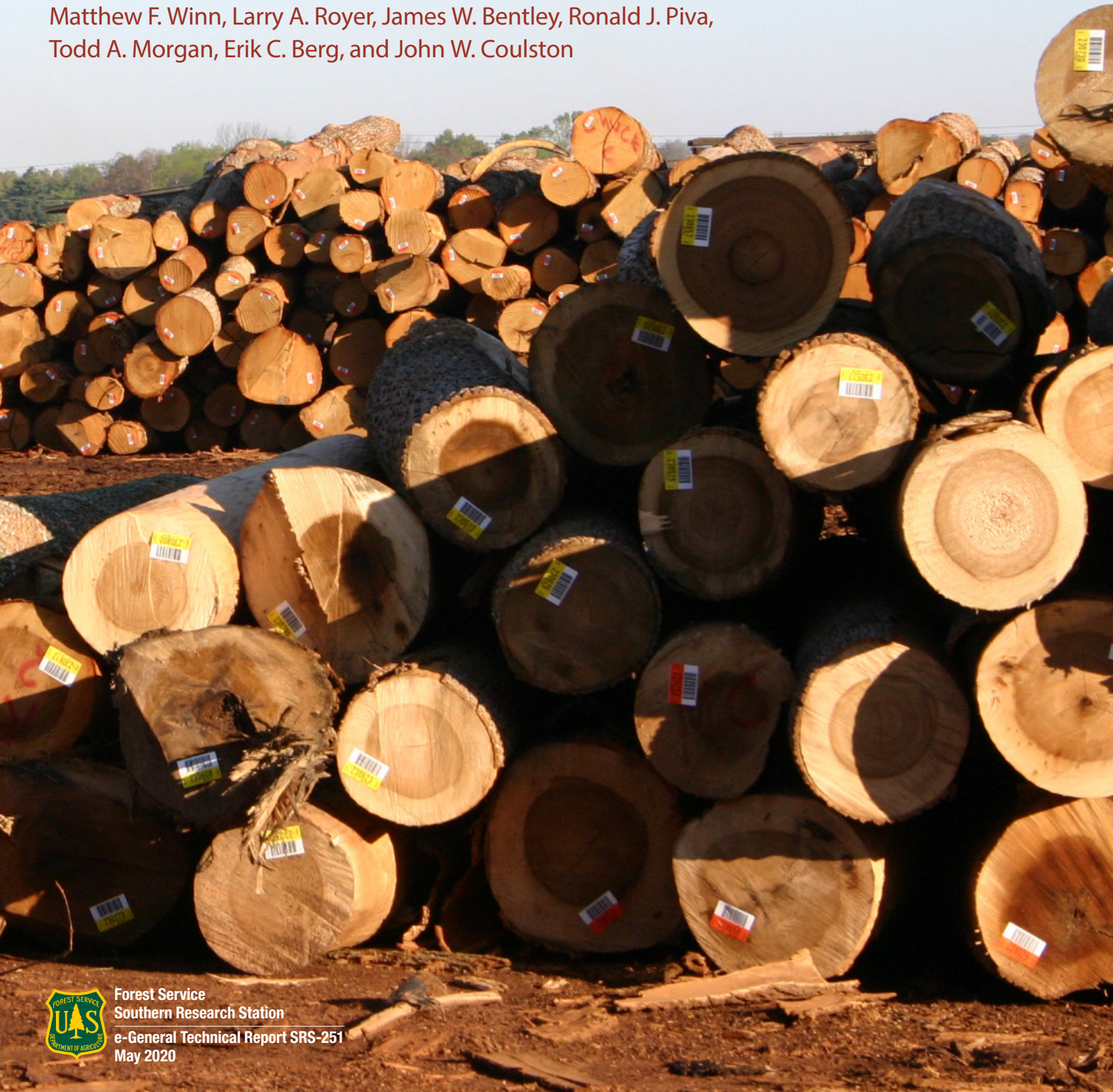
USDA
United States Department of Agriculture

TIMBER PRODUCTS MONITORING:

Unit of Measure Conversion Factors for Roundwood Receiving Facilities

Matthew F. Winn, Larry A. Royer, James W. Bentley, Ronald J. Piva,
Todd A. Morgan, Erik C. Berg, and John W. Coulston



Forest Service
Southern Research Station
e-General Technical Report SRS-251
May 2020

Authors

Matthew F. Winn is a Forestry Technician, U.S. Department of Agriculture Forest Service, Southern Research Station, Blacksburg, VA 24060.

Larry A. Royer is an Information Technology Specialist, University of Nevada, Las Vegas, NV 89154.

James W. Bentley is a Forester, U.S. Department of Agriculture Forest Service, Southern Research Station, Knoxville, TN 37919.

Ronald J. Piva is a Forester, U.S. Department of Agriculture Forest Service, Northern Research Station, St. Paul, MN 55108.

Todd A. Morgan is the Director of Forest Industry Research, University of Montana, Bureau of Business and Economic Research, Missoula, MT 59812.

Erik C. Berg is a Research Forester, University of Montana, Bureau of Business and Economic Research, Missoula, MT 59812.

John W. Coulston is a Research Forester, U.S. Department of Agriculture Forest Service, Southern Research Station, Blacksburg, VA 24060.

Abstract

The U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis (FIA) program surveys primary roundwood receiving facilities in the United States to determine industrial uses of roundwood. The questionnaires provide general mill information such as location, type, and size, as well as procurement information such as the volume of roundwood received by product type, species, and geographic origin. The questionnaires are also used to estimate the volume, type, and use of mill residues. For ease of reporting, few restrictions are placed on the units of measure, meaning mills can report volume estimates in whatever units they choose. Conversion factors or procedures are then used to transform the survey data into regional and national standardized units. These conversion factors can vary by region, State, product type, species, survey year, or other variables. This report provides a compilation and discussion of the regional conversion factors used by FIA to transform mill survey roundwood and residue volume estimates into standard units of measurement.

Keywords: Conversion factors, Forest Inventory and Analysis, mill residues, roundwood, timber products, unit of measurement.

Cover Photograph

Mixed hardwood logs, Tony Johnson, USDA Forest Service

Product Disclaimer

The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

May 2020

Forest Service
Research & Development
Southern Research Station
e-General Technical Report SRS-251

Southern Research Station
200 W.T. Weaver Blvd.
Asheville, NC 28804
www.srs.fs.usda.gov

TIMBER PRODUCTS MONITORING:

Unit of Measure Conversion Factors for Roundwood Receiving Facilities

Matthew F. Winn
Larry A. Royer
James W. Bentley
Ronald J. Piva
Todd A. Morgan
Erik C. Berg
John W. Coulston

Contents

Index of tables 1

Introduction 4
- General Survey Procedures 4
- Residues 6
- Conversion Factors 6

Saw Logs 7
- Southern Region 7
- Northern Region 7
- Western Region 8
- Saw Logs Tables 8

Veneer/Plywood Logs 15
- Southern Region 15
- Northern Region 15
- Western Region 15
- Veneer/Plywood Logs Tables 16

Pulp Mill Logs 19
- Southern Region 19
- Northern Region 19
- Western Region 19
- Pulp Mill Logs Tables 20

Composite Panels/Engineered Wood Products 50
- Southern Region 50
- Northern Region 50
- Western Region 50
- Composite Panels/ Engineered Wood Products Tables 51

Bioenergy/Industrial Fuelwood 52
- Southern Region 52
- Northern Region 52
- Western Region 52
- Bioenergy/Industrial Fuelwood Tables 53

Posts, Poles, and Pilings 55
- Southern Region 55
- Northern Region 57
- Western Region 57
- Posts, Poles, and Pilings Tables 58

House/Cabin Logs 63
- Southern Region 63
- Northern Region 63
- Western Region 64
- House/Cabin Logs Tables 64

Residential Fuelwood 67
- Southern Region 67
- Northern Region 67
- Western Region 67
- Residential Fuelwood Tables 68

Other Products 70
- Southern Region 70
- Northern Region 70
- Western Region 70
- Other Products Section Tables 71

Residues 76
- Southern Region 76
- Northern Region 77
- Western Region 78
- Residues Tables 79

Conversion Factor Variability 88
- Expected Variability 88
- Actual Variability 91
- Variability Comparison 105
- Conversion Factor Variability Tables 109

Summary 135

Literature Cited 136

Definition of Terms 137

Appendix A: Conversion factor tables 139

Appendix B: Measurement unit descriptions 140

Appendix C: Northern tree species, species group, and bark thickness 144

Index of tables

(A quick reference for conversion factor tables by roundwood type and region is available in Appendix A: Conversion factor tables)

6 Table 1—National and regional standard measurement units for each roundwood type

8 Table 2—Conversion factors used by Forest Inventory and Analysis in the Southern Region to convert saw log and veneer log volume measured using Doyle log rule to International ¼-inch

9 Table 3—Conversion factors used by Forest Inventory and Analysis in the Southern Region to convert saw log and veneer log volume measured using Scribner Decimal C log rule to International ¼-inch

10 Table 4—Conversion factors used by Forest Inventory and Analysis in the Southern Region to convert saw log and veneer log volume measured using Cedar log rule to International ¼-inch

11 Table 5—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Southern Region of the United States

12 Table 6—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Northern Region of the United States (includes all Northern States and northern tree species)

13 Table 7—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Western Region of the United States (includes all western tree species)

14 Table 8—Roundwood conversion factors used by Forest Inventory and Analysis for stud logs in the Western Region of the United States (includes all western tree species)

16 Table 9—Roundwood conversion factors used by Forest Inventory and Analysis for veneer logs in the Southern Region of the United States**17** Table 10—Roundwood conversion factors used by Forest Inventory and Analysis for veneer logs in the Northern Region of the United States (includes all Northern States and northern tree species)

18 Table 11—Roundwood conversion factors used by Forest Inventory and Analysis for veneer logs in the Western Region of the United States (includes all western tree species)

20 Table 12—Roundwood conversion factors used by Forest Inventory and Analysis for pulp mill logs in the Southern Region of the United States

21 Table 13—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States)

35 Table 14— Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States)

49 Table 15—Roundwood conversion factors used by Forest Inventory and Analysis for pulp mill logs in the Western Region of the United States (includes all western tree species)

51 Table 16—Conversion factors used by Forest Inventory and Analysis for roundwood processed into composite panels or engineered wood products in the Southern Region of the United States

51 Table 17—Conversion factors used by Forest Inventory and Analysis for roundwood processed into composite panels or engineered wood products in the Western Region of the United States (includes all western tree species)

53 Table 18—Conversion factors used by Forest Inventory and Analysis for roundwood processed into bioenergy and industrial fuelwood in the Southern Region of the United States

53 Table 19—Conversion factors used by Forest Inventory and Analysis for roundwood processed into bioenergy and industrial fuelwood in the Northern Region of the United States (includes all Northern States and northern tree species)

54 Table 20—Roundwood conversion factors used by Forest Inventory and Analysis for energywood logs in the Western Region of the United States (includes all western tree species)

59 Table 22—Conversion factors used by Forest Inventory and Analysis for roundwood processed into posts ≤9 feet in length in the Southern Region of the United States (includes all Southern States and southern tree species)

60 Table 23—Conversion factors used by Forest Inventory and Analysis for roundwood processed into posts in the Northern Region of the United States (includes all Northern States and northern tree species)

60 Table 24—Conversion factors used by Forest Inventory and Analysis for roundwood processed into poles in the Northern Region of the United States (includes all Northern States and northern tree species)

60 Table 25—Conversion factors used by Forest Inventory and Analysis for roundwood processed into pilings in the Northern Region of the United States (includes all Northern States and northern tree species)

61 Table 26—Conversion factors used by Forest Inventory and Analysis for roundwood processed into poles and posts in the Western Region of the United States (includes all western tree species)

62 Table 27—Conversion factors used by Forest Inventory and Analysis for roundwood processed into pilings and utility poles in the Western Region of the United States (includes all western tree species)

64 Table 28—Conversion factors used by Forest Inventory and Analysis for house and cabin logs in the Northern Region of the United States (includes all Northern States and northern tree species)

65 able 29—Roundwood conversion factors used by Forest Inventory and Analysis for house and cabin logs in the Western Region of the United States (includes all western tree species)

66 Table 30—Conversion factors used by Forest Inventory and Analysis for roundwood processed into vigas in the Western Region of the United States (includes all western tree species)

66 Table 31—Conversion factors used by Forest Inventory and Analysis for roundwood processed into latillas in the Western Region of the United States (includes all western tree species)

68 Table 32—Conversion factors used by Forest Inventory and Analysis for residential fuelwood in the Southern Region of the United States

68 Table 33—Conversion factors used by Forest Inventory and Analysis for residential fuelwood in the Northern Region of the United States (includes all Northern States and northern tree species)

69 Table 34—Roundwood conversion factors used by Forest Inventory and Analysis for firewood logs in the Western Region of the United States (includes all western tree species)

71 Table 35—Conversion factors used by Forest Inventory and Analysis for other products in the Northern Region of the United States (includes all Northern States and northern tree species)

72 Table 36—Roundwood conversion factors used by Forest Inventory and Analysis for furniture logs in the Western Region of the United States (includes all western tree species)

73 Table 37—Roundwood conversion factors used by Forest Inventory and Analysis for cedar logs in the Western Region of the United States (includes all western tree species)

74 Table 38—Roundwood conversion factors used by Forest Inventory and Analysis for fiber logs in the Western Region of the United States (includes all western tree species)

75 Table 39—Conversion factors used by Forest Inventory and Analysis for roundwood processed into other wood products in the Western Region of the United States (includes all western tree species)

79 Table 40—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for saw logs in the Southern Region of the United States

80 Table 41—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for veneer/plywood logs in the Southern Region of the United States

81 Table 42—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for composite panel/engineered wood product logs in the Southern Region of the United States

81 Table 43—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for piling/pole/post logs, pulp mill logs, house/cabin logs, bioenergy/fuelwood logs, and other products in the Southern Region of the United States

82 Table 44—Conversion factors used by Forest Inventory and Analysis for all residue types in the Southern Region of the United States

82 Table 45—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for saw logs in the Northern Region of the United States

83 Table 46—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for veneer logs in the Northern Region of the United States

83 Table 47—Roundwood/chips-to-residue conversion factors used by Forest Inventory and Analysis for pulp and composite panels in the Northern Region of the United States

83 Table 48—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for house/cabin logs in the Northern Region of the United States

84 Table 49—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for pilings in the Northern Region of the United States

84 Table 50—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for poles in the Northern Region of the United States

84 Table 51—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for posts in the Northern Region of the United States

85 Table 52—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for other products in the Northern Region of the United States

85 Table 53—Conversion factors used by Forest Inventory and Analysis for mill residues used in pulp and composite panel production in the Northern Region of the United States (includes all Northern States)

87 Table 55—Residue conversion factors used by Forest Inventory and Analysis in the Western Region of the United States (includes all Western States and western tree species)

109 Table 56—Expected sources of variability for roundwood and residue conversion factors used in Forest Inventory and Analysis Timber Product Output data processing

110 Table 57—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

118 Table 58—Roundwood-to-residue variability sources by region, roundwood type, residue type, and roundwood/residue units of measure for Forest Inventory and Analysis Timber Product Output data conversions

119 Table 59—Inter-State percentage differences in saw log conversion factors (MCF to MBF) used in the Southern Region of the United States[a]

119 Table 60—Inter-State percentage differences in average yearly saw log conversion factors (MCF to MBF) used in the Western Region of the United States

120 Table 61—Inter-State percentage differences in veneer log conversion factors (MCF to MBF) used in the Southern Region of the United States[a]

120 Table 62—Inter-State percentage differences in average yearly veneer log conversion factors (MCF to MBF) used in the Western Region of the United States

121 Table 63—Inter-State percentage differences in pulp mill log conversion factors (standard cords to MBF) used in the Southern Region of the United States

122 Table 64—Mean, ranges, maximum percentage difference from the mean (PDM), and number of observations for species group conversion factors used to convert pulp mill logs to standard cords in the Northern Region of the United States

123 Table 65—Species groups associated with lower and upper ranges and maximum percentage difference from the mean (PDM) for conversion factors used to convert pulp mill logs to standard cords in the Northern Region of the United States

124 Table 66—Inter-State percentage differences in average yearly pulp mill log conversion factors and composite panel/engineered wood product logs (MCF to MBF) used in the Western Region of the United States

124 Table 67—Inter-State percentage differences in conversion factors (MCF to standard cords) for logs manufactured into composite panels or engineered wood products in the Southern Region of the United States[a]

125 Table 68—Inter-State percentage differences in average yearly energywood log conversion factors (MCF to MBF) used in the Western Region of the United States

125 Table 69—Inter-State percentage differences in average yearly post and pole log conversion factors (MCF to MBF) used in the Western Region of the United States

125 Table 70—Inter-State percentage differences in average yearly utility pole and piling roundwood conversion factors (MCF to MBF) used in the Western Region of the United States

126 Table 71—Inter-State percentage differences in average yearly house/cabin log conversion factors (MCF to MBF) used in the Western Region of the United States

126 Table 72—Inter-State percentage differences in average yearly viga/latilla log conversion factors (MCF to MBF) used in the Western Region of the United States

126 Table 73—Inter-State percentage differences in average yearly firewood log conversion factors (MCF to MBF) used in the Western Region of the United States

127 Table 74—Inter-State percentage differences in average yearly furniture log conversion factors (MCF to MBF) used in the Western Region of the United States

127 Table 75—Inter-State percentage differences in average yearly cedar log conversion factors (MCF to MBF) used in the Western Region of the United States

127 able 76—Inter-State percentage differences in average yearly fiber log conversion factors (MCF to MBF) used in the Western Region of the United States

128 Table 77—Inter-State percentage differences in average yearly log conversion factors (MCF to MBF) for other logs used in the Western Region of the United States

128 Table 78—Inter-State percentage differences in residue conversion factors (standard cords to MCF) in the Southern Region of the United States

129 Table 79—Inter-State percentage differences in roundwood-to-residue conversion factors for saw logs (MBF to green tons) in the Southern Region of the United States

131 Table 80—Inter-State percentage differences in roundwood-to-residue conversion factors for veneer logs (MBF to green tons) in the Southern Region of the United States

133 Table 81—Inter-State percentage differences in roundwood-to-bark residue conversion factors for composite panel/engineered wood product logs (standard cords to green tons) in the Southern Region of the United States

134 Table 82—Inter-State percentage differences in average yearly roundwood-to-residue conversion factors (MBF lumber tally to BDU) for western sawmills

Introduction

Roundwood products are logs, bolts, or chips cut from trees for industrial or consumer use. The U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis (FIA) program categorizes roundwood based on product output. Standard roundwood types include: saw logs, veneer and plywood logs, pulp mill logs and chipped roundwood, composite panels and engineered wood products, bioenergy and fuelwood, house and cabin logs, pilings, poles, posts, residential fuelwood, and other miscellaneous types. In order to determine the nationwide usage of industrial roundwood, FIA conducts Timber Product Output (TPO) surveys. All primary roundwood receiving facilities (from here on out referred to as "mills") within each State are canvassed to determine use of roundwood by product, species, and geographic location. In addition, the volume, type, and use of wood residues generated during primary processing operations are also determined. Survey units are divided into three regions (fig. 1). The Southern Region includes Texas, Oklahoma, Arkansas, Kentucky, Virginia, and all States to the south and east. The Western Region includes New Mexico, Colorado, Wyoming, Montana, and all States to the west (including Alaska). All other States to the north and east are grouped into the Northern Region. Through 2018 (data year 2017), regional mill surveys were administered periodically, with the South canvassed every 2 years, the North every 3–5 years, and the West every 4–7 years. Beginning in 2019 (data year 2018), TPO mill studies began adopting an annual sample-based approach. A stratified sampling approach that approximates probability proportional to size sampling (Coulston and others 2018) was implemented in the Eastern United States. This approach targets a 40-percent sample of roundwood receiving facilities. The 40-percent sample of roundwood receiving facilities accounts for approximately 85–95 percent of all roundwood volume received for products.

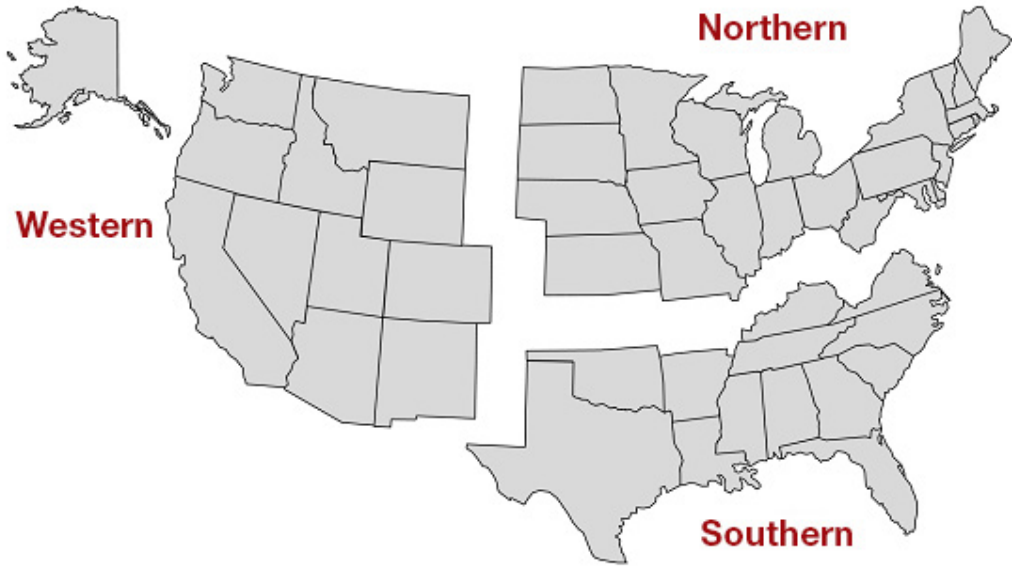


Figure 1—Regional division of Forest Inventory and Analysis (FIA) Timber Product Output (TPO) primary wood-using mill canvassing.

General Survey Procedures

Mill questionnaires are typically administered through the U.S. Postal Service, e-mail, telephone calls, fax, or in-person mill visits. Once the mill information is collected, the regional administrators check the data for accuracy, consistency, and completeness. Survey information is then prepared for data entry by assigning numerical codes to the different data items, with each region having their own set of codes or using the national standard codes for mill data (e.g., mill type, roundwood type received, measurement units, tree species, product type, residue type, etc). Coded mill data from the hard-copy or electronic survey forms are then entered into a database/compilation system where the data are stored and summarized as needed for reporting purposes.

Measurement Units

All roundwood estimates that are entered into the database have associated units of measure based on data provided by the mills and can vary by mill, region, species, log size, and/or product type. Though the regional survey administrators may suggest units of measure for different roundwood types, few restrictions are placed on the mills regarding the units they can report. With the exception of roundwood used for residential fuelwood, which can be reported in various miscellaneous units, the units of measure in the subsequent paragraphs encompass the majority of the primary wood products industry (see app. B for descriptions of measurement units referenced in this report).

Roundwood entering mills is scaled by weight, volume, or linear measurements, usually dependent on the type of product manufactured. Weight is typically reported in tons, metric tonnes (usually Canadian mills), or pounds and can represent either green or dry wood material. In general, there is a strong correlation between wood weight and volume, so many mills estimate roundwood volume from weight measurements (Fonseca 2005). However, in some States (such as Maine), it is illegal to convert weight measurements to volume for the purpose of payment (Maine Revised Statutes Title 10. Commerce and Trade § 2363-A. Measurement of wood [2013]).

Volume scaling of roundwood can be performed on an individual log or stacked logs basis. Stacked volume measurement includes the area occupied by solid wood, bark, and the air space between the individual pieces. In some cases, the stacked logs have been peeled, so the volume estimate does not include bark. The most common measure of stacked volume is the standard cord, which occupies a space of 128 cubic feet (4 feet x 4 feet x 8 feet). Other measurement units associated with stacked roundwood include the Lake States cord (4 feet x 4 feet x 100 inches, or ~133 cubic feet), 102-inch cord, 104-inch cord, and the 4,600-pound cord.

Individual log scaling uses length and diameter measurements to estimate volume either in cubic volumetric units or in product output units. Cubic volumetric units include cubic feet, cunits (100 cubic feet), and cubic meters, and estimates using this scaling method include the full volume of sound wood including lumber, chips, sawdust, shavings, etc. Scaling methods based on product output are used to predict the portion of a log that is recoverable as a finished primary product and does not include saw kerf, slabs, or mill residues. They typically rely on reference tables or formulas with log length and diameters as the input variables. According to Bond (2011), the most common unit of measure in the United States for output-based scaling is board feet (1 inch x 1 inch x 1 foot), but some mills tally in linear feet, pieces, or lath bundles (multiple pieces), depending on the end product. The major board foot log rules in use include Doyle, International ¼-inch, Scribner, and Scribner Decimal C, and mill preference tends to vary by region (Bond 2011). The Scribner log rule, which is the most widely used in the United States, can be further subdivided into eastside (short log) and westside (long log), the latter of which is primarily used in the coastal regions of the Pacific Northwest (Spelter 2003). In lieu of scaling logs to determine roundwood volume, some mills determine volume based on a board foot tally of the lumber produced.

To simplify analysis of roundwood usage data and to allow for consistent reporting, each TPO regional program uses its own standard measurement units for each roundwood type. If mills report data in units other than the designated standard units, the values are converted using regional conversion factors. Additionally, conversions are made to national standardized units of measure if they differ from regional units. Table 1 lists the national and regional standard units associated with each roundwood type. The units used by the Northern and Southern Regions vary by roundwood type while the Western Region uses thousand board feet (MBF) Scribner for all types.

Residues

In addition to roundwood usage data, the TPO mill surveys also collect information on the volume and disposition of wood residues generated during primary processing of each roundwood and species type (hardwood/softwood). Mill residues can be classified as bark, coarse (slabs, edgings, trims, cores, etc.), sawdust (fine), planer or lathe shavings (fine), or logs/short sections chipped or not processed as the mill's primary product. The Northern and Southern Regions have no standard unit of measure for residues but typically use green tons or thousand cubic feet (MCF). Standard cords are sometimes used in the North for regional reporting. The standard unit of measurement for residues in the Western Region are bone dry units (BDU). Other residue measurement units occasionally reported by mills include cubic meters, cunits, 200-cubic-foot units (200 CFU), pounds, dry tons, and bone dry tons (BDT). Note that "bone dry tons" is the terminology used in the Western Region but is equivalent to "dry tons," which is the terminology used in the other regions.

Conversion Factors

Mills report the volume of roundwood received in a variety of measurement units. If the mill-reported units differ from the regional standard units, conversion factors must be applied to the raw data. Measurement units used in regional and national TPO reports often differ from the standard units used by each region; therefore, volume conversions to various reporting units are also necessary. Though the majority of conversions are done using a single factor, there are some cases where conversions are performed using formulas or conversion tables that take into account multiple dependent variables. Residue conversions are performed in the same manner as roundwood conversions but have their own set of conversion factors. In situations where residue amounts cannot be provided by the mills, roundwood volumes are used to estimate the volume of each type of mill residue produced.

Once mill survey data have been collected and processed, the summarized information is disseminated to the public through published reports and through the online TPO Reporting Tool at https://www.fs.usda.gov/srsfia/php/tpo_2009/tpo_rpa_int1.php. The purpose of this report is to provide a comprehensive compilation of all roundwood conversion factors/processes used by each region in order to illustrate how the data presented to the public are derived. Mill residue and roundwood-to-residue conversion factors are also given. Accompanying the list of conversion factors are specific examples illustrating how conversion factors/processes for each product type and region are applied. A discussion of factor variability between and within regions is also presented, as well as recommendations for improving factor consistency and accuracy.

Table 1—National and regional standard measurement units for each roundwood type

Roundwood type	National	Southern Region	Northern Region	Western Region
Saw logs	MBF International ¼-inch	MBF International ¼-inch	MBF International ¼-inch	MBF Scribner
Veneer and plywood logs	MBF International ¼-inch	MBF International ¼-inch	MBF International ¼-inch	MBF Scribner
Pulp mill logs and chipped roundwood	Standard cords	Standard cords	Standard cords	MBF Scribner
Composite panels/ engineered wood products	Standard cords	Standard cords	Standard cords	MBF Scribner
Bioenergy/ industrial fuelwood	Standard cords	Standard cords	Standard cords	MBF Scribner
House and cabin logs	MCF	MCF	MCF	MBF Scribner
Pilings	MCF	C-pieces	MLF	MBF Scribner
Poles	MCF	C-pieces	Pieces	MBF Scribner
Posts	MCF	M-pieces	M-pieces	MBF Scribner
Residential fuelwood	Standard cords	Standard cords	Standard cords	MBF Scribner
Other	MCF	MCF	MCF	MBF Scribner

For a list of abbreviations, see p. 137.

Saw Logs

Saw logs are roundwood products, usually 8 feet in length or longer, processed into a variety of sawn products such as lumber, cants, blocks, and squares. Saw log volume is typically determined using a log rule (a formula or table used to estimate the board feet of lumber inside a log of a given diameter and length). Allowances for losses due to slabs, saw kerf, edgings, and shrinkage are built into each rule. Though not as common, some mills estimate volume in cubic feet, in which case allowances for wood losses are typically not considered in the volume determination. Log rules tend to vary by region, so what is frequently used in one part of the country may not be as common in another.

Southern Region

In the Southern Region, the FIA standard unit for saw log volume is MBF and is calculated using the International ¼-inch log rule. Three other commonly used log rules in the South are Doyle, Scribner Decimal C, and Cedar. Tables 2–4 list the factors used to convert log volume estimates based on Doyle, Scribner Decimal C, and Cedar log rules, respectively, to the standard rule of International ¼-inch. The log scale conversion factors vary by scaling diameter and log length. The factors used to convert the various other units of measurement to standard units are listed in table 5 and vary by State and species type. (Note that State-specific conversion factors are based on the State where the mill resides, not the State where the roundwood originated. This is the case for all regions.)

CONVERSION EXAMPLE 1: A sawmill in Tennessee reports that it processed 4,000 MBF Doyle log rule of hardwood logs to lumber. On average the logs have a scaling diameter of 15 inches and a length of 12 feet.

Regional/national standard unit conversion (MBF Doyle to MBF International ¼-inch) using table 2:
4,000 MBF Doyle × 1.264 MBF International ¼-inch per MBF Doyle = 5,056 MBF International ¼-inch

Conversion to MCF (MBF International ¼-inch to MCF) using table 5:
5,056 MBF International ¼-inch × 0.163 MCF per MBF International ¼-inch = 824 MCF

Northern Region

The Northern Region also uses MBF International ¼-inch as the standard unit of measure for log volume. Other log rules used in the North include Doyle, Scribner, and Scribner Decimal C. Whereas the Southern Region uses log rule tables to convert between the various log rules, the Northern Region uses straight conversion factors (table 6). Average log length and diameter are not taken into consideration. The factors used to convert all units to standard units are listed in table 6 and are used for all Northern States and northern species.

CONVERSION EXAMPLE 2: A sawmill in New York reports that it processed 5,000 MBF Scribner Decimal C of hardwood logs to lumber.

Regional/national standard unit conversion (MBF Scribner Decimal C to MBF International ¼-inch) using table 6:
5,000 MBF Scribner Decimal C × 1.08 MBF International ¼-inch per MBF Scribner Decimal C = 5,400 MBF International ¼-inch

Conversion to MCF (MBF International ¼-inch to MCF) using table 6:
5,400 MBF International ¼-inch × 0.158 MCF per MBF International ¼-inch = 853 MCF

Western Region

In the Western Region, the standard unit for saw log volume is MBF Scribner, and mills rarely report log volumes using other log rules. However, the Scribner rule comes in two variations which mainly differ by maximum log length allowed. The westside rule, which is used in the coastal regions of the Pacific Northwest, allows for maximum log lengths of 40 feet. The eastside rule is typically used for areas east of the Cascade Range and allows for a maximum log length of 20 feet. Table 7 lists the factors used to convert Scribner log volume to International ¼-inch and cubic foot volume, as well as several other weight and volume conversion factors related to saw logs. In the West, separate factors are used for stud logs for conversion to standard cords and weight. Stud logs are typically from smaller trees 8–12 inches diameter at breast height (DBH) or from larger diameter tree "top logs." Products derived from stud logs are generally products such as 2 by 4s and 2 by 6s. Conversion factors for stud logs are shown in table 8. Saw log and stud log factors used to convert between Scribner volume and MCF vary by State and survey year. Other conversion factors apply to all logs.

CONVERSION EXAMPLE 3: In 2016, a sawmill in Colorado reported that it processed 3,000 MBF Scribner of logs to lumber.

National standard unit conversion (MBF Scribner to MBF International ¼-inch) using table 7:
3,000 MBF Scribner × 1.12 MBF International ¼-inch per MBF Scribner = 3,360 MBF International ¼-inch

Conversion to MCF (MBF Scribner to MCF) using table 7:
3,000 MBF Scribner / 4.8 MBF Scribner per MCF = 625 MCF

Saw Logs Tables

Table 2—Conversion factors used by Forest Inventory and Analysis in the Southern Region to convert saw log and veneer log volume measured using Doyle log rule to International ¼-inch

Scaling diameter	Log length (feet)						
	6	8	10	12	14	16	>16
inches	*MBF International ¼-inch per MBF Doyle*						
6	2.500	5.000	3.333	5.000	3.750	5.000	1.320
7	3.333	2.000	2.500	2.857	3.125	3.333	1.320
8	1.667	1.875	2.000	2.083	2.500	2.500	1.320
9	1.667	1.538	1.875	1.842	2.045	2.000	1.320
10	1.429	1.667	1.522	1.667	1.719	1.806	1.320
11	1.389	1.400	1.452	1.486	1.628	1.633	1.320
12	1.250	1.406	1.375	1.458	1.518	1.484	1.320
13	1.333	1.341	1.373	1.393	1.408	1.420	1.320
14	1.184	1.300	1.270	1.333	1.307	1.350	1.320
15	1.222	1.230	1.250	1.264	1.274	1.322	1.320
16	1.111	1.181	1.222	1.204	1.230	1.250	1.320
17	1.111	1.118	1.179	1.181	1.216	1.213	1.320
18	1.081	1.122	1.138	1.156	1.163	1.173	1.320
19	1.071	1.106	1.099	1.124	1.142	1.156	1.320
20	1.042	1.055	1.094	1.094	1.116	1.133	1.320
21	1.065	1.069	1.077	1.083	1.107	1.107	1.320
22	1.025	1.049	1.059	1.070	1.074	1.096	1.320
23	1.037	1.022	1.040	1.052	1.060	1.080	1.320
24	1.000	1.025	1.020	1.033	1.057	1.063	1.320
25	1.000	0.995	1.014	1.027	1.036	1.043	1.320
26	0.989	0.992	1.007	1.019	1.026	1.033	1.320
27	0.985	0.981	0.997	1.008	1.015	1.021	1.320
28	0.972	0.972	0.986	0.995	1.012	1.016	1.320
29	0.962	0.974	0.985	0.991	0.996	1.008	1.320
30	0.965	0.962	0.969	0.976	0.988	0.999	1.320

Table 3—Conversion factors used by Forest Inventory and Analysis in the Southern Region to convert saw log and veneer log volume measured using Scribner Decimal C log rule to International ¼-inch

Scaling diameter	Log length (feet)						
	6	8	10	12	14	16	>16
inches	*----------MBF International ¼-inch per MBF Doyle----------*						
6	1.000	2.000	1.000	1.500	1.500	1.000	1.120
7	2.000	1.000	1.500	1.000	1.250	1.000	1.120
8	1.000	1.500	1.000	1.250	1.750	1.333	1.120
9	1.500	1.000	1.000	1.167	1.500	1.250	1.120
10	1.000	1.000	1.167	1.500	1.375	1.083	1.120
11	1.250	1.167	1.125	1.375	1.400	1.143	1.120
12	1.000	1.125	1.100	1.167	1.214	1.188	1.120
13	1.000	1.100	1.167	1.214	1.250	1.150	1.120
14	1.125	1.083	1.143	1.111	1.150	1.227	1.120
15	1.100	1.071	1.056	1.045	1.125	1.143	1.120
16	1.000	1.063	1.100	1.083	1.107	1.125	1.120
17	1.000	1.056	1.042	1.071	1.125	1.139	1.120
18	1.000	1.000	1.077	1.063	1.053	1.095	1.120
19	1.000	1.042	1.033	1.056	1.071	1.083	1.120
20	0.909	0.964	1.029	1.000	1.042	1.036	1.120
21	0.958	1.033	1.026	1.022	1.037	1.067	1.120
22	0.962	1.000	1.024	1.040	1.052	1.076	1.120
23	1.000	0.974	1.022	1.018	1.015	1.026	1.120
24	1.000	0.976	1.020	1.033	1.057	1.063	1.120
25	0.971	0.957	0.966	1.063	1.000	1.000	1.120
26	0.947	0.960	0.984	1.000	0.989	1.000	1.120
27	0.929	0.963	0.971	0.976	0.979	0.982	1.120
28	0.955	0.966	0.986	0.977	1.000	1.009	1.120
29	0.978	0.984	1.013	1.011	1.028	1.033	1.120
30	0.980	0.985	1.000	1.010	1.026	1.023	1.120

Table 4—Conversion factors used by Forest Inventory and Analysis in the Southern Region to convert saw log and veneer log volume measured using Cedar log rule to International ¼-inch

Scaling diameter	Log length (feet)						
	6	8	10	12	14	16	>16
inches	*----------MBF International ¼-inch per MBF Doyle----------*						
6	0.625	0.909	0.769	0.938	0.789	0.952	0.952
7	0.909	0.667	0.833	0.909	1.000	1.034	1.034
8	0.714	0.789	0.833	0.893	1.061	1.053	1.053
9	0.833	0.833	1.000	0.972	1.071	1.042	1.042
10	0.909	1.000	0.946	1.023	1.058	1.102	1.102
11	0.926	0.972	1.000	1.019	1.111	1.111	1.111
12	0.938	1.047	1.038	1.094	1.133	1.118	1.118
13	1.053	1.100	1.111	1.133	1.149	1.150	1.150
14	1.023	1.121	1.096	1.149	1.127	1.164	1.164
15	1.100	1.119	1.145	1.150	1.154	1.203	1.203
16	1.053	1.118	1.158	1.140	1.165	1.184	1.184
17	1.094	1.105	1.168	1.163	1.200	1.199	1.199
18	1.111	1.146	1.167	1.181	1.190	1.198	1.198
19	1.125	1.168	1.157	1.180	1.203	1.215	1.215
20	1.124	1.134	1.182	1.180	1.202	1.224	1.224
21	1.173	1.183	1.196	1.199	1.223	1.226	1.226
22	1.157	1.181	1.201	1.209	1.215	1.237	1.237
23	1.186	1.178	1.199	1.213	1.218	1.246	1.246
24	1.172	1.199	1.192	1.211	1.237	1.246	1.246

Table 5—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Southern Region of the United States[a]

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
All Southern States	All species	Board feet (lumber tally)	MBF International ¼-inch	0.00105	MBF per board foot
Georgia	All species	MCF	MBF International ¼-inch	0.168	MCF per MBF
Oklahoma	All species	MCF	MBF International ¼-inch	0.168	MCF per MBF
All Southern States	Hardwood	Dry tons	MBF International ¼-inch	3.139	Tons per MBF
All Southern States	Hardwood	Green tons	MBF International ¼-inch	6.278	Tons per MBF
All Southern States	Hardwood	Standard cords	MBF International ¼-inch	0.420	MBF per cord
Alabama	Hardwood	MCF	MBF International ¼-inch	0.165	MCF per MBF
Arkansas	Hardwood	MCF	MBF International ¼-inch	0.159	MCF per MBF
Florida	Hardwood	MCF	MBF International ¼-inch	0.170	MCF per MBF
Kentucky	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Louisiana	Hardwood	MCF	MBF International ¼-inch	0.166	MCF per MBF
Mississippi	Hardwood	MCF	MBF International ¼-inch	0.165	MCF per MBF
North Carolina	Hardwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
South Carolina	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Tennessee	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Texas	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Virginia	Hardwood	MCF	MBF International ¼-inch	0.164	MCF per MBF
All Southern States	Softwood	Dry tons	MBF International ¼-inch	2.92125	Tons per MBF
All Southern States	Softwood	Green tons	MBF International ¼-inch	5.84250	Tons per MBF
All Southern States	Softwood	Standard cords	MBF International ¼-inch	0.415	MBF per cord
Alabama	Softwood	MCF	MBF International ¼-inch	0.167	MCF per MBF
Arkansas	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Florida	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Kentucky	Softwood	MCF	MBF International ¼-inch	0.165	MCF per MBF
Louisiana	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Mississippi	Softwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
North Carolina	Softwood	MCF	MBF International ¼-inch	0.171	MCF per MBF
South Carolina	Softwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
Tennessee	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Texas	Softwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
Virginia	Softwood	MCF	MBF International ¼-inch	0.171	MCF per MBF

[a] This table does not include log rule conversions for saw logs. See tables 2, 3, and 4 for log rule conversions.

