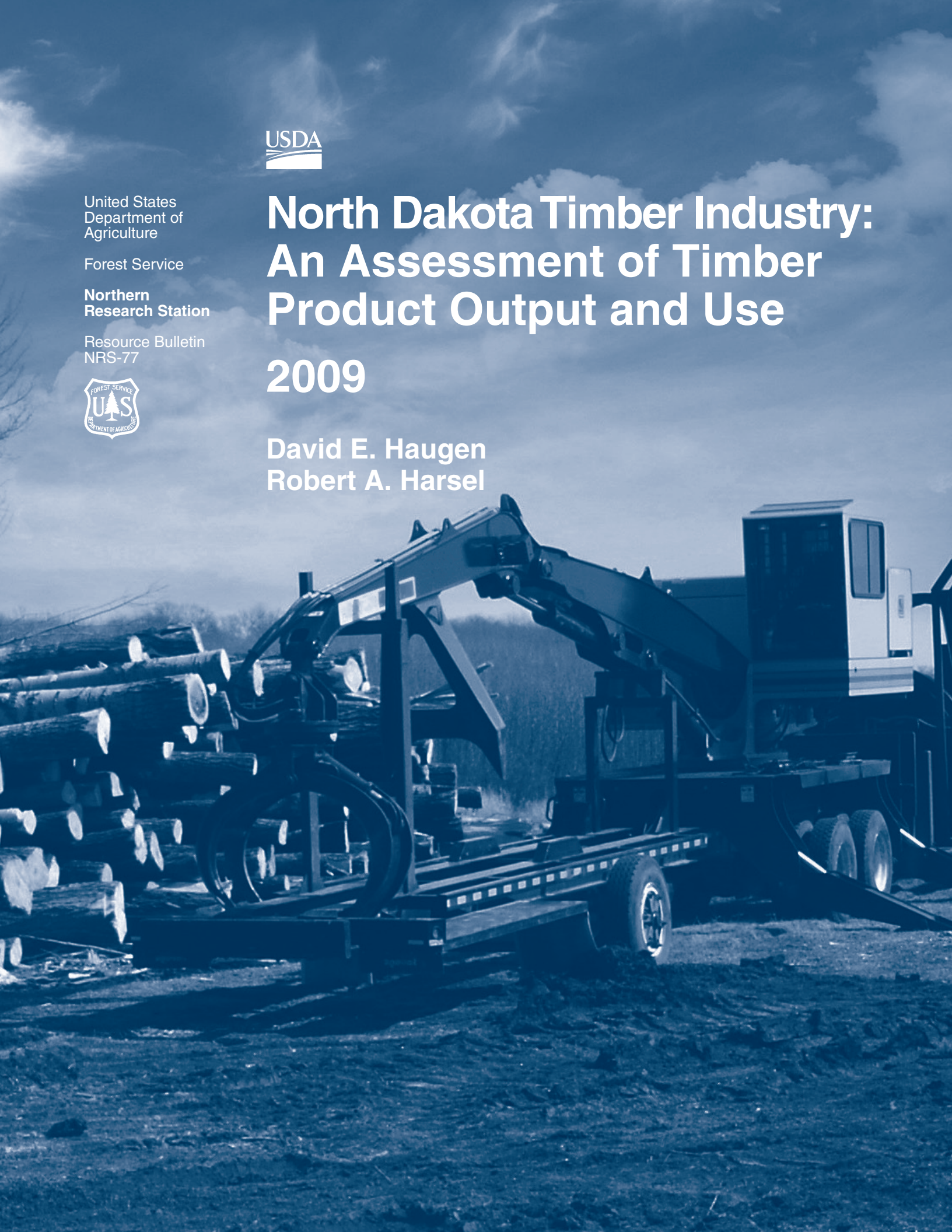

United States
Department of
Agriculture

Forest Service

**Northern
Research Station**

Resource Bulletin
NRS-77

North Dakota Timber Industry: An Assessment of Timber Product Output and Use

2009

David E. Haugen
Robert A. Harsel

Abstract

In 2009, there were 13 primary wood-processing mills in North Dakota, 4 more mills than in 2003. These mills processed 68,000 cubic feet of industrial roundwood, of which 66,000 cubic feet was harvested from the State. Another 89,300 cubic feet of the industrial roundwood harvested in North Dakota was sent to primary wood-processing mills in Minnesota. Saw log harvesting accounted for 97 percent of the total harvest. The harvesting of industrial roundwood products resulted in 79,300 cubic feet of logging residues. Primary wood-processing mills generated 987,700 green tons of mill residues; 40 percent of the mill residues were used for domestic fuel. Thirty-three percent of the mill residues generated were not used for other products.

Cover Photo

Aspen harvest. Photo by U.S. Forest Service.

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Contents

INTRODUCTION

North Dakota's wood products manufacturing industry employs more than 1,900 workers with an output of about $340 million (NAICS 321—wood product manufacturing) (U.S. Census Bureau 2007). This bulletin analyzes recent North Dakota forest industry trends and reports the results of a detailed study of the forest product industry, industrial roundwood production, and associated primary mill wood and bark residue production in North Dakota in 2009. Such detailed information is necessary for long range planning and decisionmaking in wood procurement, economic research, forest resources management, and forest industry development. Likewise, researchers use current forest industry and industrial roundwood information for assessing future research needs and project development.

The 2003 Timber Industrial Assessment for North Dakota (Haugen and Harsel 2005) was used as a primary baseline of comparison for results. As a result of our ongoing efforts to improve the timber product output (TPO) survey's efficiency and reliability, minor changes in previously published data (e.g., Haugen and Harsel 2005) may have occurred because of omissions or correction of errors with the reprocessing of earlier data. Rows and columns of supporting tables in the current report may not sum due to rounding, but data in each table cell are accurately displayed.

Information about the forest land resource of North Dakota is available at the Forest Inventory and Analysis Web site at: http://nrs.fs.fed.us/fia/data-tools/state-reports/ND.

The Authors

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STUDY METHODS

This study was a cooperative effort between the North Dakota Forest Service (NDFS) and the Forest Inventory and Analysis (FIA) unit at the Northern Research Station (NRS) of the U.S. Forest Service. The FIA program is responsible for providing forest resource statistics for all ownerships across the United States, including timber products outputs.

Using questionnaires supplied by NRS and designed to determine the size and composition of the State's primary wood-using industry, its use of roundwood, and its generation and disposition of wood residues, NDFS surveyed all known primary wood-using mills. Completed questionnaires were sent to NRS to process and analyze. As part of data processing, all industrial roundwood volumes reported on the questionnaires were converted to standard units of measure using regional conversion factors (Table 1). Timber removals by source of material and harvest residues generated during logging were estimated from standard product volumes using factors developed from logging utilization studies previously conducted by NRS. Data on North Dakota's industrial roundwood receipts were loaded into a regional timber removals database where they were supplemented with data on out-of State uses of North Dakota roundwood to provide a complete assessment of North Dakota's timber product output.

Certain terms used in this report—retained, export, import, production, and receipts—have specialized meanings and relationships unique to the FIA program that surveys timber product output (TPO) (Fig. 1).

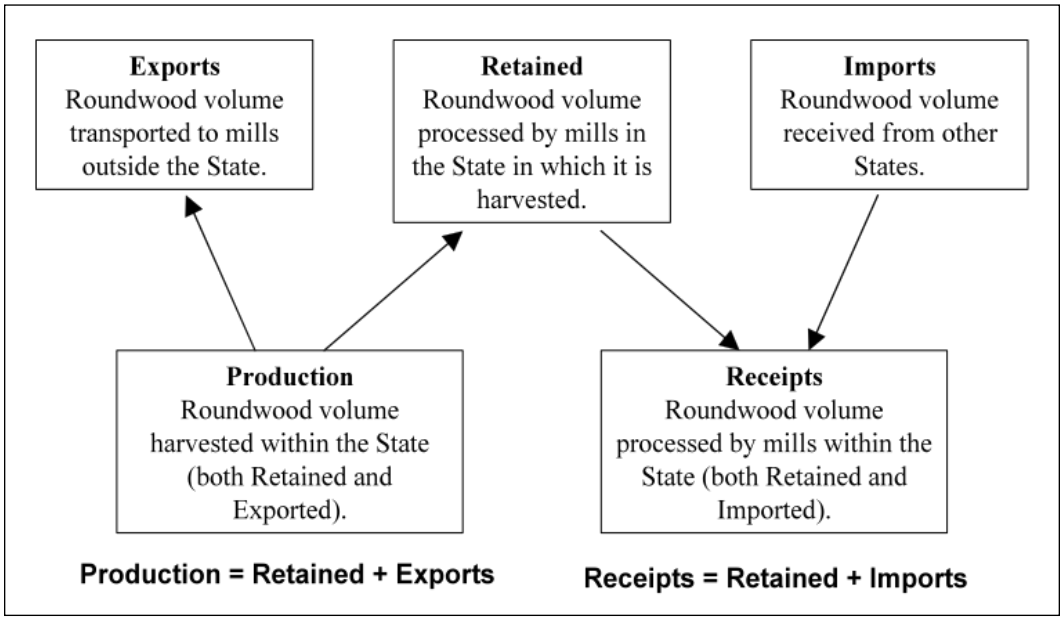

Figure 1.—Diagram of the movement of industrial roundwood.

