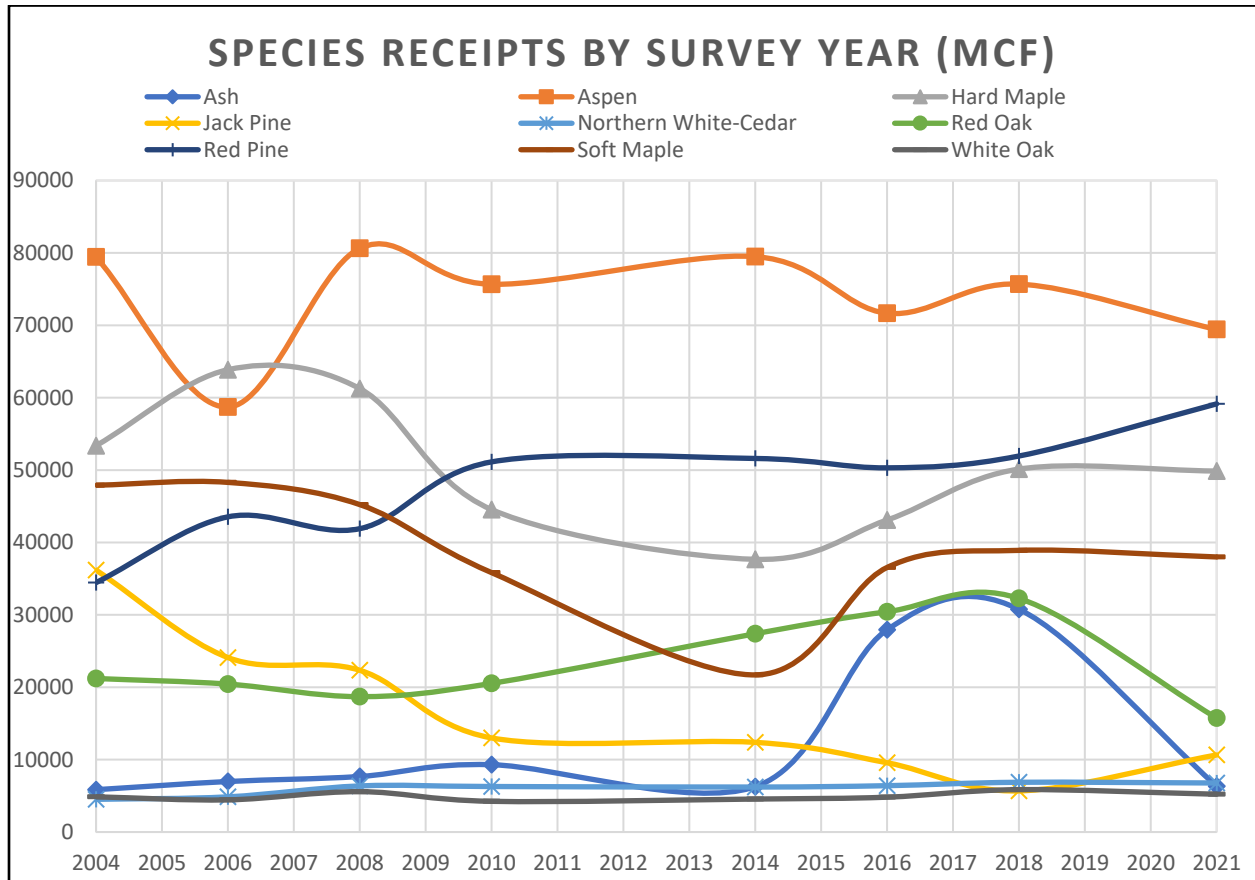




Figure 3. Receipts of selected species by survey year, in thousand cubic feet.