Table 6—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
102-inch cord	MBF International ¼-inch	0.53125	MBF per cord
Cubic feet	MBF International ¼-inch	0.006329114	MBF per cubic foot
Cubic meters	MBF International ¼-inch	0.22351	MBF per cubic meter
Green tons	MBF International ¼-inch	0.2174	MBF per ton
Lake States cord	MBF International ¼-inch	0.52085	MBF per cord
Mine ties (pieces)	MBF International ¼-inch	0.01	MBF per piece
Pallets (pieces)	MBF International ¼-inch	0.013	MBF per piece
Small ties (pieces)	MBF International ¼-inch	0.025	MBF per piece
Standard cords	MBF International ¼-inch	0.5	MBF per cord
MBF Doyle	MBF International ¼-inch	1.38	MBF International ¼-inch per MBF Doyle
MBF lumber tally	MBF International ¼-inch	1.0	MBF International ¼-inch per MBF lumber tally
MBF Scribner	MBF International ¼-inch	1.08	MBF International ¼-inch per MBF Scribner
MBF Scribner Decimal C	MBF International ¼-inch	1.08	MBF International ¼-inch per MBF Scribner Decimal C
MBF International ¼-inch	MCF	0.158	MCF per MBF
Ties (pieces)	MBF International ¼-inch	0.035	MBF per piece

Table 7—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	83	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	93	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4150	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4650	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.08	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.33	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meter per cunit
Alaska	2005	MCF	MBF Scribner	5.3	MBF Scribner per MCF
Alaska	2011	MCF	MBF Scribner	5.78	MBF Scribner per MCF
Alaska	2015	MCF	MBF Scribner	5.3	MBF Scribner per MCF
Arizona	2002	MCF	MBF Scribner	5.61	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	5.61	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	5.95	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	5.60	MBF Scribner per MCF
California	2000	MCF	MBF Scribner	5.22	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	5.35	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	5.44	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	5.32	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	5.25	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	5.27	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	4.32	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	4.8	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	4.172	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	4.7	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	4.99	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	4.49	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	3.89	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	3.93	MBF Scribner per MCF
Nevada	2005	MCF	MBF Scribner	5.22	MBF Scribner per MCF
Nevada	2007	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Nevada	2012	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Nevada	2015	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Nevada	2016	MCF	MBF Scribner	5.0	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	5.86	MBF Scribner per MCF

(Continued)

Table 7 *(Continued)*—Roundwood conversion factors used by Forest Inventory and Analysis for saw logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
New Mexico	2007	MCF	MBF Scribner	5.75	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	5.55	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	5.71	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	4.19	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.35	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	4.08	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	5.42	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	5.15	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	5.08	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Washington	2002	MCF	MBF Scribner	4.19	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.35	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	4.08	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	4.08	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	4.08	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	4.68	MBF Scribner per MCF
Wyoming	2005	MCF	MBF Scribner	4.78	MBF Scribner per MCF
Wyoming	2010	MCF	MBF Scribner	6.48	MBF Scribner per MCF
Wyoming	2014	MCF	MBF Scribner	4.62	MBF Scribner per MCF

Table 8—Roundwood conversion factors used by Forest Inventory and Analysis for stud logs in the Western Region of the United States (includes all western tree species)[a]

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	81	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	91	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4050	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4550	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.03	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.28	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit

[a] All MCF to MBF conversion factors for stud logs are the same as for saw logs.

Veneer/Plywood Logs

Veneer and plywood logs are roundwood products peeled, sliced, stamped, or sawn into a variety of veneer products. On the low end (in terms of log value), this includes softwood logs manufactured into plywood and sheathing and on the high end includes appearance-grade hardwood veneer logs.

Southern Region

Board foot volume of veneer logs in the Southern Region is estimated using the same log rules as those used for saw logs, and the conversion factors for the various log rules are also the same (tables 2–4). The standard unit for veneer logs is MBF International ¼-inch. Some of the conversion factors used for veneer logs differ slightly from those used for saw logs, so a complete list of veneer log conversion factors is shown in table 9.

CONVERSION EXAMPLE 4: A plywood mill in South Carolina reports that it processed 20,000 MBF Scribner Decimal C of softwood logs with an average scaling diameter of 12 inches and a length of 18 feet.

Regional/national standard unit conversion (MBF Scribner Decimal C to MBF International ¼-inch) using table 3:
20,000 MBF Scribner Decimal C × 1.120 MBF International ¼-inch per MBF Scribner Decimal C = 22,400 MBF International ¼-inch

Conversion to MCF (MBF International ¼-inch to MCF) using table 9:
22,400 MBF International ¼-inch × 0.169 MCF per MBF International ¼-inch = 3,786 MCF

Northern Region

The standard unit of measure for veneer logs in the Northern Region is MBF International ¼-inch. Other log rules used in the region include Doyle, Scribner, and Scribner Decimal C. Similar to saw logs, single factors are used to convert these log rules to the standard log rule of International ¼-inch (table 10). Conversion factors for the various units of measure are shown in table 10 and are used for all Northern States and northern species.

CONVERSION EXAMPLE 5: A veneer mill in West Virginia reports that it processed 10,000 MBF Scribner of hardwood logs.

Regional/national standard unit conversion (MBF Scribner to MBF International ¼-inch) using table 10:
10,000 MBF Scribner × 1.04 MBF International ¼-inch per MBF Scribner = 10,400 MBF International ¼-inch

Conversion to MCF (MBF International ¼-inch to MCF) using table 10:
10,400 MBF International ¼-inch × 0.158 MCF per MBF International ¼-inch = 1,643 MCF

Western Region

In the Western Region, the standard measurement unit for veneer logs is MBF Scribner, and as is the case with saw logs, other log rules are rarely used. All western conversion factors associated with veneer logs are shown in table 11. Conversions between MBF Scribner and MCF vary by State and survey year while all other conversion factors apply to all logs.

CONVERSION EXAMPLE 6: In 2009, a veneer mill in Montana reported that it processed 9,000 MBF Scribner of Douglas-fir logs.

National standard unit conversion (MBF Scribner to MBF International ¼-inch) using table 11:
9,000 MBF Scribner × 1.12 MBF International ¼-inch per MBF Scribner = 10,080 MBF International ¼-inch

Conversion to MCF (MBF Scribner to MCF) using table 11:
9,000 MBF Scribner / 5.56 MBF Scribner per MCF = 1,619 MCF

Veneer/Plywood Logs Tables

Table 9—Roundwood conversion factors used by Forest Inventory and Analysis for veneer logs in the Southern Region of the United States[a]

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
All Southern States	All species	Board feet (lumber tally)	MBF International ¼-inch	0.00105	MBF per board foot
Florida	All species	MCF	MBF International ¼-inch	0.168	MCF per MBF
All Southern States	Hardwood	Dry tons	MBF International ¼-inch	3.139	Tons per MBF
All Southern States	Hardwood	Green tons	MBF International ¼-inch	6.278	Tons per MBF
All Southern States	Hardwood	Standard cords	MBF International ¼-inch	0.420	MBF per cord
Alabama	Hardwood	MCF	MBF International ¼-inch	0.165	MCF per MBF
Arkansas	Hardwood	MCF	MBF International ¼-inch	0.159	MCF per MBF
Georgia	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Kentucky	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Louisiana	Hardwood	MCF	MBF International ¼-inch	0.161	MCF per MBF
Mississippi	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
North Carolina	Hardwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
Oklahoma	Hardwood	MCF	MBF International ¼-inch	0.157	MCF per MBF
South Carolina	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Tennessee	Hardwood	MCF	MBF International ¼-inch	0.162	MCF per MBF
Texas	Hardwood	MCF	MBF International ¼-inch	0.163	MCF per MBF
Virginia	Hardwood	MCF	MBF International ¼-inch	0.164	MCF per MBF
All Southern States	Softwood	Dry tons	MBF International ¼-inch	2.92125	Tons per MBF
All Southern States	Softwood	Green tons	MBF International ¼-inch	5.84250	Tons per MBF
All Southern States	Softwood	Standard cords	MBF International ¼-inch	0.415	MBF per cord
Alabama	Softwood	MCF	MBF International ¼-inch	0.167	MCF per MBF
Arkansas	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Georgia	Softwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
Kentucky	Softwood	MCF	MBF International ¼-inch	0.164	MCF per MBF
Louisiana	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Mississippi	Softwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
North Carolina	Softwood	MCF	MBF International ¼-inch	0.170	MCF per MBF
Oklahoma	Softwood	MCF	MBF International ¼-inch	0.168	MCF per MBF
South Carolina	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Tennessee	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Texas	Softwood	MCF	MBF International ¼-inch	0.169	MCF per MBF
Virginia	Softwood	MCF	MBF International ¼-inch	0.170	MCF per MBF

[a] This table does not include log rule conversions for veneer logs. See tables 2, 3, and 4 for log rule conversions.

Table 10—Roundwood conversion factors used by Forest Inventory and Analysis for veneer logs in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
104-inch cord	MBF International ¼-inch	0.54165	MBF per cord
Board feet – Doyle	MBF International ¼-inch	0.00114	MBF per board foot
Board feet – International ¼-inch	MBF International ¼-inch	0.001	MBF per board foot
Board feet (lumber tally)	MBF International ¼-inch	0.001	MBF per board foot
Board feet – Scribner	MBF International ¼-inch	0.00104	MBF per board foot
Board feet – Scribner Decimal C	MBF International ¼-inch	0.00104	MBF per board foot
Cubic feet	MBF International ¼-inch	0.006329114	MBF per cubic foot
Green tons	MBF International ¼-inch	0.2174	MBF per ton
Lake States cord	MBF International ¼-inch	0.52085	MBF per cord
Standard cords	MBF International ¼-inch	0.5	MBF per cord
MBF Doyle	MBF International ¼-inch	1.14	MBF International ¼-inch per MBF Doyle
MBF International ¼-inch	MCF	0.158	MCF per MBF
MBF lumber tally	MBF International ¼-inch	1.0	MBF International ¼-inch per MBF lumber tally
MBF Scribner	MBF International ¼-inch	1.04	MBF International ¼-inch per MBF Scribner
MBF Scribner Decimal C	MBF International ¼-inch	1.04	MBF International ¼-inch per MBF Scribner Decimal C

Table 11—Roundwood conversion factors used by Forest Inventory and Analysis for veneer logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	85	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	95	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4250	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4750	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.13	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.38	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
California	2000	MCF	MBF Scribner	5.22	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	4.7	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	4.92	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	4.997	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	4.7	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	6.26	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	6.16	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	5.04	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	5.56	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	4.21	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	4.28	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.48	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	4.79	MBF Scribner per MCF
Washington	2002	MCF	MBF Scribner	4.28	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.48	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	4.79	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	4.79	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	4.79	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	4.58	MBF Scribner per MCF

Pulp Mill Logs

Pulpwood refers to roundwood logs, bolts, or chips reduced to individual wood fibers by chemical or mechanical means for the manufacture of a variety of paper and paperboard products. Roundwood products used in the production of pulp are also referred to as pulp mill logs.

Southern Region

Standard units for pulpwood in the Southern Region are standard cords. Conversion factors for pulp mill log volume are listed in table 12 and vary by both State and species.

CONVERSION EXAMPLE 7: A pulp and paper mill in Mississippi processed 1.8 million green tons of softwood logs.

Regional/national standard unit conversion (green tons to standard cords) using table 12:
1,800,000 green tons / 2.7 green tons per standard cord = 666,667 standard cords

Conversion to MCF (standard cords to MCF) using table 12:
666,667 standard cords × 0.0766 MCF per standard cord = 51,067 MCF

Northern Region

The standard unit of measure for pulpwood logs in the Northern Region is the standard cord. Conversions from standard cords to cubic volumetric units vary by sub-region. Factors for Northeastern States are listed in table 13 and apply to Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, and West Virginia. Factors for the North Central States are listed in table 14 and apply to Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin. All other pulpwood conversion factors apply to all Northern States but vary by species group.

CONVERSION EXAMPLE 8: A pulp and paper mill in Maryland processed 1.6 million green tons of logs, 70 percent of which is yellow-poplar (1,120,000 tons) and the rest is loblolly pine (480,000 tons).

Regional/national standard unit conversion (green tons to standard cords) using table 13:
Yellow-poplar: 1,120,000 green tons × 0.4219 standard cords per green ton = 472,528 standard cords
Loblolly pine: 480,000 green tons × 0.3956 standard cords per green ton = 189,888 standard cords

Conversion to MCF (standard cords to MCF) using table 13:
Yellow-poplar: 472,528 standard cords × 0.085 MCF per standard cord = 40,165 MCF
Loblolly pine: 189,888 standard cords × 0.085 MCF per standard cord = 16,140 MCF

Western Region

In the Western Region, the standard measurement unit for pulpwood logs is MBF Scribner. All western conversion factors associated with pulpwood logs are shown in table 15. Conversions between MBF Scribner and MCF vary by State and survey year while other conversion factors apply to all logs.

CONVERSION EXAMPLE 9: In 2013, a mill in Oregon reported that it processed 600,000 green tons of unpeeled pulpwood logs.

Regional standard unit conversion (green tons to MBF Scribner) using table 15:
600,000 green tons / 25 green tons per MCF × 2.64 MBF Scribner per MCF = 63,360 MBF Scribner

National standard unit conversion (green tons to standard cords) using table 15:
600,000 green tons / 2.25 green tons per standard cord = 266,667 standard cords

Pulp Mill Logs Tables

Table 12—Roundwood conversion factors used by Forest Inventory and Analysis for pulp mill logs in the Southern Region of the United States

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
Virginia	All species	Standard cords	MCF	0.0763	MCF per cord
All Southern States	Hardwood	Green tons	Standard cords	2.8	Tons per cord
Alabama	Hardwood	Standard cords	MCF	0.0755	MCF per cord
Arkansas	Hardwood	Standard cords	MCF	0.0766	MCF per cord
Florida	Hardwood	Standard cords	MCF	0.0750	MCF per cord
Georgia	Hardwood	Standard cords	MCF	0.0774	MCF per cord
Kentucky	Hardwood	Standard cords	MCF	0.0764	MCF per cord
Louisiana	Hardwood	Standard cords	MCF	0.0750	MCF per cord
Mississippi	Hardwood	Standard cords	MCF	0.0750	MCF per cord
North Carolina	Hardwood	Standard cords	MCF	0.0770	MCF per cord
Oklahoma	Hardwood	Standard cords	MCF	0.0766	MCF per cord
South Carolina	Hardwood	Standard cords	MCF	0.0706	MCF per cord
Tennessee	Hardwood	Standard cords	MCF	0.0766	MCF per cord
Texas	Hardwood	Standard cords	MCF	0.0706	MCF per cord
All Southern States	Softwood	Green tons	Standard cords	2.7	Tons per cord
Alabama	Softwood	Standard cords	MCF	0.0770	MCF per cord
Arkansas	Softwood	Standard cords	MCF	0.0775	MCF per cord
Florida	Softwood	Standard cords	MCF	0.0760	MCF per cord
Georgia	Softwood	Standard cords	MCF	0.0770	MCF per cord
Kentucky	Softwood	Standard cords	MCF	0.0773	MCF per cord
Louisiana	Softwood	Standard cords	MCF	0.0760	MCF per cord
Mississippi	Softwood	Standard cords	MCF	0.0766	MCF per cord
North Carolina	Softwood	Standard cords	MCF	0.0765	MCF per cord
Oklahoma	Softwood	Standard cords	MCF	0.0770	MCF per cord
South Carolina	Softwood	Standard cords	MCF	0.0750	MCF per cord
Tennessee	Softwood	Standard cords	MCF	0.0770	MCF per cord
Texas	Softwood	Standard cords	MCF	0.0750	MCF per cord

Table 13—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Softwoods	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Softwoods	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Softwoods	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Softwoods	Cunits	Standard cords	1.1765	Cords per cunit
Softwoods	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Softwoods	Dry tons	Standard cords	0.89072	Cords per ton
Softwoods	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Softwoods	Green tons	Standard cords	0.4688	Cords per ton
Softwoods	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Softwoods	Peeled green tons	Standard cords	0.56349	Cords per ton
Softwoods	Peeled Lake States cords	Standard cords	1.2521	Cords (standard) per cord (peeled Lake States)
Softwoods	Peeled standard cords	Standard cords	1.202	Cords (standard) per cord (peeled)
Softwoods	Standard cords	MCF	0.085	MCF per cord
Cedar/juniper (eastern redcedar)	4,600-pound cord	Standard cords	1.213	Cords (standard) per cord (4,600-pound)
Cedar/juniper (eastern redcedar)	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Cedar/juniper (eastern redcedar)	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Cedar/juniper (eastern redcedar)	Cunits	Standard cords	1.1765	Cords per cunit
Cedar/juniper (eastern redcedar)	Dry metric tonnes	Standard cords	0.93016	Cords per tonne
Cedar/juniper (eastern redcedar)	Dry tons	Standard cords	0.84384	Cords per ton
Cedar/juniper (eastern redcedar)	Green metric tonnes	Standard cords	0.58135	Cords per tonne
Cedar/juniper (eastern redcedar)	Green tons	Standard cords	0.5274	Cords per ton
Cedar/juniper (eastern redcedar)	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cedar/juniper (eastern redcedar)	Peeled Lake States cords	Standard cords	1.1771	Cords (standard) per cord (peeled Lake States)
Cedar/juniper (eastern redcedar)	Peeled standard cords	Standard cords	1.13	Cords (standard) per cord (peeled)
Cedar/juniper (eastern redcedar)	Standard cords	MCF	0.085	MCF per cord
Cedar/juniper (Northern white-cedar)	4,600-pound cord	Standard cords	1.4557	Cords (standard) per cord (4,600-pound)
Cedar/juniper (Northern white-cedar)	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Cedar/juniper (Northern white-cedar)	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Cedar/juniper (Northern white-cedar)	Cunits	Standard cords	1.1765	Cords per cunit
Cedar/juniper (Northern white-cedar)	Dry metric tonnes	Standard cords	1.39529	Cords per tonne
Cedar/juniper (Northern white-cedar)	Dry tons	Standard cords	1.2658	Cords per ton
Cedar/juniper (Northern white-cedar)	Green metric tonnes	Standard cords	0.69765	Cords per tonne
Cedar/juniper (Northern white-cedar)	Green tons	Standard cords	0.6329	Cords per ton
Cedar/juniper (Northern white-cedar)	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cedar/juniper (Northern white-cedar)	Peeled dry tons	Standard cords	1.43038	Cords per ton
Cedar/juniper (Northern white-cedar)	Peeled green tons	Standard cords	0.71519	Cords per ton
Cedar/juniper (Northern white-cedar)	Peeled Lake States cords	Standard cords	1.1771	Cords (standard) per cord (peeled Lake States)
Cedar/juniper (Northern white-cedar)	Peeled metric dry tonnes	Standard cords	1.57671	Cords per tonne
Cedar/juniper (Northern white-cedar)	Peeled metric green tonnes	Standard cords	0.78835	Cords per tonne
Cedar/juniper (Northern white-cedar)	Peeled standard cords	Standard cords	1.13	Cords (standard) per cord (peeled)
Cedar/juniper (Northern white-cedar)	Standard cords	MCF	0.085	MCF per cord
Cypress	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Cypress	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Cypress	Cubic meter	Standard cords	0.415477	Cords per cubic meter

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Cypress	Cunits	Standard cords	1.1765	Cords per cunit
Cypress	Dry metric tonnes	Standard cords	0.95935	Cords per tonne
Cypress	Dry tons	Standard cords	0.87032	Cords per ton
Cypress	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Cypress	Green tons	Standard cords	0.3956	Cords per ton
Cypress	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cypress	Peeled Lake States cords	Standard cords	1.1771	Cords (standard) per cord (peeled Lake States)
Cypress	Peeled standard cords	Standard cords	1.13	Cords (standard) per cord (peeled)
Cypress	Standard cords	MCF	0.085	MCF per cord
Douglas-fir	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Douglas-fir	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Douglas-fir	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Douglas-fir	Cunits	Standard cords	1.1765	Cords per cunit
Douglas-fir	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Douglas-fir	Dry tons	Standard cords	0.89072	Cords per ton
Douglas-fir	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Douglas-fir	Green tons	Standard cords	0.4688	Cords per ton
Douglas-fir	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Douglas-fir	Peeled Lake States cords	Standard cords	1.2136	Cords (standard) per cord (peeled Lake States)
Douglas-fir	Peeled standard cords	Standard cords	1.165	Cords (standard) per cord (peeled)
Douglas-fir	Standard cords	MCF	0.085	MCF per cord
True firs (*Abies* spp.)	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
True firs (*Abies* spp.)	Cubic feet	Standard cords	0.011765	Cords per cubic foot
True firs (*Abies* spp.)	Cubic meter	Standard cords	0.415477	Cords per cubic meter
True firs (*Abies* spp.)	Cunits	Standard cords	1.1765	Cords per cunit
True firs (*Abies* spp.)	Dry metric tonnes	Standard cords	1.13687	Cords per tonne
True firs (*Abies* spp.)	Dry tons	Standard cords	1.03136	Cords per ton
True firs (*Abies* spp.)	Green metric tonnes	Standard cords	0.51676	Cords per tonne
True firs (*Abies* spp.)	Green tons	Standard cords	0.4688	Cords per ton
True firs (*Abies* spp.)	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
True firs (*Abies* spp.)	Peeled dry tons	Standard cords	1.20159	Cords per ton
True firs (*Abies* spp.)	Peeled green tons	Standard cords	0.54618	Cords per ton
True firs (*Abies* spp.)	Peeled Lake States cords	Standard cords	1.2136	Cords (standard) per cord (peeled Lake States)
True firs (*Abies* spp.)	Peeled metric dry tonnes	Standard cords	1.32452	Cords per tonne
True firs (*Abies* spp.)	Peeled metric green tonnes	Standard cords	0.60205	Cords per tonne
True firs (*Abies* spp.)	Peeled standard cords	Standard cords	1.165	Cords (standard) per cord (peeled)
True firs (*Abies* spp.)	Standard cords	MCF	0.085	MCF per cord
Hemlock	4,600-pound cord	Standard cords	0.9545	Cords (standard) per cord (4,600-pound)
Hemlock	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Hemlock	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Hemlock	Cunits	Standard cords	1.1765	Cords per cunit
Hemlock	Dry metric tonnes	Standard cords	0.96065	Cords per tonne
Hemlock	Dry tons	Standard cords	0.8715	Cords per ton
Hemlock	Green metric tonnes	Standard cords	0.45745	Cords per tonne
Hemlock	Green tons	Standard cords	0.415	Cords per ton

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Hemlock	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Hemlock	Peeled dry tons	Standard cords	1.09641	Cords per ton
Hemlock	Peeled green tons	Standard cords	0.5221	Cords per ton
Hemlock	Peeled Lake States cords	Standard cords	1.3105	Cords (standard) per cord (peeled Lake States)
Hemlock	Peeled metric dry tonnes	Standard cords	1.20857	Cords per tonne
Hemlock	Peeled metric green tonnes	Standard cords	0.57551	Cords per tonne
Hemlock	Peeled standard cords	Standard cords	1.258	Cords (standard) per cord (peeled)
Hemlock	Standard cords	MCF	0.085	MCF per cord
Jack pine	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Jack pine	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Jack pine	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Jack pine	Cunits	Standard cords	1.1765	Cords per cunit
Jack pine	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Jack pine	Dry tons	Standard cords	0.89072	Cords per ton
Jack pine	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Jack pine	Green tons	Standard cords	0.4688	Cords per ton
Jack pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Jack pine	Peeled dry tons	Standard cords	1.07872	Cords per ton
Jack pine	Peeled green tons	Standard cords	0.56774	Cords per ton
Jack pine	Peeled Lake States cords	Standard cords	1.2615	Cords (standard) per cord (peeled Lake States)
Jack pine	Peeled metric dry tonnes	Standard cords	1.18907	Cords per tonne
Jack pine	Peeled metric green tonnes	Standard cords	0.62583	Cords per tonne
Jack pine	Peeled standard cords	Standard cords	1.211	Cords (standard) per cord (peeled)
Jack pine	Standard cords	MCF	0.085	MCF per cord
Loblolly/shortleaf pine	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Loblolly/shortleaf pine	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Loblolly/shortleaf pine	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Loblolly/shortleaf pine	Cunits	Standard cords	1.1765	Cords per cunit
Loblolly/shortleaf pine	Dry metric tonnes	Standard cords	0.87214	Cords per tonne
Loblolly/shortleaf pine	Dry tons	Standard cords	0.7912	Cords per ton
Loblolly/shortleaf pine	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Loblolly/shortleaf pine	Green tons	Standard cords	0.3956	Cords per ton
Loblolly/shortleaf pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Loblolly/shortleaf pine	Peeled dry tons	Standard cords	0.95419	Cords per ton
Loblolly/shortleaf pine	Peeled green tons	Standard cords	0.4771	Cords per ton
Loblolly/shortleaf pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Loblolly/shortleaf pine	Peeled metric dry tonnes	Standard cords	1.05181	Cords per tonne
Loblolly/shortleaf pine	Peeled metric green tonnes	Standard cords	0.5259	Cords per tonne
Loblolly/shortleaf pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Loblolly/shortleaf pine	Standard cords	MCF	0.085	MCF per cord
Longleaf/slash pine	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Longleaf/slash pine	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Longleaf/slash pine	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Longleaf/slash pine	Cunits	Standard cords	1.1765	Cords per cunit

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Longleaf/slash pine	Dry metric tonnes	Standard cords	0.87214	Cords per tonne
Longleaf/slash pine	Dry tons	Standard cords	0.7912	Cords per ton
Longleaf/slash pine	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Longleaf/slash pine	Green tons	Standard cords	0.3956	Cords per ton
Longleaf/slash pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Longleaf/slash pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Longleaf/slash pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Longleaf/slash pine	Standard cords	MCF	0.085	MCF per cord
Ponderosa/Jeffrey pine	4,600-pound cord	Standard cords	1.1417	Cords (standard) per cord (4,600-pound)
Ponderosa/Jeffrey pine	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Ponderosa/Jeffrey pine	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Ponderosa/Jeffrey pine	Cunits	Standard cords	1.1765	Cords per cunit
Ponderosa/Jeffrey pine	Dry metric tonnes	Standard cords	1.03965	Cords per tonne
Ponderosa/Jeffrey pine	Dry tons	Standard cords	0.94316	Cords per ton
Ponderosa/Jeffrey pine	Green metric tonnes	Standard cords	0.54718	Cords per tonne
Ponderosa/Jeffrey pine	Green tons	Standard cords	0.4964	Cords per ton
Ponderosa/Jeffrey pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Ponderosa/Jeffrey pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Ponderosa/Jeffrey pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Ponderosa/Jeffrey pine	Standard cords	MCF	0.085	MCF per cord
Red pine	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Red pine	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Red pine	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Red pine	Cunits	Standard cords	1.1765	Cords per cunit
Red pine	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Red pine	Dry tons	Standard cords	0.89072	Cords per ton
Red pine	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Red pine	Green tons	Standard cords	0.4688	Cords per ton
Red pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Red pine	Peeled dry tons	Standard cords	1.0707	Cords per ton
Red pine	Peeled green tons	Standard cords	0.56353	Cords per ton
Red pine	Peeled Lake States cords	Standard cords	1.2615	Cords (standard) per cord (peeled Lake States)
Red pine	Peeled metric dry tonnes	Standard cords	1.18023	Cords per tonne
Red pine	Peeled metric green tonnes	Standard cords	0.62117	Cords per tonne
Red pine	Peeled standard cords	Standard cords	1.211	Cords (standard) per cord (peeled)
Red pine	Standard cords	MCF	0.085	MCF per cord
White pine	4,600-pound cord	Standard cords	1.0987	Cords (standard) per cord (4,600-pound)
White pine	Cubic feet	Standard cords	0.011765	Cords per cubic foot
White pine	Cubic meter	Standard cords	0.415477	Cords per cubic meter
White pine	Cunits	Standard cords	1.1765	Cords per cunit
White pine	Dry metric tonnes	Standard cords	1.00048	Cords per tonne
White pine	Dry tons	Standard cords	0.90763	Cords per ton
White pine	Green metric tonnes	Standard cords	0.52657	Cords per tonne
White pine	Green tons	Standard cords	0.4777	Cords per ton

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
White pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
White pine	Peeled dry tons	Standard cords	1.09453	Cords per ton
White pine	Peeled green tons	Standard cords	0.57607	Cords per ton
White pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
White pine	Peeled metric dry tonnes	Standard cords	1.2065	Cords per tonne
White pine	Peeled metric green tonnes	Standard cords	0.635	Cords per tonne
White pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
White pine	Standard cords	MCF	0.085	MCF per cord
Other pines	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Other pines	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Other pines	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Other pines	Cunits	Standard cords	1.1765	Cords per cunit
Other pines	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Other pines	Dry tons	Standard cords	0.89072	Cords per ton
Other pines	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Other pines	Green tons	Standard cords	0.4688	Cords per ton
Other pines	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Other pines	Peeled dry tons	Standard cords	1.07421	Cords per ton
Other pines	Peeled green tons	Standard cords	0.56538	Cords per ton
Other pines	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Other pines	Peeled metric dry tonnes	Standard cords	1.1841	Cords per tonne
Other pines	Peeled metric green tonnes	Standard cords	0.62321	Cords per tonne
Other pines	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Other pines	Standard cords	MCF	0.085	MCF per cord
Spruce	4,600-pound cord	Standard cords	1.1532	Cords (standard) per cord (4,600-pound)
Spruce	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Spruce	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Spruce	Cunits	Standard cords	1.1765	Cords per cunit
Spruce	Dry metric tonnes	Standard cords	1.07775	Cords per tonne
Spruce	Dry tons	Standard cords	0.97773	Cords per ton
Spruce	Green metric tonnes	Standard cords	0.55269	Cords per tonne
Spruce	Green tons	Standard cords	0.5014	Cords per ton
Spruce	Lake State cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Spruce	Peeled dry tons	Standard cords	1.10744	Cords per ton
Spruce	Peeled green tons	Standard cords	0.56792	Cords per ton
Spruce	Peeled Lake States cords	Standard cords	1.1802	Cords (standard) per cord (peeled Lake States)
Spruce	Peeled metric dry tonnes	Standard cords	1.22074	Cords per tonne
Spruce	Peeled metric green tonnes	Standard cords	0.62602	Cords per tonne
Spruce	Peeled standard cords	Standard cords	1.133	Cords (standard) per cord (peeled)
Spruce	Standard cords	MCF	0.085	MCF per cord
Tamarack/larch	4,600-pound cord	Standard cords	0.9869	Cords (standard) per cord (4,600-pound)
Tamarack/larch	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Tamarack/larch	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Tamarack/larch	Cunits	Standard cords	1.1765	Cords per cunit

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Tamarack/larch	Dry metric tonnes	Standard cords	0.85139	Cords per tonne
Tamarack/larch	Dry tons	Standard cords	0.77238	Cords per ton
Tamarack/larch	Green metric tonnes	Standard cords	0.473	Cords per tonne
Tamarack/larch	Green tons	Standard cords	0.4291	Cords per ton
Tamarack/larch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Tamarack/larch	Peeled dry tons	Standard cords	0.88281	Cords per ton
Tamarack/larch	Peeled green tons	Standard cords	0.49045	Cords per ton
Tamarack/larch	Peeled Lake States cords	Standard cords	1.1907	Cords (standard) per cord (peeled Lake States)
Tamarack/larch	Peeled metric dry tonnes	Standard cords	0.97313	Cords per tonne
Tamarack/larch	Peeled metric green tonnes	Standard cords	0.54063	Cords per tonne
Tamarack/larch	Peeled standard cords	Standard cords	1.143	Cords (standard) per cord (peeled)
Tamarack/larch	Standard cords	MCF	0.085	MCF per cord
Hardwoods	4,600-pound cord	Standard cords	0.906	Cords (standard) per cord (4,600-pound)
Hardwoods	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Hardwoods	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Hardwoods	Cunits	Standard cords	1.1765	Cords per cunit
Hardwoods	Dry metric tonnes	Standard cords	0.80326	Cords per tonne
Hardwoods	Dry tons	Standard cords	0.72872	Cords per ton
Hardwoods	Green metric tonnes	Standard cords	0.4342	Cords per tonne
Hardwoods	Green tons	Standard cords	0.3939	Cords per ton
Hardwoods	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Hardwoods	Peeled green tons	Standard cords	0.46219	Cords per ton
Hardwoods	Peeled Lake States cords	Standard cords	1.2223	Cords (standard) per cord (peeled Lake States)
Hardwoods	Peeled standard cords	Standard cords	1.1734	Cords (standard) per cord (peeled)
Hardwoods	Standard cords	MCF	0.085	MCF per cord
Alder	4,600-pound cord	Standard cords	1.09867	Cords (standard) per cord (4,600-pound)
Alder	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Alder	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Alder	Cunits	Standard cords	1.1765	Cords per cunit
Alder	Dry metric tonnes	Standard cords	0.94782	Cords per tonne
Alder	Dry tons	Standard cords	0.85986	Cords per ton
Alder	Green metric tonnes	Standard cords	0.52657	Cords per tonne
Alder	Green tons	Standard cords	0.4777	Cords per ton
Alder	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Alder	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Alder	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Alder	Standard cords	MCF	0.085	MCF per cord
Ash	4,600-pound cord	Standard cords	0.9959	Cords (standard) per cord (4,600-pound)
Ash	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Ash	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Ash	Cunits	Standard cords	1.1765	Cords per cunit
Ash	Dry metric tonnes	Standard cords	0.8114	Cords per tonne
Ash	Dry tons	Standard cords	0.7361	Cords per ton
Ash	Green metric tonnes	Standard cords	0.4773	Cords per tonne
Ash	Green tons	Standard cords	0.433	Cords per ton

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Ash	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Ash	Peeled dry tons	Standard cords	0.43847	Cords per ton
Ash	Peeled green tons	Standard cords	0.25792	Cords per ton
Ash	Peeled Lake States cords	Standard cords	1.2417	Cords (standard) per cord (peeled Lake States)
Ash	Peeled metric dry tonnes	Standard cords	0.48333	Cords per tonne
Ash	Peeled metric green tonnes	Standard cords	0.28431	Cords per tonne
Ash	Peeled standard cords	Standard cords	1.192	Cords (standard) per cord (peeled)
Ash	Standard cords	MCF	0.085	MCF per cord
Aspen/balsam poplar	4,600-pound cord	Standard cords	0.9869	Cords (standard) per cord (4,600-pound)
Aspen/balsam poplar	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Aspen/balsam poplar	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Aspen/balsam poplar	Cunits	Standard cords	1.1765	Cords per cunit
Aspen/balsam poplar	Dry metric tonnes	Standard cords	1.04059	Cords per tonne
Aspen/balsam poplar	Dry tons	Standard cords	0.94402	Cords per ton
Aspen/balsam poplar	Green metric tonnes	Standard cords	0.473	Cords per tonne
Aspen/balsam poplar	Green tons	Standard cords	0.4291	Cords per ton
Aspen/balsam poplar	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Aspen/balsam poplar	Peeled dry tons	Standard cords	1.13941	Cords per ton
Aspen/balsam poplar	Peeled green tons	Standard cords	0.51791	Cords per ton
Aspen/balsam poplar	Peeled Lake States cords	Standard cords	1.2573	Cords (standard) per cord (peeled Lake States)
Aspen/balsam poplar	Peeled metric dry tonnes	Standard cords	1.25597	Cords per tonne
Aspen/balsam poplar	Peeled metric green tonnes	Standard cords	0.5709	Cords per tonne
Aspen/balsam poplar	Peeled standard cords	Standard cords	1.207	Cords (standard) per cord (peeled)
Aspen/balsam poplar	Standard cords	MCF	0.085	MCF per cord
Basswood	4,600-pound cord	Standard cords	1.1884	Cords (standard) per cord (4,600-pound)
Basswood	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Basswood	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Basswood	Cunits	Standard cords	1.1765	Cords per cunit
Basswood	Dry metric tonnes	Standard cords	1.13912	Cords per tonne
Basswood	Dry tons	Standard cords	1.0334	Cords per ton
Basswood	Green metric tonnes	Standard cords	0.56956	Cords per tonne
Basswood	Green tons	Standard cords	0.5167	Cords per ton
Basswood	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Basswood	Peeled dry tons	Standard cords	1.23379	Cords per ton
Basswood	Peeled green tons	Standard cords	0.61689	Cords per ton
Basswood	Peeled Lake States cords	Standard cords	1.2438	Cords (standard) per cord (peeled Lake States)
Basswood	Peeled metric dry tonnes	Standard cords	1.36001	Cords per tonne
Basswood	Peeled metric green tonnes	Standard cords	0.68	Cords per tonne
Basswood	Peeled standard cords	Standard cords	1.194	Cords (standard) per cord (peeled)
Basswood	Standard cords	MCF	0.085	MCF per cord
Beech	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Beech	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Beech	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Beech	Cunits	Standard cords	1.1765	Cords per cunit

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Beech	Dry metric tonnes	Standard cords	0.74132	Cords per tonne
Beech	Dry tons	Standard cords	0.67252	Cords per ton
Beech	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Beech	Green tons	Standard cords	0.3956	Cords per ton
Beech	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Beech	Peeled dry tons	Standard cords	0.71954	Cords per ton
Beech	Peeled green tons	Standard cords	0.42326	Cords per ton
Beech	Peeled Lake States cords	Standard cords	1.1146	Cords (standard) per cord (peeled Lake States)
Beech	Peeled metric dry tonnes	Standard cords	0.79315	Cords per tonne
Beech	Peeled metric green tonnes	Standard cords	0.46656	Cords per tonne
Beech	Peeled standard cords	Standard cords	1.07	Cords (standard) per cord (peeled)
Beech	Standard cords	MCF	0.085	MCF per cord
White (paper) birch	4,600-pound cord	Standard cords	0.9241	Cords (standard) per cord (4,600-pound)
White (paper) birch	Cubic feet	Standard cords	0.011765	Cords per cubic foot
White (paper) birch	Cubic meter	Standard cords	0.415477	Cords per cubic meter
White (paper) birch	Cunits	Standard cords	1.1765	Cords per cunit
White (paper) birch	Dry metric tonnes	Standard cords	0.79723	Cords per tonne
White (paper) birch	Dry tons	Standard cords	0.72324	Cords per ton
White (paper) birch	Green metric tonnes	Standard cords	0.4429	Cords per tonne
White (paper) birch	Green tons	Standard cords	0.4018	Cords per ton
White (paper) birch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
White (paper) birch	Peeled dry tons	Standard cords	0.84051	Cords per ton
White (paper) birch	Peeled green tons	Standard cords	0.46695	Cords per ton
White (paper) birch	Peeled Lake States cords	Standard cords	1.2105	Cords (standard) per cord (peeled Lake States)
White (paper) birch	Peeled metric dry tonnes	Standard cords	0.92649	Cords per tonne
White (paper) birch	Peeled metric green tonnes	Standard cords	0.51472	Cords per tonne
White (paper) birch	Peeled standard cords	Standard cords	1.162	Cords (standard) per cord (peeled)
White (paper) birch	Standard cords	MCF	0.085	MCF per cord
Yellow birch	4,600-pound cord	Standard cords	0.8563	Cords (standard) per cord (4,600-pound)
Yellow birch	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Yellow birch	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Yellow birch	Cunits	Standard cords	1.1765	Cords per cunit
Yellow birch	Dry metric tonnes	Standard cords	0.7387	Cords per tonne
Yellow birch	Dry tons	Standard cords	0.67014	Cords per ton
Yellow birch	Green metric tonnes	Standard cords	0.41039	Cords per tonne
Yellow birch	Green tons	Standard cords	0.3723	Cords per ton
Yellow birch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Yellow birch	Peeled dry tons	Standard cords	0.76463	Cords per ton
Yellow birch	Peeled green tons	Standard cords	0.4248	Cords per ton
Yellow birch	Peeled Lake States cords	Standard cords	1.1886	Cords (standard) per cord (peeled Lake States)
Yellow birch	Peeled metric dry tonnes	Standard cords	0.84285	Cords per tonne
Yellow birch	Peeled metric green tonnes	Standard cords	0.46825	Cords per tonne
Yellow birch	Peeled standard cords	Standard cords	1.141	Cords (standard) per cord (peeled)
Yellow birch	Standard cords	MCF	0.085	MCF per cord

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Other birch	4,600-pound cord	Standard cords	0.8903	Cords (standard) per cord (4,600-pound)
Other birch	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Other birch	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Other birch	Cunits	Standard cords	1.1765	Cords per cunit
Other birch	Dry metric tonnes	Standard cords	0.76806	Cords per tonne
Other birch	Dry tons	Standard cords	0.69678	Cords per ton
Other birch	Green metric tonnes	Standard cords	0.4267	Cords per tonne
Other birch	Green tons	Standard cords	0.3871	Cords per ton
Other birch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Other birch	Peeled dry tons	Standard cords	0.80234	Cords per ton
Other birch	Peeled green tons	Standard cords	0.44574	Cords per ton
Other birch	Peeled Lake States cords	Standard cords	1.1995	Cords (standard) per cord (peeled Lake States)
Other birch	Peeled metric dry tonnes	Standard cords	0.88442	Cords per tonne
Other birch	Peeled metric green tonnes	Standard cords	0.49134	Cords per tonne
Other birch	Peeled standard cords	Standard cords	1.1515	Cords (standard) per cord (peeled)
Other birch	Standard cords	MCF	0.085	MCF per cord
Black cherry	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Black cherry	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Black cherry	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Black cherry	Cunits	Standard cords	1.1765	Cords per cunit
Black cherry	Dry metric tonnes	Standard cords	0.93016	Cords per tonne
Black cherry	Dry tons	Standard cords	0.84384	Cords per ton
Black cherry	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Black cherry	Green tons	Standard cords	0.4688	Cords per ton
Black cherry	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Black cherry	Peeled dry tons	Standard cords	0.92999	Cords per ton
Black cherry	Peeled green tons	Standard cords	0.51666	Cords per ton
Black cherry	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Black cherry	Peeled metric dry tonnes	Standard cords	1.02513	Cords per tonne
Black cherry	Peeled metric green tonnes	Standard cords	0.56952	Cords per tonne
Black cherry	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Black cherry	Standard cords	MCF	0.085	MCF per cord
Black walnut	4,600-pound cord	Standard cords	0.9391	Cords (standard) per cord (4,600-pound)
Black walnut	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Black walnut	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Black walnut	Cunits	Standard cords	1.1765	Cords per cunit
Black walnut	Dry metric tonnes	Standard cords	0.81012	Cords per tonne
Black walnut	Dry tons	Standard cords	0.73494	Cords per ton
Black walnut	Green metric tonnes	Standard cords	0.45007	Cords per tonne
Black walnut	Green tons	Standard cords	0.4083	Cords per ton
Black walnut	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Black walnut	Peeled dry tons	Standard cords	0.81284	Cords per ton
Black walnut	Peeled green tons	Standard cords	0.45158	Cords per ton
Black walnut	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Black walnut	Peeled metric dry tonnes	Standard cords	0.89599	Cords per tonne