Table 1.—Conversion factors from reported unit of measure to standard unit of measure[a]

Product (Standard unit of measure)	Reported unit of measure: International ¼-inch rule MBF	Doyle scale MBF	Green tons	Standard cords	Thousand pieces	Thousand cubic feet
Saw logs and handles (MBF International ¼-inch rule)	1	1.38	0.2174	0.5		0.158
Veneer logs and cooperage (MBF International ¼-inch rule)	1	1.14		0.5		0.158
Pulp and composite products, and industrial fuelwood (Standard cords)			0.4167	1		0.079
Mine timbers (Thousand cubic feet)		0.2322		0.079	6.7	1
Poles (Pieces)	20		4.348	10	1,000	0.0079
Posts (Thousand pieces)	0.2		0.04167	0.1	1	0.79
Cabin logs, excelsior/shavings, and miscellaneous products (Thousand cubic feet)	0.158	0.21804	0.0329193	0.079	7.9	1

[a] Reported volume times conversion factor = Standard volume.

PRIMARY TIMBER INDUSTRY IN NORTH DAKOTA

Industrial Roundwood

- In 2009, North Dakota's primary wood-using industry totaled 13 mills, an increase of 4 mills since 2003 (Table 2, Fig. 2).

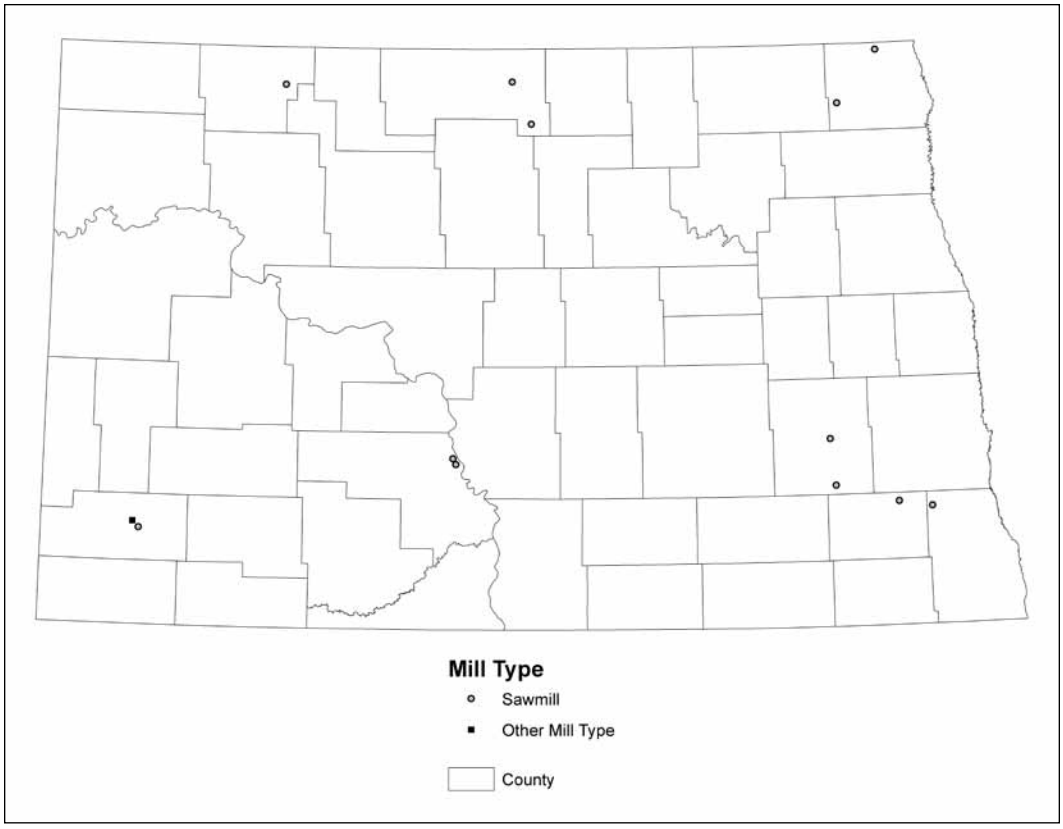

Figure 2.—Primary wood-using mills by region, North Dakota, 2009.

- In 2009, the primary wood-using mills in North Dakota processed 68,000 cubic feet of industrial roundwood (Table 3).

- Ninety-eight percent of the industrial roundwood processed by the State's primary wood-using mills was cut from North Dakota forest lands. Minnesota forests supplied the small amount of out-of-State wood used by North Dakota's forest products industry (Table 4).

- Eighty-seven percent of the industrial roundwood processed by North Dakota primary wood-using mills were hardwood species. Cottonwood alone accounted for 83 percent of the total volume processed. Other species of importance to the forest products industry were ponderosa pine, spruce, eastern redcedar, ash, and bur oak.

- Industrial roundwood production decreased by 48 percent, or 295,300 cubic feet in 2003 to 153,200 cubic feet in 2009 (Table 5, Fig. 3).

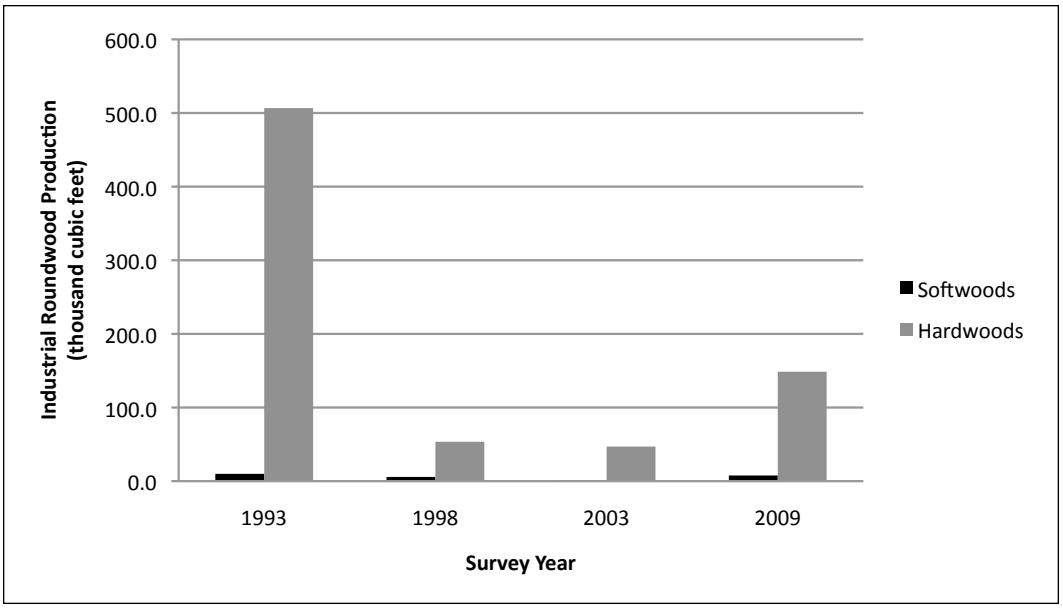

Figure 3.—Industrial roundwood production by softwoods and hardwoods, and survey year, North Dakota (Haugen and Harsel 2001, Haugen and Harsel 2005, May and Harsel 1995).

- Forty-three percent of the 156,300 cubic feet of industrial roundwood harvested in North Dakota was processed in the State (Table 6). Primary wood processors in Minnesota received the remaining 57 percent of the industrial roundwood exported out of state.

- In 2009, 92 percent or 143,700 cubic feet of industrial roundwood was harvested from the Eastern Forest Inventory Unit (Table 7). Industrial roundwood harvests from the Western Unit were 8 percent (12,500 cubic feet).