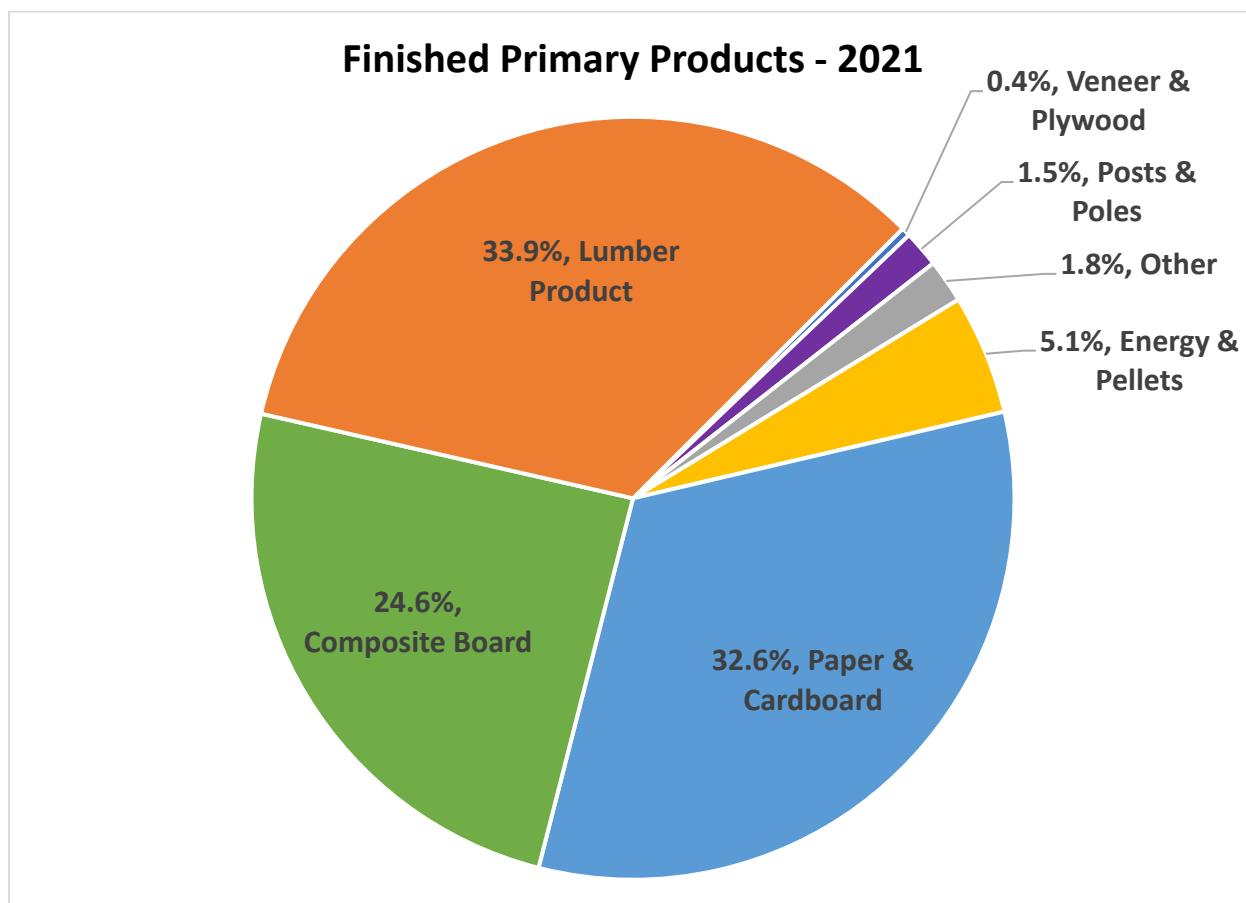


**Finished Products Produced**

Respondents were asked to estimate the percentage of their roundwood receipts used to produce their mill’s finished products. About 34% of the volume received by Michigan mills was sent to a sawmill to produce grade lumber, dimension lumber, pallet cut stock, crane mats, and other industrial lumber. Dimension/stud lumber and rough lumber represented the greatest proportion of sawmill product volume at 42% and 27% respectively.

About 33% of the volume received by Michigan mills was used to produce paper, pulp, and cardboard products. Around 25% of the volume was used to produce composite board products (oriented strand board, particle board, hardboard, and composite board siding). Energy and pellets represented 5% of the finished product volume. The remaining product types (posts and poles, veneer and plywood, and other products) each represented less than 2% of the total volume. See Figure 4 for more detail.