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Black walnut	Peeled metric green tonnes	Standard cords	0.49777	Cords per tonne
Black walnut	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Black walnut	Standard cords	MCF	0.085	MCF per cord
Cottonwood	4,600-pound cord	Standard cords	0.9869	Cords (standard) per cord (4,600-pound)
Cottonwood	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Cottonwood	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Cottonwood	Cunits	Standard cords	1.1765	Cords per cunit
Cottonwood	Dry metric tonnes	Standard cords	1.04059	Cords per tonne
Cottonwood	Dry tons	Standard cords	0.94402	Cords per ton
Cottonwood	Green metric tonnes	Standard cords	0.473	Cords per tonne
Cottonwood	Green tons	Standard cords	0.4291	Cords per ton
Cottonwood	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cottonwood	Peeled dry tons	Standard cords	1.13379	Cords per ton
Cottonwood	Peeled green tons	Standard cords	0.51536	Cords per ton
Cottonwood	Peeled Lake States cords	Standard cords	1.2407	Cords (standard) per cord (peeled Lake States)
Cottonwood	Peeled metric dry tonnes	Standard cords	1.24978	Cords per tonne
Cottonwood	Peeled metric green tonnes	Standard cords	0.56808	Cords per tonne
Cottonwood	Peeled standard cords	Standard cords	1.191	Cords (standard) per cord (peeled)
Cottonwood	Standard cords	MCF	0.085	MCF per cord
Elm	4,600-pound cord	Standard cords	0.9241	Cords (standard) per cord (4,600-pound)
Elm	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Elm	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Elm	Cunits	Standard cords	1.1765	Cords per cunit
Elm	Dry metric tonnes	Standard cords	0.88581	Cords per tonne
Elm	Dry tons	Standard cords	0.8036	Cords per ton
Elm	Green metric tonnes	Standard cords	0.4429	Cords per tonne
Elm	Green tons	Standard cords	0.4018	Cords per ton
Elm	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Elm	Peeled dry tons	Standard cords	0.94434	Cords per ton
Elm	Peeled green tons	Standard cords	0.47217	Cords per ton
Elm	Peeled Lake States cords	Standard cords	1.224	Cords (standard) per cord (peeled Lake States)
Elm	Peeled metric dry tonnes	Standard cords	1.04095	Cords per tonne
Elm	Peeled metric green tonnes	Standard cords	0.52048	Cords per tonne
Elm	Peeled standard cords	Standard cords	1.175	Cords (standard) per cord (peeled)
Elm	Standard cords	MCF	0.085	MCF per cord
Hickory	4,600-pound cord	Standard cords	0.8512	Cords (standard) per cord (4,600-pound)
Hickory	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Hickory	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Hickory	Cunits	Standard cords	1.1765	Cords per cunit
Hickory	Dry metric tonnes	Standard cords	0.65274	Cords per tonne
Hickory	Dry tons	Standard cords	0.59216	Cords per ton
Hickory	Green metric tonnes	Standard cords	0.40796	Cords per tonne
Hickory	Green tons	Standard cords	0.3701	Cords per ton
Hickory	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Hickory	Peeled dry tons	Standard cords	0.65209	Cords per ton
Hickory	Peeled green tons	Standard cords	0.40756	Cords per ton
Hickory	Peeled Lake States cords	Standard cords	1.1907	Cords (standard) per cord (peeled Lake States)
Hickory	Peeled metric dry tonnes	Standard cords	0.7188	Cords per tonne
Hickory	Peeled metric green tonnes	Standard cords	0.44925	Cords per tonne
Hickory	Peeled standard cords	Standard cords	1.143	Cords (standard) per cord (peeled)
Hickory	Standard cords	MCF	0.085	MCF per cord
Hard maple[c]	4,600-pound cord	Standard cords	0.8319	Cords (standard) per cord (4,600-pound)
Hard maple[c]	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Hard maple[c]	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Hard maple[c]	Cunits	Standard cords	1.1765	Cords per cunit
Hard maple[c]	Dry metric tonnes	Standard cords	0.71766	Cords per tonne
Hard maple[c]	Dry tons	Standard cords	0.65106	Cords per ton
Hard maple[c]	Green metric tonnes	Standard cords	0.3987	Cords per tonne
Hard maple[c]	Green tons	Standard cords	0.3617	Cords per ton
Hard maple[c]	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Hard maple[c]	Peeled dry tons	Standard cords	0.74018	Cords per ton
Hard maple[c]	Peeled green tons	Standard cords	0.41121	Cords per ton
Hard maple[c]	Peeled Lake States cords	Standard cords	1.1844	Cords (standard) per cord (peeled Lake States)
Hard maple[c]	Peeled metric dry tonnes	Standard cords	0.8159	Cords per tonne
Hard maple[c]	Peeled metric green tonnes	Standard cords	0.45328	Cords per tonne
Hard maple[c]	Peeled standard cords	Standard cords	1.137	Cords (standard) per cord (peeled)
Hard maple[c]	Standard cords	MCF	0.085	MCF per cord
Soft maple[d]	4,600-pound cord	Standard cords	0.9391	Cords (standard) per cord (4,600-pound)
Soft maple[d]	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Soft maple[d]	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Soft maple[d]	Cunits	Standard cords	1.1765	Cords per cunit
Soft maple[d]	Dry metric tonnes	Standard cords	0.81012	Cords per tonne
Soft maple[d]	Dry tons	Standard cords	0.73494	Cords per ton
Soft maple[d]	Green metric tonnes	Standard cords	0.45007	Cords per tonne
Soft maple[d]	Green tons	Standard cords	0.4083	Cords per ton
Soft maple[d]	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Soft maple[d]	Peeled dry tons	Standard cords	0.8401	Cords per ton
Soft maple[d]	Peeled green tons	Standard cords	0.46672	Cords per ton
Soft maple[d]	Peeled Lake States cords	Standard cords	1.1907	Cords (standard) per cord (peeled Lake States)
Soft maple[d]	Peeled metric dry tonnes	Standard cords	0.92604	Cords per tonne
Soft maple[d]	Peeled metric green tonnes	Standard cords	0.51447	Cords per tonne
Soft maple[d]	Peeled standard cords	Standard cords	1.143	Cords (standard) per cord (peeled)
Soft maple[d]	Standard cords	MCF	0.085	MCF per cord
Red oak	4,600-pound cord	Standard cords	0.7921	Cords (standard) per cord (4,600-pound)
Red oak	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Red oak	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Red oak	Cunits	Standard cords	1.1765	Cords per cunit
Red oak	Dry metric tonnes	Standard cords	0.68334	Cords per tonne

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Red oak	Dry tons	Standard cords	0.61992	Cords per ton
Red oak	Green metric tonnes	Standard cords	0.37963	Cords per tonne
Red oak	Green tons	Standard cords	0.3444	Cords per ton
Red oak	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Red oak	Peeled dry tons	Standard cords	0.74066	Cords per ton
Red oak	Peeled green tons	Standard cords	0.41148	Cords per ton
Red oak	Peeled Lake States cords	Standard cords	1.236	Cords (standard) per cord (peeled Lake States)
Red oak	Peeled metric dry tonnes	Standard cords	0.81643	Cords per tonne
Red oak	Peeled metric green tonnes	Standard cords	0.45357	Cords per tonne
Red oak	Peeled standard cords	Standard cords	1.1865	Cords (standard) per cord (peeled)
Red oak	Standard cords	MCF	0.085	MCF per cord
White oak	4,600-pound cord	Standard cords	0.8563	Cords (standard) per cord (4,600-pound)
White oak	Cubic feet	Standard cords	0.011765	Cords per cubic foot
White oak	Cubic meter	Standard cords	0.415477	Cords per cubic meter
White oak	Cunits	Standard cords	1.1765	Cords per cunit
White oak	Dry metric tonnes	Standard cords	0.65662	Cords per tonne
White oak	Dry tons	Standard cords	0.59568	Cords per ton
White oak	Green metric tonnes	Standard cords	0.41039	Cords per tonne
White oak	Green tons	Standard cords	0.3723	Cords per ton
White oak	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
White oak	Peeled dry tons	Standard cords	0.66895	Cords per ton
White oak	Peeled green tons	Standard cords	0.41809	Cords per ton
White oak	Peeled Lake States cords	Standard cords	1.2813	Cords (standard) per cord (peeled Lake States)
White oak	Peeled metric dry tonnes	Standard cords	0.73738	Cords per tonne
White oak	Peeled metric green tonnes	Standard cords	0.46086	Cords per tonne
White oak	Peeled standard cords	Standard cords	1.23	Cords (standard) per cord (peeled)
White oak	Standard cords	MCF	0.085	MCF per cord
Sweetgum	4,600-pound cord	Standard cords	0.8439	Cords (standard) per cord (4,600-pound)
Sweetgum	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Sweetgum	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Sweetgum	Cunits	Standard cords	1.1765	Cords per cunit
Sweetgum	Dry metric tonnes	Standard cords	0.84931	Cords per tonne
Sweetgum	Dry tons	Standard cords	0.77049	Cords per ton
Sweetgum	Green metric tonnes	Standard cords	0.40443	Cords per tonne
Sweetgum	Green tons	Standard cords	0.3669	Cords per ton
Sweetgum	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Sweetgum	Peeled dry tons	Standard cords	0.85215	Cords per ton
Sweetgum	Peeled green tons	Standard cords	0.40579	Cords per ton
Sweetgum	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Sweetgum	Peeled metric dry tonnes	Standard cords	0.93933	Cords per tonne
Sweetgum	Peeled metric green tonnes	Standard cords	0.4473	Cords per tonne
Sweetgum	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Sweetgum	Standard cords	MCF	0.085	MCF per cord
Sycamore	4,600-pound cord	Standard cords	0.9391	Cords (standard) per cord (4,600-pound)

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Sycamore	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Sycamore	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Sycamore	Cunits	Standard cords	1.1765	Cords per cunit
Sycamore	Dry metric tonnes	Standard cords	0.90014	Cords per tonne
Sycamore	Dry tons	Standard cords	0.8166	Cords per ton
Sycamore	Green metric tonnes	Standard cords	0.45007	Cords per tonne
Sycamore	Green tons	Standard cords	0.4083	Cords per ton
Sycamore	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Sycamore	Peeled dry tons	Standard cords	0.9376	Cords per ton
Sycamore	Peeled green tons	Standard cords	0.4688	Cords per ton
Sycamore	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Sycamore	Peeled metric dry tonnes	Standard cords	1.03352	Cords per tonne
Sycamore	Peeled metric green tonnes	Standard cords	0.51676	Cords per tonne
Sycamore	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Sycamore	Standard cords	MCF	0.085	MCF per cord
Tupelo/black gum	4,600-pound cord	Standard cords	0.8692	Cords (standard) per cord (4,600-pound)
Tupelo/black gum	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Tupelo/black gum	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Tupelo/black gum	Cunits	Standard cords	1.1765	Cords per cunit
Tupelo/black gum	Dry metric tonnes	Standard cords	0.83312	Cords per tonne
Tupelo/black gum	Dry tons	Standard cords	0.7558	Cords per ton
Tupelo/black gum	Green metric tonnes	Standard cords	0.41656	Cords per tonne
Tupelo/black gum	Green tons	Standard cords	0.3779	Cords per ton
Tupelo/black gum	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Tupelo/black gum	Peeled dry tons	Standard cords	0.83591	Cords per ton
Tupelo/black gum	Peeled green tons	Standard cords	0.41796	Cords per ton
Tupelo/black gum	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Tupelo/black gum	Peeled metric dry tonnes	Standard cords	0.92143	Cords per tonne
Tupelo/black gum	Peeled metric green tonnes	Standard cords	0.46071	Cords per tonne
Tupelo/black gum	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Tupelo/black gum	Standard cords	MCF	0.085	MCF per cord
Yellow-poplar	4,600-pound cord	Standard cords	0.9704	Cords (standard) per cord (4,600-pound)
Yellow-poplar	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Yellow-poplar	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Yellow-poplar	Cunits	Standard cords	1.1765	Cords per cunit
Yellow-poplar	Dry metric tonnes	Standard cords	0.97663	Cords per tonne
Yellow-poplar	Dry tons	Standard cords	0.88599	Cords per ton
Yellow-poplar	Green metric tonnes	Standard cords	0.46506	Cords per tonne
Yellow-poplar	Green tons	Standard cords	0.4219	Cords per ton
Yellow-poplar	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Yellow-poplar	Peeled dry tons	Standard cords	0.9799	Cords per ton
Yellow-poplar	Peeled green tons	Standard cords	0.46662	Cords per ton
Yellow-poplar	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Yellow-poplar	Peeled metric dry tonnes	Standard cords	1.08014	Cords per tonne
Yellow-poplar	Peeled metric green tonnes	Standard cords	0.51435	Cords per tonne

(Continued)

Table 13 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the Northeastern States of the United States (includes all Northeastern States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Yellow-poplar	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Yellow-poplar	Standard cords	MCF	0.085	MCF per cord
Other hardwoods	4,600-pound cord	Standard cords	1.09867	Cords (standard) per cord (4,600-pound)
Other hardwoods	Cubic feet	Standard cords	0.011765	Cords per cubic foot
Other hardwoods	Cubic meter	Standard cords	0.415477	Cords per cubic meter
Other hardwoods	Cunits	Standard cords	1.1765	Cords per cunit
Other hardwoods	Dry metric tonnes	Standard cords	0.94782	Cords per tonne
Other hardwoods	Dry tons	Standard cords	0.85986	Cords per ton
Other hardwoods	Green metric tonnes	Standard cords	0.52657	Cords per tonne
Other hardwoods	Green tons	Standard cords	0.4777	Cords per ton
Other hardwoods	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Other hardwoods	Peeled dry tons	Standard cords	0.92999	Cords per ton
Other hardwoods	Peeled green tons	Standard cords	0.51666	Cords per ton
Other hardwoods	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Other hardwoods	Peeled metric dry tonnes	Standard cords	1.02513	Cords per tonne
Other hardwoods	Peeled metric green tonnes	Standard cords	0.56952	Cords per tonne
Other hardwoods	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Other hardwoods	Standard cords	MCF	0.085	MCF per cord

[a] Northeastern States include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, and West Virginia.

[b] See table C.1 in appendix C for a list of tree species and associated species groups found in the Northern Region.

[c] Includes all *Acer* spp. with specific gravity ≥0.5.

[d] Includes all *Acer* spp. with specific gravity <0.5.

Table 14— Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Softwoods	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Softwoods	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Softwoods	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Softwoods	Cunits	Standard cords	1.2658	Cords per cunit
Softwoods	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Softwoods	Dry tons	Standard cords	0.89072	Cords per ton
Softwoods	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Softwoods	Green tons	Standard cords	0.4688	Cords per ton
Softwoods	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Softwoods	Peeled green tons	Standard cords	0.56349	Cords per ton
Softwoods	Peeled Lake States cords	Standard cords	1.2521	Cords (standard) per cord (peeled Lake States)
Softwoods	Peeled standard cords	Standard cords	1.202	Cords (standard) per cord (peeled)
Softwoods	Standard cords	MCF	0.079	MCF per cord
Cedar/juniper (eastern redcedar)	4,600-pound cord	Standard cords	1.213	Cords (standard) per cord (4,600-pound)
Cedar/juniper (eastern redcedar)	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Cedar/juniper (eastern redcedar)	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Cedar/juniper (eastern redcedar)	Cunits	Standard cords	1.2658	Cords per cunit
Cedar/juniper (eastern redcedar)	Dry metric tonnes	Standard cords	0.93016	Cords per tonne
Cedar/juniper (eastern redcedar)	Dry tons	Standard cords	0.84384	Cords per ton
Cedar/juniper (eastern redcedar)	Green metric tonnes	Standard cords	0.58135	Cords per tonne
Cedar/juniper (eastern redcedar)	Green tons	Standard cords	0.5274	Cords per ton
Cedar/juniper (eastern redcedar)	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cedar/juniper (eastern redcedar)	Peeled Lake States cords	Standard cords	1.1771	Cords (standard) per cord (peeled Lake States)
Cedar/juniper (eastern redcedar)	Peeled standard cords	Standard cords	1.13	Cords (standard) per cord (peeled)
Cedar/juniper (eastern redcedar)	Standard cords	MCF	0.079	MCF per cord
Cedar/juniper (Northern white-cedar)	4,600-pound cord	Standard cords	1.4557	Cords (standard) per cord (4,600-pound)
Cedar/juniper (Northern white-cedar)	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Cedar/juniper (Northern white-cedar)	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Cedar/juniper (Northern white-cedar)	Cunits	Standard cords	1.2658	Cords per cunit
Cedar/juniper (Northern white-cedar)	Dry metric tonnes	Standard cords	1.39529	Cords per tonne
Cedar/juniper (Northern white-cedar)	Dry tons	Standard cords	1.2658	Cords per ton
Cedar/juniper (Northern white-cedar)	Green metric tonnes	Standard cords	0.69765	Cords per tonne
Cedar/juniper (Northern white-cedar)	Green tons	Standard cords	0.6329	Cords per ton
Cedar/juniper (Northern white-cedar)	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cedar/juniper (Northern white-cedar)	Peeled dry tons	Standard cords	1.43038	Cords per ton
Cedar/juniper (Northern white-cedar)	Peeled green tons	Standard cords	0.71519	Cords per ton
Cedar/juniper (Northern white-cedar)	Peeled Lake States cords	Standard cords	1.1771	Cords (standard) per cord (peeled Lake States)
Cedar/juniper (Northern white-cedar)	Peeled metric dry tonnes	Standard cords	1.57671	Cords per tonne
Cedar/juniper (Northern white-cedar)	Peeled metric green tonnes	Standard cords	0.78835	Cords per tonne
Cedar/juniper (Northern white-cedar)	Peeled standard cords	Standard cords	1.13	Cords (standard) per cord (peeled)
Cedar/juniper (Northern white-cedar)	Standard cords	MCF	0.079	MCF per cord
Cypress	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Cypress	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Cypress	Cubic meter	Standard cords	0.44701	Cords per cubic meter

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Cypress	Cunits	Standard cords	1.2658	Cords per cunit
Cypress	Dry metric tonnes	Standard cords	0.95935	Cords per tonne
Cypress	Dry tons	Standard cords	0.87032	Cords per ton
Cypress	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Cypress	Green tons	Standard cords	0.3956	Cords per ton
Cypress	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cypress	Peeled Lake States cords	Standard cords	1.1771	Cords (standard) per cord (peeled Lake States)
Cypress	Peeled standard cords	Standard cords	1.13	Cords (standard) per cord (peeled)
Cypress	Standard cords	MCF	0.079	MCF per cord
Douglas-fir	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Douglas-fir	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Douglas-fir	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Douglas-fir	Cunits	Standard cords	1.2658	Cords per cunit
Douglas-fir	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Douglas-fir	Dry tons	Standard cords	0.89072	Cords per ton
Douglas-fir	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Douglas-fir	Green tons	Standard cords	0.4688	Cords per ton
Douglas-fir	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Douglas-fir	Peeled Lake States cords	Standard cords	1.2136	Cords (standard) per cord (peeled Lake States)
Douglas-fir	Peeled standard cords	Standard cords	1.165	Cords (standard) per cord (peeled)
Douglas-fir	Standard cords	MCF	0.079	MCF per cord
True firs	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
True firs	Cubic feet	Standard cords	0.01266	Cords per cubic foot
True firs	Cubic meter	Standard cords	0.44701	Cords per cubic meter
True firs	Cunits	Standard cords	1.2658	Cords per cunit
True firs	Dry metric tonnes	Standard cords	1.13687	Cords per tonne
True firs	Dry tons	Standard cords	1.03136	Cords per ton
True firs	Green metric tonnes	Standard cords	0.51676	Cords per tonne
True firs	Green tons	Standard cords	0.4688	Cords per ton
True firs	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
True firs	Peeled dry tons	Standard cords	1.20159	Cords per ton
True firs	Peeled green tons	Standard cords	0.54618	Cords per ton
True firs	Peeled Lake States cords	Standard cords	1.2136	Cords (standard) per cord (peeled Lake States)
True firs	Peeled metric dry tonnes	Standard cords	1.32452	Cords per tonne
True firs	Peeled metric green tonnes	Standard cords	0.60205	Cords per tonne
True firs	Peeled standard cords	Standard cords	1.165	Cords (standard) per cord (peeled)
True firs	Standard cords	MCF	0.079	MCF per cord
Hemlock	4,600-pound cord	Standard cords	0.9545	Cords (standard) per cord (4,600-pound)
Hemlock	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Hemlock	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Hemlock	Cunits	Standard cords	1.2658	Cords per cunit
Hemlock	Dry metric tonnes	Standard cords	0.96065	Cords per tonne
Hemlock	Dry tons	Standard cords	0.8715	Cords per ton
Hemlock	Green metric tonnes	Standard cords	0.45745	Cords per tonne
Hemlock	Green tons	Standard cords	0.415	Cords per ton

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Hemlock	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Hemlock	Peeled dry tons	Standard cords	1.09641	Cords per ton
Hemlock	Peeled green tons	Standard cords	0.5221	Cords per ton
Hemlock	Peeled Lake States cords	Standard cords	1.3105	Cords (standard) per cord (peeled Lake States)
Hemlock	Peeled metric dry tonnes	Standard cords	1.20857	Cords per tonne
Hemlock	Peeled metric green tonnes	Standard cords	0.57551	Cords per tonne
Hemlock	Peeled standard cords	Standard cords	1.258	Cords (standard) per cord (peeled)
Hemlock	Standard cords	MCF	0.079	MCF per cord
Jack pine	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Jack pine	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Jack pine	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Jack pine	Cunits	Standard cords	1.2658	Cords per cunit
Jack pine	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Jack pine	Dry tons	Standard cords	0.89072	Cords per ton
Jack pine	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Jack pine	Green tons	Standard cords	0.4688	Cords per ton
Jack pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Jack pine	Peeled dry tons	Standard cords	1.07872	Cords per ton
Jack pine	Peeled green tons	Standard cords	0.56774	Cords per ton
Jack pine	Peeled Lake States cords	Standard cords	1.2615	Cords (standard) per cord (peeled Lake States)
Jack pine	Peeled metric dry tonnes	Standard cords	1.18907	Cords per tonne
Jack pine	Peeled metric green tonnes	Standard cords	0.62583	Cords per tonne
Jack pine	Peeled standard cords	Standard cords	1.211	Cords (standard) per cord (peeled)
Jack pine	Standard cords	MCF	0.079	MCF per cord
Loblolly/shortleaf pine	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Loblolly/shortleaf pine	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Loblolly/shortleaf pine	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Loblolly/shortleaf pine	Cunits	Standard cords	1.2658	Cords per cunit
Loblolly/shortleaf pine	Dry metric tonnes	Standard cords	0.87214	Cords per tonne
Loblolly/shortleaf pine	Dry tons	Standard cords	0.7912	Cords per ton
Loblolly/shortleaf pine	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Loblolly/shortleaf pine	Green tons	Standard cords	0.3956	Cords per ton
Loblolly/shortleaf pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Loblolly/shortleaf pine	Peeled dry tons	Standard cords	0.95419	Cords per ton
Loblolly/shortleaf pine	Peeled green tons	Standard cords	0.4771	Cords per ton
Loblolly/shortleaf pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Loblolly/shortleaf pine	Peeled metric dry tonnes	Standard cords	1.05181	Cords per tonne
Loblolly/shortleaf pine	Peeled metric green tonnes	Standard cords	0.5259	Cords per tonne
Loblolly/shortleaf pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Loblolly/shortleaf pine	Standard cords	MCF	0.079	MCF per cord
Longleaf/slash pine	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Longleaf/slash pine	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Longleaf/slash pine	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Longleaf/slash pine	Cunits	Standard cords	1.2658	Cords per cunit

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Longleaf/slash pine	Dry metric tonnes	Standard cords	0.87214	Cords per tonne
Longleaf/slash pine	Dry tons	Standard cords	0.7912	Cords per ton
Longleaf/slash pine	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Longleaf/slash pine	Green tons	Standard cords	0.3956	Cords per ton
Longleaf/slash pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Longleaf/slash pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Longleaf/slash pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Longleaf/slash pine	Standard cords	MCF	0.079	MCF per cord
Ponderosa/Jeffrey pine	4,600-pound cord	Standard cords	1.1417	Cords (standard) per cord (4,600-pound)
Ponderosa/Jeffrey pine	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Ponderosa/Jeffrey pine	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Ponderosa/Jeffrey pine	Cunits	Standard cords	1.2658	Cords per cunit
Ponderosa/Jeffrey pine	Dry metric tonnes	Standard cords	1.03965	Cords per tonne
Ponderosa/Jeffrey pine	Dry tons	Standard cords	0.94316	Cords per ton
Ponderosa/Jeffrey pine	Green metric tonnes	Standard cords	0.54718	Cords per tonne
Ponderosa/Jeffrey pine	Green tons	Standard cords	0.4964	Cords per ton
Ponderosa/Jeffrey pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Ponderosa/Jeffrey pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Ponderosa/Jeffrey pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Ponderosa/Jeffrey pine	Standard cords	MCF	0.079	MCF per cord
Red pine	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Red pine	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Red pine	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Red pine	Cunits	Standard cords	1.2658	Cords per cunit
Red pine	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Red pine	Dry tons	Standard cords	0.89072	Cords per ton
Red pine	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Red pine	Green tons	Standard cords	0.4688	Cords per ton
Red pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Red pine	Peeled dry tons	Standard cords	1.0707	Cords per ton
Red pine	Peeled green tons	Standard cords	0.56353	Cords per ton
Red pine	Peeled Lake States cords	Standard cords	1.2615	Cords (standard) per cord (peeled Lake States)
Red pine	Peeled metric dry tonnes	Standard cords	1.18023	Cords per tonne
Red pine	Peeled metric green tonnes	Standard cords	0.62117	Cords per tonne
Red pine	Peeled standard cords	Standard cords	1.211	Cords (standard) per cord (peeled)
Red pine	Standard cords	MCF	0.079	MCF per cord
White pine	4,600-pound cord	Standard cords	1.0987	Cords (standard) per cord (4,600-pound)
White pine	Cubic feet	Standard cords	0.01266	Cords per cubic foot
White pine	Cubic meter	Standard cords	0.44701	Cords per cubic meter
White pine	Cunits	Standard cords	1.2658	Cords per cunit
White pine	Dry metric tonnes	Standard cords	1.00048	Cords per tonne
White pine	Dry tons	Standard cords	0.90763	Cords per ton
White pine	Green metric tonnes	Standard cords	0.52657	Cords per tonne
White pine	Green tons	Standard cords	0.4777	Cords per ton

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
White pine	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
White pine	Peeled dry tons	Standard cords	1.09453	Cords per ton
White pine	Peeled green tons	Standard cords	0.57607	Cords per ton
White pine	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
White pine	Peeled metric dry tonnes	Standard cords	1.2065	Cords per tonne
White pine	Peeled metric green tonnes	Standard cords	0.635	Cords per tonne
White pine	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
White pine	Standard cords	MCF	0.079	MCF per cord
Other pines	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Other pines	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Other pines	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Other pines	Cunits	Standard cords	1.2658	Cords per cunit
Other pines	Dry metric tonnes	Standard cords	0.98184	Cords per tonne
Other pines	Dry tons	Standard cords	0.89072	Cords per ton
Other pines	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Other pines	Green tons	Standard cords	0.4688	Cords per ton
Other pines	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Other pines	Peeled dry tons	Standard cords	1.07421	Cords per ton
Other pines	Peeled green tons	Standard cords	0.56538	Cords per ton
Other pines	Peeled Lake States cords	Standard cords	1.2563	Cords (standard) per cord (peeled Lake States)
Other pines	Peeled metric dry tonnes	Standard cords	1.1841	Cords per tonne
Other pines	Peeled metric green tonnes	Standard cords	0.62321	Cords per tonne
Other pines	Peeled standard cords	Standard cords	1.206	Cords (standard) per cord (peeled)
Other pines	Standard cords	MCF	0.079	MCF per cord
Spruce	4,600-pound cord	Standard cords	1.1532	Cords (standard) per cord (4,600-pound)
Spruce	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Spruce	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Spruce	Cunits	Standard cords	1.2658	Cords per cunit
Spruce	Dry metric tonnes	Standard cords	1.07775	Cords per tonne
Spruce	Dry tons	Standard cords	0.97773	Cords per ton
Spruce	Green metric tonnes	Standard cords	0.55269	Cords per tonne
Spruce	Green tons	Standard cords	0.5014	Cords per ton
Spruce	Lake State cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Spruce	Peeled dry tons	Standard cords	1.10744	Cords per ton
Spruce	Peeled green tons	Standard cords	0.56792	Cords per ton
Spruce	Peeled Lake States cords	Standard cords	1.1802	Cords (standard) per cord (peeled Lake States)
Spruce	Peeled metric dry tonnes	Standard cords	1.22074	Cords per tonne
Spruce	Peeled metric green tonnes	Standard cords	0.62602	Cords per tonne
Spruce	Peeled standard cords	Standard cords	1.133	Cords (standard) per cord (peeled)
Spruce	Standard cords	MCF	0.079	MCF per cord
Tamarack/larch	4,600-pound cord	Standard cords	0.9869	Cords (standard) per cord (4,600-pound)
Tamarack/larch	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Tamarack/larch	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Tamarack/larch	Cunits	Standard cords	1.2658	Cords per cunit

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Tamarack/larch	Dry metric tonnes	Standard cords	0.85139	Cords per tonne
Tamarack/larch	Dry tons	Standard cords	0.77238	Cords per ton
Tamarack/larch	Green metric tonnes	Standard cords	0.473	Cords per tonne
Tamarack/larch	Green tons	Standard cords	0.4291	Cords per ton
Tamarack/larch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Tamarack/larch	Peeled dry tons	Standard cords	0.88281	Cords per ton
Tamarack/larch	Peeled green tons	Standard cords	0.49045	Cords per ton
Tamarack/larch	Peeled Lake States cords	Standard cords	1.1907	Cords (standard) per cord (peeled Lake States)
Tamarack/larch	Peeled metric dry tonnes	Standard cords	0.97313	Cords per tonne
Tamarack/larch	Peeled metric green tonnes	Standard cords	0.54063	Cords per tonne
Tamarack/larch	Peeled standard cords	Standard cords	1.143	Cords (standard) per cord (peeled)
Tamarack/larch	Standard cords	MCF	0.079	MCF per cord
Hardwoods	4,600-pound cord	Standard cords	0.906	Cords (standard) per cord (4,600-pound)
Hardwoods	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Hardwoods	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Hardwoods	Cunits	Standard cords	1.2658	Cords per cunit
Hardwoods	Dry metric tonnes	Standard cords	0.80326	Cords per tonne
Hardwoods	Dry tons	Standard cords	0.72872	Cords per ton
Hardwoods	Green metric tonnes	Standard cords	0.4342	Cords per tonne
Hardwoods	Green tons	Standard cords	0.3939	Cords per ton
Hardwoods	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Hardwoods	Peeled green tons	Standard cords	0.46219	Cords per ton
Hardwoods	Peeled Lake States cords	Standard cords	1.2223	Cords (standard) per cord (peeled Lake States)
Hardwoods	Peeled standard cords	Standard cords	1.1734	Cords (standard) per cord (peeled)
Hardwoods	Standard cords	MCF	0.079	MCF per cord
Alder	4,600-pound cord	Standard cords	1.09867	Cords (standard) per cord (4,600-pound)
Alder	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Alder	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Alder	Cunits	Standard cords	1.2658	Cords per cunit
Alder	Dry metric tonnes	Standard cords	0.94782	Cords per tonne
Alder	Dry tons	Standard cords	0.85986	Cords per ton
Alder	Green metric tonnes	Standard cords	0.52657	Cords per tonne
Alder	Green tons	Standard cords	0.4777	Cords per ton
Alder	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Alder	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Alder	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Alder	Standard cords	MCF	0.079	MCF per cord
Ash	4,600-pound cord	Standard cords	0.9959	Cords (standard) per cord (4,600-pound)
Ash	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Ash	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Ash	Cunits	Standard cords	1.2658	Cords per cunit
Ash	Dry metric tonnes	Standard cords	0.8114	Cords per tonne
Ash	Dry tons	Standard cords	0.7361	Cords per ton
Ash	Green metric tonnes	Standard cords	0.4773	Cords per tonne
Ash	Green tons	Standard cords	0.433	Cords per ton

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Ash	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Ash	Peeled dry tons	Standard cords	0.43847	Cords per ton
Ash	Peeled green tons	Standard cords	0.25792	Cords per ton
Ash	Peeled Lake States cords	Standard cords	1.2417	Cords (standard) per cord (peeled Lake States)
Ash	Peeled metric dry tonnes	Standard cords	0.48333	Cords per tonne
Ash	Peeled metric green tonnes	Standard cords	0.28431	Cords per tonne
Ash	Peeled standard cords	Standard cords	1.192	Cords (standard) per cord (peeled)
Ash	Standard cords	MCF	0.079	MCF per cord
Aspen/balsam poplar	4,600-pound cord	Standard cords	0.9869	Cords (standard) per cord (4,600-pound)
Aspen/balsam poplar	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Aspen/balsam poplar	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Aspen/balsam poplar	Cunits	Standard cords	1.2658	Cords per cunit
Aspen/balsam poplar	Dry metric tonnes	Standard cords	1.04059	Cords per tonne
Aspen/balsam poplar	Dry tons	Standard cords	0.94402	Cords per ton
Aspen/balsam poplar	Green metric tonnes	Standard cords	0.473	Cords per tonne
Aspen/balsam poplar	Green tons	Standard cords	0.4291	Cords per ton
Aspen/balsam poplar	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Aspen/balsam poplar	Peeled dry tons	Standard cords	1.13941	Cords per ton
Aspen/balsam poplar	Peeled green tons	Standard cords	0.51791	Cords per ton
Aspen/balsam poplar	Peeled Lake States cords	Standard cords	1.2573	Cords (standard) per cord (peeled Lake States)
Aspen/balsam poplar	Peeled metric dry tonnes	Standard cords	1.25597	Cords per tonne
Aspen/balsam poplar	Peeled metric green tonnes	Standard cords	0.5709	Cords per tonne
Aspen/balsam poplar	Peeled standard cords	Standard cords	1.207	Cords (standard) per cord (peeled)
Aspen/balsam poplar	Standard cords	MCF	0.079	MCF per cord
Basswood	4,600-pound cord	Standard cords	1.1884	Cords (standard) per cord (4,600-pound)
Basswood	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Basswood	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Basswood	Cunits	Standard cords	1.2658	Cords per cunit
Basswood	Dry metric tonnes	Standard cords	1.13912	Cords per tonne
Basswood	Dry tons	Standard cords	1.0334	Cords per ton
Basswood	Green metric tonnes	Standard cords	0.56956	Cords per tonne
Basswood	Green tons	Standard cords	0.5167	Cords per ton
Basswood	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Basswood	Peeled dry tons	Standard cords	1.23379	Cords per ton
Basswood	Peeled green tons	Standard cords	0.61689	Cords per ton
Basswood	Peeled Lake States cords	Standard cords	1.2438	Cords (standard) per cord (peeled Lake States)
Basswood	Peeled metric dry tonnes	Standard cords	1.36001	Cords per tonne
Basswood	Peeled metric green tonnes	Standard cords	0.68	Cords per tonne
Basswood	Peeled standard cords	Standard cords	1.194	Cords (standard) per cord (peeled)
Basswood	Standard cords	MCF	0.079	MCF per cord
Beech	4,600-pound cord	Standard cords	0.9099	Cords (standard) per cord (4,600-pound)
Beech	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Beech	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Beech	Cunits	Standard cords	1.2658	Cords per cunit

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Beech	Dry metric tonnes	Standard cords	0.74132	Cords per tonne
Beech	Dry tons	Standard cords	0.67252	Cords per ton
Beech	Green metric tonnes	Standard cords	0.43607	Cords per tonne
Beech	Green tons	Standard cords	0.3956	Cords per ton
Beech	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Beech	Peeled dry tons	Standard cords	0.71954	Cords per ton
Beech	Peeled green tons	Standard cords	0.42326	Cords per ton
Beech	Peeled Lake States cords	Standard cords	1.1146	Cords (standard) per cord (peeled Lake States)
Beech	Peeled metric dry tonnes	Standard cords	0.79315	Cords per tonne
Beech	Peeled metric green tonnes	Standard cords	0.46656	Cords per tonne
Beech	Peeled standard cords	Standard cords	1.07	Cords (standard) per cord (peeled)
Beech	Standard cords	MCF	0.079	MCF per cord
White (paper) birch	4,600-pound cord	Standard cords	0.9241	Cords (standard) per cord (4,600-pound)
White (paper) birch	Cubic feet	Standard cords	0.01266	Cords per cubic foot
White (paper) birch	Cubic meter	Standard cords	0.44701	Cords per cubic meter
White (paper) birch	Cunits	Standard cords	1.2658	Cords per cunit
White (paper) birch	Dry metric tonnes	Standard cords	0.79723	Cords per tonne
White (paper) birch	Dry tons	Standard cords	0.72324	Cords per ton
White (paper) birch	Green metric tonnes	Standard cords	0.4429	Cords per tonne
White (paper) birch	Green tons	Standard cords	0.4018	Cords per ton
White (paper) birch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
White (paper) birch	Peeled dry tons	Standard cords	0.84051	Cords per ton
White (paper) birch	Peeled green tons	Standard cords	0.46695	Cords per ton
White (paper) birch	Peeled Lake States cords	Standard cords	1.2105	Cords (standard) per cord (peeled Lake States)
White (paper) birch	Peeled metric dry tonnes	Standard cords	0.92649	Cords per tonne
White (paper) birch	Peeled metric green tonnes	Standard cords	0.51472	Cords per tonne
White (paper) birch	Peeled standard cords	Standard cords	1.162	Cords (standard) per cord (peeled)
White (paper) birch	Standard cords	MCF	0.079	MCF per cord
Yellow birch	4,600-pound cord	Standard cords	0.8563	Cords (standard) per cord (4,600-pound)
Yellow birch	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Yellow birch	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Yellow birch	Cunits	Standard cords	1.2658	Cords per cunit
Yellow birch	Dry metric tonnes	Standard cords	0.7387	Cords per tonne
Yellow birch	Dry tons	Standard cords	0.67014	Cords per ton
Yellow birch	Green metric tonnes	Standard cords	0.41039	Cords per tonne
Yellow birch	Green tons	Standard cords	0.3723	Cords per ton
Yellow birch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Yellow birch	Peeled dry tons	Standard cords	0.76463	Cords per ton
Yellow birch	Peeled green tons	Standard cords	0.4248	Cords per ton
Yellow birch	Peeled Lake States cords	Standard cords	1.1886	Cords (standard) per cord (peeled Lake States)
Yellow birch	Peeled metric dry tonnes	Standard cords	0.84285	Cords per tonne
Yellow birch	Peeled metric green tonnes	Standard cords	0.46825	Cords per tonne
Yellow birch	Peeled standard cords	Standard cords	1.141	Cords (standard) per cord (peeled)
Yellow birch	Standard cords	MCF	0.079	MCF per cord