- Cottonwood was the most harvested species for industrial roundwood in 2009 (Fig. 4). Other important species harvested were aspen/balsam poplar, ponderosa pine, spruce, bur oak, and ash.

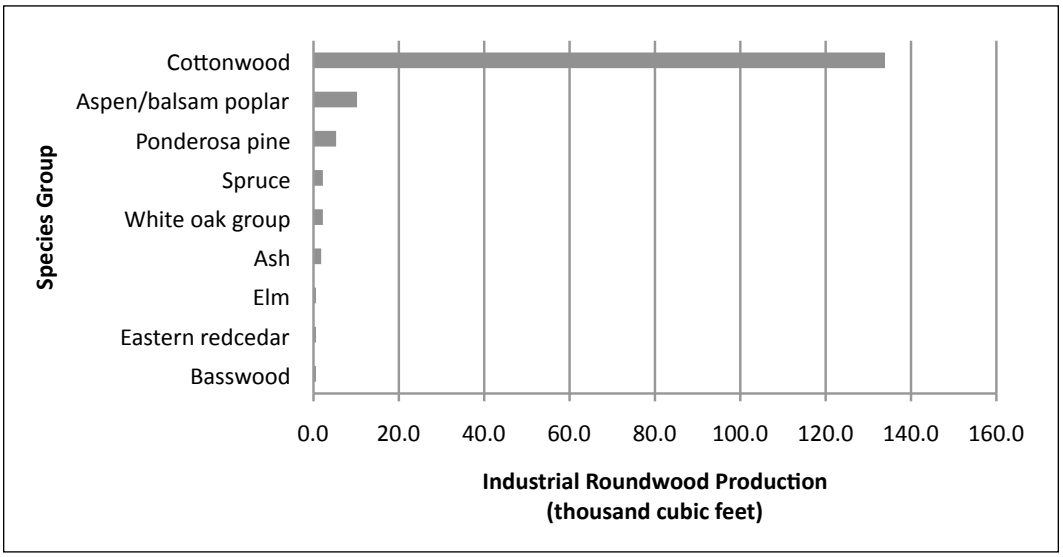

Figure 4.—Industrial roundwood production by species group, North Dakota, 2009.

- Sawmills were the largest consumers of North Dakota industrial roundwood produced in 2009. (Table 8, Fig. 5).

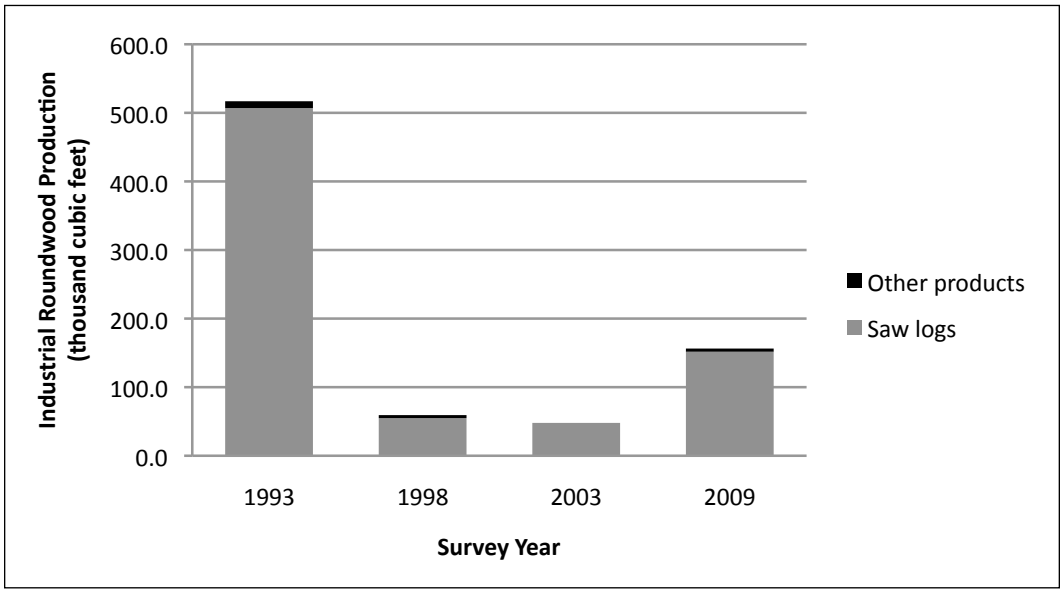

Figure 5.—Industrial roundwood production, in thousand cubic feet, by product and survey year, North Dakota (Haugen and Harsel 2001, Haugen and Harsel 2005, May and Harsel 1995).

Saw Logs

- North Dakota sawmill receipts totaled 359,000 board feet in 2009, an increase of 33 percent from 2003 (Table 9). Softwood saw log receipts were estimated at 22,000 board feet, while those of hardwoods equaled 338,000 board feet.

- Cottonwood saw log receipts increased by 49 percent, while aspen/balsam poplar and bur oak saw log receipts declined between the 2003 and 2009 survey.

- Saw log production decreased by 15 percent between 2003 and 2009, from 1 million board feet in 2003 to 859,000 board feet in 2009. Softwood saw log production increased to 16,000 board feet in 2009, while that of hardwoods decreased by 16 percent to 842,000 board feet.

- In 2009, cottonwood accounted for almost 89 percent of the total harvest of saw logs from North Dakota forests. Other important species groups harvested were aspen/balsam poplar, spruce, and bur oak (Fig. 6).

- Residential fuelwood is not included in this report.

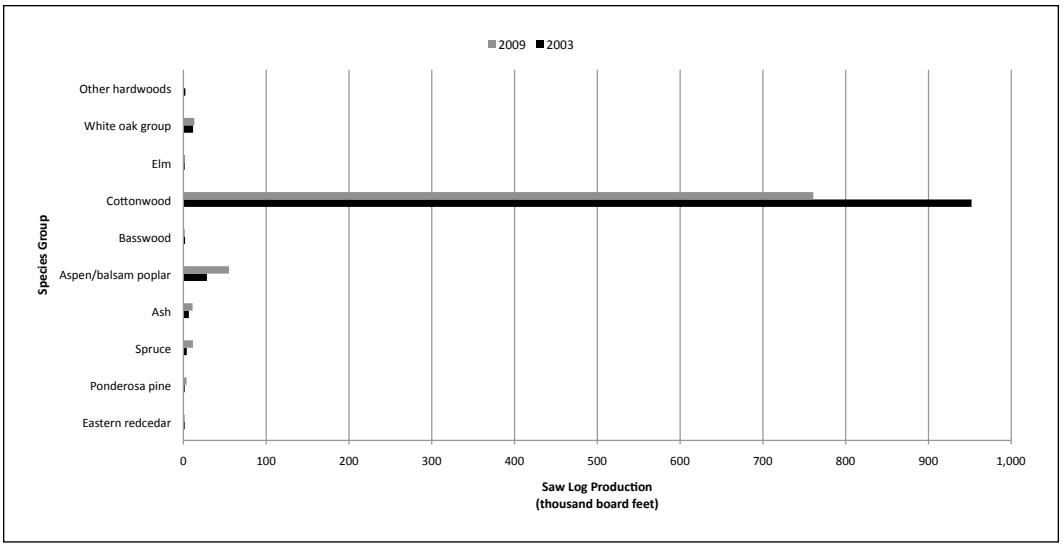

Figure 6.—Saw log production by species group, North Dakota, 2003 and 2009.

Timber Removals

- During the harvest of industrial roundwood from North Dakota's forests in 2009, 156,200 cubic feet of wood material from growing stock (e.g., sawtimber and pole timber) and non-growing stock (e.g., limb wood, saplings, cull trees, dead trees) was used for primary wood products and another 79,300 cubic feet of wood material from growing stock (e.g., logging residue) and non-growing stock (e.g., logging slash) was left on the ground as harvest residues (Table 10, Fig. 7).