Figure 4. Finished products produced in 2021 by type and percentage of total volume.



### Mill residues

Mills were asked to estimate the amount of bark, coarse residues, and fine residue (shavings and sawdust) produced from wood processed in 2021. About 89% of the active mills that responded to the survey provided at least partial information on their residue production; however, only 63% provided volume data. Disposal of residues is an ongoing concern; some mills have difficulty finding outlets for mill residuals. Mills reported estimates totaling just over 3 million green tons, and of that total approximately 80% were bark and coarse wood residues. Approximately 44% of mill residue was generated in the Northern Lower Peninsula. Approximately 22% was produced in the Eastern Upper Peninsula, and another 22% was produced in the Western Upper Peninsula. The Southern Lower Peninsula produced about 12% of total residues.

Table 9. Mill residues by major species group and residue type, in green tons.

Residue Type	Bark	Coarse	Fine	Total Residues	Percentage
Softwood	283,088	491,857	132,035	906,979	30%
Hardwood	1,008,146	679,691	465,572	2,153,409	70%
<b>Total</b>	<b>1,291,234</b>	<b>1,171,547</b>	<b>597,607</b>	<b>3,060,388</b>	<b>100%</b>

### Residue Uses

Mills were asked to indicate how they dispose of their manufacturing residues – how they dispose of their bark, coarse residues (slabs, edgings, cutoffs, chips), and fine residues (shavings and sawdust). For each type of residue, mills were asked to indicate what percentage of the volume generated went to various uses. Overall, about 30% of all residues were sold for mulch, another 21% was used for power generation on-site, and about 18% was used for the manufacture of composite board products.

By type of residue, about 58% of bark residuals were used for fuel, 12% going to another plant, and 46% remaining on site. Approximately 39% of bark residues were used for mulch or soil additives. Among fine residuals, the greatest use was for animal bedding at about 57%. The second was for manufacturing of composite products at 12%. Coarse residuals were primarily used for the manufacture of composite products (40%), mulch/soil products (32%), or industrial fuel at a biomass plant (19%).

Table 10. Disposal of mill residues by residue type and use, as a percentage of volume.

Residue Use	Bark	Coarse	Fine	Use Total Volume
Animal Bedding	0.0%	0.0%	56.5%	11.0%
Bio-energy pellets	1.7%	3.4%	3.9%	2.8%
Charcoal or chemical wood	0.0%	1.1%	0.8%	0.6%
Industrial fuel at other plants	12.3%	19.0%	8.0%	14.0%
Industrial fuel at this plant (on-site)	46.1%	0.0%	7.6%	20.9%
Manufacture of fiber/composite products	0.0%	39.8%	12.0%	17.6%
Mulch/soil additive (includes biochar)	39.4%	32.0%	9.5%	30.7%
Not Used (landfill, etc.)	0.5%	0.4%	0.5%	0.5%
Other miscellaneous uses (specify)	0.0%	0.7%	1.1%	0.5%
Residential fuelwood	0.0%	3.7%	0.1%	1.4%

## **Biomass Energy Plants**

Michigan had 8 active biomass energy plants in 2021 that used wood residues to produce power. Seven of the plants used roundwood and timber harvest residues from forest land or urban wood for fuel in the form of chips or ground wood. These plants also use mill and manufacturer residues for fuel – bark, chipped or ground coarse residues, and sawdust – and are an important outlet for the disposal of these residues. The 8<sup>th</sup> plant only used manufacturing residues.

About 14% of the 2021 mill residue volume is estimated to have been sold for industrial fuel at other plants, including biomass energy plants, which is a decrease from 21% in 2018. Biomass energy plants reported that about 52% of their wood fuel came from a combination of mill and manufacturer residues and recycled wood. Approximately 48% of biomass energy wood fuel was from roundwood, harvest residues, or urban wood tree removal/maintenance. The proportion of wood that came from mill residues and recycled wood was higher than in 2018, which was 38%. Total woody fuel consumed by energy plants in 2021 was estimated to be about 1.3 million green tons, slightly higher than in 2018 (1.2 million green tons).

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