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Other birch	4,600-pound cord	Standard cords	0.8903	Cords (standard) per cord (4,600-pound)
Other birch	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Other birch	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Other birch	Cunits	Standard cords	1.2658	Cords per cunit
Other birch	Dry metric tonnes	Standard cords	0.76806	Cords per tonne
Other birch	Dry tons	Standard cords	0.69678	Cords per ton
Other birch	Green metric tonnes	Standard cords	0.4267	Cords per tonne
Other birch	Green tons	Standard cords	0.3871	Cords per ton
Other birch	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Other birch	Peeled dry tons	Standard cords	0.80234	Cords per ton
Other birch	Peeled green tons	Standard cords	0.44574	Cords per ton
Other birch	Peeled Lake States cords	Standard cords	1.1995	Cords (standard) per cord (peeled Lake States)
Other birch	Peeled metric dry tonnes	Standard cords	0.88442	Cords per tonne
Other birch	Peeled metric green tonnes	Standard cords	0.49134	Cords per tonne
Other birch	Peeled standard cords	Standard cords	1.1515	Cords (standard) per cord (peeled)
Other birch	Standard cords	MCF	0.079	MCF per cord
Black cherry	4,600-pound cord	Standard cords	1.0782	Cords (standard) per cord (4,600-pound)
Black cherry	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Black cherry	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Black cherry	Cunits	Standard cords	1.2658	Cords per cunit
Black cherry	Dry metric tonnes	Standard cords	0.93016	Cords per tonne
Black cherry	Dry tons	Standard cords	0.84384	Cords per ton
Black cherry	Green metric tonnes	Standard cords	0.51676	Cords per tonne
Black cherry	Green tons	Standard cords	0.4688	Cords per ton
Black cherry	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Black cherry	Peeled dry tons	Standard cords	0.92999	Cords per ton
Black cherry	Peeled green tons	Standard cords	0.51666	Cords per ton
Black cherry	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Black cherry	Peeled metric dry tonnes	Standard cords	1.02513	Cords per tonne
Black cherry	Peeled metric green tonnes	Standard cords	0.56952	Cords per tonne
Black cherry	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Black cherry	Standard cords	MCF	0.079	MCF per cord
Black walnut	4,600-pound cord	Standard cords	0.9391	Cords (standard) per cord (4,600-pound)
Black walnut	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Black walnut	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Black walnut	Cunits	Standard cords	1.2658	Cords per cunit
Black walnut	Dry metric tonnes	Standard cords	0.81012	Cords per tonne
Black walnut	Dry tons	Standard cords	0.73494	Cords per ton
Black walnut	Green metric tonnes	Standard cords	0.45007	Cords per tonne
Black walnut	Green tons	Standard cords	0.4083	Cords per ton
Black walnut	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Black walnut	Peeled dry tons	Standard cords	0.81284	Cords per ton
Black walnut	Peeled green tons	Standard cords	0.45158	Cords per ton
Black walnut	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Black walnut	Peeled metric dry tonnes	Standard cords	0.89599	Cords per tonne

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Black walnut	Peeled metric green tonnes	Standard cords	0.49777	Cords per tonne
Black walnut	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Black walnut	Standard cords	MCF	0.079	MCF per cord
Cottonwood	4,600-pound cord	Standard cords	0.9869	Cords (standard) per cord (4,600-pound)
Cottonwood	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Cottonwood	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Cottonwood	Cunits	Standard cords	1.2658	Cords per cunit
Cottonwood	Dry metric tonnes	Standard cords	1.04059	Cords per tonne
Cottonwood	Dry tons	Standard cords	0.94402	Cords per ton
Cottonwood	Green metric tonnes	Standard cords	0.473	Cords per tonne
Cottonwood	Green tons	Standard cords	0.4291	Cords per ton
Cottonwood	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Cottonwood	Peeled dry tons	Standard cords	1.13379	Cords per ton
Cottonwood	Peeled green tons	Standard cords	0.51536	Cords per ton
Cottonwood	Peeled Lake States cords	Standard cords	1.2407	Cords (standard) per cord (peeled Lake States)
Cottonwood	Peeled metric dry tonnes	Standard cords	1.24978	Cords per tonne
Cottonwood	Peeled metric green tonnes	Standard cords	0.56808	Cords per tonne
Cottonwood	Peeled standard cords	Standard cords	1.191	Cords (standard) per cord (peeled)
Cottonwood	Standard cords	MCF	0.079	MCF per cord
Elm	4,600-pound cord	Standard cords	0.9241	Cords (standard) per cord (4,600-pound)
Elm	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Elm	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Elm	Cunits	Standard cords	1.2658	Cords per cunit
Elm	Dry metric tonnes	Standard cords	0.88581	Cords per tonne
Elm	Dry tons	Standard cords	0.8036	Cords per ton
Elm	Green metric tonnes	Standard cords	0.4429	Cords per tonne
Elm	Green tons	Standard cords	0.4018	Cords per ton
Elm	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Elm	Peeled dry tons	Standard cords	0.94434	Cords per ton
Elm	Peeled green tons	Standard cords	0.47217	Cords per ton
Elm	Peeled Lake States cords	Standard cords	1.224	Cords (standard) per cord (peeled Lake States)
Elm	Peeled metric dry tonnes	Standard cords	1.04095	Cords per tonne
Elm	Peeled metric green tonnes	Standard cords	0.52048	Cords per tonne
Elm	Peeled standard cords	Standard cords	1.175	Cords (standard) per cord (peeled)
Elm	Standard cords	MCF	0.079	MCF per cord
Hickory	4,600-pound cord	Standard cords	0.8512	Cords (standard) per cord (4,600-pound)
Hickory	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Hickory	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Hickory	Cunits	Standard cords	1.2658	Cords per cunit
Hickory	Dry metric tonnes	Standard cords	0.65274	Cords per tonne
Hickory	Dry tons	Standard cords	0.59216	Cords per ton
Hickory	Green metric tonnes	Standard cords	0.40796	Cords per tonne
Hickory	Green tons	Standard cords	0.3701	Cords per ton
Hickory	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Hickory	Peeled dry tons	Standard cords	0.65209	Cords per ton
Hickory	Peeled green tons	Standard cords	0.40756	Cords per ton
Hickory	Peeled Lake States cords	Standard cords	1.1907	Cords (standard) per cord (peeled Lake States)
Hickory	Peeled metric dry tonnes	Standard cords	0.7188	Cords per tonne
Hickory	Peeled metric green tonnes	Standard cords	0.44925	Cords per tonne
Hickory	Peeled standard cords	Standard cords	1.143	Cords (standard) per cord (peeled)
Hickory	Standard cords	MCF	0.079	MCF per cord
Hard maple[c]	4,600-pound cord	Standard cords	0.8319	Cords (standard) per cord (4,600-pound)
Hard maple[c]	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Hard maple[c]	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Hard maple[c]	Cunits	Standard cords	1.2658	Cords per cunit
Hard maple[c]	Dry metric tonnes	Standard cords	0.71766	Cords per tonne
Hard maple[c]	Dry tons	Standard cords	0.65106	Cords per ton
Hard maple[c]	Green metric tonnes	Standard cords	0.3987	Cords per tonne
Hard maple[c]	Green tons	Standard cords	0.3617	Cords per ton
Hard maple[c]	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Hard maple[c]	Peeled dry tons	Standard cords	0.74018	Cords per ton
Hard maple[c]	Peeled green tons	Standard cords	0.41121	Cords per ton
Hard maple[c]	Peeled Lake States cords	Standard cords	1.1844	Cords (standard) per cord (peeled Lake States)
Hard maple[c]	Peeled metric dry tonnes	Standard cords	0.8159	Cords per tonne
Hard maple[c]	Peeled metric green tonnes	Standard cords	0.45328	Cords per tonne
Hard maple[c]	Peeled standard cords	Standard cords	1.137	Cords (standard) per cord (peeled)
Hard maple[c]	Standard cords	MCF	0.079	MCF per cord
Soft maple[d]	4,600-pound cord	Standard cords	0.9391	Cords (standard) per cord (4,600-pound)
Soft maple[d]	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Soft maple[d]	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Soft maple[d]	Cunits	Standard cords	1.2658	Cords per cunit
Soft maple[d]	Dry metric tonnes	Standard cords	0.81012	Cords per tonne
Soft maple[d]	Dry tons	Standard cords	0.73494	Cords per ton
Soft maple[d]	Green metric tonnes	Standard cords	0.45007	Cords per tonne
Soft maple[d]	Green tons	Standard cords	0.4083	Cords per ton
Soft maple[d]	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Soft maple[d]	Peeled dry tons	Standard cords	0.8401	Cords per ton
Soft maple[d]	Peeled green tons	Standard cords	0.46672	Cords per ton
Soft maple[d]	Peeled Lake States cords	Standard cords	1.1907	Cords (standard) per cord (peeled Lake States)
Soft maple[d]	Peeled metric dry tonnes	Standard cords	0.92604	Cords per tonne
Soft maple[d]	Peeled metric green tonnes	Standard cords	0.51447	Cords per tonne
Soft maple[d]	Peeled standard cords	Standard cords	1.143	Cords (standard) per cord (peeled)
Soft maple[d]	Standard cords	MCF	0.079	MCF per cord
Red oak	4,600-pound cord	Standard cords	0.7921	Cords (standard) per cord (4,600-pound)
Red oak	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Red oak	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Red oak	Cunits	Standard cords	1.2658	Cords per cunit
Red oak	Dry metric tonnes	Standard cords	0.68334	Cords per tonne

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Red oak	Dry tons	Standard cords	0.61992	Cords per ton
Red oak	Green metric tonnes	Standard cords	0.37963	Cords per tonne
Red oak	Green tons	Standard cords	0.3444	Cords per ton
Red oak	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Red oak	Peeled dry tons	Standard cords	0.74066	Cords per ton
Red oak	Peeled green tons	Standard cords	0.41148	Cords per ton
Red oak	Peeled Lake States cords	Standard cords	1.236	Cords (standard) per cord (peeled Lake States)
Red oak	Peeled metric dry tonnes	Standard cords	0.81643	Cords per tonne
Red oak	Peeled metric green tonnes	Standard cords	0.45357	Cords per tonne
Red oak	Peeled standard cords	Standard cords	1.1865	Cords (standard) per cord (peeled)
Red oak	Standard cords	MCF	0.079	MCF per cord
White oak	4,600-pound cord	Standard cords	0.8563	Cords (standard) per cord (4,600-pound)
White oak	Cubic feet	Standard cords	0.01266	Cords per cubic foot
White oak	Cubic meter	Standard cords	0.44701	Cords per cubic meter
White oak	Cunits	Standard cords	1.2658	Cords per cunit
White oak	Dry metric tonnes	Standard cords	0.65662	Cords per tonne
White oak	Dry tons	Standard cords	0.59568	Cords per ton
White oak	Green metric tonnes	Standard cords	0.41039	Cords per tonne
White oak	Green tons	Standard cords	0.3723	Cords per ton
White oak	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
White oak	Peeled dry tons	Standard cords	0.66895	Cords per ton
White oak	Peeled green tons	Standard cords	0.41809	Cords per ton
White oak	Peeled Lake States cords	Standard cords	1.2813	Cords (standard) per cord (peeled Lake States)
White oak	Peeled metric dry tonnes	Standard cords	0.73738	Cords per tonne
White oak	Peeled metric green tonnes	Standard cords	0.46086	Cords per tonne
White oak	Peeled standard cords	Standard cords	1.23	Cords (standard) per cord (peeled)
White oak	Standard cords	MCF	0.079	MCF per cord
Sweetgum	4,600-pound cord	Standard cords	0.8439	Cords (standard) per cord (4,600-pound)
Sweetgum	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Sweetgum	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Sweetgum	Cunits	Standard cords	1.2658	Cords per cunit
Sweetgum	Dry metric tonnes	Standard cords	0.84931	Cords per tonne
Sweetgum	Dry tons	Standard cords	0.77049	Cords per ton
Sweetgum	Green metric tonnes	Standard cords	0.40443	Cords per tonne
Sweetgum	Green tons	Standard cords	0.3669	Cords per ton
Sweetgum	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Sweetgum	Peeled dry tons	Standard cords	0.85215	Cords per ton
Sweetgum	Peeled green tons	Standard cords	0.40579	Cords per ton
Sweetgum	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Sweetgum	Peeled metric dry tonnes	Standard cords	0.93933	Cords per tonne
Sweetgum	Peeled metric green tonnes	Standard cords	0.4473	Cords per tonne
Sweetgum	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Sweetgum	Standard cords	MCF	0.079	MCF per cord
Sycamore	4,600-pound cord	Standard cords	0.9391	Cords (standard) per cord (4,600-pound)

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Sycamore	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Sycamore	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Sycamore	Cunits	Standard cords	1.2658	Cords per cunit
Sycamore	Dry metric tonnes	Standard cords	0.90014	Cords per tonne
Sycamore	Dry tons	Standard cords	0.8166	Cords per ton
Sycamore	Green metric tonnes	Standard cords	0.45007	Cords per tonne
Sycamore	Green tons	Standard cords	0.4083	Cords per ton
Sycamore	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Sycamore	Peeled dry tons	Standard cords	0.9376	Cords per ton
Sycamore	Peeled green tons	Standard cords	0.4688	Cords per ton
Sycamore	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Sycamore	Peeled metric dry tonnes	Standard cords	1.03352	Cords per tonne
Sycamore	Peeled metric green tonnes	Standard cords	0.51676	Cords per tonne
Sycamore	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Sycamore	Standard cords	MCF	0.079	MCF per cord
Tupelo/black gum	4,600-pound cord	Standard cords	0.8692	Cords (standard) per cord (4,600-pound)
Tupelo/black gum	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Tupelo/black gum	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Tupelo/black gum	Cunits	Standard cords	1.2658	Cords per cunit
Tupelo/black gum	Dry metric tonnes	Standard cords	0.83312	Cords per tonne
Tupelo/black gum	Dry tons	Standard cords	0.7558	Cords per ton
Tupelo/black gum	Green metric tonnes	Standard cords	0.41656	Cords per tonne
Tupelo/black gum	Green tons	Standard cords	0.3779	Cords per ton
Tupelo/black gum	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Tupelo/black gum	Peeled dry tons	Standard cords	0.83591	Cords per ton
Tupelo/black gum	Peeled green tons	Standard cords	0.41796	Cords per ton
Tupelo/black gum	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Tupelo/black gum	Peeled metric dry tonnes	Standard cords	0.92143	Cords per tonne
Tupelo/black gum	Peeled metric green tonnes	Standard cords	0.46071	Cords per tonne
Tupelo/black gum	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Tupelo/black gum	Standard cords	MCF	0.079	MCF per cord
Yellow-poplar	4,600-pound cord	Standard cords	0.9704	Cords (standard) per cord (4,600-pound)
Yellow-poplar	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Yellow-poplar	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Yellow-poplar	Cunits	Standard cords	1.2658	Cords per cunit
Yellow-poplar	Dry metric tonnes	Standard cords	0.97663	Cords per tonne
Yellow-poplar	Dry tons	Standard cords	0.88599	Cords per ton
Yellow-poplar	Green metric tonnes	Standard cords	0.46506	Cords per tonne
Yellow-poplar	Green tons	Standard cords	0.4219	Cords per ton
Yellow-poplar	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Yellow-poplar	Peeled dry tons	Standard cords	0.9799	Cords per ton
Yellow-poplar	Peeled green tons	Standard cords	0.46662	Cords per ton
Yellow-poplar	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Yellow-poplar	Peeled metric dry tonnes	Standard cords	1.08014	Cords per tonne
Yellow-poplar	Peeled metric green tonnes	Standard cords	0.51435	Cords per tonne

(Continued)

Table 14 *(Continued)*—Conversion factors used by Forest Inventory and Analysis for pulp mill logs and chipped roundwood as well as composite panels and engineered wood products in the North Central States of the United States (includes all North Central States[a])

Species group[b]	Input unit of measure	Output unit of measure	Factor	Factor units
Yellow-poplar	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Yellow-poplar	Standard cords	MCF	0.079	MCF per cord
Other hardwoods	4,600-pound cord	Standard cords	1.09867	Cords (standard) per cord (4,600-pound)
Other hardwoods	Cubic feet	Standard cords	0.01266	Cords per cubic foot
Other hardwoods	Cubic meter	Standard cords	0.44701	Cords per cubic meter
Other hardwoods	Cunits	Standard cords	1.2658	Cords per cunit
Other hardwoods	Dry metric tonnes	Standard cords	0.94782	Cords per tonne
Other hardwoods	Dry tons	Standard cords	0.85986	Cords per ton
Other hardwoods	Green metric tonnes	Standard cords	0.52657	Cords per tonne
Other hardwoods	Green tons	Standard cords	0.4777	Cords per ton
Other hardwoods	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Other hardwoods	Peeled dry tons	Standard cords	0.92999	Cords per ton
Other hardwoods	Peeled green tons	Standard cords	0.51666	Cords per ton
Other hardwoods	Peeled Lake States cords	Standard cords	1.1521	Cords (standard) per cord (peeled Lake States)
Other hardwoods	Peeled metric dry tonnes	Standard cords	1.02513	Cords per tonne
Other hardwoods	Peeled metric green tonnes	Standard cords	0.56952	Cords per tonne
Other hardwoods	Peeled standard cords	Standard cords	1.106	Cords (standard) per cord (peeled)
Other hardwoods	Standard cords	MCF	0.079	MCF per cord

[a] North Central States include Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

[b] See table C.1 in appendix C for a list of tree species and associated species groups found in the Northern Region.

[c] Includes all *Acer* spp. with specific gravity ≥0.5.

[d] Includes all *Acer* spp. with specific gravity <0.5.

Table 15—Roundwood conversion factors used by Forest Inventory and Analysis for pulp mill logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	80	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	90	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50[a]	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4000	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4500	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.0	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.25	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2005	MCF	MBF Scribner	3.9	MBF Scribner per MCF
Alaska	2015	MCF	MBF Scribner	5.3	MBF Scribner per MCF
California	2000	MCF	MBF Scribner	2.5	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	2.21	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.454	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	2.4	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	2.43	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	2.81	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	3.0	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	2.49	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	2.2	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	1.02	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Washington	2002	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	2.64	MBF Scribner per MCF

[a] 50 green pounds per cubic foot is equivalent to 25 green tons per MCF.

Composite Panels/Engineered Wood Products

This classification includes roundwood products that are manufactured into chips, wafers, strands, flakes, shavings, or sawdust and then reconstituted into a variety of panel and engineered lumber products.

Southern Region

In the Southern Region, FIA standard units for composite products are standard cords. Table 16 lists the factors used by FIA to convert mill-reported values to standard units. Note that conversions from MCF vary by State.

CONVERSION EXAMPLE 10: A mill in North Carolina reports that 300,000 green tons of softwood chips were produced from roundwood to make composite panels.

Regional/national standard unit conversion (green tons to standard cords) using table 16:
300,000 green tons / 2.7 green tons per standard cord = 111,111 standard cords

Conversion to MCF (standard cords to MCF) using table 16:
111,111 standard cords × 0.0780 MCF per standard cord = 8,667 MCF

Northern Region

In the Northern Region, the standard unit for roundwood processed into composite panel or engineered product material is the standard cord. The conversion factors used in the Northern Region for these product types are the same as those used for pulpwood logs. Factors vary by sub-region for cubic volumetric conversions and vary by species group for all other conversions. Pulpwood factors for Northeastern States are shown in table 13, and factors for North Central States are shown in table 14.

CONVERSION EXAMPLE 11: A mill in Ohio reports that 90,000 green tons of aspen roundwood was processed to make oriented strand board.

Regional/national standard unit conversion (green tons to standard cords) using table 13:
90,000 green tons × 0.4291 standard cords per green ton = 38,619 standard cords

Conversion to MCF (standard cords to MCF) using table 13:
38,619 standard cords × 0.085 MCF per standard cord = 3,283 MCF

Western Region

The standard measurement unit for logs processed into composite panel or engineered product material is MBF Scribner in the Western Region. Conversions between MBF Scribner and MCF vary by State and survey year while other conversion factors apply to all logs. Regional conversion factors for the West are shown in table 17.

CONVERSION EXAMPLE 12: In 2016, an oriented strand board plant in Washington reported that it processed 12,000 MBF Scribner of peeled logs.

Conversion to MCF (MBF Scribner to MCF) using table 15:
12,000 MBF Scribner / 2.64 MBF Scribner per MCF = 4,545 MCF

National standard unit conversion (MCF to standard cords) using table 17:
4,545 MCF / 0.08 MCF per standard cord = 56,813 standard cords

Composite Panels/Engineered Wood Products Tables

Table 16—Conversion factors used by Forest Inventory and Analysis for roundwood processed into composite panels or engineered wood products in the Southern Region of the United States

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
All Southern States	Hardwood	Green tons	Standard cords	2.8	Tons per cord
Alabama	Hardwood	MCF	Standard cords	0.0740	MCF per cord
Arkansas	Hardwood	MCF	Standard cords	0.0766	MCF per cord
Florida	Hardwood	MCF	Standard cords	0.0750	MCF per cord
Georgia	Hardwood	MCF	Standard cords	0.0750	MCF per cord
Kentucky	Hardwood	MCF	Standard cords	0.0764	MCF per cord
Louisiana	Hardwood	MCF	Standard cords	0.0750	MCF per cord
Mississippi	Hardwood	MCF	Standard cords	0.0750	MCF per cord
North Carolina	Hardwood	MCF	Standard cords	0.0766	MCF per cord
Oklahoma	Hardwood	MCF	Standard cords	0.0766	MCF per cord
South Carolina	Hardwood	MCF	Standard cords	0.0705	MCF per cord
Tennessee	Hardwood	MCF	Standard cords	0.0726	MCF per cord
Texas	Hardwood	MCF	Standard cords	0.0705	MCF per cord
Virginia	Hardwood	MCF	Standard cords	0.0763	MCF per cord
All Southern States	Softwood	Green tons	Standard cords	2.7	Tons per cord
Alabama	Softwood	MCF	Standard cords	0.0772	MCF per cord
Arkansas	Softwood	MCF	Standard cords	0.0779	MCF per cord
Florida	Softwood	MCF	Standard cords	0.0776	MCF per cord
Georgia	Softwood	MCF	Standard cords	0.0774	MCF per cord
Kentucky	Softwood	MCF	Standard cords	0.0773	MCF per cord
Louisiana	Softwood	MCF	Standard cords	0.0780	MCF per cord
Mississippi	Softwood	MCF	Standard cords	0.0754	MCF per cord
North Carolina	Softwood	MCF	Standard cords	0.0780	MCF per cord
Oklahoma	Softwood	MCF	Standard cords	0.0780	MCF per cord
South Carolina	Softwood	MCF	Standard cords	0.0777	MCF per cord
Tennessee	Softwood	MCF	Standard cords	0.0781	MCF per cord
Texas	Softwood	MCF	Standard cords	0.0777	MCF per cord
Virginia	Softwood	MCF	Standard cords	0.0771	MCF per cord

Table 17—Conversion factors used by Forest Inventory and Analysis for roundwood processed into composite panels or engineered wood products in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor[a]	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inc[h]	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	MBF Scribner	BDT	3.0	BDT per MBF
All Western States	All	Standard cords	Cubic feet (inside bark)	80	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	90	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4000	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4500	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.0	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.25	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.38	Cubic meters per cunit

[a] All conversions from MCF to MBF Scribner are the same as those for pulp mill logs (see table 15).

Bioenergy/Industrial Fuelwood

Roundwood products that are used in industrial settings to produce some form of energy (heat, steam, etc.) are classified as bioenergy or industrial fuelwood.

Southern Region

The standard unit of measure for bioenergy/industrial fuelwood in the Southern Region is the standard cord. Table 18 lists the factors used by FIA to convert mill-reported roundwood consumption to standard units of measure. Conversion factors apply to all Southern States.

CONVERSION EXAMPLE 13: A mill in Georgia reports that 50,000 green tons of softwood roundwood was used to produce industrial fuelwood.

Regional/national standard unit conversion (green tons to standard cords) using table 18:
50,000 green tons / 2.70 green tons per standard cord = 18,519 standard cords

Conversion to MCF (standard cords to MCF) using table 18:
18,519 standard cords × 0.0770 MCF per standard cord = 1,426 MCF

Northern Region

As in the Southern Region, standard cords are the standard units of measure for bioenergy/industrial fuelwood in the Northern Region. Table 19 lists conversion factors used for roundwood processed into bioenergy/fuelwood. The factors are used for all Northern States and northern species.

CONVERSION EXAMPLE 14: A mill in Indiana reports that it uses 500 green tons of hardwood/ softwood roundwood for industrial fuelwood.

Regional/national standard unit conversion (green tons to standard cords) using table 19:
500 green tons × 0.4167 standard cords per green ton = 208 standard cords

Conversion to MCF (standard cords to MCF) using table 19:
208 standard cords / 14.3 standard cords per MCF = 15 MCF

Western Region

In the Western Region, bioenergy and industrial fuelwood are referred to as energywood. As with all other roundwood categories in the region, the standard unit of measure for energywood is MBF Scribner. Conversions between MBF Scribner and MCF vary by State and survey year while other conversion factors apply to all logs. Table 20 lists the conversion factors used for energywood in the West.

CONVERSION EXAMPLE 15: In 2015, a bioenergy mill in Idaho processed 4,000 MBF Scribner of unpeeled roundwood.

Conversion to MCF (MBF Scribner to MCF) using table 20:
4,000 MBF Scribner / 3.51 MBF Scribner per MCF = 1,140 MCF

National standard unit conversion (MCF to standard cords) using table 20:
1,140 MCF / 0.09 MCF per standard cord = 12,667 standard cords

Bioenergy/Industrial Fuelwood Tables

Table 18—Conversion factors used by Forest Inventory and Analysis for roundwood processed into bioenergy and industrial fuelwood in the Southern Region of the United States

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
All Southern States	Hardwood	Dry tons	Standard cords	1.40	Tons per cord
All Southern States	Hardwood	Green tons	Standard cords	2.80	Tons per cord
All Southern States	Hardwood	MCF	Standard cords	0.0755	MCF per cord
All Southern States	Softwood	Dry tons	Standard cords	1.35	Tons per cord
All Southern States	Softwood	Green tons	Standard cords	2.70	Tons per cord
All Southern States	Softwood	MCF	Standard cords	0.0770	MCF per cord

Table 19—Conversion factors used by Forest Inventory and Analysis for roundwood processed into bioenergy and industrial fuelwood in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
Cubic feet	Standard cords	0.0143	Cords per cubic foot
Dry tons	Standard cords	0.6667	Cords per ton
Green tons	Standard cords	0.4167	Cords per ton
Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Standard cords	MBF	0.25	MBF per cord
MCF	Standard cords	14.3	Cords per MCF

Table 20—Roundwood conversion factors used by Forest Inventory and Analysis for energywood logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	MBF Scribner	BDT	3.0	BDT per MBF
All Western States	All	Standard cords	Cubic feet (inside bark)	80	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	90	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4000	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4500	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.0	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.25	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2011	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Alaska	2015	MCF	MBF Scribner	3.05	MBF Scribner per MCF
Arizona	2002	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	3.0	MBF Scribner per MCF
California	2000	MCF	MBF Scribner	1.0	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	1.0	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	1.0	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	3.0	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	2.5	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	2.4	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	3.51	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	2.49	MBF Scribner per MCF
Nevada	2005	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Nevada	2016	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	2.64	MBF Scribner per MCF
Wyoming	2014	MCF	MBF Scribner	1.67	MBF Scribner per MCF

Posts, Poles, and Pilings

Posts, poles, and pilings are roundwood products milled (cut, peeled, etc.) into standard sizes (lengths and circumferences) to be put in the ground to provide vertical and lateral support in buildings, foundations, utility lines, and fences. They may also include nonindustrial (unmilled) roundwood.

Southern Region

The standard unit for poles and pilings in the Southern Region is hundred pieces (C-pieces) while the standard unit for posts is thousand pieces (M-pieces). All three of these roundwood products can also be reported in green tons or MCF. The units of measure of the input determine the conversion process. For poles and pilings, if the input units of measure are cubic feet, equation (1) is used to convert to the standard unit of C-pieces.

$$C_PIECES = POLE_CF / POLE_CF_FACTOR / 100 \quad (1)$$

where

C_PIECES = hundred pieces (poles, pilings, and posts >9 feet long)
POLE_CF = pole and piling input amount in cubic feet
POLE_CF_FACTOR = value from the CF factor column in table 21 that corresponds to the average log scaling diameter and length

If the input units of measure are tons, equation (2) is used to convert to the standard unit of C-pieces.

$$C_PIECES = POLE_T / (POLE_WT_FACTOR / 2000) / 100 \quad (2)$$

where

C_PIECES = hundred pieces (poles, pilings, and posts >9 feet long)
POLE_T = pole and piling input amount in tons
POLE_WT_FACTOR = value from the WT factor column in table 21 that corresponds to the average log scaling diameter and length

To convert the pole and piling standard unit of C-pieces to MCF, use equation (3). To convert to green tons, use equation (4).

$$MCF = C_PIECES \times POLE_CF_FACTOR / 10 \quad (3)$$

where

MCF = thousand cubic feet (poles, pilings, and posts >9 feet long)
C_PIECES = hundred pieces (poles, pilings, and posts >9 feet long)
POLE_CF_FACTOR = value from the CF factor column in table 21 that corresponds to the average log scaling diameter and length

$$GT = C_PIECES \times 100 \times (POLE_WT_FACTOR / 2000) \quad (4)$$

where

GT = green tons (poles, pilings, and posts >9 feet long)
C_PIECES = hundred pieces (poles, pilings, and posts >9 feet long)
POLE_WT_FACTOR = value from the WT factor column in table 21 that corresponds to the average log scaling diameter and length

CONVERSION EXAMPLE 16: A mill in Georgia reports that it processed 500,000 cubic feet of yellow pine roundwood to make power line poles. The average log scaling diameter is 6 inches, and the average length is 40 feet.

Regional standard unit conversion (cubic feet to C-pieces) using table 21:
500,000 cubic feet / 16.75 cubic feet per piece / 100 pieces per C-piece = 299 C-pieces

Conversion to green tons (C-pieces to green tons) using table 21:
299 C-pieces × 100 pieces per C-piece × (1,005 pounds per piece / 2,000 pounds per green ton) = 15,025 green tons

CONVERSION EXAMPLE 17: A mill in North Carolina reports that it processed 20,000 green tons of yellow pine roundwood to make pilings. The average log scaling diameter is 4 inches, and the average length is 22 feet.

Regional standard unit conversion (green tons to C-pieces) using table 21:
20,000 green tons / (200 pounds per piece / 2,000 pounds per green ton) / 100 pieces per C-piece = 2,000 C-pieces

Conversion to MCF (C-pieces to MCF) using table 21:
2,000 C-pieces × 100 pieces per C-piece × 3.34 cubic feet per piece / 1,000 cubic feet per MCF = 668 MCF

If roundwood material is processed into posts and the log length is >9 feet, the pole and piling conversion formulas for standard and reporting units are used. Otherwise, conversions for posts ≤9 feet in length use different formulas and a different set of conversion factors (table 22). If the input unit of measure is cubic feet, equation (5) is used to convert to the standard unit of M-pieces. If the post input unit of measure is anything other than cubic feet, equation (6) is used.

$$M_PIECES = POST_CF / POST_CF_FACTOR / 1000 \quad (5)$$

where

M_PIECES = thousand pieces (posts ≤9 feet long)
POST_CF = post input amount in cubic feet
POST_CF_FACTOR = value from the CF factor column in table 22 that corresponds to the average log scaling diameter and length

$$M_PIECES = POST_T / (POST_WT_FACTOR / 2000) / 1000 \quad (6)$$

where

M_PIECES = thousand pieces (posts ≤9 feet long)
POST_T = post input amount in tons
POST_WT_FACTOR = value from the WT factor column in table 22 that corresponds to the average log scaling diameter and length

To convert the post standard unit of M-pieces to MCF, use equation (7). To convert to green tons, use equation (8).

$$MCF = M_PIECES \times POST_CF_FACTOR \quad (7)$$

where

MCF = thousand cubic feet (posts ≤9 feet long)
M_PIECES = thousand pieces (posts ≤9 feet long)
POST_CF_FACTOR = value from the CF factor column in table 22 that corresponds to the average log scaling diameter and length

$$GT = M_PIECES \times 1000 \times POST_WT_FACTOR / 2000 \quad (8)$$

where

GT = green tons (posts ≤9 feet long)
M_PIECES = thousand pieces (posts ≤9 feet long)
POST_WT_FACTOR = value from the WT factor column in table 22 that corresponds to the average log scaling diameter and length

CONVERSION EXAMPLE 18: A post mill in Alabama reports that it processed 650,000 cubic feet of yellow pine roundwood to make fence posts. The average log scaling diameter is 5 inches, and the average length is 7 feet.

Regional standard unit conversion (cubic feet to M-pieces) using table 22:
650,000 cubic feet / 1.21 cubic feet per piece / 1,000 pieces per M-piece = 537 M-pieces

Conversion to green tons (M-pieces to green tons) using table 22:
537 M-pieces × 1,000 pieces per M-piece × 54 pounds per piece / 2,000 pounds per green ton = 14,499 green tons

CONVERSION EXAMPLE 19: A post mil-l in Texas reports that it processed 8,000 green tons of yellow pine roundwood to make fence posts. The average log scaling diameter is 4 inches, and the average length is 8 feet.

Regional standard unit conversion (green tons to M-pieces) using table 22:
8,000 green tons / (36 pounds per piece / 2,000 pounds per green ton) / 1,000 pieces per M-piece = 444 M-pieces

Conversion to MCF (M-pieces to MCF) using table 22:
444 M-pieces × 0.82 MCF per M-piece = 364 MCF

Northern Region

In the Northern Region, the standard units for posts, poles, and pilings are M-pieces, pieces, and thousand linear feet (MLF), respectively. The conversion factors for posts, poles, and pilings are found in tables 23–25, respectively, and apply to all Northern States and northern species.

CONVERSION EXAMPLE 20: A mill in New Jersey reports that it processed 500 MBF Doyle of roundwood into poles.

Regional standard unit conversion (MBF to pieces) using table 24:
500 MBF × 27.6 pieces per MBF = 13,800 pieces

Conversion to MCF (pieces to MCF) using table 24:
13,800 pieces × 0.0079 MCF per piece = 109 MCF

CONVERSION EXAMPLE 21: A mill in Michigan reports that it processed 35,000 Lake States cords of roundwood to make dock pilings.

Regional standard unit conversion (Lake States cords to MLF) using table 25:
35,000 Lake States cords × 0.06491 MLF per cord = 2,272 MLF

Conversion to MCF (MLF to MCF) using table 25:
2,272 MLF × 0.79 MCF per MLF = 1,795 MCF

Western Region

The standard measurement unit for poles, posts, and pilings/utility poles in the Western Region is MBF Scribner. Posts and poles use the same set of conversion factors (table 26) while separate factors are used for pilings and utility poles (table 27). For all product types, conversions between MBF Scribner and MCF vary by State and survey year. Other conversion factors apply to all logs.

CONVERSION EXAMPLE 22: In 2014, a utility pole mill in Washington processed 3,600 MBF (Scribner eastside) of peeled roundwood.

Conversion to MCF (MBF Scribner to MCF) using table 27:
3,600 MBF Scribner / 4.61 MBF Scribner per MCF = 781 MCF

National standard unit conversion (MCF to standard cords) using table 27:
781 MCF / 0.086 MCF per standard cord = 9,081 standard cords

Posts, Poles, and Pilings Tables

Table 21—Conversion factors used by Forest Inventory and Analysis for roundwood processed into poles, pilings, and posts >9 feet in length in the Southern Region of the United States (includes all Southern States and southern tree species)

Scaling diameter	Length	CF factor	WT factor
inches	*feet*	*cubic feet per piece*	*pounds per piece*
3	10	0.77	46
3	12	0.93	56
3	14	1.24	74
3	16	1.41	85
3	18	1.80	108
3	20	2.00	120
3	22	2.20	132
3	25	2.82	169
3	28	3.56	214
3	30	3.82	229
3.5	10	0.90	54
3.5	12	1.09	65
3.5	14	1.45	87
3.5	16	1.65	99
3.5	18	2.10	126
3.5	20	2.34	140
3.5	22	2.57	154
3.5	25	3.30	198
3.5	28	4.17	250
3.5	30	4.47	268
4	10	1.24	74
4	12	1.49	89
4	14	1.92	115
4	16	2.19	131
4	18	2.61	157
4	20	3.04	182
4	22	3.34	200
4	25	4.20	252
4	28	4.93	295
4	30	5.52	331
4	35	7.07	424
4.5	10	1.51	90
4.5	12	1.81	108
4.5	14	2.32	139
4.5	16	2.66	160
4.5	18	3.13	188
4.5	20	3.64	218
4.5	22	4.00	240
4.5	25	4.98	298
4.5	28	6.07	364
4.5	30	6.51	390
4.5	35	7.91	475

Scaling diameter	Length	CF factor	WT factor
inches	*feet*	*cubic feet per piece*	*pounds per piece*
5	10	1.81	108
5	12	2.17	130
5	14	2.76	165
5	16	3.15	189
5	18	3.70	222
5	20	4.30	258
5	22	4.73	284
5	25	5.83	350
5	28	6.80	408
5	30	8.25	495
5	35	11.75	705
5	40	14.67	880
5	45	17.75	1,065
6	10	2.50	150
6	12	3.00	180
6	14	3.75	225
6	16	4.29	257
6	18	5.18	310
6	20	5.76	345
6	22	6.34	380
6	25	7.75	465
6	30	10.00	600
6	35	13.50	810
6	40	16.75	1,005
6	45	20.25	1,215
6	50	24.17	1,450
7	10	3.28	197
7	12	3.94	236
7	14	4.90	294
7	16	5.60	336
7	18	6.71	403
7	20	7.46	448
7	22	8.20	492
7	25	9.92	595
7	30	13.12	787
7	35	16.96	1,018
7	40	20.70	1,242
7	45	24.70	1,482
7	50	28.90	1,734
8	10	4.20	252
8	12	5.00	300
8	14	6.20	372

Scaling diameter	Length	CF factor	WT factor
inches	*feet*	*cubic feet per piece*	*pounds per piece*
8	16	7.09	425
8	18	8.44	506
8	20	9.38	563
8	22	10.32	619
8	25	11.33	680
8	30	15.50	930
8	35	19.60	1,176
8	40	23.80	1,428
8	45	28.25	1,695
8	50	32.80	1,968
9	10	5.19	311
9	12	6.23	373
9	14	7.65	459
9	16	8.75	525
9	18	10.35	621
9	20	11.50	690
9	22	12.65	759
9	25	15.10	906
9	30	19.02	1,141
9	35	23.31	1,398
9	40	27.90	1,674
9	45	32.85	1,971
9	50	38.20	2,292
10	10	6.31	379
10	12	7.57	454
10	14	9.25	555
10	16	10.58	635
10	18	12.45	747
10	20	13.84	830
10	22	15.22	913
10	25	18.10	1,086
10	30	22.71	1,363
10	35	27.69	1,661
10	40	33.04	1,982
10	45	38.75	2,325
10	50	44.90	2,694
11	10	7.53	452
11	12	9.03	542
11	14	11.00	660
12	10	8.87	532
12	12	10.64	638
12	14	12.92	775

Table 22—Conversion factors used by Forest Inventory and Analysis for roundwood processed into posts ≤9 feet in length in the Southern Region of the United States (includes all Southern States and southern tree species)

Scaling diameter	Length	CF factor	WT factor
inches	*feet*	*cubic feet per piece*	*pounds per piece*
<3	5.0	0.22	10
3.0–3.5	5.0	0.36	16
4.0–4.5	5.0	0.56	25
5.0	5.0	0.86	39
6.0	5.0	1.20	54
7.0	5.0	1.50	68
8.0	5.0	1.95	88
3 to 5[a]	5.0	0.43	20
4 to 6[a]	5.0	0.68	31
<3	5.5	0.25	11
3.0–3.5	5.5	0.40	18
4.0–4.5	5.5	0.62	27
5.0	5.5	0.95	43
6.0	5.5	1.32	59
7.0	5.5	1.65	74
8.0	5.5	2.15	97
3 to 5[a]	5.5	0.48	22
4 to 6[a]	5.5	0.74	34
2.5	6.0	0.28	12
3.0	6.0	0.38	16
3.5	6.0	0.50	22
4.0	6.0	0.62	27
4.5	6.0	0.75	33
5.0	6.0	1.04	47
6.0	6.0	1.44	65
7.0	6.0	1.80	81
8.0	6.0	2.35	105
3 to 5[a]	6.0	0.52	24
4 to 6[a]	6.0	0.81	37
2.5	6.5	0.30	13
3.0	6.5	0.41	18
3.5	6.5	0.54	23
4.0	6.5	0.67	29
4.5	6.5	0.81	36
5.0	6.5	1.13	51
5.5	6.5	1.34	60
6.0	6.5	1.55	70
7.0	6.5	2.00	90
8.0	6.5	2.55	115
3 to 5[a]	6.5	0.57	26
4 to 6[a]	6.5	0.88	40
2.5	7.0	0.33	14
3.0	7.0	0.44	19
3.5	7.0	0.59	25
4.0	7.0	0.73	32
4.5	7.0	0.87	39
5.0	7.0	1.21	54
6.0	7.0	1.67	75
7.0	7.0	2.20	100
8.0	7.0	2.80	126
3 to 5[a]	7.0	0.60	27
4 to 6[a]	7.0	0.97	44
2.5	8.0	0.37	15
3.0	8.0	0.51	23
3.5	8.0	0.66	31
4.0	8.0	0.82	36
4.5	8.0	1.12	50
5.0	8.0	1.38	62
6.0	8.0	1.99	90
7.0	8.0	2.55	117
8.0	8.0	3.25	150
3 to 5[a]	8.0	0.70	32
4 to 6[a]	8.0	1.11	50
<3	9.0	0.43	20
3.0	9.0	0.60	28
3.5	9.0	0.72	35
4.0	9.0	1.01	45
4.5	9.0	1.26	57
5.0	9.0	1.65	73
6.0	9.0	2.25	102
7.0	9.0	2.95	133
8.0	9.0	3.75	169
3 to 5[a]	9.0	0.80	36
4 to 6[a]	9.0	1.25	56

[a] Used when a mill reported a range of scaling diameters instead of an average diameter.