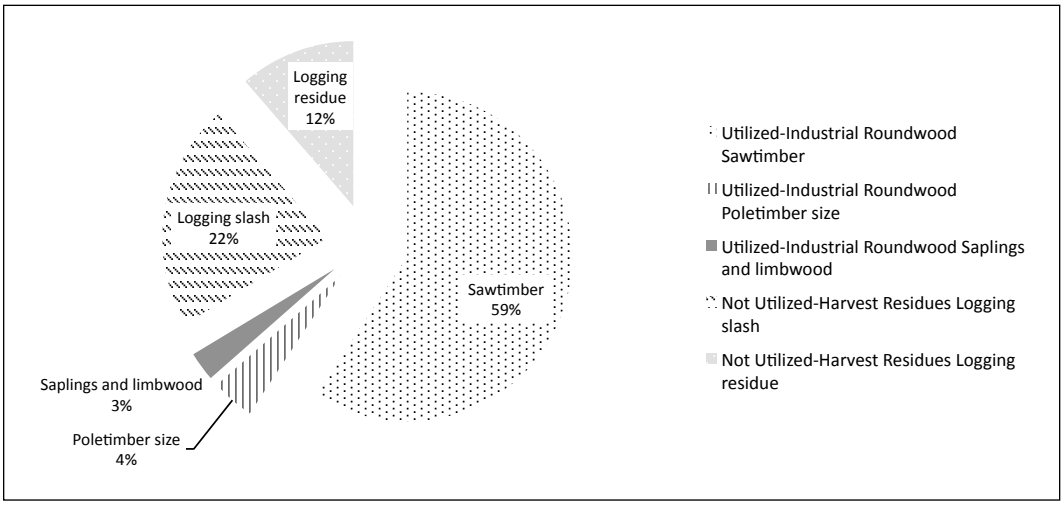

Figure 7.—Distribution of timber removals for industrial roundwood by source of material, North Dakota, 2009.

- Growing-stock sources, at 176,300 cubic feet, were the largest component of removals for industrial roundwood production. Eighty-five percent of the growing stock removed was used for products and 15 percent was left as harvest residue. Sawtimber-size trees accounted for 79 percent of the growing-stock volume used for products, and the remainder came from pole-size trees.

- In 2009, 59,300 cubic feet of non-growing-stock wood material was removed in the production of industrial roundwood, but only 11 percent of this material was used for products and the remainder was left on the ground as logging slash. Fifty-eight percent of the non-growing-stock material used for industrial roundwood came from limbs of growing-stock trees and the other 42 percent came from cull trees.

- Ninety-two percent of the total growing-stock material removed from North Dakota's timberland in 2009 came from the Eastern Forest Inventory Unit (Table 11).

- In 2009, 871,000 board feet were removed from North Dakota's sawtimber inventory (Table 12). Cottonwood accounted for 88 percent of the total sawtimber volume removed.

- The harvesting of industrial roundwood products from North Dakota forests in 2009 left 79,300 cubic feet of harvest residues on the ground (Table 13).

Harvest Intensity

- Statewide in 2009, there was an average of 14.0 cubic feet of average annual net growth (gross growth minus mortality) of growing stock per acre on forest land, and an average of 1.8 cubic feet of harvest-related wood removals per acre of forest land in North Dakota. Only two counties had more than 2 cubic feet of total wood material removed per acre of forest land (Fig. 8). (For reference, a cord of roundwood contains about 79 cubic feet of wood.)

- In 2009, there were 741,100 acres of forest land in North Dakota (Haugen 2010). The net volume in live trees on forest land was 679 million cubic feet. The 235,500 cubic feet of total wood material removed due to harvesting (Table 10) was less than 1 percent of the total live volume of trees on forest land in North Dakota.

Primary Mill Residues

- In converting industrial roundwood into products, such as lumber, North Dakota's primary wood-using industries generated 987,700 green tons of wood residue (coarse and fine residues) and bark residue (Table 14).

- Twenty-two percent of the mill residues were in the form of bark residue. Fine wood residue (e.g., sawdust) made up another 28 percent of the total mill residues. Coarse wood residue (e.g., slabs and edgings residue) accounted for the remaining 50 percent (Fig. 9).

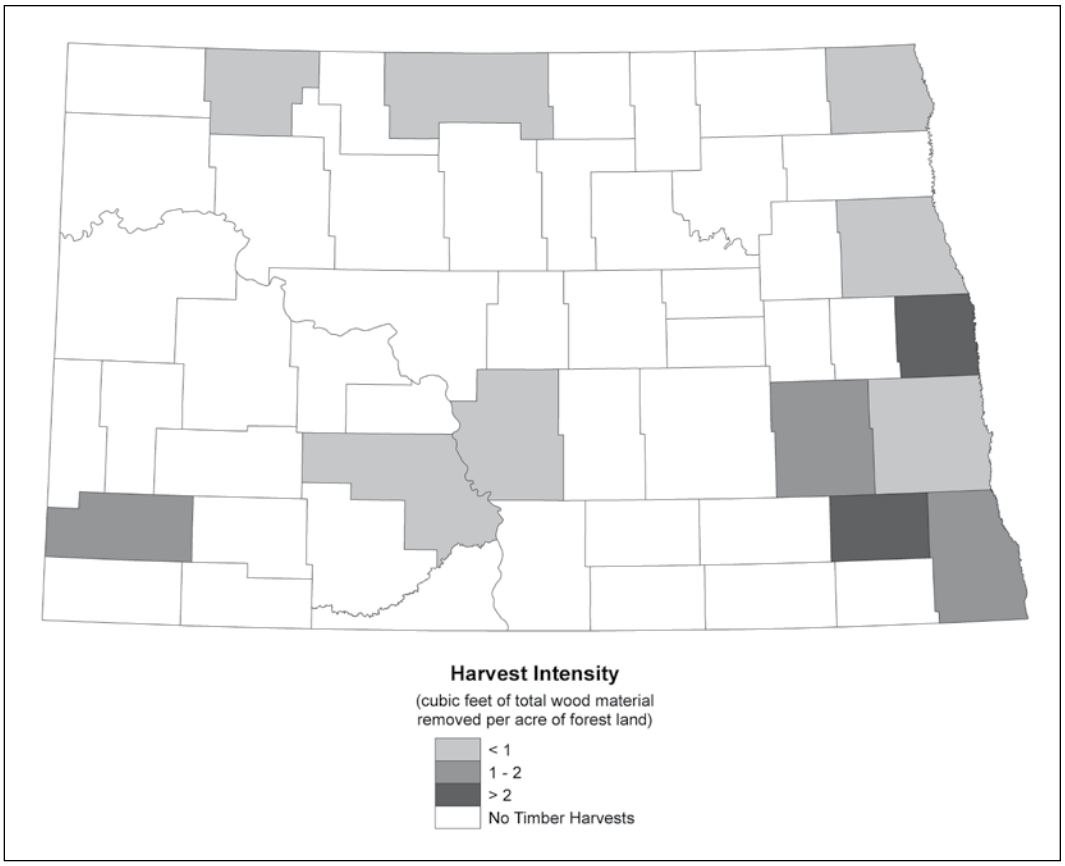

Figure 8.—Harvest intensity for industrial roundwood production, North Dakota, 2009.

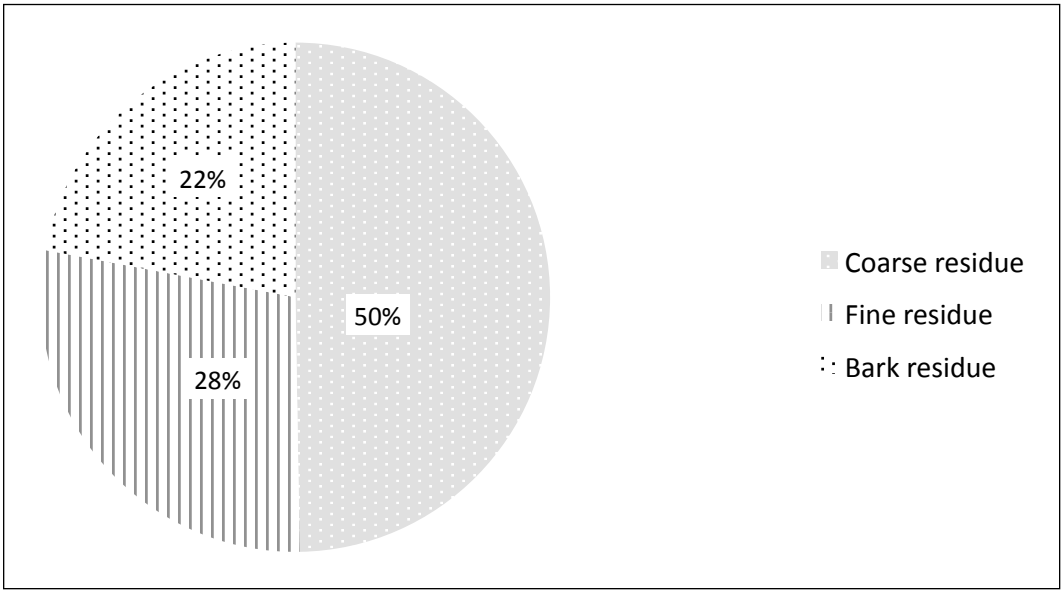

Figure 9.—Distribution of residues generated by primary wood-using mills by type of residue, North Dakota, 2009.

- Residential fuel, unused, miscellaneous use (e.g., livestock bedding, small dimension, and specialty items), and mulch accounted for 40, 33, 25, and 2 percent, respectively of the end-use of mill residues generated by the primary wood processors in North Dakota (Fig. 10).

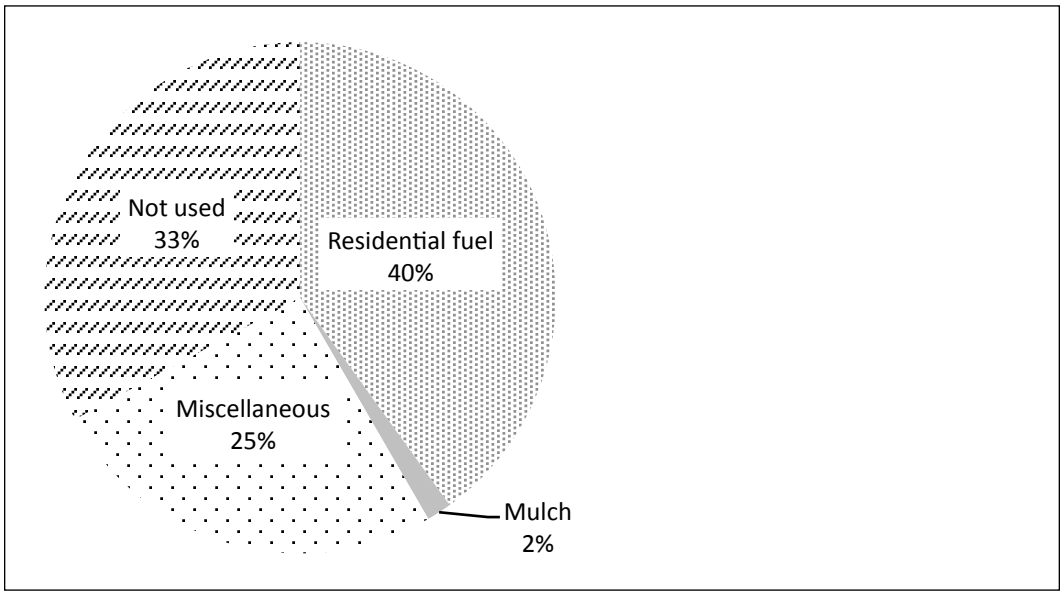

Figure 10.—Distribution of residues generated by primary wood-using mills by method of disposal, North Dakota, 2009.

- Seventy-seven percent of the coarse residue was used for domestic fuel. Miscellaneous uses consumed 79 percent of the total fine residue generated, and 92 percent of the bark residue generated went unused.

ACKNOWLEDGMENTS

Special thanks are given to the primary wood-using firms for supplying information for this study and to the North Dakota Forest Service whose cooperation in canvassing survey respondents is greatly appreciated.

Figures 2 and 8 were created by Brian Walters, forester with Forest Inventory and Analysis in St. Paul, MN.

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APPENDIX

Definition of Terms

Board foot. Unit of measure applied to roundwood. It relates to lumber that is 1 foot long, 1 foot wide, and 1 inch thick (or its equivalent).

Bolt. A short log no more than 8 feet long to be sawn for lumber, peeled or sliced for veneer, shaved for excelsior, or converted into shingles, cooperage stock, dimension stock, blocks, blanks, or other products.

Central stem. The portion of a tree between a 1-foot stump and the minimum 4.0-inch top diameter outside bark, or point where the central stem breaks into limbs.

Coarse mill residue. Wood residue suitable for chipping such as slabs, edgings, and veneer cores.

Commercial species. Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cull removals. Net volume of rough and rotten trees plus the net volume in sections of the central stem of growing-stock trees that do not meet regional merchantability standards but are harvested for industrial roundwood products.

Diameter at breast height (d.b.h.). The outside bark diameter at 4.5 feet above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Doyle rule. A simple log rule or formula for estimating the board-foot volume of logs based on a 4-inch slabbing allowance to square the log. This rule is used in the Eastern and Southern United States.

Exports. The volume of roundwood utilized by mills outside the state where the timber was harvested.

Fine mill residue. Wood residue not suitable for chipping, such as sawdust and veneer clippings.

Forest land. Land at least 10 percent stocked with trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams or other bodies of water, or clearings in forest areas shall be classified as forest if less than 120 feet wide.

Growing-stock removals. The growing-stock volume removed from timberland by harvesting industrial roundwood products. (Note: Includes sawtimber removals, poletimber removals, and logging residues.)

Growing-stock tree. A live timberland tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume. Net volume of growing-stock trees 5.0 inches d.b.h. and larger, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

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

Harvest residues. The total net volume of unused portions of trees cut or killed by logging. (Note: Includes both logging residues and logging slash.)

Industrial fuelwood. A roundwood product, with or without bark, used to generate energy at manufacturing facilities and schools, correctional institutions, or electric generating plants.

Imports. The volume of roundwood delivered to a mill or group of mills in a specific state but harvested outside that state.

Industrial roundwood exports. The quantity of industrial roundwood harvested in a geographical area and transported to other geographical areas.

Industrial roundwood imports. The quantity of industrial roundwood received from other geographical areas.

Industrial roundwood products. Saw logs, pulpwood, veneer logs, poles, commercial posts, pilings, cooperage logs, particleboard bolts, shaving bolts, lath bolts, charcoal bolts, and chips from roundwood used for pulp or board products.

Industrial roundwood production. The quantity of industrial roundwood harvested in a geographic area plus all industrial roundwood exported to other geographical areas.

Industrial roundwood receipts. The quantity of industrial roundwood received by commercial mills in a geographic area plus all industrial roundwood imported from other geographical areas.

Industrial roundwood retained. The quantity of industrial roundwood harvested from and processed by commercial mills within the same geographical area.

International ¼-inch rule. A log rule or formula for estimating the board-foot volume of logs, allowing ½ inch of taper for each 4-foot length and assuming ¼ inch of kerf. This rule is used as the U.S. Forest Service standard log rule in the Eastern United States.

Limbwood removals. Net volume of all portions of a tree other than the central stem (including forks, large limbs, tops, and stumps) harvested for industrial roundwood products.

Logging residue. The net volume of unused portions of the merchantable central stem of growing-stock trees cut or killed by logging.

Logging slash. The net volume of unused portions of the unmerchantable (non-growing stock) sections of trees cut or killed by logging.

Merchantable sections. Sections of the central stem of growing-stock trees that meet either pulpwood or saw log specifications.

Net volume. Gross volume less deductions for rot, sweep, or other defects affecting use for roundwood products.

Noncommercial species. Trees species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial roundwood products. Noncommercial species are listed in the volume tables as rough trees.

Nonforest land. Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, active Christmas tree plantations, orchards, nurseries, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 39.9-acre areas of water classified by the Bureau of the Census as land.) If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre to qualify as nonforest land.

Nonforest land removals. Net volume of trees on nonforest lands harvested for industrial roundwood products.

Poletimber. A growing-stock tree at least 5.0 inches d.b.h. but smaller than sawtimber size (9.0 inches d.b.h. for softwoods, 11.0 inches d.b.h. for hardwoods).

Poletimber removals. Net volume in the merchantable central stem of poletimber trees harvested for industrial roundwood products.

Primary wood-using mills. Mills receiving roundwood or chips from roundwood for processing into products such as lumber, veneer, and pulp.

Primary wood-using mill residue. Wood materials (coarse and fine) and bark generated at manufacturing plants that process industrial roundwood into principal products. These residues include wood products obtained incidental to production of principal products and wood materials not utilized for some product.

Production. The quantity of roundwood material harvested in a geographic area plus all roundwood material exported to other geographical areas.

Receipts. The quantity of roundwood material received by commercial mills in a geographic area plus all roundwood material imported from other geographical areas.

Retained. Roundwood volume harvested from and processed by mills within the same state.

Rotten tree. A tree that does not meet regional merchantability standards because of excessive unsound cull.

Rough tree. A tree that does not meet regional merchantability standards because of excessive sound cull (includes forks, sweep and crook, and large branches or knots), including noncommercial tree species.

Roundwood. Logs, bolts, or other round sections cut from trees (including chips from roundwood).