Table 23—Conversion factors used by Forest Inventory and Analysis for roundwood processed into posts in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
Cubic feet	M-pieces	0.001265823	M-pieces per cubic foot
Green tons	M-pieces	0.04167	M-pieces per ton
Lake States cords	M-pieces	0.104	M-pieces per cord
Pieces	M-pieces	0.001	M-pieces per piece
Standard cords	M-pieces	0.1	M-pieces per cord
MBF Doyle	M-pieces	0.276	M-pieces per MBF
MBF International ¼-inch	M-pieces	0.2	M-pieces per MBF
MBF lumber tally	M-pieces	0.2	M-pieces per MBF
MBF Scribner	M-pieces	0.216	M-pieces per MBF
MBF Scribner Decimal C	M-pieces	0.216	M-pieces per MBF
MCF	M-pieces	1.265823	M-pieces per MCF
M-pieces	MBF	5.0	MBF per M-piece
M-pieces	MCF	0.79	MCF per M-piece

Table 24—Conversion factors used by Forest Inventory and Analysis for roundwood processed into poles in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
Green tons	Pieces	4.348	Pieces per ton
Lake States cords	Pieces	10.4	Pieces per cord
Standard cords	Pieces	10.0	Pieces per cord
Pieces	MBF	0.05	MBF per piece
Pieces	MCF	0.0079	MCF per piece
MBF Doyle	Pieces	27.6	Pieces per MBF
MBF International ¼-inch	Pieces	20.0	Pieces per MBF
MBF lumber tally	Pieces	20.0	Pieces per MBF
MBF Scribner	Pieces	21.6	Pieces per MBF
MBF Scribner Decimal C	Pieces	21.6	Pieces per MBF
MCF	Pieces	126.582278	Pieces per MCF
M-pieces	Pieces	1000.0	Pieces per M-piece

Table 25—Conversion factors used by Forest Inventory and Analysis for roundwood processed into pilings in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
Green tons	MLF	0.04167	MLF per ton
Lake States cords	MLF	0.06491	MLF per cord
Linear feet	MLF	0.001	MLF per linear foot
Pieces	MLF	0.025	MLF per piece
Standard cords	MLF	0.0623116	MLF per cord
MBF Doyle	MLF	0.30912	MLF per MBF
MBF International ¼-inch	MLF	0.224	MLF per MBF
MBF lumber tally	MLF	0.224	MLF per MBF
MBF Scribner	MLF	0.24192	MLF per MBF
MBF Scribner Decimal C	MLF	0.24192	MLF per MBF
MCF	MLF	1.265823	MLF per MCF
MLF	MBF	5.0	MBF per MLF
MLF	MCF	0.79	MCF per MLF
M-pieces	MLF	25.0	MLF per M-pieces

Table 26—Conversion factors used by Forest Inventory and Analysis for roundwood processed into poles and posts in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	78	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	88	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	3900	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4400	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	1.95	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.2	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Arizona	2002	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	2.31	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	1.45	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	7.07	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	3.29	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	2.21	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	2.0	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	1.01	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.093	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	3.1	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	1.56	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	1.3	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	2.49	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	2.81	MBF Scribner per MCF
Nevada	2005	MCF	MBF Scribner	2.0	MBF Scribner per MCF
Nevada	2007	MCF	MBF Scribner	2.0	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	1.06	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	1.02	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	2.13	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	1.54	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	4.52	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	3.72	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	2.0	MBF Scribner per MCF
Washington	2002	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	4.52	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	4.52	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	4.52	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	3.39	MBF Scribner per MCF
Wyoming	2005	MCF	MBF Scribner	3.39	MBF Scribner per MCF
Wyoming	2010	MCF	MBF Scribner	1.15	MBF Scribner per MCF
Wyoming	2014	MCF	MBF Scribner	1.81	MBF Scribner per MCF

Table 27—Conversion factors used by Forest Inventory and Analysis for roundwood processed into pilings and utility poles in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	86	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	96	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4300	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4800	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.15	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.4	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
California	2000	MCF	MBF Scribner	5.35	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.093	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	4.87	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	4.17	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	1.06	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	5.58	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	4.54	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	4.61	MBF Scribner per MCF
Washington	2002	MCF	MBF Scribner	4.19	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	4.61	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	4.61	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	4.61	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	5.0	MBF Scribner per MCF

House/Cabin Logs

Roundwood used in the primary construction of log homes or cabins is classified by FIA as house/cabin logs. These logs are typically either peeled and used in roundwood form or processed into two-, three-, or four-sided cants.

Southern Region

In the Southern Region, the standard unit of measure for house/cabin logs is MCF, and the conversion factors vary by processing method. For logs that are peeled only, the conversion factors for poles and pilings are used (table 21). If the logs are processed into cant form, saw log factors are used (tables 2–5).

CONVERSION EXAMPLE 23: A mill in Virginia peeled 35,000 pine logs for cabin construction. No further milling was performed on the logs. The average log scaling diameter is 9 inches, and the average length is 30 feet.

Regional/national standard unit conversion (pieces to MCF) using table 21:
35,000 pieces × 19.02 cubic feet per piece / 1000 = 666 MCF

Conversion to green tons (pieces to green tons) using table 21:
35,000 pieces × 1,141 pounds per piece / 2,000 pounds per green ton = 19,968 green tons

CONVERSION EXAMPLE 24: A mill in Tennessee processed 2,400 MBF of cedar logs to cants for use in log home construction. The log rule used by the mill to scale the logs is the Cedar rule, and on average, the logs have a scaling diameter of 14 inches and a length of 20 feet.

Regional/national standard unit conversion (MBF Cedar to MCF) using tables 4 and 5:
2,400 MBF Cedar × 1.164 MBF International ¼-inch per MBF Cedar = 2,794 MBF International ¼-inch
2,794 MBF International ¼-inch × 0.169 MCF per MBF International ¼-inch = 472 MCF

Conversion to green tons (MBF International ¼-inch to green tons) using table 5:
2,794 MBF International ¼-inch × 5.84250 green tons per MBF International ¼-inch = 16,324 green tons

Northern Region

In the Northern Region, the standard unit for house/cabin logs (both roundwood and cants) is MCF. Conversion factors for house/cabin logs are found in table 28 and are used for all Northern States and northern species.

CONVERSION EXAMPLE 25: A mill in Maine reports that 3,000 MBF International ¼-inch of pine logs are processed into cants for use in cabin construction.

Regional/national standard unit conversion (MBF to MCF) using table 28:
3,000 MBF × 0.158 MCF per MBF = 474 MCF

Conversion to green tons (MCF to green tons) using table 28:
474 MCF / 0.0329193 MCF per ton = 14,399 green tons

Western Region

The standard unit for house/cabin logs in the Western Region is MBF Scribner. Conversion factors for house/cabin logs are shown in table 29. There are two other product categories that fall under the house/cabin logs roundwood type, and each has a separate set of conversion factors. Vigas are rough-hewn roof timbers or rafters used primarily in adobe building in Arizona and New Mexico. Latillas are wood pieces laid between beams of a ceiling or above vigas for decoration. Conversion factors for roundwood manufactured into vigas and latillas are shown in tables 30 and 31, respectively. For all product types, conversions between MBF Scribner and MCF vary by State and survey year, while all other conversion factors apply to all logs.

CONVERSION EXAMPLE 26: In 2016, a mill in New Mexico processed 400 MBF Scribner of viga logs.

National standard unit conversion (MBF Scribner to MCF) using table 30:
400 MBF Scribner / 4.54 MBF Scribner per MCF = 88 MCF

Conversion to green tons (MCF to green tons) using table 30:
88,000 cubic feet × 50 green pounds per cubic foot / 2000 green pounds per green ton = 2,200 green tons

House/Cabin Logs Tables

Table 28—Conversion factors used by Forest Inventory and Analysis for house and cabin logs in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
Cubic feet	MCF	0.001	MCF per cubic foot
Green tons	MCF	0.0329193	MCF per ton
Lake States cords	MCF	0.0822943	MCF per cord
Linear feet	MCF	0.00049375	MCF per linear foot
Pieces	MCF	0.0079	MCF per piece
Standard cords	MCF	0.079	MCF per cord
MBF Doyle	MCF	0.21804	MCF per MBF
MBF International ¼-inch	MCF	0.158	MCF per MBF
MBF lumber tally	MCF	0.158	MCF per MBF
MBF Scribner	MCF	0.17064	MCF per MBF
MBF Scribner Decimal C	MCF	0.17064	MCF per MBF
MCF	MBF	3.1646	MBF per MCF
MLF	MCF	0.49375	MCF per MLF

Table 29—Roundwood conversion factors used by Forest Inventory and Analysis for house and cabin logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	86	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	94	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	37.5	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	3225	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	3525	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	1.61	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	1.76	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2005	MCF	MBF Scribner	5.3	MBF Scribner per MCF
Alaska	2011	MCF	MBF Scribner	5.05	MBF Scribner per MCF
Alaska	2015	MCF	MBF Scribner	6.54	MBF Scribner per MCF
Arizona	2002	MCF	MBF Scribner	5.98	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	5.98	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	5.97	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	3.75	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	5.02	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	5.74	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	5.08	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	4.8	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	4.54	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.093	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	5.1	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	5.23	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	4.6	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	4.95	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	4.75	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	4.91	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	5.23	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	5.17	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	4.56	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	4.54	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	4.94	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	5.54	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	4.81	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	5.5	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	4.6	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	4.94	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	4.94	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	4.94	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	5.05	MBF Scribner per MCF
Wyoming	2005	MCF	MBF Scribner	5.05	MBF Scribner per MCF
Wyoming	2010	MCF	MBF Scribner	5.7	MBF Scribner per MCF
Wyoming	2014	MCF	MBF Scribner	5.61	MBF Scribner per MCF

Table 30—Conversion factors used by Forest Inventory and Analysis for roundwood processed into vigas in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	86	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	94	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4300	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4700	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.15	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.35	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Arizona	2002	MCF	MBF Scribner	5.98	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	4.9	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	2.04	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	5.74	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	5.23	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	5.17	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	4.5	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	4.54	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	5.05	MBF Scribner per MCF

Table 31—Conversion factors used by Forest Inventory and Analysis for roundwood processed into latillas in the Western Region of the United States (includes all western tree species[a])

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	78	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	88	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	3900	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4400	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	1.95	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.2	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit

[a] All MCF to MBF conversion factors for logs manufactured into latillas are the same as those for vigas (see table 30).

Residential Fuelwood

Wood used as fuel in households is classified as residential fuelwood. It can be used as a primary or secondary source of heat, or it can simply be used for pleasure. Estimates for residential fuelwood are primarily obtained from the U.S. Department of Energy (DOE), though some States conduct their own fuelwood surveys. The DOE fuelwood estimates are reported in standard cords.

Southern Region

The standard unit of measure for residential fuelwood in the Southern Region is the standard cord. All conversion factors vary by species type and are listed in table 32.

CONVERSION EXAMPLE 27: The DOE reports that Oklahoma residents used 250,000 standard cords of hardwood last year for home heating or pleasure.

Conversion to green tons (standard cords to green tons) using table 32:
250,000 standard cords × 2.8 green tons per standard cord = 700,000 green tons

Conversion to MCF (standard cords to MCF) using table 32:
250,000 standard cords × 0.0764 MCF per cord = 19,100 MCF

Northern Region

Standard cords are the standard unit of measure for residential fuelwood in the Northern Region as well. The conversion factors for residential fuelwood in the Northern Region are listed in table 33 and apply to all Northern States and northern species.

CONVERSION EXAMPLE 28: A tate survey from Minnesota estimated that 125 million pieces of wood were used for residential heating.

Regional/national standard unit conversion (pieces to standard cords) using table 33:
125,000,000 pieces × 0.0033 standard cords per piece = 412,500 standard cords

Conversion to MCF (standard cords to MCF) using table 33:
412,500 standard cords / 14.3 standard cords per MCF = 28,846 MCF

Western Region

In the Western Region, the standard unit for roundwood processed into residential fuelwood is MBF Scribner. Residential fuelwood can also be measured in green or dry tons/pounds, MCF, cunits, and standard cords. Table 34 lists the conversion factors for residential fuelwood logs. For all product types, conversions between MBF Scribner and MCF vary by State and survey year, while all other conversion factors apply to all logs.

CONVERSION EXAMPLE 29: A mill in Alaska processed 450 MBF Scribner of bark-on roundwood into firewood in 2011.

Conversion to MCF (MBF Scribner to MCF) using table 34:
450 MBF Scribner / 5.0 MBF Scribner per MCF = 90 MCF

National standard unit conversion (MCF to standard cords) using table 34:
90 MCF / 0.088 MCF per standard cord = 1,023 standard cords

Residential Fuelwood Tables

Table 32—Conversion factors used by Forest Inventory and Analysis for residential fuelwood in the Southern Region of the United States

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
All Southern States	Hardwood	Green tons	Standard cords	2.8	Tons per cord
All Southern States	Hardwood	MCF	Standard cords	0.0764	MCF per cord
All Southern States	Softwood	Green tons	Standard cords	2.7	Tons per cord
All Southern States	Softwood	MCF	Standard cords	0.0755	MCF per cord

Table 33—Conversion factors used by Forest Inventory and Analysis for residential fuelwood in the Northern Region of the United States (includes all Northern States and northern tree species)

Input unit of measure	Output unit of measure	Factor	Factor units
100 pieces	Standard cords	0.3333	Cords per 100 pieces
10-inch trees	Standard cords	0.166	Cords per tree
10x cords	Standard cords	10.0	Cords per 10x cord
150 pieces	Standard cords	0.5	Cords per 150 pieces
15-inch trees	Standard cords	0.4	Cords per tree
200 pieces	Standard cords	0.6667	Cords per 200 pieces
20-inch trees	Standard cords	0.8	Cords per tree
25-inch trees	Standard cords	1.25	Cords per tree
300 pieces	Standard cords	1.0	Cords per 300 pieces
30-inch trees	Standard cords	1.85	Cords per tree
40-inch trees	Standard cords	2.65	Cords per tree
50 pieces	Standard cords	0.1667	Cords per 50 pieces
5-inch trees	Standard cords	0.033	Cords per tree
Car trunk	Standard cords	0.1667	Cords per trunk
Cubic feet	Standard cords	0.0143	Cords per cubic foot
Dry pounds	Standard cords	0.0003	Cords per pound
Dry tons	Standard cords	0.6667	Cords per ton
Face cord 4 x 8 x 12 inches	Standard cords	0.25	Cords (standard) per cord (face)
Face cord 4 x 8 x 16 inches	Standard cords	0.3333	Cords (standard) per cord (face)
Face cord 4 x 8 x 18 inches	Standard cords	0.375	Cords (standard) per cord (face)
Face cord 4 x 8 x 24 inches	Standard cords	0.5	Cords (standard) per cord (face)
Green pounds	Standard cords	0.0002	Cords per pound
Green tons	Standard cords	0.4167	Cords per ton
Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
Pallets (pieces)	Standard cords	0.033333333	Cords per piece
Pieces	Standard cords	0.0033	Cords per piece
Small bundle	Standard cords	0.03	Cords per bundle
Small car trunk	Standard cords	0.1	Cords per trunk
Small hatchback	Standard cords	0.125	Cords per hatchback
Small truck	Standard cords	0.24	Cords per truck
Small van	Standard cords	0.4	Cords per van
Small wagon	Standard cords	0.1667	Cords per wagon
Standard cords	MBF International ¼-inch	0.4	MBF per cord
Standard cords	MCF	0.07	MCF per cord
Station wagon	Standard cords	0.25	Cords per wagon
Suburban	Standard cords	0.5	Cords per Suburban
MCF	Standard cords	14.3	Cords per MCF
Van	Standard cords	0.5	Cords per van
1/2-ton truck	Standard cords	0.385	Cords per truck
3/4-ton truck	Standard cords	0.46	Cords per truck

Table 34—Roundwood conversion factors used by Forest Inventory and Analysis for firewood logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	78	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	88	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	3900	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4400	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	1.95	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.2	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2005	MCF	MBF Scribner	3.9	MBF Scribner per MCF
Alaska	2011	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Arizona	2015	MCF	MBF Scribner	3.12	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	3.2	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	3.3	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	3.29	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	2.21	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	3.0	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	2.8	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	2.4	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	3.51	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	2.66	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	2.49	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	3.39	MBF Scribner per MCF
Nevada	2005	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Nevada	2007	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Nevada	2012	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Nevada	2015	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Nevada	2016	MCF	MBF Scribner	5.0	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	1.06	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	1.02	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	5.0	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	3.47	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	3.346	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	5.08	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	3.2	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	3.346	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	3.346	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	3.346	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	2.38	MBF Scribner per MCF
Wyoming	2005	MCF	MBF Scribner	2.38	MBF Scribner per MCF
Wyoming	2010	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Wyoming	2014	MCF	MBF Scribner	2.96	MBF Scribner per MCF

Other Products

The category "other products" is a miscellaneous category of roundwood products such as cooperage, excelsior, shingles, artisan products, etc.

Southern Region

The standard unit for these "other products" in the Southern Region is MCF but can also be reported in green tons. For hardwoods, the conversion factor is 37.5 green tons per MCF, and for softwoods, the conversion factor is 35 green tons per MCF.

CONVERSION EXAMPLE 30: A stave mill in Kentucky produces 500 green tons of white oak staves for whisky barrels.

Standard unit conversion (green tons to MCF):
500 green tons / 37.5 green tons per MCF = 13.3 MCF

Northern Region

The standard unit of measure for the "other products" category in the Northern Region is MCF. The conversion factors apply to all Northern States and northern species and can be found in table 35.

CONVERSION EXAMPLE 31: A mill in Maine processes 2,000 MBF International ¼-inch of eastern white-cedar logs to produce shingles.

Standard unit conversion (MBF to MCF) using table 35:
2,000 MBF × 0.158 MCF per MBF = 316 MCF

Western Region

The Western Region has several product categories that fall under the national "other product" category. Each category has its own set of unique conversion factors. The first category, furniture logs, includes any roundwood timber product used to directly manufacture furniture (often rustic western furniture). The second product category includes cedar logs (usually western redcedar) that are used to produce shakes, shingles, fence posts, and rails. The third product category includes fiber logs that are used to produce miscellaneous fiber products such as excelsior, shavings, animal bedding, etc. The conversion factors used for furniture logs, cedar logs, and fiber logs are listed in tables 36–38, respectively. For all other product types that don't fall into one of the above categories, the conversion factors in table 39 are used. The standard unit of measure for all categories is MBF Scribner, while green or dry tons/pounds, MCF, cunits, and standard cords are also used on occasion. Conversions between MBF Scribner and MCF vary by State and survey year, while all other conversion factors apply to all logs.

CONVERSION EXAMPLE 32: A log furniture manufacturer in Montana processed 600 MBF Scribner of roundwood in 2014.

National standard unit conversion (MBF Scribner to MCF) using table 36:
600 MBF Scribner / 3.24 MBF Scribner per MCF = 185 MCF

Conversion to green tons (MCF to green tons) using table 36:
185,000 cubic feet × 50 green pounds per cubic foot / 2000 green pounds per green ton = 4,625 green tons

Other Products Tables

Table 35—Conversion factors used by Forest Inventory and Analysis for other products[a] in the Northern Region of the United States (includes all Northern States and northern tree species[b])

Input unit of measure	Output unit of measure	Factor	Factor units
Cubic feet	MCF	0.001	MCF per cubic foot
Cubic yards	MCF	0.016875	MCF per cubic yard
Green tons	MCF	0.0329193	MCF per ton
Lake States cords	MCF	0.0822943	MCF per cord
Lath bundle (1,000 pieces)	MCF	0.0451	MCF per bundle
Lath bundle (50 pieces)	MCF	0.0016	MCF per bundle
Linear feet	MCF	0.00049375	MCF per linear foot
Pieces	MCF	0.0079	MCF per piece
Standard cords	MCF	0.079	MCF per cord
MBF Doyle	MCF	0.21804	MCF per MBF
MBF International ¼-inch	MCF	0.158	MCF per MBF
MBF lumber tally	MCF	0.158	MCF per MBF
MBF Scribner	MCF	0.17064	MCF per MBF
MBF Scribner Decimal C	MCF	0.17064	MCF per MBF
MCF	MBF	3.1646	MBF per MCF
MLF	MCF	0.49375	MCF per MLF

[a] The category "other products" is a miscellaneous category of roundwood products such as cooperage, excelsior, shingles, artisan products, etc.

[b] Conversion factors listed in the table can also be applied to excelsior/shavings.

Table 36—Roundwood conversion factors used by Forest Inventory and Analysis for furniture logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	78	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	88	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	3900	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4400	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	1.95	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.2	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2005	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Alaska	2011	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Arizona	2002	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	1.05	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	3.29	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	2.21	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	2.0	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	1.01	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.093	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	3.1	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	1.99	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	1.99	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	2.49	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	3.24	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	1.06	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	2.01	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	3.47	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Wyoming	2005	MCF	MBF Scribner	1.0	MBF Scribner per MCF
Wyoming	2010	MCF	MBF Scribner	1.18	MBF Scribner per MCF
Wyoming	2014	MCF	MBF Scribner	1.21	MBF Scribner per MCF

Table 37—Roundwood conversion factors used by Forest Inventory and Analysis for cedar logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	75	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	85	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	38	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	19	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	2850	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	3230	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	1.43	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	1.62	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2005	MCF	MBF Scribner	5.0	MBF Scribner per MCF
Alaska	2011	MCF	MBF Scribner	5.297	MBF Scribner per MCF
Alaska	2015	MCF	MBF Scribner	5.35	MBF Scribner per MCF
California	2000	MCF	MBF Scribner	5.35	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.093	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	3.4	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	3.58	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	3.48	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	3.58	MBF Scribner per MCF
Washington	2002	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	3.58	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	3.58	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	3.58	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	3.41	MBF Scribner per MCF

Table 38—Roundwood conversion factors used by Forest Inventory and Analysis for fiber logs in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	84	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	94	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4200	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4650	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.1	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.33	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Arizona	2002	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	4.9	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	3.0	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	3.5	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	3.29	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	3.0	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	2.8	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	2.43	MBF Scribner per MCF
Nevada	2016	MCF	MBF Scribner	2.05	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	1.06	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	1.02	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	2.0	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	3.47	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	2.75	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	3.47	MBF Scribner per MCF
Washington	2010	MCF	MBF Scribner	2.41	MBF Scribner per MCF
Washington	2012	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Washington	2014	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Washington	2016	MCF	MBF Scribner	1.91	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	2.38	MBF Scribner per MCF

Table 39—Conversion factors used by Forest Inventory and Analysis for roundwood processed into other wood products in the Western Region of the United States (includes all western tree species)

State	Survey year	Input unit of measure	Output unit of measure	Factor	Factor units
All Western States	All	MBF Scribner	MBF International ¼-inch	1.12	MBF International ¼-inch per MBF Scribner
All Western States	All	Standard cords	Cubic feet (inside bark)	84	Cubic feet per cord
All Western States	All	Standard cords	Cubic feet (including bark)	94	Cubic feet per cord
All Western States	All	Cubic feet	Green pounds	50	Pounds per cubic foot
All Western States	All	Cubic feet	Dry pounds	25	Pounds per cubic foot
All Western States	All	Standard cords	Green pounds (inside bark)	4200	Pounds per cord
All Western States	All	Standard cords	Green pounds (including bark)	4650	Pounds per cord
All Western States	All	Standard cords	Green tons (inside bark)	2.1	Tons per cord
All Western States	All	Standard cords	Green tons (including bark)	2.33	Tons per cord
All Western States	All	Cunit	Cubic feet	100	Cubic feet per cunit
All Western States	All	Cunit	Cubic meter	2.83	Cubic meters per cunit
Alaska	2005	MCF	MBF Scribner	5.03	MBF Scribner per MCF
Alaska	2011	MCF	MBF Scribner	4.53	MBF Scribner per MCF
Alaska	2015	MCF	MBF Scribner	6.2	MBF Scribner per MCF
Arizona	2002	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2007	MCF	MBF Scribner	1.05	MBF Scribner per MCF
Arizona	2012	MCF	MBF Scribner	1.8	MBF Scribner per MCF
Arizona	2016	MCF	MBF Scribner	2.69	MBF Scribner per MCF
California	2000	MCF	MBF Scribner	3.0	MBF Scribner per MCF
California	2006	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2012	MCF	MBF Scribner	5.0	MBF Scribner per MCF
California	2016	MCF	MBF Scribner	4.29	MBF Scribner per MCF
Colorado	2002	MCF	MBF Scribner	3.29	MBF Scribner per MCF
Colorado	2007	MCF	MBF Scribner	2.21	MBF Scribner per MCF
Colorado	2012	MCF	MBF Scribner	2.79	MBF Scribner per MCF
Colorado	2016	MCF	MBF Scribner	1.72	MBF Scribner per MCF
Idaho	2001	MCF	MBF Scribner	3.0	MBF Scribner per MCF
Idaho	2006	MCF	MBF Scribner	2.4	MBF Scribner per MCF
Idaho	2011	MCF	MBF Scribner	2.43	MBF Scribner per MCF
Idaho	2015	MCF	MBF Scribner	3.52	MBF Scribner per MCF
Montana	2004	MCF	MBF Scribner	2.49	MBF Scribner per MCF
Montana	2009	MCF	MBF Scribner	2.69	MBF Scribner per MCF
Montana	2014	MCF	MBF Scribner	2.36	MBF Scribner per MCF
New Mexico	2002	MCF	MBF Scribner	1.06	MBF Scribner per MCF
New Mexico	2007	MCF	MBF Scribner	1.02	MBF Scribner per MCF
New Mexico	2012	MCF	MBF Scribner	2.1	MBF Scribner per MCF
New Mexico	2016	MCF	MBF Scribner	3.13	MBF Scribner per MCF
Oregon	2003	MCF	MBF Scribner	4.45	MBF Scribner per MCF
Oregon	2008	MCF	MBF Scribner	3.71	MBF Scribner per MCF
Oregon	2013	MCF	MBF Scribner	4.85	MBF Scribner per MCF
Utah	2002	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2007	MCF	MBF Scribner	2.05	MBF Scribner per MCF
Utah	2012	MCF	MBF Scribner	2.75	MBF Scribner per MCF
Utah	2016	MCF	MBF Scribner	3.33	MBF Scribner per MCF
Wyoming	2000	MCF	MBF Scribner	3.01	MBF Scribner per MCF
Wyoming	2005	MCF	MBF Scribner	3.19	MBF Scribner per MCF

Residues

Mill residues are wood and bark materials generated at primary wood-using mills when roundwood products are processed into primary wood products. This includes slabs, edgings, trimmings, sawdust, veneer clippings and cores, and pulp screenings. This also includes mill residues recycled as byproducts as well as those left unutilized and disposed of as waste. FIA has five classifications for residues (though not all regions use all classifications): bark, coarse, fine (shavings), fine (sawdust), and whole log chipped. Bark residue refers to the exterior cover of the log that is removed during the debarking process. Coarse residue is solid wood material produced during timber processing operations and includes slabs, edgings, trimmings, veneer cores, etc., and includes chips that are produced from these residues. Shavings are small, thin slices of wood that develop from wood machining operations such as planing, molding, shaping, boring, routing, and turning. Sawdust refers to fine wood residues resulting from the cutting and breaking action of saw teeth. Finally, "whole log chipped" refers to any log sent to the chipper without going through a saw. Most of these are logs that are too small to economically process or logs that are too defective (cull logs).

Southern Region

Unlike roundwood, there are no FIA standard units for residues in the Southern Region, but volumes are typically reported in green tons or MCF.

Estimating Residue from Roundwood—If a mill provided residue estimates on the mill questionnaire, those values are used in the TPO reports (after unit conversion if necessary). If no amount of residue was provided by the mill, the residues are estimated using the type and volume of roundwood processed. Residue conversion factors for saw logs, veneer logs, and composite panel/engineered wood product logs are listed in tables 40–42, respectively. Conversion factors for piling/pole/post logs, pulp mill logs, house/cabin logs, bioenergy/fuelwood, and "other" products are listed in table 43. All conversions are to residue green tons and can vary by State, species type, roundwood type, residue type, or any combination thereof.

CONVERSION EXAMPLE 33: A sawmill in Arkansas reported that it processed 3,000 MBF of hardwood logs. The mill uses the International ¼-inch rule to scale their logs and did not report residue amounts on the mill questionnaire.

Bark residue conversion (roundwood MBF to residue green tons) using table 40:
3,000 MBF International ¼-inch × 0.5535 residue green tons per MBF International ¼-inch = 1,661 residue green tons

Coarse residue conversion (roundwood MBF to residue green tons) using table 40:
3,000 MBF International ¼-inch × 1.8386 residue green tons per MBF International ¼-inch = 5,516 residue green tons

Sawdust residue conversion (roundwood MBF to residue green tons) using table 40:
3,000 MBF International ¼-inch × 1.0747 residue green tons per MBF International ¼-inch = 3,224 residue green tons

Shavings residue conversion (roundwood MBF to residue green tons) using table 40:
3,000 MBF International ¼-inch × 0.4715 residue green tons per MBF International ¼-inch = 1,415 residue green tons

CONVERSION EXAMPLE 34: A pole mill in Mississippi reported that it manufactured 150,000 yellow pine poles. No mill residue was reported.

Bark residue conversion (roundwood C-pieces to residue green tons) using table 43:
1,500 C-pieces × 6.2649 residue green tons per C-piece = 9,397 residue green tons

Coarse residue conversion (roundwood C-pieces to residue green tons) using table 43:
1,500 C-pieces × 4.5115 residue green tons per C-piece = 6,767 residue green tons

Residue Conversion Factors—If residue amounts were directly reported by mills, the conversion factors in table 44 are used to convert to reporting units of green tons or MCF solid wood equivalent (SWE). Thousand cubic foot conversion factors vary by State and species while green ton factors vary by species only.

CONVERSION EXAMPLE 35: A hardwood sawmill in Virginia reported that it generated 37,000 green tons of residues (5,800 tons bark, 18,400 tons coarse, 11,300 tons sawdust, and 1,500 tons shavings).

Bark residue conversion (green tons to MCF) using table 44:
5,800 green tons × 0.4057 cords per green ton = 2,353 cords
2,353 cords × 0.07610 MCF per cord = 179 MCF

Coarse residue conversion (green tons to MCF) using table 44:
18,400 green tons × 0.4057 cords per green ton = 7,465 cords
7,465 cords × 0.07610 MCF per cord = 568 MCF

Sawdust residue conversion (green tons to MCF) using table 44:
11,300 green tons × 0.4057 cords per green ton = 4,584 cords
4,584 cords × 0.07610 MCF per cord = 349 MCF

Shavings residue conversion (green tons to MCF) using table 44:
1,500 green tons × 0.4057 cords per green ton = 609 cords
609 cords × 0.07610 MCF per cord = 46 MCF

Northern Region

Like the Southern Region, there are no FIA standard units for residues in the Northern Region, but volumes are typically reported in green tons or MCF. If no residue amounts are reported on the mill questionnaire, residues are estimated from roundwood production.

Estimating Residue from Roundwood—Conversion factors used for estimating residues from roundwood are dependent upon product type, product source, residue type, and bark thickness. Product types include saw logs, veneer logs, pulpwood, bioenergy/fuelwood, house/cabin logs, pilings, poles, posts, and other products. Residue types include bark, coarse, or fine, and bark thickness is classified as either thin or thick, depending upon species. Bark thickness only affects bark residue estimates. Table C.1 in appendix C lists the bark thickness classifications for all northern tree species. Product sources for saw logs include band saw mill logs and "other" mill logs, and this classification only affects fine residue conversions. This log classification is based on the premise that band saws typically have a smaller kerf and thus produce less fine residues. Roundwood-to-residue conversion factors for saw logs are found in table 45. Product source for veneer logs includes roundwood logs and bolts. Conversion factors for veneer logs are listed in table 46. Pulpwood conversion factors are shown in table 47, and sources include roundwood logs and bolts and whole tree chips. Product source for house/cabin logs, pilings, poles, posts, and other products are roundwood logs and bolts. Roundwood-to-residue conversion factors for these product types are listed in tables 48–52 respectively. Conversion factors apply to all Northern States.

CONVERSION EXAMPLE 36: A circular sawmill in Minnesota reported that it processed 650 MBF International ¼-inch of red pine logs to lumber. They did not report any residue amounts on the mill questionnaire.

Bark residue conversion (roundwood MBF to residue green tons) using tables C.1 and 45:
650 MBF International ¼-inch × 0.57 residue green tons per MBF International ¼-inch = 370.5 residue green tons

Coarse residue conversion (roundwood MBF to residue green tons) using table 45:
650 MBF International ¼-inch × 1.34 residue green tons per MBF International ¼-inch = 871 residue green tons

Fine residue conversion (roundwood MBF to residue green tons) using table 45:
650 MBF International ¼-inch × 0.78 residue green tons per MBF International ¼-inch = 507 residue green tons

Residue Conversion Factors—Table 53 lists the factors used to convert between various residue measurement units. Green weight conversion factors differ by species type. Factors apply to all residue types and all Northern States.

CONVERSION EXAMPLE 37: A hardwood sawmill in Missouri reported that it generated 1,400 standard cords of residues (700 cords bark, 420 cords coarse, and 280 cords fine).

Bark residue conversion (standard cords to green tons) using table 53:
700 standard cords / 0.4545 standard cords per green ton = 1,540 green tons

Coarse residue conversion (standard cords to green tons) using table 53:
420 standard cords / 0.4545 standard cords per green ton = 924 green tons

Fine residue conversion (standard cords to green tons) using table 53:
280 standard cords / 0.4545 standard cords per green ton = 616 green tons

Western Region

The standard units for mill residues in the Western Region are BDU (equivalent to 2,400 pounds) but are sometimes reported in 200 CFU. If no residue amounts are reported on the mill questionnaire, residues are estimated from roundwood consumption.

Estimating Residue from Roundwood—In the Western Region, conversion factors used for estimating residues from roundwood apply only to sawmills and vary by State, survey year, and residue type, including bark, coarse, sawdust, and planer shavings. Roundwood-to-residue conversion factors for the West are shown in table 54 and apply to all timber species.

CONVERSION EXAMPLE 38: Lumber production for a sawmill in Idaho was 40,000 MBF lumber tally in 2011. No residue amounts were reported by the mill.

Bark residue conversion (MBF lumber tally to residue BDU) using table 54:
40,000 MBF lumber tally × 0.24 residue BDU per MBF lumber tally = 9,600 residue BDU

Coarse residue conversion (MBF lumber tally to residue BDU) using table 54:
40,000 MBF lumber tally × 0.39 residue BDU per MBF lumber tally = 15,600 residue BDU

Sawdust residue conversion (MBF lumber tally to residue BDU) using table 54:
40,000 MBF lumber tally × 0.15 residue BDU per MBF lumber tally = 6,000 residue BDU

Planer shaving residue conversion (MBF lumber tally to residue BDU) using table 54:
40,000 MBF lumber tally × 0.08 residue BDU per MBF lumber tally = 3,200 residue BDU

Residue Conversion Factors—Western factors used to convert residue amounts to SWE are shown in table 55. Acceptable residue measurement units include BDU, BDT, green tons, pounds, cubic feet, cubic yards, and 200 CFU. Conversions to/from 200 CFU vary by residue type while all other residue conversions apply to all types. Residue types include bark, sawdust, planer shavings, hogged fuel, and pulp chips.

CONVERSION EXAMPLE 39: A sawmill in Utah reported that it generated 5,000 MCF of residues (1,200 MCF bark, 800 MCF sawdust, 700 MCF planer shavings, and 2,300 MCF hogged fuel).

Bark residue conversions (MCF to BDU, cubic feet [SWE], and green tons) using table 55:
1,200 MCF × 5 200 CFU per MCF × 0.83 BDU per 200 CFU = 4,980 BDU
4,980 BDU × 96 cubic feet (SWE) per BDU = 512,640 cubic feet (SWE)
4,980 BDU × 2.4 green tons per BDU = 12,816 green tons

Sawdust residue conversions (MCF to BDU, cubic feet [SWE], and green tons) using table 55:
800 MCF × 5 200 CFU per MCF × 0.83 BDU per 200 CFU = 3,320 BDU
3,320 BDU × 96 cubic feet (SWE) per BDU = 318,720 cubic feet (SWE)
3,320 BDU × 2.4 green tons per BDU = 7,968 green tons

Planer shaving residue conversions (MCF to BDU, cubic feet [SWE], and green tons) using table 55:
700 MCF × 5 200 CFU per MCF × 0.52 BDU per 200 CFU = 1,820 BDU
1,820 BDU × 96 cubic feet (SWE) per BDU = 174,720 cubic feet (SWE)
1,820 BDU × 2.4 green tons per BDU = 4,368 green tons

Hogged fuel residue conversions (MCF to BDU, cubic feet [SWE], and green tons)using table 55:
2,300 MCF × 5 200 CFU per MCF × 0.75 BDU per 200 CFU = 8,625 BDU
8,625 BDU × 96 cubic feet (SWE) per BDU = 828,000 cubic feet (SWE)
8,625 BDU × 2.4 green tons per BDU = 20,700 green tons

Residues Tables

Table 40—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for saw logs in the Southern Region of the United States

State	Residue type	Species type	Factor[a]
Alabama	Bark	Hardwood	0.6305
Alabama	Bark	Softwood	0.5375
Alabama	Coarse	Hardwood	1.6543
Alabama	Coarse	Softwood	1.8519
Alabama	Fine (sawdust)	Hardwood	1.1579
Alabama	Fine (sawdust)	Softwood	0.8945
Arkansas	Bark	Hardwood	0.5535
Arkansas	Bark	Softwood	0.4005
Arkansas	Coarse	Hardwood	1.8386
Arkansas	Coarse	Softwood	1.7622
Arkansas	Fine (sawdust)	Hardwood	1.0747
Arkansas	Fine (sawdust)	Softwood	1.0581
Florida	Bark	Hardwood	0.6305
Florida	Bark	Softwood	0.5375
Florida	Coarse	Hardwood	1.7057
Florida	Coarse	Softwood	1.7969
Florida	Fine (sawdust)	Hardwood	1.1579
Florida	Fine (sawdust)	Softwood	0.8945
Georgia	Bark	Hardwood	0.6305
Georgia	Bark	Softwood	0.5375
Georgia	Coarse	Hardwood	1.6543
Georgia	Coarse	Softwood	1.8519
Georgia	Fine (sawdust)	Hardwood	1.1579
Georgia	Fine (sawdust)	Softwood	0.8945
Kentucky	Bark	Hardwood	0.5535
Kentucky	Bark	Softwood	0.4005
Kentucky	Coarse	Hardwood	1.7455
Kentucky	Coarse	Softwood	1.6241
Kentucky	Fine (sawdust)	Hardwood	1.0747
Kentucky	Fine (sawdust)	Softwood	1.0581
Louisiana	Bark	Hardwood	0.6305
Louisiana	Bark	Softwood	0.5375
Louisiana	Coarse	Hardwood	1.7057
Louisiana	Coarse	Softwood	1.7969
Louisiana	Fine (sawdust)	Hardwood	1.1579
Louisiana	Fine (sawdust)	Softwood	0.8945
Mississippi	Bark	Hardwood	0.6305
Mississippi	Bark	Softwood	0.5375
Mississippi	Coarse	Hardwood	1.6543
Mississippi	Coarse	Softwood	1.8519
Mississippi	Fine (sawdust)	Hardwood	1.1579
Mississippi	Fine (sawdust)	Softwood	0.8945
North Carolina	Bark	Hardwood	0.5535
North Carolina	Bark	Softwood	0.4005
North Carolina	Coarse	Hardwood	1.8386
North Carolina	Coarse	Softwood	1.7622
North Carolina	Fine (sawdust)	Hardwood	1.0747
North Carolina	Fine (sawdust)	Softwood	1.0581
Oklahoma	Bark	Hardwood	0.5535
Oklahoma	Bark	Softwood	0.4005
Oklahoma	Coarse	Hardwood	1.8386
Oklahoma	Coarse	Softwood	1.7622
Oklahoma	Fine (sawdust)	Hardwood	1.0747
Oklahoma	Fine (sawdust)	Softwood	1.0581
South Carolina	Bark	Hardwood	0.6305
South Carolina	Bark	Softwood	0.5375
South Carolina	Coarse	Hardwood	1.8060
South Carolina	Coarse	Softwood	1.5524
South Carolina	Fine (sawdust)	Hardwood	1.1579
South Carolina	Fine (sawdust)	Softwood	0.8945
Tennessee	Bark	Hardwood	0.5535
Tennessee	Bark	Softwood	0.4005
Tennessee	Coarse	Hardwood	1.8386
Tennessee	Coarse	Softwood	1.7622
Tennessee	Fine (sawdust)	Hardwood	1.0747
Tennessee	Fine (sawdust)	Softwood	1.0581
Texas	Bark	Hardwood	0.5535
Texas	Bark	Softwood	0.4005
Texas	Coarse	Hardwood	1.8386
Texas	Coarse	Softwood	1.7622
Texas	Fine (sawdust)	Hardwood	1.0747
Texas	Fine (sawdust)	Softwood	1.0581
Virginia	Bark	Hardwood	0.5535
Virginia	Bark	Softwood	0.4005
Virginia	Coarse	Hardwood	1.7455
Virginia	Coarse	Softwood	1.6241
Virginia	Fine (sawdust)	Hardwood	1.0747
Virginia	Fine (sawdust)	Softwood	1.0581
All Southern States	Fine (shavings)	Hardwood	0.4715
All Southern States	Fine (shavings)	Softwood	0.5704

[a] Factor units are green tons of residue per MBF International ¼-inch.