Sapling. A live tree between 1.0 and 5.0 inches d.b.h.

Saw log portion. That portion of the central stem of sawtimber trees between the stump and the saw log top.

Saw log top. The point on the central stem of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7.0 inches diameter outside bark for softwoods and 9.0 inches diameter outside bark for hardwoods.

Sawtimber removals. As used in Table 10, sawtimber removals refers to the net volume in the merchantable central stem of sawtimber-size trees harvested for industrial roundwood products. (Note: includes the saw log and upper stem portions of sawtimber-size trees.) When referring to the sawtimber volume removed from timberland as in Table 12, sawtimber removals refers to the net volume in the saw log portion of sawtimber-size trees harvested for roundwood products or left on the ground as harvest residue, and is usually expressed in thousands of board feet (International ¼-inch rule).

Sawtimber tree. A growing-stock tree containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. and hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume. Net volume in the saw log portion of sawtimber trees.

Softwoods. Coniferous trees, usually evergreen, having needles or scale-like leaves.

Timber product output. The volume of roundwood products produced from an area's forests.

Timberland. Forest land that is producing, or is capable of producing, in excess of 20 cubic feet per acre per year of industrial roundwood products under natural conditions, is not withdrawn from timber utilization by statute or administrative regulation, and is not associated with urban or rural development.

Tree. A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown; sometimes defined as attaining a minimum diameter of 3 in. (7.6 cm) and a minimum height of 15 ft (4.6 m) at maturity. For FIA, any plant on the tree list in the current field manual is measured as a tree.

Upper stem portion. That portion of the central stem of sawtimber trees between the saw log top and the minimum top diameter of 4.0 inches outside bark, or to the point where the central stem breaks into limbs.

Common and Scientific Names of Tree Species by Species Group

Softwoods

Eastern redcedar	*Juniperus virginiana*
Ponderosa pine	*Pinus ponderosa*
White spruce	*Picea glauca*

Hardwoods

Ash

Black ash	*Fraxinus nigra*
Green ash	*Fraxinus pennsylvanica*

Aspen/balsam poplar	
Quaking aspen	*Populus tremuloides*
Balsam poplar	*Populus balsamifera*
American basswood	*Tilia Americana*
Cottonwood	
Eastern cottonwood	*Populus deltoides*
Plains cottonwood	*Populus sargentii*
White birch	*Betula papyrifera*
Elm	
American elm	*Ulmus Americana*
Siberian elm	*Ulmus pumila*
Slippery elm	*Ulmus rubra*
Soft maples	
Boxelder	*Acer negundo*
Silver maple	*Acer saccharinum*
White oak group	
Bur oak	*Quercus macrocarpa*
Other hardwoods	
Hackberry	*Celtis occidentalis*
White poplar	*Populus alba*
Black willow	*Salix nigra*

Tables

Table 2.—Number of active primary wood-using mills by mill type and survey year, North Dakota

Kind of mill and mill size		Survey Year			
		1993	1998	2003	2009
Sawmills					
	Large[a]	1	--	--	--
	Small[b]	11	8	9	12
	Total	12	8	9	12
Other products[c]		1	1	--	1
All mills		13	9	9	13
Pulp mills	--	2	2	2	1
Charcoal[d]	3	60	52	36	15
Handle mills	19	12	7	10	6
Post and pole mills	6	14	22	28	23
Other products[e]	94	44	9	3	11
Total	213	171	132	113	81
All mills	2,806	1,161	681	599	491

[a] Annual lumber production in excess of 5 million board feet.

[b] Annual lumber production less than 1 million board feet.

[c] Includes plants producing mulch, posts, cabin logs, etc.

Table 3.—Industrial roundwood receipts, in thousand cubic feet, by mill type, hardwoods and softwoods, and survey year, North Dakota

Kind of mill	Survey Year				% change from
	1993	1998	2003	2009	2003 - 2009
All species					
Saw logs[a]	511.6	59.3	47.9	68.1	42%
Softwoods					
Saw logs[a]	4.9	5.8	0.9	8.8	870%
Hardwoods					
Saw logs[a]	506.7	53.5	47.0	59.3	26%

[a] Saw logs and other products are combined to avoid disclosure of individual mills.

All table cells without observations are indicated by -- . Table value of 0 indicates the volume rounds to less than 1,000 cubic feet. Columns and rows may not add to their totals due to rounding.

Table 4.—Industrial roundwood receipts, in thousand cubic feet, by Forest Inventory Unit, species group, and State of origin, North Dakota, 2009

Species Group	Total	State of origin	
		Minnesota	North Dakota
Softwoods			
Eastern redcedar	1.3	1.1	0.2
Ponderosa pine	5.3	--	6.2
Spruce	2.2	--	1.2
Softwood total	8.8	1.1	7.6
Hardwoods			
Ash	1.2	--	1.2
Aspen/balsam poplar	0.2	--	0.2
Basswood	0.1	--	0.1
Cottonwood	56.5	--	56.5
Elm	0.4	--	0.4
White oak group	1.0	--	1.0
Hardwood total	59.4	--	59.4
State total	68.1	1.1	67.0

All table cells without observations are indicated by -- .

Table 5.—Industrial roundwood production, in thousand cubic feet, by product, hardwoods and softwoods, and survey year, North Dakota

Product	Survey Year				% change from
	1993	1998	2003	2009	2003 - 2009
All species					
Saw logs[a]	516.6	59.3	296.2	156.3	-47%
Softwoods					
Saw logs[a]	9.9	5.7	0.9	7.7	748%
Hardwoods					
Saw logs[a]	506.7	53.5	295.3	153.2	-48%

[a] Saw logs and other products are combined to avoid disclosure of individual mills.

Table 6.—Industrial roundwood production, in thousand cubic feet, by Forest Inventory Unit, species group, and State of destination, North Dakota, 2009

		State of destiniation	
Species group	Total	Minnesota	North Dakota
Softwoods			
Eastern redcedar	0.2	--	0.2
Ponderosa pine	6.2	--	6.2
Spruce	1.2	--	1.2
Softwood total	7.6	--	7.6
Hardwoods			
Ash	1.8	0.6	1.2
Aspen/balsam poplar	10.3	10.0	0.2
Basswood	0.1	--	0.1
Cottonwood	133.9	77.4	56.5
Elm	0.4	--	0.4
White oak group	2.2	1.2	1.0
Hardwood total	148.6	89.3	59.3
State total	156.2	89.3	66.9

All table cells without observations are indicated by -- .

Table 7.—Industrial roundwood production, in thousand cubic feet, by Forest Inventory Unit, county, and species group, North Dakota, 2009

Forest Inventory Unit and county	Softwoods					Hardwoods						
	All species	Eastern redcedar	Ponderosa pine	Spruce	Total softwoods	Ash	Aspen/ balsam poplar	Bass-wood	Cotton-wood	Elm	White oak group	Total hardwoods
Eastern												
Barnes	1.8	--	--	0.2	0.2	0.2	--	--	1.4	--	--	1.6
Bottineau	0.3	--	--	--	--	0.1	0.2	--	--	--	--	0.3
Cass	0.9	--	--	--	--	0.4	--	--	0.3	--	0.2	0.9
Pembina	12.9	--	--	1.0	1.0	--	10.0	--	--	--	1.9	11.9
Ransom	49.3	--	--	--	--	--	--	--	49.3	--	--	49.3
Richland	23.3	0.0	0.7	--	0.7	0.4	--	0.1	22.0	--	0.1	22.6
Traill	55.3	--	--	--	--	0.2	--	--	55.1	--	--	55.3
Unit total	143.8	0.0	0.7	1.2	1.9	1.3	10.2	0.1	128.1	--	2.2	141.9
Western												
Burke	0.6	--	--	--	--	0.1	--	--	0.5	--	--	0.6
Burleigh	3.0	--	--	--	--	0.2	--	--	2.6	0.2	--	3.0
Mortan	3.0	--	--	--	--	0.2	--	--	2.6	0.2	--	3.0
Slope	5.9	0.1	4.6	--	5.7	0.2	--	--	--	--	--	0.2
Unit total	12.5	0.1	4.6	--	5.7	0.7	--	--	5.7	0.4	--	6.8
State total	156.3	0.1	5.3	1.2	7.6	2	10.2	0.1	133.8	0.4	2.2	148.7

All table cells without observations are indicated by -- .