Table 41—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for veneer/plywood logs in the Southern Region of the United States

State	Residue type	Species type	Factor[a]
Alabama	Bark	Hardwood	0.6305
Alabama	Bark	Softwood	0.5375
Alabama	Coarse	Hardwood	1.6543
Alabama	Coarse	Softwood	1.8519
Alabama	Fine (sawdust)	Hardwood	1.6294
Alabama	Fine (sawdust)	Softwood	1.4649
Alabama	Fine (shavings)	Hardwood	1.6294
Alabama	Fine (shavings)	Softwood	1.4649
Arkansas	Bark	Hardwood	0.5535
Arkansas	Bark	Softwood	0.4005
Arkansas	Coarse	Hardwood	0.8911
Arkansas	Coarse	Softwood	1.9171
Arkansas	Fine (sawdust)	Hardwood	0.4573
Arkansas	Fine (sawdust)	Softwood	0.6635
Arkansas	Fine (shavings)	Hardwood	0.4573
Arkansas	Fine (shavings)	Softwood	0.6635
Florida	Bark	Hardwood	0.6305
Florida	Bark	Softwood	0.5375
Florida	Coarse	Hardwood	1.7057
Florida	Coarse	Softwood	1.7969
Florida	Fine (sawdust)	Hardwood	1.6294
Florida	Fine (sawdust)	Softwood	1.4649
Florida	Fine (shavings)	Hardwood	1.6294
Florida	Fine (shavings)	Softwood	1.4649
Georgia	Bark	Hardwood	0.6305
Georgia	Bark	Softwood	0.5375
Georgia	Coarse	Hardwood	1.6543
Georgia	Coarse	Softwood	1.8519
Georgia	Fine (sawdust)	Hardwood	1.6294
Georgia	Fine (sawdust)	Softwood	1.4649
Georgia	Fine (shavings)	Hardwood	1.6294
Georgia	Fine (shavings)	Softwood	1.4649
Kentucky	Bark	Hardwood	0.5535
Kentucky	Bark	Softwood	0.4005
Kentucky	Coarse	Hardwood	0.8911
Kentucky	Coarse	Softwood	1.9171
Kentucky	Fine (sawdust)	Hardwood	0.4573
Kentucky	Fine (sawdust)	Softwood	0.6635
Kentucky	Fine (shavings)	Hardwood	0.4573
Kentucky	Fine (shavings)	Softwood	0.6635
Louisiana	Bark	Hardwood	0.6305
Louisiana	Bark	Softwood	0.5375
Louisiana	Coarse	Hardwood	1.7057
Louisiana	Coarse	Softwood	1.7969
Louisiana	Fine (sawdust)	Hardwood	1.6294
Louisiana	Fine (sawdust)	Softwood	1.4649
Louisiana	Fine (shavings)	Hardwood	1.6294
Louisiana	Fine (shavings)	Softwood	1.4649
Mississippi	Bark	Hardwood	0.6305
Mississippi	Bark	Softwood	0.5375
Mississippi	Coarse	Hardwood	1.6543
Mississippi	Coarse	Softwood	1.8519
Mississippi	Fine (sawdust)	Hardwood	1.6294
Mississippi	Fine (sawdust)	Softwood	1.4649
Mississippi	Fine (shavings)	Hardwood	1.6294
Mississippi	Fine (shavings)	Softwood	1.4649
North Carolina	Bark	Hardwood	0.5535
North Carolina	Bark	Softwood	0.4005
North Carolina	Coarse	Hardwood	0.8911
North Carolina	Coarse	Softwood	1.9171
North Carolina	Fine (sawdust)	Hardwood	0.4573
North Carolina	Fine (sawdust)	Softwood	0.6635
North Carolina	Fine (shavings)	Hardwood	0.4573
North Carolina	Fine (shavings)	Softwood	0.6635
Oklahoma	Bark	Hardwood	0.5535
Oklahoma	Bark	Softwood	0.4005
Oklahoma	Coarse	Hardwood	0.8911
Oklahoma	Coarse	Softwood	1.9171
Oklahoma	Fine (sawdust)	Hardwood	0.4573
Oklahoma	Fine (sawdust)	Softwood	0.6635
Oklahoma	Fine (shavings)	Hardwood	0.4573
Oklahoma	Fine (shavings)	Softwood	0.6635
South Carolina	Bark	Hardwood	0.6305
South Carolina	Bark	Softwood	0.5375
South Carolina	Coarse	Hardwood	1.8060
South Carolina	Coarse	Softwood	1.5524
South Carolina	Fine (sawdust)	Hardwood	1.6294
South Carolina	Fine (sawdust)	Softwood	1.4649
South Carolina	Fine (shavings)	Hardwood	1.6294
South Carolina	Fine (shavings)	Softwood	1.4649
Tennessee	Bark	Hardwood	0.5535
Tennessee	Bark	Softwood	0.4005
Tennessee	Coarse	Hardwood	0.8911
Tennessee	Coarse	Softwood	1.9171
Tennessee	Fine (sawdust)	Hardwood	0.4573
Tennessee	Fine (sawdust)	Softwood	0.6635
Tennessee	Fine (shavings)	Hardwood	0.4573
Tennessee	Fine (shavings)	Softwood	0.6635
Texas	Bark	Hardwood	0.5535
Texas	Bark	Softwood	0.4005
Texas	Coarse	Hardwood	0.8911
Texas	Coarse	Softwood	1.9171
Texas	Fine (sawdust)	Hardwood	0.4573
Texas	Fine (sawdust)	Softwood	0.6635
Texas	Fine (shavings)	Hardwood	0.4573
Texas	Fine (shavings)	Softwood	0.6635
Virginia	Bark	Hardwood	0.5535
Virginia	Bark	Softwood	0.4005
Virginia	Coarse	Hardwood	0.8911
Virginia	Coarse	Softwood	1.9171
Virginia	Fine (sawdust)	Hardwood	0.4573
Virginia	Fine (sawdust)	Softwood	0.6635
Virginia	Fine (shavings)	Hardwood	0.4573
Virginia	Fine (shavings)	Softwood	0.6635

[a] Factor units are green tons of residue per MBF International ¼-inch.

Table 42—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for composite panel/engineered wood product logs in the Southern Region of the United States

State	Residue type	Species type	Factor[a]
Alabama	Bark	Hardwood	0.3051
Alabama	Bark	Softwood	0.2485
Arkansas	Bark	Hardwood	0.3120
Arkansas	Bark	Softwood	0.2485
Florida	Bark	Hardwood	0.3051
Florida	Bark	Softwood	0.2431
Georgia	Bark	Hardwood	0.3051
Georgia	Bark	Softwood	0.2485
Kentucky	Bark	Hardwood	0.3096
Kentucky	Bark	Softwood	0.2508
Louisiana	Bark	Hardwood	0.3051
Louisiana	Bark	Softwood	0.2431
Mississippi	Bark	Hardwood	0.3051
Mississippi	Bark	Softwood	0.2485
North Carolina	Bark	Hardwood	0.3120
North Carolina	Bark	Softwood	0.2485
Oklahoma	Bark	Hardwood	0.3120
Oklahoma	Bark	Softwood	0.2485
South Carolina	Bark	Hardwood	0.2868
South Carolina	Bark	Softwood	0.2348
Tennessee	Bark	Hardwood	0.3120
Tennessee	Bark	Softwood	0.2485
Texas	Bark	Hardwood	0.3120
Texas	Bark	Softwood	0.2485
Virginia	Bark	Hardwood	0.3095
Virginia	Bark	Softwood	0.2508

[a] Factor units are green tons of residue per standard cord.

Table 43—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for piling/pole/post logs, pulp mill logs, house/cabin logs, bioenergy/fuelwood logs, and other products in the Southern Region of the United States

Roundwood type	State	Residue type	Species type	Factor	Factor units[a]
Bioenergy/fuelwood	All Southern States	Bark	Hardwood	4.0678	Tons per MCF
Bioenergy/fuelwood	All Southern States	Bark	Softwood	3.4234	Tons per MCF
House/cabin logs	All Southern States	Bark	All species	6.2649	Tons per C-pieces
House/cabin logs	All Southern States	Coarse	Hardwood	4.6240	Tons per C-pieces
House/cabin logs	All Southern States	Coarse	Softwood	4.5115	Tons per C-pieces
Pilings/poles	All Southern States	Bark	All species	6.2649	Tons per C-pieces
Pilings/poles	All Southern States	Coarse	Hardwood	4.6240	Tons per C-pieces
Pilings/poles	All Southern States	Coarse	Softwood	4.5115	Tons per C-pieces
Posts	All Southern States	Bark	All species	2.6771	Tons per M-pieces
Pulp mill logs	All Southern States	Bark	Hardwood	4.0678	Tons per MCF
Pulp mill logs	All Southern States	Bark	Softwood	3.4234	Tons per MCF
Other products	All Southern States	Bark	Hardwood	4.0678	Tons per MCF
Other products	All Southern States	Bark	Softwood	3.4234	Tons per MCF

[a] Tons represent green tons of residue produced.

Table 44—Conversion factors used by Forest Inventory and Analysis for all residue types in the Southern Region of the United States

State	Species type	Input unit of measure	Output unit of measure	Factor	Factor units
Alabama	Hardwood	Standard cords	MCF	0.07500	MCF per cord
Alabama	Softwood	Standard cords	MCF	0.07255	MCF per cord
Arkansas	Hardwood	Standard cords	MCF	0.07663	MCF per cord
Arkansas	Softwood	Standard cords	MCF	0.07255	MCF per cord
Florida	Hardwood	Standard cords	MCF	0.07500	MCF per cord
Florida	Softwood	Standard cords	MCF	0.07100	MCF per cord
Georgia	Hardwood	Standard cords	MCF	0.07500	MCF per cord
Georgia	Softwood	Standard cords	MCF	0.07255	MCF per cord
Kentucky	Hardwood	Standard cords	MCF	0.07610	MCF per cord
Kentucky	Softwood	Standard cords	MCF	0.07326	MCF per cord
Louisiana	Hardwood	Standard cords	MCF	0.07500	MCF per cord
Louisiana	Softwood	Standard cords	MCF	0.07100	MCF per cord
Mississippi	Hardwood	Standard cords	MCF	0.07050	MCF per cord
Mississippi	Softwood	Standard cords	MCF	0.06860	MCF per cord
North Carolina	Hardwood	Standard cords	MCF	0.07663	MCF per cord
North Carolina	Softwood	Standard cords	MCF	0.07255	MCF per cord
Oklahoma	Hardwood	Standard cords	MCF	0.07500	MCF per cord
Oklahoma	Softwood	Standard cords	MCF	0.07255	MCF per cord
South Carolina	Hardwood	Standard cords	MCF	0.07663	MCF per cord
South Carolina	Softwood	Standard cords	MCF	0.07255	MCF per cord
Tennessee	Hardwood	Standard cords	MCF	0.07663	MCF per cord
Tennessee	Softwood	Standard cords	MCF	0.07255	MCF per cord
Texas	Hardwood	Standard cords	MCF	0.07663	MCF per cord
Texas	Softwood	Standard cords	MCF	0.07255	MCF per cord
Virginia	Hardwood	Standard cords	MCF	0.07610	MCF per cord
Virginia	Softwood	Standard cords	MCF	0.07326	MCF per cord
All Southern States	Hardwood	Green tons	Standard cords	0.4057	Cords per ton
All Southern States	Softwood	Green tons	Standard cords	0.4158	Cords per ton
All Southern States	All species	Green tons	Dry tons	0.5	Dry tons per green ton

Table 45—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for saw logs in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Residue units	Factor	Units[b]
All	Bark	Thin	Green tons	0.34	Tons per MBF
All	Bark	Thin	Dry tons	0.21	Tons per MBF
All	Bark	Thin	Cubic feet	18.00	Cubic feet per MBF
All	Bark	Thick	Green tons	0.57	Tons per MBF
All	Bark	Thick	Dry tons	0.37	Tons per MBF
All	Bark	Thick	Cubic feet	31.00	Cubic feet per MBF
All	Coarse	All	Green tons	1.34	Tons per MBF
All	Coarse	All	Dry tons	0.79	Tons per MBF
All	Coarse	All	Cubic feet	48.00	Cubic feet per MBF
Band saw mill logs	Fine	All	Green tons	0.45	Tons per MBF
Band saw mill logs	Fine	All	Dry tons	0.27	Tons per MBF
Band saw mill logs	Fine	All	Cubic feet	16.00	Cubic feet per MBF
Other mill type logs	Fine	All	Green tons	0.78	Tons per MBF
Other mill type logs	Fine	All	Dry tons	0.46	Tons per MBF
Other mill type logs	Fine	All	Cubic feet	28.00	Cubic feet per MBF

[a] Table C.1 contains bark thickness classifications for all northern tree species.

[b] Roundwood units are MBF International ¼-inch.

Table 46—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for veneer logs in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	MBF International ¼-inch	Green tons	0.34	Tons per MBF
Roundwood logs and bolts	Bark	Thin	MBF International ¼-inch	Dry tons	0.21	Tons per MBF
Roundwood logs and bolts	Bark	Thin	MBF International ¼-inch	Cubic feet	18.00	Cubic feet per MBF
Roundwood logs and bolts	Bark	Thick	MBF International ¼-inch	Green tons	0.57	Tons per MBF
Roundwood logs and bolts	Bark	Thick	MBF International ¼-inch	Dry tons	0.37	Tons per MBF
Roundwood logs and bolts	Bark	Thick	MBF International ¼-inch	Cubic feet	31.00	Cubic feet per MBF
Roundwood logs and bolts	Coarse	All	MBF International ¼-inch	Green tons	1.79	Tons per MBF
Roundwood logs and bolts	Coarse	All	MBF International ¼-inch	Dry tons	1.05	Tons per MBF
Roundwood logs and bolts	Coarse	All	MBF International ¼-inch	Cubic feet	62.10	Cubic feet per MBF
Roundwood logs and bolts	Fine	All	MBF International ¼-inch	Green tons	0.08	Tons per MBF
Roundwood logs and bolts	Fine	All	MBF International ¼-inch	Dry tons	0.05	Tons per MBF
Roundwood logs and bolts	Fine	All	MBF International ¼-inch	Cubic feet	2.70	Cubic feet per MBF

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 47—Roundwood/chips-to-residue conversion factors used by Forest Inventory and Analysis for pulp and composite panels in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	Standard cords	Green tons	0.169850374	Tons per cord
Roundwood logs and bolts	Bark	Thin	Standard cords	Dry tons	0.106650235	Tons per cord
Roundwood logs and bolts	Bark	Thin	Standard cords	Cubic feet	9.006019813	Cubic feet per cord
Roundwood logs and bolts	Bark	Thick	Standard cords	Green tons	0.285190627	Tons per cord
Roundwood logs and bolts	Bark	Thick	Standard cords	Dry tons	0.183280403	Tons per cord
Roundwood logs and bolts	Bark	Thick	Standard cords	Cubic feet	15.499834100	Cubic feet per cord
Roundwood logs and bolts	Fine	All	Standard cords	Green tons	0.11	Tons per cord
Roundwood logs and bolts	Fine	All	Standard cords	Dry tons	0.06	Tons per cord
Roundwood logs and bolts	Fine	All	Standard cords	Cubic feet	3.80	Cubic feet per cord
Whole tree chips	Fine	All	Standard cords	Green tons	0.11	Tons per cord
Whole tree chips	Fine	All	Standard cords	Dry tons	0.06	Tons per cord
Whole tree chips	Fine	All	Standard cords	Cubic feet	3.80	Cubic feet per cord

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 48—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for house/cabin logs in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	MCF	Green tons	2.15	Tons per MCF
Roundwood logs and bolts	Bark	Thin	MCF	Dry tons	1.35	Tons per MCF
Roundwood logs and bolts	Bark	Thin	MCF	Cubic feet	114.00	Cubic feet per MCF
Roundwood logs and bolts	Bark	Thick	MCF	Green tons	3.61	Tons per MCF
Roundwood logs and bolts	Bark	Thick	MCF	Dry tons	2.32	Tons per MCF
Roundwood logs and bolts	Bark	Thick	MCF	Cubic feet	196.20	Cubic feet per MCF
Roundwood logs and bolts	Coarse	All	MCF	Green tons	1.99	Tons per MCF
Roundwood logs and bolts	Coarse	All	MCF	Dry tons	1.00	Tons per MCF
Roundwood logs and bolts	Coarse	All	MCF	Cubic feet	57.80	Cubic feet per MCF
Roundwood logs and bolts	Fine	All	MCF	Green tons	2.99	Tons per MCF
Roundwood logs and bolts	Fine	All	MCF	Dry tons	1.99	Tons per MCF
Roundwood logs and bolts	Fine	All	MCF	Cubic feet	94.60	Cubic feet per MCF

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 49—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for pilings in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	MLF	Green tons	1.831255	Tons per MLF
Roundwood logs and bolts	Bark	Thin	MLF	Dry tons	1.1584	Tons per MLF
Roundwood logs and bolts	Bark	Thin	MLF	Cubic feet	96.9602	Cubic feet per MLF
Roundwood logs and bolts	Bark	Thick	MLF	Green tons	3.07	Tons per MLF
Roundwood logs and bolts	Bark	Thick	MLF	Dry tons	2.00	Tons per MLF
Roundwood logs and bolts	Bark	Thick	MLF	Cubic feet	167.00	Cubic feet per MLF
Roundwood logs and bolts	Coarse	All	MLF	Green tons	1.47	Tons per MLF
Roundwood logs and bolts	Coarse	All	MLF	Dry tons	0.87	Tons per MLF
Roundwood logs and bolts	Coarse	All	MLF	Cubic feet	51.10	Cubic feet per MLF
Roundwood logs and bolts	Fine	All	MLF	Green tons	2.39	Tons per MLF
Roundwood logs and bolts	Fine	All	MLF	Dry tons	1.41	Tons per MLF
Roundwood logs and bolts	Fine	All	MLF	Cubic feet	83.30	Cubic feet per MLF

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 50—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for poles in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	Pieces	Green tons	0.017895	Tons per piece
Roundwood logs and bolts	Bark	Thin	Pieces	Dry tons	0.011584	Tons per piece
Roundwood logs and bolts	Bark	Thin	Pieces	Cubic feet	0.969602	Cubic feet per piece
Roundwood logs and bolts	Bark	Thick	Pieces	Green tons	0.03	Tons per piece
Roundwood logs and bolts	Bark	Thick	Pieces	Dry tons	0.02	Tons per piece
Roundwood logs and bolts	Bark	Thick	Pieces	Cubic feet	1.67	Cubic feet per piece
Roundwood logs and bolts	Coarse	All	Pieces	Green tons	0.02	Tons per piece
Roundwood logs and bolts	Coarse	All	Pieces	Dry tons	0.01	Tons per piece
Roundwood logs and bolts	Coarse	All	Pieces	Cubic feet	0.58	Cubic feet per piece
Roundwood logs and bolts	Fine	All	Pieces	Green tons	0.03	Tons per piece
Roundwood logs and bolts	Fine	All	Pieces	Dry tons	0.02	Tons per piece
Roundwood logs and bolts	Fine	All	Pieces	Cubic feet	0.95	Cubic feet per piece

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 51—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for posts in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	M-pieces	Green tons	1.70	Tons per M-piece
Roundwood logs and bolts	Bark	Thin	M-pieces	Dry tons	1.06	Tons per M-piece
Roundwood logs and bolts	Bark	Thin	M-pieces	Cubic feet	90.00	Cubic feet per M-piece
Roundwood logs and bolts	Bark	Thick	M-pieces	Green tons	2.85	Tons per M-piece
Roundwood logs and bolts	Bark	Thick	M-pieces	Dry tons	1.83	Tons per M-piece
Roundwood logs and bolts	Bark	Thick	M-pieces	Cubic feet	155.00	Cubic feet per M-piece
Roundwood logs and bolts	Coarse	All	M-pieces	Green tons	0.88	Tons per M-piece
Roundwood logs and bolts	Coarse	All	M-pieces	Dry tons	0.52	Tons per M-pieces
Roundwood logs and bolts	Coarse	All	M-pieces	Cubic feet	30.60	Cubic feet per M-piece
Roundwood logs and bolts	Fine	All	M-pieces	Green tons	2.07	Tons per M-piece
Roundwood logs and bolts	Fine	All	M-pieces	Dry tons	1.22	Tons per M-piece
Roundwood logs and bolts	Fine	All	M-pieces	Cubic feet	72.00	Cubic feet per M-piece

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 52—Roundwood-to-residue conversion factors used by Forest Inventory and Analysis for other products in the Northern Region of the United States

Product source	Residue type	Bark thickness[a]	Roundwood units	Residue units	Factor	Units
Roundwood logs and bolts	Bark	Thin	MCF	Green tons	2.15	Tons per MCF
Roundwood logs and bolts	Bark	Thin	MCF	Dry tons	1.35	Tons per MCF
Roundwood logs and bolts	Bark	Thin	MCF	Cubic feet	114.00	Cubic feet per MCF
Roundwood logs and bolts	Bark	Thick	MCF	Green tons	3.61	Tons per MCF
Roundwood logs and bolts	Bark	Thick	MCF	Dry tons	2.32	Tons per MCF
Roundwood logs and bolts	Bark	Thick	MCF	Cubic feet	196.20	Cubic feet per MCF
Roundwood logs and bolts	Coarse	All	MCF	Green tons	8.48	Tons per MCF
Roundwood logs and bolts	Coarse	All	MCF	Dry tons	4.99	Tons per MCF
Roundwood logs and bolts	Coarse	All	MCF	Cubic feet	303.80	Cubic feet per MCF
Roundwood logs and bolts	Fine	All	MCF	Green tons	4.94	Tons per MCF
Roundwood logs and bolts	Fine	All	MCF	Dry tons	2.91	Tons per MCF
Roundwood logs and bolts	Fine	All	MCF	Cubic feet	177.20	CF per MCF

[a] Table C.1 contains bark thickness classifications for all northern tree species.

Table 53—Conversion factors used by Forest Inventory and Analysis for mill residues used in pulp and composite panel production in the Northern Region of the United States (includes all Northern States)

Species type	Input unit of measure	Output unit of measure	Factor	Factor units
All	Standard cords	MBF	0.5	MBF per cord
All	Standard cords	MCF	0.079	MCF per cord
All	Lake States cords	Standard cords	1.0417	Cords (standard) per cord (Lake States)
All	Cubic feet	Standard cords	0.012658	Cords per cubic foot
All	Cubic meter	Standard cords	0.447010941	Cords per cubic meter
All	Cunits	Standard cords	1.2658	Cords per cunit
All	Dry tons	Standard cords	0.8	Cords per ton
All	Dry metric tonnes	Standard cords	0.88184	Cords per tonne
Hardwood	1,000 green pounds	Standard cords	0.22725	Cords per 1,000 pounds
Hardwood	4,600-pound cord	Standard cords	1.04535	Cords (standard) per cord (4,600-pound)
Hardwood	Green metric tonnes	Standard cords	0.50099535	Cords per tonne
Hardwood	Green tons	Standard cords	0.4545	Cords per ton
Softwood	1,000 green pounds	Standard cords	0.2439	Cords per 1,000 pounds
Softwood	4,600-pound cord	Standard cords	1.12194	Cords (standard) per cord (4,600-pound)
Softwood	Green metric tonnes	Standard cords	0.53770194	Cords per tonne
Softwood	Green tons	Standard cords	0.4878	Cords per ton

Table 54—Sawmill residue conversion factors used by Forest Inventory and Analysis in the Western Region of the United States (includes all western tree species)

State[a]	Year	Residue type	Factor[b]
Alaska	2015	Bark	0.17
Alaska	2015	Coarse	0.60
Alaska	2015	Sawdust	0.17
Alaska	2015	Planer shavings	0.09[c]
Arizona	2002	Bark	0.28
Arizona	2002	Coarse	0.56
Arizona	2002	Sawdust	0.19
Arizona	2002	Planer shavings	0.16
Arizona	2007	Bark	0.17
Arizona	2007	Coarse	0.56
Arizona	2007	Sawdust	0.19
Arizona	2007	Planer shavings	0.10
Arizona	2012	Bark	0.19
Arizona	2012	Coarse	0.63
Arizona	2012	Sawdust	0.19
Arizona	2012	Planer shavings	0.06
Arizona	2016	Bark	0.23
Arizona	2016	Coarse	0.65
Arizona	2016	Sawdust	0.23
Arizona	2016	Planer shavings	0.10
California	2000	Bark	0.23
California	2000	Coarse	0.41
California	2000	Sawdust	0.15
California	2000	Planer shavings	0.13
California	2006	Bark	0.21
California	2006	Coarse	0.37
California	2006	Sawdust	0.15
California	2006	Planer shavings	0.11
California	2012	Bark	0.22
California	2012	Coarse	0.33
California	2012	Sawdust	0.14
California	2012	Planer shavings	0.08
California	2016	Bark	0.21
California	2016	Coarse	0.33
California	2016	Sawdust	0.14
California	2016	Planer shavings	0.10
Colorado	2002	Bark	0.28
Colorado	2002	Coarse	0.56
Colorado	2002	Sawdust	0.19
Colorado	2002	Planer shavings	0.16
Colorado	2007	Bark	0.17
Colorado	2007	Coarse	0.56
Colorado	2007	Sawdust	0.19
Colorado	2007	Planer shavings	0.10
Colorado	2012	Bark	0.19
Colorado	2012	Coarse	0.63
Colorado	2012	Sawdust	0.19
Colorado	2012	Planer shavings	0.06
Colorado	2016	Bark	0.23
Colorado	2016	Coarse	0.65
Colorado	2016	Sawdust	0.23
Colorado	2016	Planer shavings	0.10
Idaho	2001	Bark	0.20
Idaho	2001	Coarse	0.42
Idaho	2001	Sawdust	0.17
Idaho	2001	Planer shavings	0.13
Idaho	2006	Bark	0.20
Idaho	2006	Coarse	0.39
Idaho	2006	Sawdust	0.15
Idaho	2006	Planer shavings	0.09
Idaho	2011	Bark	0.24
Idaho	2011	Coarse	0.39
Idaho	2011	Sawdust	0.15
Idaho	2011	Planer shavings	0.08
Idaho	2015	Bark	0.17
Idaho	2015	Coarse	0.41
Idaho	2015	Sawdust	0.13
Idaho	2015	Planer shavings	0.09
Montana	2004	Bark	0.15
Montana	2004	Coarse	0.47
Montana	2004	Sawdust	0.19
Montana	2004	Planer shavings	0.20
Montana	2009	Bark	0.14
Montana	2009	Coarse	0.44
Montana	2009	Sawdust	0.21
Montana	2009	Planer shavings	0.19
Montana	2014	Bark	0.12
Montana	2014	Coarse	0.42
Montana	2014	Sawdust	0.21
Montana	2014	Planer shavings	0.16
New Mexico	2002	Bark	0.28
New Mexico	2002	Coarse	0.56
New Mexico	2002	Sawdust	0.19
New Mexico	2002	Planer shavings	0.16
New Mexico	2007	Bark	0.17
New Mexico	2007	Coarse	0.56
New Mexico	2007	Sawdust	0.19
New Mexico	2007	Planer shavings	0.10
New Mexico	2012	Bark	0.19
New Mexico	2012	Coarse	0.63
New Mexico	2012	Sawdust	0.19
New Mexico	2012	Planer shavings	0.06
New Mexico	2016	Bark	0.23
New Mexico	2016	Coarse	0.65
New Mexico	2016	Sawdust	0.23
New Mexico	2016	Planer shavings	0.10
Oregon	2003	Bark	0.17
Oregon	2003	Coarse	0.37
Oregon	2003	Sawdust	0.13
Oregon	2003	Planer shavings	0.08
Oregon	2008	Bark	0.16
Oregon	2008	Coarse	0.36
Oregon	2008	Sawdust	0.11
Oregon	2008	Planer shavings	0.08
Oregon	2013	Bark	0.17
Oregon	2013	Coarse	0.37
Oregon	2013	Sawdust	0.13
Oregon	2013	Planer shavings	0.08
Utah	2002	Bark	0.28
Utah	2002	Coarse	0.56
Utah	2002	Sawdust	0.19
Utah	2002	Planer shavings	0.16
Utah	2007	Bark	0.17
Utah	2007	Coarse	0.56
Utah	2007	Sawdust	0.19
Utah	2007	Planer shavings	0.10
Utah	2012	Bark	0.19
Utah	2012	Coarse	0.63
Utah	2012	Sawdust	0.19
Utah	2012	Planer shavings	0.06
Utah	2016	Bark	0.23
Utah	2016	Coarse	0.65
Utah	2016	Sawdust	0.23
Utah	2016	Planer shavings	0.10
Wyoming	2014	Bark	0.22
Wyoming	2014	Coarse	0.44
Wyoming	2014	Sawdust	0.30
Wyoming	2014	Planer shavings	0.19

[a] Nevada residue factors not reported as most saw logs are shipped out of State. Washington residue factors not reported.

[b] Factor units are BDU of residue per MBF lumber tally.

c This factor represents only the few pristine Alaskan sawmills that planed lumber. The combined planer shavings factor was <0.001 for all sawmills which only produced lumber.

Table 55—Residue conversion factors used by Forest Inventory and Analysis in the Western Region of the United States (includes all Western States and western tree species)

Residue type	Input unit of measure	Output unit of measure	Factor	Factor units
All	BDU	Pounds	2400	Pounds per BDU
All	BDU	Cubic feet (SWE)	96	Cubic feet per BDU
All	BDU	Cubic yards (SWE)	3.38	Cubic yard per BDU
All	BDU	BDT	1.2	BDT per BDU
All	BDU	Green tons	2.4	Tons per BDU
Pulp chips	200 CFU	Cubic feet (SWE)	80	Cubic feet per 200 CFU
Sawdust	200 CFU	Cubic feet (SWE)	80	Cubic feet per 200 CFU
Planer shavings	200 CFU	Cubic feet (SWE)	50	Cubic feet per 200 CFU
Hogged fuel	200 CFU	Cubic feet (SWE)	72	Cubic feet per 200 CFU
Bark	200 CFU	Cubic feet (SWE)	85	Cubic feet per 200 CFU
Pulp chips	200 CFU	Pounds	2000	Pounds per 200 CFU
Sawdust	200 CFU	Pounds	2000	Pounds per 200 CFU
Planer shavings	200 CFU	Pounds	1250	Pounds per 200 CFU
Hogged fuel	200 CFU	Pounds	1800	Pounds per 200 CFU
Bark	200 CFU	Pounds	2125	Pounds per 200 CFU
Pulp chips	200 CFU	BDU	0.83	BDU per 200 CFU
Sawdust	200 CFU	BDU	0.83	BDU per 200 CFU
Planer shavings	200 CFU	BDU	0.52	BDU per 200 CFU
Hogged fuel	200 CFU	BDU	0.75	BDU per 200 CFU
Bark	200 CFU	BDU	0.89	BDU per 200 CFU

Conversion Factor Variability

Each region has its own set of guidelines for collecting and compiling TPO data. Included in these regional guidelines are sets of conversion factors that are applied to raw mill data when the measurement units differ from the region's standard units or the typical units used for reporting at the regional or national levels. Though the origin of many conversion factors in use is indeterminate, the consensus among regional survey administrators is that they were derived from past or ongoing mill studies. In some cases, reported mill over-run or under-run (percentage difference in scaled log volume and volume of lumber produced) is used to derive conversion factors. An example would be board-foot-to-cubic-foot volume conversions for saw logs in the Western Region. Due to the variability across the Nation in terms of species and size of harvested timber, the products manufactured, and common regional measurement units, one would expect there to be regional differences in conversion factors. Similarly, intra-regional differences in conversion factors are also common because much of the same ecological and manufacturing variability found between regions can also be found within regions. In order to ensure the accuracy and consistency of regional conversion factors used in TPO data processing, the expected versus actual variability was examined.

Expected Variability

All roundwood and residue measurement units used by FIA fall into one of three categories: weight, individual log volume, or stacked log volume. The individual log volume category can further be broken down into cubic volumetric units and product output units. The stacked log volume category can be subdivided into peeled and unpeeled logs. When converting volume/weight from one measurement category to another or even within categories, the first question that should be asked is whether variability among conversion factors is expected. If so, what are the dependent variables, and what amount of variability is reasonable? Even when variability is justified, the extent of acceptable variability is difficult to determine, and factor ranges that seem reasonable for one roundwood type or region may not be suitable for others. Expected conversion factor variability between and within each of the measurement unit categories is discussed below. In addition, expected sources of variability for roundwood-to-residue conversions are also given. A summary of all expected variability sources is shown in table 56.

Weight / Weight

Weight measurement units are commonly used for all roundwood types and residues. Conversions from one weight unit to another weight unit are not dependent upon any other factors, assuming that the input and output represent the same product type (e.g., converting softwood pulp mill logs from green metric tonnes to green tons). However, if the input and output represent roundwood/residue with differing characteristics, some variability should be expected. One example would be conversions from green weight units to dry weight units. The green/dry ratio for wood is directly related to moisture content, which can range from 30 to >200 percent in green wood (Ross 2010) and can vary by species, position in tree, tree age, heartwood/sapwood/ratio, geographic area, season, and time since felling (Clark and Daniels 2000, Fonseca 2005, Miles and Smith 2009). Glass and Zelinka (2010) list green heartwood and sapwood moisture contents for various domestic hardwood and softwood species. For the hardwoods listed, average moisture contents range from 44 to 162 percent for heartwood and 44 to 146 percent for sapwood. Softwood average moisture contents range from 31 to 121 percent for heartwood and 98 to 249 percent for sapwood. Another study by Clark and others (1985, 1986a, 1986b) illustrates the effect of geography on moisture content. As part of the study, the moisture content of various tree species was measured in the Coastal Plain, Piedmont, and Upland regions of the South. For white oak (*Quercus alba*), yellow-poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), and hickory (*Carya* spp.) (species which are found in all regions), average moisture content of the merchantable portion of sample trees ranged from 61 to 71 percent, 90 to 113 percent, 100 to 115 percent, and 53 to 61 percent, respectively. Of the variability factors associated with moisture content, the only ones that can

practically be applied to mill survey data are tree species, average log dimensions, and geographic area, as the majority of mills don't provide information on the other factors. Due to the high variability in moisture content among different hardwood and softwood species, green/dry weight conversion factors should be based on individual species, not just species types. It is possible that conversion factors based on species group (e.g., hickories or spruces) would be sufficient, but further analysis of variability within groups would be necessary.

Another area where weight-to-weight conversion factors should show variability is when converting between peeled logs and logs containing bark. This conversion type is dependent upon the weight of the bark, which is a function of bark density, thickness, and moisture content. Bark characteristics can vary by species, tree age, and the position within the tree (Miles and Smith 2009), and moisture content is dependent upon the factors mentioned in the previous paragraph. In addition to bark characteristics, the amount of bark retained on a log when it arrives at a mill can also affect the peeled/unpeeled weight ratio. Bark retention can be substantially affected by harvest method and seasonality of harvest. As with green-to-dry weight conversions, tree species, average log dimensions, and geographic area would be the only practical variables to consider for peeled-to-bark-on log weight conversions.

Weight / Individual Log Volume

The weight of roundwood is a function of wood and bark density and volume. Bark weight on average is 12 percent of the total weight of roundwood but can range from 6 to 25 percent (Fonseca 2005). Density is dependent upon two factors: the specific gravity of the wood material and the moisture content. As specific gravity and moisture content increase, wood density increases. For example, Ross (2010) found that wood with a specific gravity of 0.30 and a moisture content of 0 percent has a wood density of 19 pounds per cubic foot. Conversely, wood that has a specific gravity of 0.54 and a moisture content of 150 percent has a wood density of 84 pounds per cubic foot. Though these are extreme examples, they demonstrate the effect of varying specific gravity and moisture content on wood density. Factors that can affect moisture content are covered in the previous section. Wood specific gravity can be highly variable and can differ by species, within a given species, and even within a single stem (Fonseca 2005). Of commercially important tree species in the United States, average specific gravities range from 0.31 to 0.88 for hardwoods and 0.29 to 0.59 for softwoods (Ross 2010).

If the density of wood and bark is known, conversions between weight and cubic volumetric units are straightforward. However, unless the density of every log is directly measured (which is impractical), density must be estimated from the dependent variables. Additionally, most cubic volumetric measurements of roundwood do not include bark, whereas weight measurements of roundwood do. Therefore, when converting between weight and cubic volumetric units, there must be a deduction/accession for bark. Considering all of the variables that determine wood weight, species, average log dimensions, and geographic area are the only ones that can be practically applied to weight/cubic conversion factors. Because specific gravity of wood and bark plays a major role in determining density and because specific gravity is highly variable within species types, roundwood conversion factors based solely on species type are likely insufficient. As with green/dry weight conversion factors, weight/cubic volume conversion factors based on species group may suffice but would require an analysis of variability within groups.

All of the variability factors associated with weight/cubic foot roundwood conversions also hold true to conversions between weight and board foot volume. Like cubic-scaled logs, roundwood scaled in board feet doesn't include bark. The major difference between cubic foot scaling and board foot scaling is that board foot scaling estimates the volume of roundwood that is recoverable as an end product and does not include saw kerf, slabs, or mill residues. The minimum requirements for estimating board foot volume are the inside bark small-end diameter and log length. Board foot estimates are highly dependent on the log rule used. For example, a 16-foot log with a small-end diameter of 16 inches would have board foot volume estimates of 144, 159, and 180 for Doyle, Scribner, and International ¼-inch log rules, respectively (Freese 1973). Due to the variability in volume estimates among log rules, conversions between weight and board foot volume are also dependent on the log rule used. A case study by Doruska and others (2006) examined the tons-per-thousand-board-feet ratio for Doyle, Scribner, and

International ¼-inch log rules for a collection of hardwood species in Arkansas. Conversion factors for 2-inch diameter classes ranged from 4.5 to 20.0 tons per MBF for Doyle, 4.8 to 10.8 for Scribner, and 4.8 to 8.2 for International ¼-inch. Based on the information presented above, ideal roundwood conversions between weight and board feet should vary by average log dimensions (scaling diameter and length) and log rule, as well as by species and geographic area. Conversions between weight and other product output units such as linear feet, pieces, or lath bundles would require an estimate of the average volume per output unit.

Weight / Stacked Log Volume

Conversions between weight and stacked log volume are common for pulp mill logs, composite panel/engineered wood product logs, bioenergy/industrial fuelwood, residential fuelwood, and mill residues. The factors that affect roundwood weight are wood/bark specific gravity, moisture content, and volume and can vary by species, position in tree, tree age, heartwood/sapwood/ratio, geographic area, season, and time since felling. Conversions between weight and volume for stacked logs differ from individual log conversions in that stacked roundwood volume also includes the air space between pieces. The ratio of solid wood/bark to air space for stacked roundwood is mainly dependent upon the diameter, length, and taper of the individual logs. Stacked smaller, longer, and more tapered logs have less solid wood content. Spelter (2003) quantified the relationship between weight and stacked log volume for southern pine logs using fundamental wood property data on specific gravity, moisture content, sapwood-to-heartwood ratios, and bark volumes. Assuming no defects, no trim, and a taper of 0.125 inches per foot, conversion factors range from 2.9 tons per cord for medium-diameter logs to <2.6 tons per cord for small- diameter logs. Taking into consideration all of the variables that affect the weight-to-stacked-log-volume relationship, as well as the information available from mill surveys, the variables that should be considered when developing conversion factors are species, geographic area, and average log dimensions.

Individual Log Volume / Individual Log Volume

The two most common measures of individual log volume are board feet and cubic feet. Board foot log volume is typically estimated with log rule tables or formulas, using the nominal log length and inside bark diameter of the small end as the input variables. The relationship between most log rules does not conform to any algebraic function, which prevents straight conversions of volume from one log rule to another. In addition, the methodology for measuring lengths and diameters can vary from one log rule to another. For accurate conversions between log rules, conversion tables that include average log length and diameter should be used. Conversions between board foot volume and other output-based measurement units such as pieces or linear feet should also take into account the average volume of the end product.

Cubic volume scaling of logs differs significantly from output-based scaling in that it is based on fiber yield, not product yield. Cubic volume scaling considers the full volume of sound wood, inclusive of lumber, slabs, chips, and sawdust. Cubic volume rules typically require measurement of both log ends, which accounts for taper, while most output-based log rules only require diameter measurement on the small end of the log and assume that the product comes from the cylindrical portion of the log defined by the small-end diameter. Accurate conversions between these two different log scaling methods are dependent upon log characteristics such as diameter, length, taper, and defects. Spelter (2003) examined the effect of changing log characteristics on the cubic-to-board-foot Scribner ratio and found that conversion factors generally increase with increasing log lengths, decreasing log diameters, and increasing taper. Though mill surveys include information on average log lengths and diameters, information on taper is not reported. A study by Clark and others (1991) found significant variation in tree form among 58 tree species as well as between different geographical areas within the Southern Region. Therefore, species and geographic location (information that is currently available from mill surveys) could be used to predict taper in the South. Similar results of the effect of geographic location on taper could not be found in published literature for the Northern and Western Regions, but it would be safe to assume that the taper/geographic location relationship is similar. Conversions between output-based measurement units and cubic units should not only consider average log length, diameter, and log rule but also species and geographic location.

Individual Log Volume / Stacked Log Volume

Unlike individual log volume, stacked log volume also includes bark (if unpeeled logs) and the air space between logs. According to Fonseca (2005), the percentage of solid wood in stacked measure normally ranges from 60 to 70 percent of the solid wood cubic volume, depending on the size of the timber, presence of bark and its thickness, straightness, presence of limbs, amount of taper, buttressing, presence of unsound wood, the tightness of the stacking, and to what degree wood is deducted. Because log length and diameter play a significant role in determining the solid wood content of stacked logs, both should be considered when formulating conversion factors. It has also been mentioned that both log form and bark thickness are species-dependent; therefore, conversion factors applied to cubic/stacked log volumes should also be species-dependent. As with other conversions, broad species categorization may be sufficient. Geographic location should also be considered as it can influence log taper within species.

The variability factors for conversions between stacked volume and board foot volume are the same as those for cubic foot conversions. However, board foot conversion factors should also take into account the log rule. For conversions to/from other output-based measurement units (e.g., pieces, linear feet), the average dimensions of the primary product manufactured should be considered.

Stacked Log Volume / Stacked Log Volume

Though the standard cord is the most common measurement unit for stacked log volume, occasionally volume is reported in face cords, Lake States cords, peeled Lake States cords, peeled standard cords, or weight-based cords. A face cord is primarily used for the measurement of residential fuelwood and has stacked dimensions of 4 feet x 8 feet x fuelwood length. Face cord conversions to/from standard cords are straight conversions and don't depend on any other factors. A Lake States cord is the same as a standard cord but has a length of 100 inches instead of 96 inches. Like face cords, conversions between Lake States cords and standard cords are also straight conversions. Conversions between standard cords and both peeled standard cords and peeled Lake States cords are dependent upon bark thickness, which varies by species. Weight-based cords, which are primarily used as a measure for pulp mill logs and chipped roundwood, depend on the density of the wood material as well as moisture content. Therefore, conversions to/from weight-based cords should vary by species, average log dimensions, and geographic area.

Roundwood Volume / Estimated Residue Volume

Conversion factors are often used to estimate manufacturing residue from the volume of roundwood processed. The measurement units for the roundwood input are volumetric units, and residue output units are typically green/dry weight or cubic volume. Variability sources for each input and output measurement unit combination would be the same as those used for roundwood conversions. For example, roundwood volume measured in board feet converted to residue measured in green tons should consider species, geographic area, average log dimensions, and log rule. Two additional factors that should be considered are residue type and product type. The product being manufactured directly affects the type and volume of residue generated. A lumber-producing mill will not generate the same type or volume of residue that a veneer mill will produce. Similarly, a sawmill that produces structural lumber will have a substantially different residue yield than a sawmill producing appearance-grade lumber.

Actual Variability

In order to better understand the extent of the intra- and inter-regional variability in conversion factors, basic statistical analysis was performed on each roundwood type as well as on mill residues. When examining the data within a region, the conversion factors used to transform the data to regional standard units of measure are compared. For inter-regional analysis, weight units of green tons per national volumetric standard unit are used for comparisons within each roundwood type. Table 57 summarizes the intra-regional variability sources for each roundwood type as well as for residue-to-roundwood-equivalent conversions. (Note that this table includes all conversion types, not just conversions to regional standard units.) Variability source is defined as the roundwood, residue, geographic, manufacturing, or survey attribute for which conversion factors differ. Over all regions, sources of variability for roundwood and

residue conversion factors include: State, sub-region, survey year, species type, species group, product type, log size, log rule, bark presence, average tree diameter, pieces per bundle, and residue type. A summary of the variability sources associated with intra-regional roundwood-to-residue conversions is shown in table 58. Sources of variability over all regions for roundwood-to-residue factors include: State, survey year, product type, product source, species type, and bark thickness.

One method used below to quantify the variability in conversion factors is the *percentage difference* (PD), which is simply the difference between two factors divided by the average of the two factors, expressed as a percentage. Because both factors are of equal importance, the percentage is expressed as an absolute value. The formula used to calculate PD is:

$$PD = 100 \mid (F1 - F2) / 2\text{-}1(F1 + F2) \mid \quad (9)$$

where

PD = percentage difference
F1 = the first conversion factor being compared
F2 = the second conversion factor being compared

A slightly different method is used when comparing more than two factors and is referred to as the *percentage difference from the mean* (PDM). This method is used when comparing a single conversion factor to the mean of all factors for a product, region, species, survey year, etc. Higher PDs indicate a greater deviation from the mean. The formula below is used to calculate PDM.

$$PDMFi = 100FiF - 1 \quad (10)$$

where

PDM = percentage difference of factor *i* (*Fi*) from the mean of factor *F* (*F*)
$F = n - 1i = Fi$

For all PD and PDM calculations within an analysis group, the variable(s) associated with the highest value is given. In addition, any variables that have a percentage value greater than one standard deviation from the mean percentage value are also mentioned.

Saw Logs

Southern Region—The standard measurement unit in the Southern Region for saw logs is MBF International ¼-inch. Standard unit conversions from other log rules (Doyle, Scribner Decimal C, and Cedar) use log rule tables with average scaling diameter and log length as input variables. Cubic foot conversions to standard units vary by species type and State. Among all States and species, conversion factors range from 0.159 to 0.171 MCF per MBF with a mean of 0.167. Hardwood conversion factors range from 0.159 to 0.170 MCF per MBF, and softwood conversion factors range from 0.165 to 0.171. The PDM for each State ranges from 0 to 3.7 percent for hardwoods and 0.3 to 2.1 percent for softwoods. Arkansas (3.7 percent) and Florida (3.0 percent) have the highest PDM values for hardwoods, while Kentucky (2.1 percent), North Carolina (1.5 percent), and Virginia (1.5 percent) have the highest for softwoods. The PD between each State is shown in table 59 and ranges from 0 to 6.7 percent for hardwoods and 0 to 3.6 percent for softwoods. Of adjacent States (shown with bold text in the table), hardwood conversion factors for Arkansas/Oklahoma have the highest PD at 5.5 percent while Kentucky/Virginia have the highest PD for softwood factors at 3.6 percent. Other State pairs that have PD values greater than one standard deviation from the mean include Arkansas/Louisiana (4.3 percent) and Arkansas/Mississippi (3.7 percent) for hardwoods and Kentucky/Tennessee (2.4 percent), Georgia/North Carolina (1.8 percent), and North Carolina/South Carolina (1.8 percent) for softwoods. Inter-species PD within each State range from 0 to 6.1 percent with Arkansas having the greatest PD between hardwood and softwood conversion factors, followed by Virginia (4.2 percent). Conversions from standard cords, green tons, and dry tons to saw log standard units vary by species type only. For standard cords, conversion factors are 0.42 MBF per cord for hardwoods and 0.415 for softwood (PD of 0.6 percent). Green ton conversion factors are 6.278 tons per MBF for hardwoods and 5.8425 for softwood (PD of 3.6 percent). Dry ton conversion factors are 3.139 tons per MBF for hardwoods and 2.92125 for softwood (PD of 3.6 percent). All other standard unit conversions for saw logs in the South apply to all States and species types.

Northern Region—The standard unit for saw logs in the North is MBF International ¼-inch. Unlike in the Southern Region where log rule tables are used to convert between log rules, the Northern Region uses single conversion factors that apply to all logs in the region, regardless of species, size, geographic location, etc. Similarly, all other saw log conversion factors apply to the entire region, meaning there is no intra-regional variability in saw log conversion factors in the North.

Western Region—In the West, the standard unit of measure for saw logs is MBF Scribner. International ¼-inch is the only other log rule for which conversions from Scribner are performed, and a single conversion factor is used for all logs. Conversions between MCF and MBF Scribner vary by State and survey year. Among all States and survey years, conversion factors range from 3.71 to 6.48 MBF per MCF with a mean of 4.95. The PDM was calculated for each survey year within a State in order to quantify yearly variation and ranges from 0.1 to 26.1 percent over all States and years. Wyoming 2010 has the greatest PDM value followed by Colorado 2012 (12.0 percent), Wyoming 2014 (10.1 percent), Idaho 2001 (9.1 percent), Wyoming 2000 (8.9 percent), and Idaho 2011 (8.8 percent). Average conversion factors for each State range from 3.84 to 5.72 MBF per MCF with a mean of 4.94 over all States. The PD between each State for average yearly conversion factors is shown in table 60 and ranges from 0.4 to 39.2 percent. Of adjacent States, PD ranges from 0.4 to 28.9 percent, with Montana/Wyoming, California/Oregon, and Nevada/Oregon having the highest PD values at 28.9, 23.6, and 18.1 percent, respectively. All conversion factors other than MBF/MCF factors apply to all logs.

All Regions—In the Southern Region, the ratio of green tons per MBF International ¼-inch is 6.28 for hardwoods and 5.84 for softwoods. In the Northern Region, the ratio is 4.60 and applies to all logs. The ratio in the Western Region varies by State and survey year and ranges from 3.57 to 6.02 tons per MBF. Average regional ratios are 6.06, 4.60, and 4.59 tons per MBF for the South, North, and West, respectively, with PDM values of 19.2, 9.5, and 9.7 percent, respectively. PD for average regional values between the South and North is 30.9 percent for hardwoods and 23.8 percent for softwoods. PD between the South and West is 31.1 percent for hardwoods and 24.1 percent for softwoods. Between the Northern and Western Regions, PD is 0.3 percent for both hardwoods and softwoods.

Veneer/Plywood Logs

Southern Region—Like saw logs, the standard unit of measure for veneer/plywood logs in the Southern Region is MBF International ¼-inch. Log rule conversions for veneer/plywood logs use the same log rule tables as those used for saw logs, but cubic foot conversions vary slightly. For all conversions from MCF to MBF, the factors range from 0.157 to 0.17 MCF per MBF with a mean of 0.166. Conversion factors for hardwoods range from 0.157 to 0.17 MCF per MBF while those for softwoods range from 0.164 to 0.17. PDM for each State ranges from 0 to 3.7 percent for hardwoods and 0.2 to 2.6 percent for softwoods. Oklahoma has the highest PDM for hardwoods, followed by Florida and North Carolina (both 3.1 percent). Kentucky has the highest PDM for softwoods. Table 61 shows the PD between each State which ranges from 0 to 6.8 percent for hardwoods and 0 to 3.6 percent for softwoods. For adjacent States, hardwood conversion factors for Oklahoma/Texas have the highest PD at 3.8 percent, followed by North Carolina/Tennessee (3.6 percent), Florida/Georgia (3.0 percent), Georgia/North Carolina (3.0 percent), and North Carolina/South Carolina (3.0 percent). Kentucky/Virginia and Kentucky/Tennessee have the highest PD for softwood factors at 3.6 and 3.0 percent, respectively. Oklahoma (6.8 percent) and Arkansas (6.1 percent) have the highest PD between hardwood and softwood conversion factors, which ranges from 0 to 6.8 percent among all States. All other standard unit conversions for veneer/plywood logs are the same as those used for saw logs, so the PD values are also the same.

Northern Region—MBF International ¼-inch is the standard unit of measure for veneer/plywood logs in the Northern Region. Similar to saw logs, single conversion factors are used to convert between log rules. All veneer/plywood conversion factors used in the North apply to the entire region, so there is no intra-regional variability.

Western Region—The standard measurement unit for veneer logs in the Western Region is MBF Scribner. Conversions between MCF and MBF Scribner vary by State and survey year. Of the 11 Western States, only six (California, Idaho, Montana, Oregon, Washington, and Wyoming) have

veneer/plywood conversion factors, dating back to 2000. Among all survey years and States that have veneer/plywood mills, conversion factors range from 4.21 to 6.26 MBF per MCF with a mean of 4.90. The PDM for each survey year within a State ranges from 0 to 15.0 percent, with Idaho 2006 having the largest, followed by Montana 2014 (14.7 percent), Idaho 2011 (13.2 percent), Montana 2009 (12.6 percent), and Idaho 2015 (11.4 percent). Average conversion factors for each State range from 4.52 to 5.53 MBF per MCF with a mean of 4.86 over all States. Table 62 lists the PD between each State for average yearly conversion factors and ranges from 0.5 to 20.2 percent. Of adjacent States, PD ranges from 2.4 to 20.2 percent, with Idaho/Oregon having the highest PD value. All conversion factors other than MBF/MCF factors have no variability among like conversions.

All Regions—In the Southern Region, the ratio of green tons per MBF International ¼-inch for veneer logs is 6.28 for hardwoods and 5.84 for softwoods. In the Northern Region, the ratio is 4.60 and applies to all logs. The ratio in the Western Region varies by State and survey year and ranges from 3.57 to 5.30 tons per MBF. Average regional ratios are 6.06, 4.60, and 4.60 tons per MBF for the South, North, and West, respectively, with PDM values of 19.1, 9.6, and 9.5 percent, respectively. PD for average regional values between the South and North is 30.9 percent for hardwoods and 23.8 percent for softwoods. PD between the South and West is 30.8 percent for hardwoods and 23.7 percent for softwoods. Between the North and West regions, PD is 0.1 percent for both hardwoods and softwoods.

Pulp Mill Logs

Southern Region—The standard measurement unit for pulp mill logs in the Southern Region is standard cords. Cubic foot conversions to standard cords vary by State and species type. Conversion factors range from 0.0706 to 0.0775 MCF per cord over all States and species types with a mean of 0.0759. Hardwood factors range from 0.0706 to 0.0774 MCF per cord, and softwood factors range from 0.075 to 0.0775 MCF per cord. Among all Southern States, South Carolina and Texas have the highest PDM for both hardwoods and softwoods, which range from 0.3 to 6.2 percent for hardwoods and 0 to 1.9 percent for softwoods. The PD between each Southern State is shown in table 63 and ranges from 0 to 9.2 percent for hardwoods and 0 to 3.3 percent for softwoods. Of adjacent States, hardwood conversion factors for Georgia/South Carolina have the highest PD at 9.2 percent, followed by North Carolina/South Carolina (8.7 percent), Arkansas/Texas (8.2 percent), Oklahoma/Texas (8.2 percent), and Louisiana/Texas (6.0 percent). The largest PD for softwood conversion factors is between Arkansas and Texas at 3.3 percent, followed by Georgia/South Carolina (2.6 percent), Oklahoma/Texas (2.6 percent), and both Arkansas/Louisiana and North Carolina/South Carolina (2.0 percent). Inter-species PD ranges from 0 to 6.0 percent, with South Carolina and Texas both having the greatest difference. Green ton conversions to standard cords vary by species type only and range from 2.7 to 2.8 tons per cord with a PD of 3.6 percent.

Northern Region—In the Northern Region, the standard unit of measure for pulp mill logs is the standard cord. Conversions to standard cords vary by species group for weight-based measurement units and units associated with peeled logs. There are 39 species groups, including all hardwoods combined and all softwoods combined in the Northern Region that have associated conversion factors for pulp mill logs. Table 64 shows the mean, ranges, and maximum PDM for the species group conversion factors and is summarized by species type (hardwood/softwood). Because not all measurement unit types have conversion factors for all species groups, the number of observations used in the calculations are also shown. Over all measurement unit types, the maximum PDM ranges from 7.4 to 48.7 percent for hardwoods and 6.5 to 39.5 percent for softwoods. Table 65 shows the species groups associated with the lower and upper ends of each range as well as the maximum PDM. The species groups associated with the maximum PDM values for each measurement unit type include basswood, ash, and white oak for hardwood and cedar/juniper (northern white-cedar) and hemlock for softwood. Conversions from standard cords to cubic volumetric units vary by sub-region. In the Northeastern States, a conversion factor of 0.085 MCF per standard cord is used, while a conversion factor of 0.079 MCF per standard cord is used in the North Central States. Conversions from Lake States cords to standard cords apply to all States and species groups.

Western Region—The standard measurement unit for pulp mill logs in the Western Region is MBF Scribner. Thousand cubic feet to MBF Scribner conversion factors vary by State and survey year. All Western States have conversion factors for pulp mill logs with the exception of three: Arizona, Nevada,

and Wyoming. Among all States and survey years, conversion factors range from 1.02 to 5.30 MBF per MCF with a mean of 2.67. The PDM for each survey year within a State ranges from 0 to 24.5 percent, with Idaho 2001 having the highest value, followed by Montana 2004 (17.0 percent), Alaska 2005 and 2015 (15.2 percent), and Montana 2014 (14.2 percent). Average conversion factors for each State range from 1.02 to 4.60 MBF per MCF with a mean of 2.53 over all States processing pulp mill logs. Table 66 lists the PD between each State for average yearly conversion factors and ranges from 0.5 to 127.4 percent. Of adjacent States, PD ranges from 0.5 to 73.7 percent, with Colorado/New Mexico having the highest PD value, followed by New Mexico/Utah (67.1 percent). All conversion factors other than MBF/MCF factors apply to all logs.

All Regions—In the Southern Region, the ratio of green tons per standard cord for pulp mill logs is 2.8 for hardwoods and 2.7 for softwoods. The ratio in the Northern Region varies by species group and ranges from 1.94 to 2.90 tons per standard cord for hardwoods and 1.58 to 2.53 for softwoods. In the Western Region, the ratio is 2.25 tons per standard cord and applies to all logs. Average regional ratios are 2.75, 2.34, and 2.25 tons per standard cord for the South, North, and West, respectively, with PDM values of 12.3, 4.3, and 8.1 percent, respectively. PD for average regional values between the South and North is 12.7 percent for hardwoods and 21.8 percent for softwoods. PD between the South and West is 21.8 percent for hardwoods and 18.2 percent for softwoods. Between the North and West regions, PD is 9.1 percent for hardwoods and 3.7 percent for softwoods.

Composite Panels / Engineered Wood Products

Southern Region—The standard unit of measure in the Southern Region for composite panel and engineered wood product logs is the standard cord. Thousand cubic foot conversions to standard cords vary by State and species type. Overall, conversion factors range from 0.0705 to 0.0781 MCF per cord with a mean of 0.0761. Among States, the conversion factors range from 0.0705 to 0.0766 MCF per cord for hardwood and 0.0754 to 0.0781 for softwood. PDM for each State ranges from 0.5 to 5.5 percent for hardwoods and 0.1 to 2.7 percent for softwoods. Maximum PDM for hardwoods is shared by South Carolina and Mississippi while Mississippi has the highest PDM for softwoods. The PD between each State ranges from 0 to 8.3 percent for hardwoods and 0 to 3.5 percent for softwoods (table 67). For adjacent States, the greatest PD for hardwoods (8.3 percent) is shared by Arkansas/Texas, North Carolina/South Carolina, and Oklahoma/Texas, with Georgia/South Carolina and Louisiana/Texas sharing the second highest PD (6.2 percent). The greatest PD among adjacent States for softwoods belongs to Mississippi/Tennessee at 3.5 percent, followed by Louisiana/Mississippi (3.4 percent), Arkansas/Mississippi (3.3 percent), and Alabama/Mississippi (2.4 percent). South Carolina and Texas share the highest inter-species PD, which ranges from 0.5 to 9.7 percent for all States, and Tennessee has the next highest at 7.3 percent. Green ton conversions to standard cords apply to all States but vary by species type. The PD between hardwood and softwood green ton conversion factors is 3.6 percent.

Northern Region—In the Northern Region, the conversion factors for logs manufactured into composite panels and engineered wood products are the same as those used for pulp mill logs, so the variability is the same as well (tables 64–65).

Western Region—In the Western Region, conversions between MCF and MBF Scribner for composite panel and engineered wood product logs are the same as those used for pulp mill logs, so the variability is also the same (table 66). Some of the other conversion factors differ from pulp mill logs but have no variability among like conversions.

All Regions—For all regions, the ratios of green tons per standard cord for composite panel and engineered wood product logs are the same as the ratios for pulp mill logs; therefore, all PD and PDM values between regions are also the same.

Bioenergy / Industrial Fuelwood

Southern Region—The standard measurement unit for bioenergy and industrial fuelwood in the Southern Region is the standard cord. Conversions to standard cords from other measurement units apply to all States but vary by species type. Thousand cubic foot conversion factors are 0.0755 MCF per

cord for hardwoods and 0.0770 for softwoods (PD of 2.0 percent). Green ton conversion factors are 2.8 tons per cord for hardwoods and 2.7 for softwoods (PD of 3.6 percent). Dry ton conversion factors are 1.40 tons per cord for hardwoods and 1.35 for softwoods (PD of 3.6 percent).

Northern Region—Standard cords are the standard unit of measure for bioenergy and industrial fuelwood in the Northern Region. All conversions to standard cords apply to all States and species; therefore, there is no factor variability within measurement unit types.

Western Region—The standard measurement unit for energywood logs in the Western Region is MBF Scribner. All States except New Mexico and Utah have factors for conversions between MCF and MBF Scribner, and they vary by State and survey year. Among all States and survey years, conversion factors range from 1.0 to 5.0 MBF per MCF with a mean of 2.17. The PDM for each survey year within a State ranges from 0 to 96.7 percent, with Arizona 2016 having the highest and five other State/year combinations having PDM values >31 percent. Average conversion factors for each State range from 1.00 to 4.03 MBF per MCF with a mean of 2.31 over all States. Table 68 lists the PD between each State for average yearly conversion factors and ranges from 1.4 to 120.4 percent. Of adjacent States, PD ranges from 1.6 to 86.5 percent, with California/Oregon having the highest. Though all of the other State pairs are within one standard deviation of the mean, it should be noted that eight State pairs have PD values >39 percent. All conversion factors other than MBF/MCF factors apply to all logs.

All Regions—In the Southern Region, the ratio of green tons per standard cord for pulp mill logs is 2.8 for hardwoods and 2.7 for softwoods. The ratios in the Northern and Western Regions are 2.40 and 2.25 green tons per standard cord, respectively, and apply to all logs within each region. Respective PDM values of average regional ratios are 11.5, 2.7, and 8.8 percent for the Southern, Northern, and Western Regions. PD for average regional values between the South and North is 15.4 percent for hardwoods and 11.8 percent for softwoods. PD between the South and West is 21.8 percent for hardwoods and 18.2 percent for softwoods. Between the Northern and Western Regions, PD is 6.4 percent for both hardwoods and softwoods.

Posts

Southern Region—Standard units for posts in the Southern Region are M-pieces. Conversion formulas that take into account the scaling diameter and length of the logs are used to convert cubic feet or green tons to the standard units. The conversion formulas apply to the entire region, so there is no State or species variability.

Northern Region—Thousand pieces are the standard unit of measure for posts in the Northern Region. There is no variability in conversion factors as they apply to all States and species within the region.

Western Region—In the Western Region, the standard measurement unit for roundwood used for posts is MBF Scribner. All States except Alaska have factors for conversions between MCF and MBF Scribner, and they vary by State and survey year. Among all States and survey years, conversion factors range from 1.00 to 7.07 MBF per MCF with a mean of 2.73. The PDM for each survey year within a State ranges from 0 to 54.6 percent, with Colorado 2002 having the highest, followed by Wyoming 2010 (52.8 percent), Colorado 2016 (52.5 percent), Montana 2004 (52.4 percent), Utah 2012 (51.5 percent), New Mexico 2012 (48.2 percent), Arizona 2012 (44.1 percent), and Idaho 2015 (42.6 percent). Seven other State/year combinations have PDM values >31 percent. Average conversion factors for each State range from 1.44 to 5.68 MBF per MCF with a mean of 2.79 over all States. The PD between each State for average yearly conversion factors is shown in table 69 and ranges from 0.8 to 119.2 percent. Of adjacent States, PD ranges from 0.8 to 111.9 percent, with Arizona/California having the highest, followed by California/Nevada (95.8 percent) and Nevada/Oregon (71.5 percent). Five other State pairs have PD values between 38 and 63 percent. All conversion factors other than MBF/MCF factors have no variability among like conversions.

All Regions—In the Southern Region, the ratio of green tons per MCF for post logs (≤9 feet in length) varies by scaling diameter and length and ranges from 20.27 to 24.31 with a mean of 22.41. In the North and West, the ratios are 30.38 and 25.00 green tons per MCF, respectively, and apply to all logs. PDM for average regional ratios are 13.6, 17.2, and 3.6 percent for the Southern, Northern, and Western

Regions, respectively. PD for average regional values (both hardwood and softwood) is 30.2 percent between the South and North, 10.9 percent between the South and West, and 19.4 percent between the North and West.

Poles

Southern Region—Poles in the Southern Region have a standard unit of measure of C-pieces. Similar to posts, formulas that apply to all States and species are used to perform unit conversions; therefore, there is no intra-regional variability in conversion factors.

Northern Region—The standard unit of measure for poles in the Northern Region is pieces. As with posts, pole conversion factors apply to the entire region.

Western Region—In the Western Region, conversions between MCF and MBF Scribner for pole logs are the same as those used for posts, so the variability is also the same (table 69).

All Regions—In the Southern Region, the ratio of green tons per MCF for pole logs (>9 feet in length) varies by scaling diameter and length and ranges from 29.80 to 30.14 with a mean of 29.98. In the Northern and Western Regions, the ratios are 29.11 and 25.00 green tons per MCF, respectively, and apply to all logs. PDM for average regional ratios are 7.0, 3.9, and 10.8 percent for the Southern, Northern, and Western Regions, respectively. PD for average regional values (both hardwood and softwood) is 2.9 percent between the South and North, 18.1 percent between the South and West, and 15.2 percent between the North and West.

Pilings

Southern Region—The standard units, conversion factors, and variability associated with poles in the Southern Region also apply to pilings, so there is no factor variability.

Northern Region—Thousand linear feet is the standard unit of measure for pilings in the Northern Region, and all conversions are applied to the entire region.

Western Region—In the Western Region, the standard measurement unit for roundwood used for utility poles and pilings is MBF Scribner. Only California, Idaho, New Mexico, Oregon, Washington, and Wyoming have factors for conversions between MCF and MBF Scribner, and they vary by State and survey year. Among all States and survey years, conversion factors range from 1.06 to 5.58 MBF per MCF with a mean of 4.35. The PDM for each survey year within a State ranges from 0 to 71.6 percent, with New Mexico 2002 having the highest and New Mexico 2012 having the second highest (49.7 percent). Average conversion factors for each State range from 3.73 to 5.18 MBF per MCF with a mean of 4.45 over all States. The PD between each State for average yearly conversion factors is shown in table 70 and ranges from 3.4 to 32.5 percent. Of adjacent States, PD ranges from 5.1 to 21.1 percent, with Idaho/Wyoming having the highest PD. All conversion factors other than MBF/MCF factors have no variability among like conversions.

All Regions—The ratio of green tons per MCF for piling logs in the Southern Region varies by scaling diameter and length and ranges from 29.80 to 30.14 with a mean of 29.98. In the Northern and Western Regions, the ratios are 30.38 and 25.00 green tons per MCF, respectively, and apply to all logs. PDM for average regional ratios are 5.4, 6.8, and 12.1 percent for the Southern, Northern, and Western Regions, respectively. PD for both hardwood and softwood average regional values is 1.3 percent between the South and North, 18.1 percent between the South and West, and 19.4 percent between the North and West.

House/Cabin Logs

Southern Region—House/cabin log standard units of measure in the Southern Region are dependent upon the processing method. If logs are peeled only, conversion factors are the same as those for poles and pilings, so there is no factor variability. If the logs are processed into cant form, the conversion rules and variability for saw logs apply (table 59).

Northern Region—Standard units for house/cabin logs in the Northern Region are MCF. There is no intra-regional variability as conversion factors apply to all States and species.

Western Region—The standard measurement unit for house/cabin logs in the Western Region is MBF Scribner. All States except Nevada have factors for conversions between MCF and MBF Scribner, and they vary by State and survey year. Among all States and survey years, conversion factors range from 3.09 to 6.54 MBF per MCF with a mean of 4.99. The PDM for each survey year within a State ranges from 0.8 to 31.4 percent with Idaho 2001 having the greatest followed by Arizona 2016 (30.8 percent), Alaska 2015 (16.2 percent), and Idaho 2011 (16.1 percent). Average conversion factors for each State range from 4.37 to 5.63 MBF per MCF with a mean of 4.98 over all States. Table 71 lists the PD between each State for average yearly conversion factors and ranges from 0.1 to 25.3 percent. Of adjacent States, PD ranges from 1.4 to 17.2 percent, with Idaho/Wyoming having the greatest PD value, followed by Arizona/California (12.9 percent) and Idaho/Utah (12.6 percent). All conversion factors other than MBF/MCF factors apply to all logs.

In addition to roundwood used for traditional log homes and cabins, the West also has conversion factors for logs processed into vigas and latillas. Arizona, Colorado, New Mexico, and Wyoming are the only Western States that have factors for this roundwood type, and the standard measurement unit is MBF Scribner. Conversions between MCF and MBF Scribner vary by State and survey year. Among all four States and survey years, conversion factors range from 1.05 to 5.98 MBF per MCF with a mean of 4.79. The PDM for each survey year within a State ranges from 0 to 71.2 percent with Arizona 2002 having the highest, followed by Arizona 2007 (69.9 percent). Though not within one standard deviation of the mean, Arizona 2012 and 2016 have PDM values >40 percent. Average conversion factors for each State range from 3.49 to 5.74 MBF per MCF with a mean of 4.79 over all States. Table 72 lists the PD between each State for average yearly conversion factors and ranges from 3.8 to 48.7 percent. Of adjacent States, PD ranges from 12.8 to 48.7 percent, with Arizona/Colorado having the highest. All conversion factors for viga logs other than MBF/MCF factors apply to all logs.

All Regions—For house/cabin logs in the Southern Region, the processing method determines which conversion factors to use. For logs that are peeled only, the ratio of green tons per MCF varies by scaling diameter and length and ranges from 29.80 to 30.14 with a mean of 29.98. For logs that are processed into cant form, the ratios vary by State and species type. Hardwood ratios range from 36.93 to 39.48 green tons per MCF with a mean of 38.17. Softwood ratios range from 34.34 to 35.59 with a mean of 34.85. Over all processing methods in the South, average green ton to MCF ratios are 30.64 and 30.37 for hardwoods and softwoods, respectively. In the Northern Region, the ratio is 30.38 tons per MCF, and in the Western Region the ratio is 18.75. Both ratios apply to all logs within the region. The Western Region has a different ratio for viga logs (25.00 tons per MCF) but this value will not be compared to other regions as they typically don't process viga logs. PDM values for average regional ratios are 16.0, 13.8, and 29.8 percent for the South, North, and West, respectively. PD for average regional values between the South and North is 22.7 percent for hardwoods and 13.7 percent for softwoods. PD between the South and West is 68.2 percent for hardwoods and 60.1 percent for softwoods. Between the North and West regions, PD is 47.3 percent for both hardwoods and softwoods.

Residential Fuelwood

Southern Region—The standard unit for residential fuelwood in the Southern Region is the standard cord. Conversion factors apply to all States within the region but differ by species type. Green ton conversion factors are 2.8 tons per cord for hardwood and 2.7 tons per cord for softwood, with a PD of 3.6 percent. Conversions from MCF use factors of 0.0764 MCF per cord for hardwood and 0.0755 for softwood (PD of 1.2 percent).

Northern Region—As in the Southern Region, the standard measurement unit in the Northern Region is the standard cord. There is no variability in conversion factors for residential fuelwood as the factors apply to all States and species within the region.

Western Region—In the Western Region, the standard measurement unit for roundwood used for residential fuelwood (firewood) is MBF Scribner. Conversions between MCF and MBF Scribner vary

by State and survey year. Among all States and survey years, conversion factors range from 1.02 to 5.08 MBF per MCF with a mean of 3.16. The PDM for each survey year within a State ranges from 0.2 to 123.2 percent, with Nevada 2016 having the greatest, followed by New Mexico 2012 (89.6 percent), Utah 2012 (64.1 percent), New Mexico 2007 (61.3 percent), New Mexico 2002 (59.8 percent), Wyoming 2010 (57.2 percent), and Nevada 2005 and 2007 (53.1 percent). Average conversion factors for each State range from 2.24 to 4.65 MBF per MCF with a mean of 3.30 over all States. The PD between each State for average yearly conversion factors is shown in table 73 and ranges from 0.8 to 69.9 percent. Of adjacent States, PD ranges from 2.7 to 69.9 percent, with California/Nevada having the highest followed by Nevada/Oregon (52.5 percent) and five other State pairs having PD values >20 percent. All conversion factors other than MBF/MCF factors have no variability among like conversions.

All Regions—In the Southern Region, the ratio of green tons per standard cord for fuelwood logs varies by species type, with hardwoods having a ratio of 2.8 and softwoods having a ratio of 2.7. In the Northern and Western Regions, the ratios are 2.4 and 2.2 green tons per cord, respectively, and apply to all logs. PDM for average regional ratios is 12.2 percent for the South, 2.0 percent for the North, and 10.2 percent for the West. PD for average regional ratios is 15.4 percent for hardwoods and 11.8 percent for softwoods between the South and the North. Between the South and the West, PD is 24.0 and 20.4 percent for hardwoods and softwoods, respectively. Between the North and the West, PD is 8.7 percent for both species types.

Other Products

Southern Region—The standard unit for "other" products in the Southern Region is MCF. Green tons are the only other valid measurement unit for the "other" product category, and conversions are dependent upon species type only. Conversion factors are 37.5 tons per MCF for hardwood and 35 tons per MCF for softwood. Inter-species PD is 6.9 percent.

Northern Region—As in the Southern Region, the standard unit of measure for "other" products in the Northern Region is MCF. Conversion factors apply to all States and species so there is no factor variability.

Western Region—In the Western Region, the "other product" category is composed of four sub-categories that each have unique conversion factors: furniture logs, cedar logs, fiber logs, and logs used for all other products. The standard unit of measurement for all sub-categories is MBF Scribner, and all conversions between MCF and MBF Scribner vary by State and survey year. All other roundwood conversion factors within each sub-category have no variability among like conversions.

For furniture logs, all States have conversion factors except for Nevada, and they range from 1.0 to 5.0 MBF per MCF with a mean of 2.37 among all States and survey years. The PDM for each survey year within a State ranges from 0 to 74.9 percent, with Washington 2010 having the highest value, followed by Alaska 2005 and 2011 (66.7 percent), Montana 2004 (55.4 percent), Colorado 2002 (54.6 percent), and Colorado 2016 (52.5 percent). Four other State/year combinations have PDM values >32 percent. Average conversion factors for each State range from 1.05 to 4.64 MBF per MCF with a mean of 2.37 over all States. Table 74 lists the PD between each State for average yearly conversion factors and ranges from 0.1 to 126.3 percent. The PD range for adjacent States is the same, with Arizona/California having the highest and eight other State pairs having PD values >63 percent.

Conversion factors for cedar logs are available for all States except Arizona, Colorado, Nevada, New Mexico, and Utah. Factors range from 3.09 to 5.35 MBF per MCF with a mean of 4.02 among all States and survey years. The PDM for each survey year within a State ranges from 0 to 17.7 percent, with Washington 2010 having the highest PD and Oregon having the second highest at 13.7 percent. Average conversion factors for each State range from 3.39 to 5.35 MBF per MCF with a mean of 4.11 over all States. Table 75 lists the PD between each State for average yearly conversion factors and ranges from 0.6 to 44.9 percent. Of adjacent States, PD ranges from 0.6 to 31.0 percent, with California/Oregon having the highest PD value.

For fiber logs, all States have conversion factors except for Montana and Alaska, and they range from 1.0 to 4.9 MBF per MCF with a mean of 2.31 among all States and survey years. The PDM for each survey

year within a State ranges from 0 to 96.0 percent, with Arizona 2012 having the highest value, followed by New Mexico 2016 (83.8 percent), Arizona 2002 and 2007 (58.0 percent), and five other State/year combinations having PDM values >40 percent. Average conversion factors for each State range from 1.0 to 3.03 MBF per MCF with a mean of 2.23 over all States. Table 76 lists the PD between each State for average yearly conversion factors and ranges from 0.7 to 100.7 percent. The PD range for adjacent States is from 2.1 to 85.7 percent, with Arizona/California having the highest.

Conversion factors for all other logs are available for all States except for Nevada and Washington. Factors range from 1.02 to 6.20 MBF per MCF with a mean of 3.01 among all States and survey years. The PDM for each survey year within a State ranges from 0.8 to 71.3 percent, with New Mexico 2016 having the greatest, followed by Arizona 2016 (6.3 percent), and New Mexico 2007 (44.2 percent) and 2002 (42.0 percent). Six other State/year combinations have values >30 percent. Average conversion factors for each State range from 1.65 to 5.25 MBF per MCF with a mean of 3.09 over all States. Table 77 lists the PD between each State for average yearly conversion factors and ranges from 0.3 to 104.5 percent. Of adjacent States, PD ranges from 0.3 to 89.6 percent, with Arizona/California having the highest PD value and five other State pairs having PD values >31 percent.

All Regions—As mentioned above, the ratio of green tons per MCF for "other" logs in the Southern Region varies by species type, with hardwoods having a ratio of 37.5 green tons per MCF and softwoods having a ratio of 35.0. In the Northern Region, the ratio is 30.38 tons per MCF and applies to all logs within the region. Green-ton-to-MCF conversions for "other" logs in the Western Region vary by log type. Cedar logs have a ratio of 19.0 tons per MCF, and all other logs have a ratio of 25.0. For regional comparisons, the 25.0 tons per MCF value will be used. PDM for average regional ratios is 18.7 percent for the South, 0.5 percent for the North, and 18.1 percent for the West. PD for average regional ratios is 21.0 percent for hardwoods and 14.1 percent for softwoods between the South and the North. Between the South and the West, PD is 40.0 and 33.3 percent for hardwoods and softwoods, respectively. Between the North and the West, PD is 19.4 percent for both species types.

Residues (Southern Region)

There are two types of residue conversions in the Southern Region: residue conversions from one measurement unit to a roundwood equivalent unit and residue estimation based on the type and amount of roundwood processed. There are no standard units of measure for residues in the South. Residue-to-roundwood-equivalent conversions from standard cords to MCF vary by State and species type and range from 0.0686 to 0.07663 MCF per cord with a mean of 0.0738. Hardwood factors range from 0.0705 to 0.07663 MCF per cord, and softwood factors range from 0.0686 to 0.07326. PDM for each State ranges from 0.6 to 6.6 percent for hardwoods and 0.6 to 4.9 percent for softwoods, with Mississippi having the highest PDM for both species types. The PD between each State ranges from 0 to 8.3 percent for hardwoods and 0 to 6.6 percent for softwoods (table 78). For adjacent States, Arkansas/Mississippi and Mississippi/Tennessee have the highest PD for both hardwoods (8.3 percent) and softwoods (5.6 percent). Alabama/Mississippi and Louisiana/Mississippi both have hardwood PD values of 6.2 percent, and the same State pairs have the second and third highest PD values for softwoods at 5.6 and 3.4 percent, respectively. Arkansas, Florida, Louisiana, North Carolina, South Carolina, Tennessee, and Texas have the highest inter-species PD at 5.5 percent. Green ton residue conversions to standard cords apply to all States but vary by species type. A factor of 0.4057 cords per ton is used for hardwoods, and 0.4158 is used for softwoods (PD of 2.5 percent). Conversion of green tons to dry tons applies to all States and species types.

Though there are no standard units of measure for residue, all roundwood-to-residue conversions are to green tons and vary by roundwood type, State, residue type, and/or species type. Because one would expect factor variability between roundwood types and residue types, the focus of this analysis will be on variability between States.

Saw logs—For bark residue estimates from roundwood, Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina all have hardwood conversion factors of 0.6305 tons per MBF International ¼-inch for hardwoods and 0.5375 for softwoods, with PDM values of 7.0 and 15.9 percent,

respectively. The same six States also have the highest inter-species PD at 32.1 percent. The maximum PD between States is 13.0 percent for hardwoods and 29.2 percent for softwoods, and the same maximum values apply to adjacent States as well (table 79). Alabama/Tennessee, Arkansas/Louisiana, Arkansas/Mississippi, Georgia/North Carolina, Georgia/Tennessee, Louisiana/Texas, Mississippi/Tennessee, and North Carolina/South Carolina have the highest PD value among State pairs for both hardwoods (13.0 percent) and softwoods (29.2 percent).

Coarse residue conversion factors range from 1.5224 to 1.8519 tons per MBF with a mean of 1.7548 over all States and species types. Hardwood factors range from 1.6543 to 1.8386 tons per MBF International ¼-inch, while softwood factors range from 1.5524 to 1.8519 tons per MBF. Alabama, Georgia, and Mississippi have the highest PDM value for hardwoods (5.9 percent), and South Carolina has the highest PDM among softwoods at 11.3 percent. PD between all Southern States as well as adjacent States ranges from 0 to 10.6 percent for hardwoods and 0 to 17.6 percent for softwoods (table 79). Of adjacent States, Alabama/Tennessee, Arkansas/Mississippi, Georgia/North Carolina, Georgia/Tennessee, and Mississippi/Tennessee all share the highest PD for hardwoods, followed by Georgia/South Carolina at 8.8 percent. Georgia/South Carolina have the highest PD for softwoods, followed by North Carolina/South Carolina (12.7 percent). South Carolina has the highest PD between hardwood and softwood species types, which ranges from 4.2 to 15.1 percent. The second highest inter-species PD (11.3 percent) is shared by Alabama, Georgia, and Mississippi.