Table 8.—Industrial roundwood production by Forest Inventory Unit, species group, and product, North Dakota, 2009

Species group	All units		Eastern			Western		
	Saw logs			Saw logs			Saw logs	
	MBF[b]	MCF[a]		MBF[b]	MCF[a]		MBF[b]	MCF[a]
Softwoods								
Eastern redcedar	0.9	0.2		0.2	0.0		0.7	0.1
Ponderoda	38.3	6.2		3.8	0.7		34.5	5.5
Spruce	6.4	1.2		6.4	1.2		--	--
Softwood total	16.3	3.0		10.4	1.9		5.9	1.0
Hardwoods								
Ash	10.7	1.8		7.4	1.2		3.4	0.6
Aspen/balsam poplar	55.3	10.3		55.0	10.2		0.3	0
Basswood	0.3	0.1		0.3	0.1		--	--
Cottonwood	760.8	133.9		727.9	128.1		32.9	5.8
Elm	2.0	0.4		--	--		2.0	0.4
White oak group	13.2	2.2		13.2	2.2		--	--
Hardwood total	842.5	148.6		803.9	141.8		38.6	6.8
State total	858.8	151.6	Unit total	814.3	143.8	Unit total	44.6	7.8

[a] Thousand cubic feet.

[b] Thousand board feet, International ¼-inch rule.

All table cells without observations are indicated by -- . Table value of 0 indicates the volume rounds to less than ½ unit of measure. Columns and rows may not add to their totals due to rounding.

Table 9.—Saw log receipts and production, in thousand board feet, International ¼-inch rule, by Forest Inventory Unit and species group, North Dakota, 2003 and 2009

	ALL UNITS					
	Receipts			Production		
Species group	2003	2009	Percent change	2003	2009	Percent change
Softwoods						
Eastern redcedar	0.3	6.3	2000%	0.3	0.9	200%
Ponderosa pine	0.2	3.8	1800%	0.2	3.8	1800%
Spruce	4.1	11.6	183%	4.1	11.6	183%
Softwood total	4.6	21.7	372%	4.6	16.3	254%
Hardwoods						
Ash	6.6	7.3	11%	6.6	11.1	68%
Aspen/balsam poplar	28.4	1.0	-96%	28.4	55.0	94%
Basswood	2.0	0.3	-85%	2.0	0.3	-85%
Cottonwood	215.0	320.9	49%	952.0	760.8	-20%
Elm	0.3	2.0	567%	0.3	2.0	567%
White oak group	11.7	6.0	-49%	11.7	13.2	13%
Other hardwoods	2.4	--	--	2.4	--	--
Hardwood total	266.4	337.5	27%	1003.4	842.4	-16%
All species	271.0	359.3	33%	1,008.0	858.8	-15%

All table cells without observations are indicated by -- . Table value of 0 indicates the volume rounds to less than 1,000 board feet. Columns and rows may not add to their totals due to rounding.

Table 10.—Wood material harvested for industrial roundwood, in thousand cubic feet, by Forest Inventory Unit, source of material, and species group, North Dakota, 2009[a]

ALL UNITS											
	Source of material										
	Growing stock				Non-growing stock						
	Used for products				Used for products						
Species group	Sawtimber	Pole-timber	Logging residue (not used)	Total growing stock	Limbwood	Saplings	Logging slash (not used)	Total non-growing stock	Total used	Total not used	Total harvested
Softwoods											
Eastern redcedar	0.16	0.01	0.00	0.17	0.01	0.00	0.04	0.04	0.17	0.04	0.21
Ponderosa pine	2.08	0.07	0.06	2.21	0.09	0.00	0.46	0.55	2.24	0.52	2.76
Spruce	5.15	0.06	0.16	5.37	0.05	0.02	1.83	1.90	5.28	1.99	7.27
Softwood total	7.39	0.14	0.23	7.75	0.15	0.02	2.33	2.49	7.69	2.55	10.24
Hardwoods											
Ash	1.80	0.01	0.26	2.07	0.01	0.04	0.46	0.51	1.86	0.72	2.58
Cottonwood	119.91	7.76	25.56	153.23	3.58	2.66	47.78	54.02	133.91	73.35	207.25
Aspen	8.01	2.00	0.31	10.32	0.12	0.07	1.20	1.39	10.19	1.52	11.71
White oak group	2.16	0.01	0.32	2.48	0.01	0.05	0.55	0.61	2.23	0.87	3.09
Basswood	0.05	0.00	0.01	0.07	0.00	0.00	0.02	0.02	0.06	0.03	0.09
Elm	0.32	0.02	0.07	0.40	0.01	0.01	0.13	0.14	0.35	0.19	0.54
Hardwood total	132.25	9.79	26.53	168.58	3.73	2.83	50.14	56.70	148.60	76.68	225.28
State total	139.64	9.93	26.76	176.33	3.88	2.84	52.47	59.19	156.28	79.23	235.52

Table 10.—Continued

EASTERN											
	Source of material										
	Growing stock				Non-growing stock						
	Used for products				Used for products						
Species group	Sawtimber	Pole-timber	Logging residue (not used)	Total growing stock	Limbwood	Saplings	Logging slash (not used)	Total non-growing stock	Total used	Total not used	Total harvested
Softwoods											
Eastern redcedar	0.04	0.00	0.00	0.04	0.00	0.00	0.01	0.01	0.04	0.01	0.05
Ponderosa pine	1.14	0.04	0.03	1.22	0.05	0.00	0.25	0.30	1.23	0.29	1.52
Spruce	0.64	0.01	0.02	0.67	0.01	0.00	0.23	0.24	0.66	0.25	0.90
Softwood total	1.82	0.05	0.06	1.92	0.06	0.00	0.49	0.55	1.92	0.54	2.47
Hardwoods											
Ash	1.20	0.00	0.18	1.38	0.01	0.03	0.31	0.34	1.24	0.48	1.72
Cottonwood	114.72	7.42	24.46	146.60	3.42	2.55	45.71	51.68	128.12	70.17	198.29
Aspen	8.01	2.00	0.31	10.32	0.12	0.07	1.20	1.39	10.19	1.52	11.71
White oak group	2.16	0.01	0.32	2.48	0.01	0.05	0.55	0.61	2.23	0.87	3.09
Basswood	0.05	0.00	0.01	0.07	0.00	0.00	0.02	0.02	0.06	0.03	0.09
Hardwood total	126.14	9.43	25.27	160.85	3.56	2.69	47.80	54.05	141.83	73.07	214.90
Unit total	127.96	9.48	25.33	162.77	3.62	2.69	48.28	54.60	143.75	73.61	217.37

Table 10.—Continued

WESTERN											
	Source of material										
	Growing stock				Non-growing stock						
	Used for products				Used for products						
Species group	Sawtimber	Pole-timber	Logging residue (not used)	Total growing stock	Limbwood	Saplings	Logging slash (not used)	Total non-growing stock	Total used	Total not used	Total harvested
Softwoods											
Eastern redcedar	0.12	0.00	0.00	0.13	0.01	0.00	0.03	0.03	0.13	0.03	0.16
Ponderosa pine	0.94	0.03	0.03	1.00	0.04	0.00	0.21	0.25	1.01	0.24	1.24
Spruce	4.51	0.05	0.14	4.70	0.05	0.01	1.60	1.66	4.62	1.74	6.36
Softwood total	5.57	0.09	0.17	5.83	0.09	0.01	1.84	1.94	5.76	2.01	7.77
Hardwoods											
Ash	0.60	0.00	0.09	0.69	0.00	0.01	0.15	0.17	0.62	0.24	0.87
Cottonwood	5.19	0.34	1.11	6.63	0.15	0.12	2.07	2.34	5.79	3.17	8.97
Elm	0.32	0.02	0.07	0.40	0.01	0.01	0.13	0.14	0.35	0.19	0.54
Hardwood total	6.11	0.36	1.26	7.73	0.17	0.14	2.35	2.65	6.77	3.61	10.38
Unit total	11.67	0.45	1.43	13.55	0.26	0.15	4.18	4.59	12.53	5.62	18.15

[a] Based on factors obtained from regional utilization studies.

All table cells without observations are indicated by -- . Table value of 0.0 indicates the volume rounds to less than 0.1 thousand cubic feet. Columns and rows may not add to their totals due to rounding.

Table 11.—Growing-stock removals from timberland for industrial roundwood, in thousand cubic feet, by Forest Inventory Unit, county, and species group, North Dakota, 2009

Forest Inventory Unit and county	All species	Softwoods				Hardwoods						
		Eastern redcedar	Ponderosa pine	Spruce	Total softwoods	Ash	Aspen/ balsam poplar	Bass-wood	Cotton-wood	Elm	White oak group	Total hardwoods
Eastern												
Barnes	2.0	--	--	0.2	0.2	0.2	--	--	1.6	--	--	1.8
Bottineau	0.2	--	--	--	--	0.1	0.2	--	--	--	--	0.2
Cass	1.1	--	--	--	--	0.5	--	--	0.4	--	0.2	1.1
Pembina	13.3	--	--	1.0	1.0	--	10.1	--	--	--	2.1	12.3
Ransom	56.4	--	--	--	--	--	--	--	56.4	--	--	56.4
Richland	26.5	0.0	0.7	--	0.7	0.4	--	0.1	25.2	--	0.1	25.8
Traill	63.3	--	--	--	--	0.2	--	--	63.0	--	--	63.3
Unit total	162.8	0.0	0.7	1.2	1.9	1.4	10.3	0.1	146.6	--	2.5	160.9
Western												
Burke	0.6	--	--	--	--	0.1	--	--	0.6	--	--	0.6
Burleigh	3.4	--	--	--	--	0.2	--	--	3.0	0.2	--	3.4
Morton	3.4	--	--	--	--	0.2	--	--	3.0	0.2	--	3.4
Slope	6.1	0.1	5.6	--	5.8	0.3	--	--	--	--	--	0.3
Unit total	13.6	0.1	5.6	--	5.8	0.7	--	--	6.6	0.4	--	7.7
State total	176.3	0.2	6.3	1.2	7.7	2.1	10.3	0.1	153.2	0.4	2.5	168.6

All table cells without observations are indicated by -- . Table value of 0 indicates the volume rounds to less than 1,000 cubic feet. Columns and rows may not add to their totals due to rounding.

Table 12.—Sawtimber removals from timberland for industrial roundwood, in thousand board feet, International ¼-inch rule, by Forest Inventory Unit, county, and species group, North Dakota, 2009

Forest Inventory Unit and county	All species	Softwoods				Hardwoods						
		Eastern redcedar	Ponderosa pine	Spruce	Total softwoods	Ash	Aspen/ balsam poplar	Bass-wood	Cotton-wood	Elm	White oak group	Total hardwoods
Eastern												
Barnes	9.9	--	--	0.9	0.9	1.0	--	--	8.0	--	--	9.0
Bottineau	1.0	--	--	--	--	0.3	--	0.7	--	--	--	1.0
Cass	5.5	--	--	--	--	2.4	--	--	1.9	--	1.2	5.5
Pembina	56.3	--	--	5.0	5.0	--	--	40.3	--	--	11.0	51.3
Ransom	280.6	--	--	--	--	--	--	--	280.6	--	--	280.6
Richland	132.3	0.2	3.7	--	3.9	2.2	0.3	--	125.3	--	0.6	128.4
Traill	314.9	--	--	--	--	1.2	--	--	313.6	--	--	314.9
Unit total	800.5	0.2	3.7	5.9	9.8	7.1	0.3	41.0	729.5	--	12.8	790.7
Western												
Burke	3.2	--	--	--	--	0.3	--	--	2.9	--	--	3.2
Burleigh	17.0	--	--	--	--	1.0	--	--	15.0	1.0	--	17.0
Morton	17.0	--	--	--	--	1.0	--	--	15.0	1.0	--	17.0
Slope	33.1	0.6	26.3	4.8	31.7	1.3	--	--	--	--	--	1.3
Unit total	70.3	0.6	26.3	4.8	31.7	3.6	--	--	33.0	2.0	--	38.6
State total	870.8	0.8	30.0	10.8	41.6	10.7	0.3	41.0	762.4	2.0	12.8	829.2

All table cells without observations are indicated by -- . Table value of 0 indicates the volume rounds to less than 1,000 cubic feet. Columns and rows may not add to their totals due to rounding.

Table 13.—Harvest residue generated by industrial roundwood harvesting, in thousand cubic feet, by Forest Inventory Unit, county, and species group, North Dakota, 2009

Forest Inventory Unit and county	All species	Softwoods				Hardwoods						
		Eastern redcedar	Ponderosa pine	Spruce	Total softwoods	Ash	Aspen/ balsam poplar	Bass-wood	Cotton-wood	Elm	White oak group	Total hardwoods
Eastern												
Barnes	0.88	--	--	0.05	0.05	0.07	--	--	0.77	--	--	0.84
Bottineau	0.05	--	--	--	--	0.02	0.03	--	--	--	--	0.05
Cass	0.43	--	--	--	--	0.16	--	--	0.19	--	0.08	0.43
Pembina	2.48	--	--	0.24	0.24	--	1.49	--	--	--	0.74	2.23
Ransom	26.99	--	--	--	--	--	--	--	26.99	--	--	26.99
Richland	12.53	0.01	0.25	--	0.26	0.15	--	0.03	12.05	--	0.04	12.27
Traill	30.26	--	--	--	--	0.08	--	--	30.17	--	--	30.26
Unit total	73.61	0.01	0.25	0.29	0.54	0.48	1.52	0.03	70.17	--	0.87	73.07
Western												
Burke	0.30	--	--	--	--	0.02	--	--	0.28	--	--	0.30
Burleigh	1.61	--	--	--	--	0.07	--	--	1.45	0.10	--	1.61
Morton	1.61	--	--	--	--	0.07	--	--	1.45	0.10	--	1.61
Slope	2.10	0.03	1.74	0.24	2.01	0.09	--	--	--	--	--	0.09
Unit total	5.62	0.03	1.74	0.24	2.01	0.24	--	--	3.17	0.19	--	3.61
State total	79.23	0.04	1.99	0.52	2.55	0.72	1.52	0.03	73.35	0.19	0.87	76.68

All table cells without observations are indicated by -- . Table value of 0 indicates the volume rounds to less than 1,000 cubic feet. Columns and rows may not add to their totals due to rounding.

Table 14.—Disposition of residues produced at primary wood-using mills, in thousand tons, green weight, by Forest Inventory Unit, disposition, residue type, and softwoods and hardwoods, North Dakota, 2009

Forest Inventory Unit and disposition	Total all residues		Residue type							
			Wood residue							
			Total wood residue		Coarse[a]		Fine[b]		Bark	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
All Units										
Residential fuel	15.8	379.8	15.8	378.0	15.8	375.4	--	2.5	--	1.8
Mulch	15.3	0.4	6.9	--	--	--	6.9	--	8.3	0.4
Miscellaneous[c]	12.4	239.3	10.7	238.9	--	--	10.7	238.9	1.6	0.4
Not used	51.5	273.3	35.3	83.5	22.5	76.9	12.8	6.6	16.2	189.8
Total	94.9	892.8	68.8	700.4	38.3	452.3	30.4	248.0	26.2	192.4
Eastern Unit										
Residential fuel	15.8	325.5	15.8	325.5	15.8	325.5	--	--	--	--
Mulch	--	0.4	--	--	--	--	--	--	--	0.4
Miscellaneous[c]	8.4	224.0	8.4	223.6	--	--	8.4	223.6	--	0.4
Not used	4.5	250.2	0.5	80.5	--	75.0	0.5	5.5	4.0	169.7
Total	28.7	800.1	24.7	629.7	15.8	400.6	8.9	229.1	4.0	170.4
Western Unit										
Residential fuel	--	54.3	--	52.4	--	49.9	--	2.5	--	1.8
Mulch	15.3	--	6.9	--	--	--	6.9	--	8.3	--
Miscellaneous[c]	3.9	15.3	2.3	15.3	--	--	2.3	15.3	1.6	--
Not used	47.0	23.1	34.9	2.9	22.5	1.8	12.3	1.1	12.2	20.2
Total	66.2	92.7	44.1	70.7	22.5	51.8	21.6	18.9	22.1	22.0

[a] Suitable for chipping such as slabs, edgings, veneer cores, etc.

[b] Not suitable for chipping such as sawdust, veneer clippings etc.

[c] Livestock bedding, small dimension, specialty items, etc.

Table may not sum due to rounding.

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Haugen, David E.; Harsel, Robert A. 2013. **North Dakota timber industry: an assessment of timber product output and use, 2009**. Resour. Bull. NRS-77. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 34 p.

Presents recent North Dakota forest industry trends; production and receipts of industrial roundwood; and production of saw logs and other products in 2009. Logging residue generated from timber harvest operations is reported, as well as wood and bark residue generated at primary wood-using mills and disposition of mill residues.

KEY WORDS: Industrial roundwood, harvest residue, mill residue, production, saw logs

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