For sawdust residues, Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina all have hardwood conversion factors of 1.1579 tons per MBF International ¼-inch for hardwoods and 0.8945 for softwoods, with PDM values of 4.0 and 9.0 percent, respectively. Inter-species PD is highest for these States at 25.7 percent. All other Southern States have residue conversion factors of 1.0747 tons per MBF International ¼-inch for hardwoods and 1.0581 for softwoods (PDM values of 3.4 and 7.7 percent, respectively). The maximum PD between all State pairs as well as adjacent States is 7.5 percent for hardwoods and 16.8 percent for softwoods (table 79). Among adjacent States, eight different State pairs have the highest PD values for both hardwoods (7.5 percent) and softwoods (16.8 percent) and include Alabama/Tennessee, Arkansas/Louisiana, Arkansas/Mississippi, Georgia/North Carolina, Georgia/Tennessee, Louisiana/Texas, Mississippi/Tennessee, and North Carolina/South Carolina.

Roundwood-to-residue conversions for shavings apply to all States but differ by species type. Hardwoods use a factor of 0.4715 tons per MBF International ¼-inch, while softwoods use a factor of 0.5704. PD between hardwood and softwood factors is 19.0 percent.

Veneer logs—Bark-roundwood-to-residue conversion factors for veneer logs in the Southern Region are identical to those used for saw logs, so variability is also the same. Conversion factors for the other residue types differ. For coarse residues, factors range from 0.8911 to 1.9171 tons per MBF International ¼-inch with a mean of 1.5592. Hardwood factors range from 0.8911 to 1.806 tons per MBF International ¼-inch, and softwood factors range from 1.5524 to 1.9171. South Carolina has the highest PDM for both hardwoods and softwoods at 43.0 and 16.3 percent, respectively. It should be noted that hardwood PDM is >29 percent for all species. PD between all Southern States as well as adjacent States ranges from 0 to 67.8 percent for hardwoods and 0 to 21.0 percent for softwoods (table 80). North Carolina/South Carolina has the highest PD for both hardwoods and softwoods among adjacent States. Other State pairs with hardwood percentage values within one standard deviation of the mean include Arkansas/Louisiana and Louisiana/Texas (62.7 percent) and Alabama/Tennessee, Georgia/North Carolina, Georgia/Tennessee, and Mississippi/Tennessee (60.0 percent). Georgia/South Carolina has the second highest PD for softwoods at 17.6 percent. The maximum inter-species PD is 73.1 percent and is shared by Arkansas, Kentucky, North Carolina, Oklahoma, Tennessee, Texas, and Virginia.

For both fine residue types of sawdust and shaving, Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina all have hardwood conversion factors of 1.6294 tons per MBF International ¼-inch for hardwoods and 1.4649 for softwoods, with PDM values of 63.2 and 41.8 percent, respectively. All other Southern States have residue conversion factors of 0.4573 tons per MBF International ¼-inch for hardwoods and 0.6635 for softwoods (PDM values of 54.2 and 35.8 percent, respectively). The greatest inter-species PD (36.8 percent) is shared by Arkansas, Kentucky, North Carolina, Oklahoma, Tennessee,

Texas, and Virginia. The maximum PD between all State pairs as well as adjacent States is 112.3 percent for hardwoods and 75.3 percent for softwoods (table 80). Among adjacent States, Alabama/Tennessee, Arkansas/Louisiana, Arkansas/Mississippi, Georgia/North Carolina, Georgia/Tennessee, Louisiana/Texas, Mississippi/Tennessee, and North Carolina/South Carolina have the highest PD values for both hardwoods and softwoods.

Composite panel/engineered wood product logs—In the Southern Region, it is assumed that the only residue produced from the processing of composite panel/engineered wood product logs is bark residue. Roundwood-to-residue conversion factors for these logs vary by State and species type and range from 0.2348 to 0.312 tons per cord with a mean of 0.277. Hardwood factors range from 0.2868 to 0.312 tons per cord while softwood factors range from 0.2348 to 0.2508. South Carolina has the highest PDM values for both hardwoods and softwoods at 6.6 and 4.9 percent, respectively. Table 81 shows the PD between all State pairs, which ranges from 0 to 8.4 percent for hardwoods and 0 to 6.6 percent for softwoods. Among adjacent State pairs, North Carolina/South Carolina have the highest PD for hardwoods, followed by Georgia/South Carolina at 6.2 percent. Both of these State pairs have the maximum softwood PD value of 5.7 percent. Arkansas, North Carolina, Oklahoma, Tennessee, and Texas have the greatest PD between species types which ranges from 19.9 to 22.7 percent.

Bioenergy/fuelwood, house/cabin, piling, pole, post, pulp mill, and other product logs—Roundwood-to-residue conversion factors in this category apply to all Southern States and vary by residue type and species type only, with the exception of house/cabin logs and piling/pole/post logs, whose bark residue factors are the same for both hardwoods and softwoods. Bioenergy/fuelwood, pulp mill, and other product bark residue conversion factors are 4.0678 tons per MCF for hardwoods and 3.4234 for softwood (PD of 17.2 percent). Coarse residue factors for house/cabin, piling, and pole logs are 4.6240 tons per C-piece for hardwoods and 4.5115 for softwoods, with a PD of 2.5 percent.

Residues (Northern Region)

Like the Southern Region, the Northern Region has factors for converting from one residue unit of measure to another as well as factors for estimating residues from roundwood. There are no standard units of measure for residues in the North. Residue-to-SWE conversions from Lake States cords, cubic feet, cubic meters, cunits, dry tons, and dry metric tonnes to standard cords apply to all States and species. Conversions from 1,000 green pounds, 4,600-pound cords, green metric tonnes, and green tons apply to all States but vary by species type. The conversion factors for 1,000 green pounds are 0.22425 cords per 1,000 pounds for hardwoods and 0.2439 for softwoods, with a PD of 8.4 percent. For 4,600-pound cords, factors are 1.04535 cords per 4,600-pound cord for hardwoods and 1.12194 for softwoods (PD of 7.1 percent). Conversions from green metric tonnes to standard cords use factors of 0.50099535 and 0.53770194 cords per tonne for hardwoods and softwoods, respectively, with an inter-species PD of 7.1 percent. Green-ton-to-standard-cord conversion factors are 0.4545 cords per ton for hardwoods and 0.4878 for softwoods (PD of 7.1 percent).

Though there are no standard units of measure for residue in the North, all roundwood-to-residue conversions are to green tons, dry tons, and cubic feet. Roundwood-to-residue conversion factors apply to all Northern States and northern species but vary by product type, product source, residue type, and/or bark thickness. Variability between conversion factors for different residue measurement units was examined and determined to be negligible. For example, green ton PD values between saw log coarse and fine residues are similar to dry ton and cubic foot PD values for the same comparison. These similarities in PD values among the different residue units hold true for all roundwood types. Therefore, to simplify the analysis, residue units of green tons will be used for comparisons.

Saw logs—In the Northern Region, saw logs are divided into two product source categories: band saw mill logs and "other" mill logs. Bark and coarse residue conversion factors are the same for both product sources, while fine residue factors vary. Band saw mill logs use a fine residue conversion factor of 0.45 tons per MBF International ¼-inch, and "other" mill logs use a factor of 0.78 (PD of 53.7 percent).

Pulp mill and composite panel logs—Product sources for pulp mill and composite panel logs are roundwood logs/bolts and whole tree chips, the latter of which applies to fine residues only and has a

conversion factor equal to that of roundwood. The only conversion factor variability is between residue types, which would be expected.

All other roundwood types—The product source for all other roundwood types is roundwood logs/bolts, and conversion factors vary by residue type and bark thickness (for bark residue only).

Residues (Western Region)

The Western Region also has both residue conversions and conversion factors for estimating residues from roundwood. In the West, the standard unit of measure for residues is the BDU. Residue conversions from BDU to SWE of pounds, cubic feet, cubic yards, BDT, and green tons apply to all States, species, survey years, and residue types. Conversions from 200 CFU to cubic feet (SWE), pounds, and BDU vary by residue type. Mean factors for all residue types are 73.4 cubic feet (SWE) per 200 CFU, 1,835 pounds per 200 CFU, and 0.76 BDU per 200 CFU. The PDM among all residue types is 15.8, 9.0, 9.0, 31.9, and 1.9 percent for bark residues, pulp chips, sawdust, planer shavings, and hogged fuel, respectively, and is the same for cubic feet (SWE), pounds, and BDU conversions.

Roundwood-to-residue conversions in the West vary by State, survey year, and residue type. Conversion factors only apply to sawmills and are expressed as BDU per MBF lumber tally. Factors are not available for Nevada or Washington, so all statistics are based on the remaining Western States.

Bark residue—Among all States and survey years, roundwood-to-bark-residue conversion factors range from 0.12 to 0.28 BDU per MBF lumber tally with a mean of 0.20. The PDM for each survey year within a State ranges from 0 to 28.7 percent, with all States from survey year 2002 having the highest PDM and all States from survey year 2007 having the second highest (21.8 percent). Average conversion factors for each State range from 0.14 to 0.22 BDU per MBF lumber tally with a mean of 0.20 over all States. Table 82 lists the PD between each State for average yearly conversion factors and ranges from 0 to 46.7 percent over all State combinations as well as adjacent States. Of adjacent States, Montana/Wyoming have the greatest PD value followed by Idaho/Montana (38.8 percent) and California/Oregon (26.5 percent).

Coarse residue—Roundwood-to-coarse-residue conversion factors range from 0.33 to 0.65 BDU per MBF lumber tally with a mean of 0.50 over all States and survey years. The PDM for each survey year within a State ranges from 0 to 13.9 percent, with California 2000 having the highest. Average conversion factors for each State range from 0.36 to 0.60 BDU per MBF lumber tally with a mean of 0.50 over all States. PD between each State for average yearly conversion factors ranges from 0 to 50.0 percent (table 82). Of adjacent States, PD also ranges from 0 to 50.0 percent, with Arizona/California having the greatest PD value followed by Idaho/Utah (39.4 percent) and both Colorado/Wyoming and Utah/Wyoming with PD values of 30.8 percent.

Sawdust residue—For sawdust, roundwood-to-residue conversion factors range from 0.11 to 0.30 BDU per MBF lumber tally with a mean of 0.18 over all States and survey years. The PDM for each survey year within a State ranges from 0 to 15.0 percent, with all States from survey year 2016 (except California) having the highest PDM, followed by Idaho 2001 and 2015 (13.3 percent) and Oregon 2008 (10.8 percent). Average conversion factors for each State range from 0.12 to 0.30 BDU per MBF with a mean of 0.19 over all States. PD between each State for average yearly conversion factors ranges from 0 to 83.5 percent (table 82). Among adjacent States, PD ranges from 0 to 66.7 percent, with Idaho/Wyoming having the highest and six other States having PD values >28 percent.

Planer shaving residue—Among all States and survey years, roundwood-to-planer-shaving-residue conversion factors range from 0.06 to 0.20 BDU per MBF lumber tally with a mean of 0.11. The PDM for each survey year within a State ranges from 0 to 52.4 percent, with all States from survey year 2002 having the highest PDM and all States from 2012 (except California) having the second highest (42.9 percent). Average conversion factors for each State range from 0.08 to 0.19 BDU per MBF lumber tally with a mean of 0.12 over all States. Table 82 lists the PD between each State for average yearly conversion factors and ranges from 0 to 81.5 percent. Of adjacent States, PD ranges from 0 to 64.3 percent, with Idaho/Wyoming having the greatest PD value followed by Idaho/Montana (61.1 percent), Colorado/Wyoming (57.6 percent), and Utah/Wyoming (57.6 percent).

Residues (All Regions)

In the Southern Region, the ratio of green tons per MCF (SWE) for mill residues varies by State and species type. Hardwood ratios range from 32.17 to 34.96 green tons per MCF across all States with a mean of 32.68 while softwood ratios range from 32.83 to 35.06 green tons per MCF with a mean of 33.36. In the Northern Region, the ratio is 27.85 green tons per MCF for hardwoods and 25.95 for softwoods. The ratio in the Western Region is 25 green tons per MCF and applies to all residues. Average regional ratios are 33.02, 26.90, and 25.00 tons per MCF for the South, North, and West, respectively, with PDM values of 16.7, 5.0, and 11.7 percent, respectively. PD for average regional values between the South and North is 16.0 percent for hardwoods and 25.0 percent for softwoods. PD between the South and West is 26.6 percent for hardwoods and 28.6 percent for softwoods. Between the Northern and Western Regions, PD is 10.8 percent for hardwoods and 3.7 percent for softwoods.

Roundwood-to-residue conversion factors, expressed as green tons of residue per MBF lumber tally, vary by State, roundwood type, and species type in the Southern Region. In the Northern Region, factors vary by roundwood type and bark thickness, and in the Western Region, factors vary by State and survey year. For all regions, there are different roundwood-to-residue conversions for each residue type. Since roundwood-to-residue conversions in the Western Region only apply to sawmill logs, the saw log conversion factors for each region will be used for comparisons, summarized by residue type.

Bark residue—In the Southern Region, the ratio of bark residue green tons to roundwood MBF lumber tally ranges from 0.58 to 0.66 for hardwoods with a mean of 0.62 and ranges from 0.42 to 0.56 for softwoods with a mean of 0.49. In the Northern Region, ratios range from 0.34 to 0.57 residue green tons per MBF lumber tally for both hardwoods and softwoods and have a mean of 0.46. In the Western Region, ratios range from 0.29 to 0.67 for both hardwoods and softwoods, with a mean of 0.48. Average regional ratios over all variability factors are 0.55, 0.46, and 0.48 for the South, North, and West, respectively; PDM for average regional ratios are 11.1, 8.5, and 2.6 percent, respectively. PD for average regional ratios between the South and the North is 30.5 percent for hardwoods and 6.8 percent for softwoods. PD between the South and the West is 24.3 percent for hardwoods and 0.5 percent for softwoods. Between the North and West, PD is 6.3 percent for both hardwoods and softwoods.

Coarse residue—The ratio of coarse residue green tons to roundwood MBF lumber tally in the Southern Region ranges from 1.74 to 1.93 for hardwoods with a mean of 1.85 and ranges from 1.63 to 1.94 for softwoods with a mean of 1.84. In the Northern Region, the ratio is 1.34 residue green tons per MBF lumber tally for both hardwoods and softwoods. Western Region ratios range from 0.79 to 1.56 for both hardwoods and softwoods with a mean of 1.21. Average regional ratios over all variability factors are 1.84, 1.34, and 1.21 for the South, North, and West, respectively. PDM for average regional ratios are 25.9, 8.5, and 17.4 percent, respectively. PD for average regional ratios between the South and the North is 31.8 percent for hardwoods and 31.4 percent for softwoods. PD between the South and the West is 41.7 percent for hardwoods and 41.3 percent for softwoods. Between the North and West, PD is 10.3 percent for both hardwoods and softwoods.

Sawdust residue—The ratio of sawdust residue green tons to roundwood MBF lumber tally in the Southern Region ranges from 1.13 to 1.22 for hardwoods with a mean of 1.17 and ranges from 0.94 to 1.11 for softwoods with a mean of 1.03. In the Northern Region, the ratio ranges from 0.45 to 0.78 residue green tons per MBF lumber tally for both hardwoods and softwoods, with a mean of 0.62. Western Region ratios range from 0.26 to 0.72 for both hardwoods and softwoods, with a mean of 0.44. Average regional ratios over all variability factors are 1.10, 0.62, and 0.44 for the South, North, and West, respectively. PDM for average regional ratios are 53.3, 14.3, and 39.1 percent, respectively. PD for average regional ratios between the South and the North is 62.1 percent for hardwoods and 50.6 percent for softwoods. PD between the South and the West is 91.1 percent for hardwoods and 80.9 percent for softwoods. Between the North and West, PD is 33.8 percent for both hardwoods and softwoods.

Shaving residue—The ratio of shaving residue green tons to roundwood MBF lumber tally in the Southern Region is 0.50 for hardwoods and 0.60 softwoods. In the Northern Region, the ratios are the same as for sawdust residue and range from 0.45 to 0.78 residue green tons per MBF lumber tally for both hardwoods and softwoods with a mean of 0.62. Western Region ratios range from 0.14 to 0.48 for

both hardwoods and softwoods, with a mean of 0.27. Average regional ratios over all variability factors are 0.55, 0.62, and 0.27 for the South, North, and West, respectively. PDM for average regional ratios are 14.8, 29.1, and 43.9 percent, respectively. PD for average regional ratios between the South and the North is 21.6 percent for hardwoods and 2.6 percent for softwoods. PD between the South and the West is 59.9 percent for hardwoods and 76.7 percent for softwoods. Between the North and West, PD is 78.9 percent for both hardwoods and softwoods.

Variability Comparison

Due to differences in the spatial distribution and physical characteristics of different tree species, as well as differences in roundwood/residue types and log scaling methods, some variability among conversion factors is expected. The number and type of variability sources are dependent upon the measurement categories being converted from and converted to. The amount of reasonable variability, however, is difficult to ascertain and is not likely the same for different regions or different conversion types within a region. For example, one would expect more variability between conversions from green weight to cubic volume in the Southern Region than in the Western Region. This is because tree species is the primary source of variability, and the South has more commercial species and a greater mix of hardwoods and softwoods than the West. This same scenario holds true for States within a region as well. Two States that are farther apart geographically would likely have greater conversion factor variability when compared to adjacent States due to the spatial distribution of individual species.

Another thing to consider when looking at conversion factor variability is that the amount of weight carried by each variability source is indeterminate, meaning that some sources of variability contribute more to conversion factor determination than others. If variability sources that contribute a large amount to conversion factor variability are not taken into consideration, the resulting conversion factors will be inaccurate. Likewise, inaccurate conversion factors could also result if too much weight is placed on variability sources that do not contribute a significant amount to variability.

The following discussion examines expected versus actual sources of variability for roundwood, residue, and roundwood-to-residue conversions within each region (summarized in tables 56–58). Since there is no standard amount of acceptable variability, the focus is on areas where variability sources are lacking or differ from what is expected. For a quantitative analysis of variability, see the previous section on "Actual Variability."

For all roundwood-to-residue conversions, expected sources of variability are product type and residue type plus any sources of variability for equivalent roundwood conversions. For each conversion type within a region, if no source of variability is mentioned, it simply means that there are no direct conversions of that type within the region. It should be noted, however, that even though direct conversions between two measurement categories may not be shown, conversions between the two categories can be determined if certain criteria are met. First, there must be a linking secondary measurement unit to which both of the other measurement units can be converted. Second, conversions must be bi-directional, meaning that measurement unit 1 can be determined from measurement unit 2 and vice versa. For example, there are no direct conversions between green and dry weight for saw logs in the Southern Region. However, there are factors for converting both green and dry weight to MBF (table 5). If the conversions from weight to MBF are bi-directional, then the ratio of green to dry weight can be determined as well as any sources of variability. In this example, the dry/green weight ratio would be 0.5 for all States and survey years, so there is no conversion factor variability.

Green Weight / Dry Weight

Expected sources of variability for conversions between green and dry weight are species, geographic area, and average log dimensions. The Southern and Western Regions have green/dry weight conversions for residues only, and there are no variability sources. In the Northern Region, there are no direct conversions between green and dry weight.

Peeled Weight / Unpeeled Weight

Species, geographic area, and average log dimensions are the expected sources of variability for conversions between peeled and unpeeled log weight, but none of the regions have direct conversions between these two weight measurement categories. Only the Northern Region distinguishes between peeled and unpeeled log weight (for pulp and composite logs), but all conversions are to standard cords.

Weight / Cubic Volume

The expected sources of variability for weight to cubic volume are species, geographic area, and average log dimensions. In the Southern Region, the "other" log category is the only roundwood type that has direct weight-to-cubic-volume conversions, and they vary by species type. For bark residue estimations from bioenergy, pulp, and "other" roundwood types, cubic/weight conversions vary by species type. In the Northern Region, weight-to-cubic-volume conversions are found with house/cabin logs and "other" logs, and neither have variability sources. Roundwood-to-bark-residue conversions apply to house/cabin and "other" logs and vary by bark thickness. Other residue types have conversion factors but no variability. In the Western Region, weight/cubic conversions are found with all roundwood types as well as residues. For roundwood, product type is the single source of variability for both house/cabin logs and "other" logs. All other roundwood types have no variability. For residues, cubic-to-weight conversion factors vary by residue type, while weight-to-cubic (SWE) conversions have no sources of variability.

Weight / Board Foot Volume

Expected variability sources for conversions between weight and board foot volume are species, geographic area, average log dimensions, and log rule. In the Southern Region, species type is the only source of variability for roundwood conversions and applies to saw logs, veneer logs, and house/cabin logs processed into cants. For roundwood-to-residue conversions, variability sources are State, residue type, and species type and only apply to saw log and veneer log conversions. In the Northern Region, sources of variability for saw-log-to-residue conversions are bark thickness for bark residues and product source for fine residues. For veneer log to residue conversions, variability sources are bark thickness for bark residues and product source for both coarse and fine residues. Conversions from board foot volume to weight in the Western Region apply to bioenergy and composite logs and have no variability. Variability sources for roundwood-to-residue conversions in the West vary by State, survey year, and residue type.

Weight / Other Product Output Volume

For conversions between weight and other product output volumes such as linear feet or pieces, expected variability sources are species, geographic area, average log dimensions, and average volume per output unit. In the Southern Region, the only roundwood conversions that have sources of variability are poles, posts, pilings, and peeled house/cabin logs, which vary by log dimensions. Roundwood-to-residue conversions in the South apply to the same roundwood types and vary by species type for coarse residues and have no variability for bark residues. The Northern Region has roundwood and roundwood-to-residue conversions for poles, posts, and pilings. Roundwood conversions have no sources of variability. Roundwood-to-bark-residue conversions vary by bark thickness, while coarse and fine residues have no variability. The Western Region has no conversion factors for weight and other product output volume.

Weight / Stacked Log Volume

The expected variability sources for weight-to-stacked-log-volume conversions are species, geographic area, and average log dimensions. Species type is the only source of variability in the Southern Region for roundwood conversions and applies to pulp, composite, bioenergy, and residential fuelwood logs. Residue conversions also vary by species type. For roundwood-to-bark-residue conversions, factors vary by State and species type for composite logs. In the Northern Region, pulp and composite log conversions vary by species group, and green weight residue conversions vary by species type. There are also roundwood conversion factors for residential fuelwood as well as dry weight residue

conversions, but neither have variability. The single source of variability for roundwood-to-bark-residue conversions is bark thickness and applies to pulp and composite logs. Conversion factors for other residue types have no variability. In the Western Region, the presence/absence of bark is a variability source for all roundwood conversions. In addition, saw, house/cabin, and "other" logs vary by product type. Residue and roundwood-to-residue conversions have no variability in the West.

Board Foot Volume / Board Foot Volume

When converting board foot volume from one log rule to another, expected sources of variability are log rule and average log dimensions. Log rule conversions in the Southern Region apply to saw logs, veneer logs, and house/cabin logs that are processed into cants. Sources of variability for these roundwood types are log rule and log dimensions. In the Northern Region, log rules apply to saw logs and veneer logs and vary by log rule only. In Western States, there are no sources of variability when converting between log rules. It should be noted, however, that the Scribner log rule is used almost exclusively by mills in the West.

Board Foot Volume / Other Product Output Volume

Expected sources of variability when converting between board foot volume and other product output volume are log rule, average log dimensions, and average volume per output unit. There are no conversions of this type in the Southern or Western Regions. In the Northern Region, product type is the single variability source for saw logs. Pole, piling, and post conversion factors vary by log rule when converting from board feet to other product output volume but have no sources of variability when converting to board feet. Board foot lumber tally conversions to other product output volume also have no variability.

Cubic Volume / Board Foot Volume

For conversions between cubic and board foot volume, expected sources of variability are species, geographic area (Southern Region only), log rule, and average log dimensions. State and species type are sources of variability for saw, veneer, and house/cabin logs processed into cants in the South. In the Northern Region, house/cabin logs and "other" logs have log rule as a variability source when converting from board feet but no variability when converting cubic volume to board feet. Lumber tally, saw log, and veneer log conversions have no variability. For saw-log-to-residue conversions, sources of variability are bark thickness for bark residues and product source for fine residues. For veneer-log-to-residue conversions, factors vary by bark thickness for bark residues and product source for both coarse and fine residues. In the Western Region, all roundwood conversions have State and survey year as variability factors. House/cabin logs and "other" logs vary by product type as well.

Cubic Volume / Other Product Output Volume

The expected sources of variability for conversions between cubic volume and other product output volume are species, geographic area, and average volume per output unit. Variability in the Southern Region is by log size and applicable to peeled house/cabin logs, pilings, poles, and posts. In the Northern Region, lath bundles in the "other" roundwood type vary by pieces per bundle, while all other product output units of this roundwood type have no variability. Conversion factors for house/cabin logs, pilings, poles, and posts also have no variability. Roundwood-to-bark-residue factors in the North vary by bark thickness for pilings, poles, and posts but have no variability for other residue types. There are no roundwood, residue, or roundwood-to-residue conversion factors of this type in the Western Region.

Cubic Volume / Stacked Log Volume

Conversions between cubic and stacked log volume have expected variability sources of species, geographic area, and average log dimensions. In the Southern Region, bioenergy, composite, pulp, and residential fuelwood log conversions, as well as mill residue conversions, vary by species type. In addition to variability by species type, composite logs, pulp logs, and residues also vary by State. In the Northern Region, bioenergy log conversions vary by product type, and pulp and composite log conversions vary by sub-region. House/cabin, residential fuelwood, "other" logs, and residue

conversions have no sources of variability. Roundwood-to-bark-residue conversions in the North vary by bark thickness for composite and pulp logs. Other residue types have no variability. All roundwood conversions in the Western Region vary by bark presence, but saw, house/cabin, and "other" log conversions vary by product type as well.

Board Foot Volume / Stacked Log Volume

Expected variability sources for conversions between board foot and stacked log volume are species, geographic area, average log dimensions, and log rule. Conversion factors in the Southern Region vary by species type for saw logs, veneer logs, and house/cabin logs processed into cants. In the Northern Region, bioenergy and industrial fuelwood logs vary by log rule and product type when converting to standard cords. When converting from standard cords to board feet International ¼-inch, there is no variability. There is also no variability for conversions of saw, veneer, house/cabin, and residential fuelwood logs, as well as residues. There are no direct conversions of this type in the Western Region for roundwood, residues, or roundwood-to-residues.

Other Product Output Volume / Stacked Log Volume

Variability sources for conversions between stacked log volume and other product output volume should include species, geographic area, average log dimensions, and average volume per output unit. There are no conversions of this type in the Southern and Western Regions. In the Northern Region, conversions exist for pilings, poles, posts, and residential fuelwood logs. The only variability is with residential fuelwood when converting trees to standard cords, which varies by average tree diameter.

Peeled Stacked Log Volume / Unpeeled Stacked Log Volume

The single source of variability expected for peeled/unpeeled stacked log volume conversions is species. This type of conversion is only found in the Northern Region and applies to pulp and composite logs. For both roundwood types, factors vary by species group.

Stacked Log Volume / Weight-Based Stacked Log Volume

The expected variability sources for conversions between stacked log volume and weight-based stacked log volume are species, geographic area, and average log dimensions. In the Southern and Western Regions, there are no conversions of this type for roundwood, residue, or roundwood-to-residue. In the Northern Region, there are conversions for pulp and composite logs, which vary by species group, and for residues, which vary by species type.

Conversion Factor Variability Tables

Table 56—Expected sources of variability for roundwood and residue conversion factors used in Forest Inventory and Analysis Timber Product Output data processing

Measurement category 1	Measurement category 2	Expected sources of variability[a]
Green weight	Dry weight	Species, geographic area, average log dimensions
Peeled weight	Unpeeled weight	Species, geographic area, average log dimensions
Green or dry weight	Cubic volume	Species, geographic area, average log dimensions
Green or dry weight	Board foot volume	Species, geographic area, average log dimensions, log rule
Green or dry weight	Other product output volume	Species, geographic area, average log dimensions, average volume per output unit
Green or dry weight	Peeled or unpeeled stacked log volume	Species, geographic area, average log dimensions
Board foot volume	Board foot volume	Log rule, average log dimensions
Board foot volume	Other product output volume	Log rule, average log dimensions, average volume per output unit
Cubic volume	Board foot volume	Species, geographic area, log rule, average log dimensions
Cubic volume	Other product output volume	Species, geographic area, average volume per output unit
Cubic volume	Peeled or unpeeled stacked log volume	Species, geographic area, average log dimensions
Board foot volume	Peeled or unpeeled stacked log volume	Species, geographic area, average log dimensions, log rule
Other product output volume	Peeled or unpeeled stacked log volume	Species, geographic area, average log dimensions, average volume per output unit
Peeled stacked volume	Unpeeled stacked volume	Species
Peeled or unpeeled stacked volume	Weight-based stacked volume	Species, geographic area, average log dimensions
Roundwood volume	Residue weight or volume	Product type, residue type[b]

[a] Does not include all variability sources. Includes only those currently available from regional mill surveys.

[b] For roundwood-to-residue conversions, additional sources of variability for each input and output measurement unit combination would be the same as those used for roundwood conversions.

Table 57—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Saw logs	Northern	102-inch cord	Board feet – International ¼-inch	None
Saw logs	Northern	Board feet (log rule)	Board feet (log rule)	Log rule
Saw logs	Northern	Board feet (lumber tally)	Board feet – International ¼-inch	None
Saw logs	Northern	Cubic feet	Board feet – International ¼-inch	None
Saw logs	Northern	Cubic meters	Board feet – International ¼-inch	None
Saw logs	Northern	Green tons	Board feet – International ¼-inch	None
Saw logs	Northern	Lake States cord	Board feet – International ¼-inch	None
Saw logs	Northern	Pieces	Board feet – International ¼-inch	Product type
Saw logs	Northern	Standard cords	Board feet – International ¼-inch	None
Saw logs	Southern	Board feet (log rule)	Board feet (log rule)	Log rule, log size
Saw logs	Southern	Board feet (lumber tally)	Board feet – International ¼-inch	None
Saw logs	Southern	Cubic feet	Board feet – International ¼-inch	State, species type
Saw logs	Southern	Dry tons	Board feet – International ¼-inch	Species type
Saw logs	Southern	Green tons	Board feet – International ¼-inch	Species type
Saw logs	Southern	Standard cords	Board feet – International ¼-inch	Species type
Saw logs	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Saw logs	Western	Cubic feet	Dry pounds	None
Saw logs	Western	Cubic feet	Green pounds	None
Saw logs	Western	Cubic feet	Board feet – Scribner	State, survey year
Saw logs	Western	Cunits	Cubic feet	None
Saw logs	Western	Cunits	Cubic meter	None
Saw logs	Western	Standard cords	Green pounds	Bark presence, product type
Saw logs	Western	Standard cords	Green tons	Bark presence, product type
Saw logs	Western	Standard cords	Cubic feet	Bark presence, product type
Veneer logs	Northern	104-inch cord	Board feet – International ¼-inch	None
Veneer logs	Northern	Board feet (log rule)	Board feet (log rule)	Log rule
Veneer logs	Northern	Board feet (lumber tally)	Board feet – International ¼-inch	None
Veneer logs	Northern	Cubic feet	Board feet – International ¼-inch	None
Veneer logs	Northern	Green tons	Board feet – International ¼-inch	None
Veneer logs	Northern	Lake States cord	Board feet – International ¼-inch	None
Veneer logs	Northern	Standard cords	Board feet – Int. ¼	None
Veneer logs	Southern	Board feet (log rule)	Board feet (log rule)	Log rule, log size
Veneer logs	Southern	Board feet (lumber tally)	Board feet – International ¼-inch	None
Veneer logs	Southern	Cubic feet	Board feet – International ¼-inch	State, species type
Veneer logs	Southern	Dry tons	Board feet – International ¼-inch	Species type
Veneer logs	Southern	Green tons	Board feet – International ¼-inch	Species type
Veneer logs	Southern	Standard cords	Board feet – International ¼-inch	Species type
Veneer logs	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Veneer logs	Western	Cubic feet	Dry pounds	None
Veneer logs	Western	Cubic feet	Green pounds	None
Veneer logs	Western	Cubic feet	Board feet – Scribner	State, survey year
Veneer logs	Western	Cunits	Cubic feet	None
Veneer logs	Western	Cunits	Cubic meter	None
Veneer logs	Western	Standard cords	Green pounds	Bark presence
Veneer logs	Western	Standard cords	Green tons	Bark presence
Veneer logs	Western	Standard cords	Cubic feet	Bark presence
Pulp mill logs	Northern	4,600-pound cord	Standard cords	Species group
Pulp mill logs	Northern	Cubic feet	Standard cords	Sub-region
Pulp mill logs	Northern	Cubic meter	Standard cords	Sub-region
Pulp mill logs	Northern	Cunits	Standard cords	Sub-region

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Pulp mill logs	Northern	Dry metric tonnes	Standard cords	Species group
Pulp mill logs	Northern	Dry tons	Standard cords	Species group
Pulp mill logs	Northern	Green metric tonnes	Standard cords	Species group
Pulp mill logs	Northern	Green tons	Standard cords	Species group
Pulp mill logs	Northern	Lake States cords	Standard cords	None
Pulp mill logs	Northern	Peeled dry tons	Standard cords	Species group
Pulp mill logs	Northern	Peeled green tons	Standard cords	Species group
Pulp mill logs	Northern	Peeled Lake States cords	Standard cords	Species group
Pulp mill logs	Northern	Peeled metric dry tonnes	Standard cords	Species group
Pulp mill logs	Northern	Peeled metric green tonnes	Standard cords	Species group
Pulp mill logs	Northern	Peeled standard cords	Standard cords	Species group
Pulp mill logs	Northern	Standard cords	Cubic feet	Sub-region
Pulp mill logs	Southern	Green tons	Standard cords	Species type
Pulp mill logs	Southern	Standard cords	Cubic feet	State, species type
Pulp mill logs	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Pulp mill logs	Western	Cubic feet	Dry pounds	None
Pulp mill logs	Western	Cubic feet	Green pounds	None
Pulp mill logs	Western	Cubic feet	Board feet – Scribner	State, survey year
Pulp mill logs	Western	Cunits	Cubic feet	None
Pulp mill logs	Western	Cunits	Cubic meter	None
Pulp mill logs	Western	Standard cords	Green pounds	Bark presence
Pulp mill logs	Western	Standard cords	Green tons	Bark presence
Pulp mill logs	Western	Standard cords	Cubic feet	Bark presence
Composite/ engineered	Northern	4,600-pound cord	Standard cords	Species group
Composite/ engineered	Northern	Cubic feet	Standard cords	Sub-region
Composite/ engineered	Northern	Cubic meter	Standard cords	Sub-region
Composite/ engineered	Northern	Cunits	Standard cords	Sub-region
Composite/ engineered	Northern	Dry metric tonnes	Standard cords	Species group
Composite/ engineered	Northern	Dry tons	Standard cords	Species group
Composite/ engineered	Northern	Green metric tonnes	Standard cords	Species group
Composite/ engineered	Northern	Green tons	Standard cords	Species group
Composite/ engineered	Northern	Lake States cords	Standard cords	None
Composite/ engineered	Northern	Peeled dry tons	Standard cords	Species group
Composite/ engineered	Northern	Peeled green tons	Standard cords	Species group
Composite/ engineered	Northern	Peeled Lake States cords	Standard cords	Species group
Composite/ engineered	Northern	Peeled metric dry tonnes	Standard cords	Species group
Composite/ engineered	Northern	Peeled metric green tonnes	Standard cords	Species group
Composite/ engineered	Northern	Peeled standard cords	Standard cords	Species group
Composite/ engineered	Northern	Standard cords	Cubic feet	Sub-region

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Composite/ engineered	Southern	Cubic feet	Standard cords	State, species type
Composite/ engineered	Southern	Green tons	Standard cords	Species type
Composite/ engineered	Western	Board feet – Scribner	BDT	None
Composite/ engineered	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Composite/ engineered	Western	Cubic feet	Dry pounds	None
Composite/ engineered	Western	Cubic feet	Green pounds	None
Composite/ engineered	Western	Cubic feet	Board feet – Scribner	State, survey year
Composite/ engineered	Western	Cunits	Cubic feet	None
Composite/ engineered	Western	Cunits	Cubic meter	None
Composite/ engineered	Western	Standard cords	Green pounds	Bark presence
Composite/ engineered	Western	Standard cords	Green tons	Bark presence
Composite/ engineered	Western	Standard cords	Cubic feet	Bark presence
Bioenergy/ industrial fuelwood	Northern	Board feet	Standard cords	Log rule, product type
Bioenergy/ industrial fuelwood	Northern	Board feet (lumber tally)	Standard cords	Product type
Bioenergy/ industrial fuelwood	Northern	Cubic feet	Standard cords	Product type
Bioenergy/ industrial fuelwood	Northern	Dry tons	Standard cords	None
Bioenergy/ industrial fuelwood	Northern	Green tons	Standard cords	None
Bioenergy/ industrial fuelwood	Northern	Lake States cords	Standard cords	None
Bioenergy/ industrial fuelwood	Northern	Standard cords	Board feet	None
Bioenergy/ industrial fuelwood	Southern	Cubic feet	Standard cords	Species type
Bioenergy/ industrial fuelwood	Southern	Dry tons	Standard cords	Species type
Bioenergy/ industrial fuelwood	Southern	Green tons	Standard cords	Species type
Bioenergy/ industrial fuelwood	Western	Board feet – Scribner	BDT	None
Bioenergy/ industrial fuelwood	Western	Board feet – Scribner	Board feet – International ¼-inch	None

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Bioenergy/ industrial fuelwood	Western	Cubic feet	Dry pounds	None
Bioenergy/ industrial fuelwood	Western	Cubic feet	Green pounds	None
Bioenergy/ industrial fuelwood	Western	Cubic feet	Board feet – Scribner	State, survey year
Bioenergy/ industrial fuelwood	Western	Cunits	Cubic feet	None
Bioenergy/ industrial fuelwood	Western	Cunits	Cubic meter	None
Bioenergy/ industrial fuelwood	Western	Standard cords	Green pounds	Bark presence
Bioenergy/ industrial fuelwood	Western	Standard cords	Green tons	Bark presence
Bioenergy/ industrial fuelwood	Western	Standard cords	Cubic feet	Bark presence
Poles	Northern	Board feet	Pieces	Log rule
Poles	Northern	Board feet (lumber tally)	Pieces	None
Poles	Northern	Cubic feet	Pieces	None
Poles	Northern	Green tons	Pieces	None
Poles	Northern	Lake States cords	Pieces	None
Poles	Northern	Pieces	Board feet	None
Poles	Northern	Pieces	Cubic feet	None
Poles	Northern	Standard cords	Pieces	None
Poles	Southern	Cubic feet	Pieces	Log size
Poles	Southern	Pounds	Pieces	Log size
Poles	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Poles	Western	Cubic feet	Dry pounds	None
Poles	Western	Cubic feet	Green pounds	None
Poles	Western	Cubic feet	Board feet – Scribner	State, survey year
Poles	Western	Cunits	Cubic feet	None
Poles	Western	Cunits	Cubic meter	None
Poles	Western	Standard cords	Green pounds	Bark presence
Poles	Western	Standard cords	Green tons	Bark presence
Poles	Western	Standard cords	Cubic feet	Bark presence
Pilings	Northern	Board feet	Linear feet	Log rule
Pilings	Northern	Board feet (lumber tally)	Linear feet	None
Pilings	Northern	Cubic feet	Linear feet	None
Pilings	Northern	Green tons	Linear feet	None
Pilings	Northern	Lake States cords	Linear feet	None
Pilings	Northern	Linear feet	Board feet	None
Pilings	Northern	Linear feet	Cubic feet	None
Pilings	Northern	Pieces	Linear feet	None
Pilings	Northern	Standard cords	Linear feet	None
Pilings	Southern	Cubic feet	Pieces	Log size
Pilings	Southern	Pounds	Pieces	Log size
Pilings	Western	Board feet – Scribner	Board feet – International ¼-inch	None

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Pilings	Western	Cubic feet	Dry pounds	None
Pilings	Western	Cubic feet	Green pounds	None
Pilings	Western	Cubic feet	Board feet – Scribner	State, survey year
Pilings	Western	Cunits	Cubic feet	None
Pilings	Western	Cunits	Cubic meter	None
Pilings	Western	Standard cords	Green pounds	Bark presence
Pilings	Western	Standard cords	Green tons	Bark presence
Pilings	Western	Standard cords	Cubic feet	Bark presence
Posts	Northern	Board feet	Pieces	Log rule
Posts	Northern	Board feet (lumber tally)	Pieces	None
Posts	Northern	Cubic feet	Pieces	None
Posts	Northern	Green tons	Pieces	None
Posts	Northern	Lake States cords	Pieces	None
Posts	Northern	Pieces	Board feet	None
Posts	Northern	Pieces	Cubic feet	None
Posts	Northern	Standard cords	Pieces	None
Posts	Southern	Cubic feet	Pieces	Log size
Posts	Southern	Pounds	Pieces	Log size
Posts	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Posts	Western	Cubic feet	Dry pounds	None
Posts	Western	Cubic feet	Green pounds	None
Posts	Western	Cubic feet	Board feet – Scribner	State, survey year
Posts	Western	Cunits	Cubic feet	None
Posts	Western	Cunits	Cubic meter	None
Posts	Western	Standard cords	Green pounds	Bark presence
Posts	Western	Standard cords	Green tons	Bark presence
Posts	Western	Standard cords	Cubic feet	Bark presence
House/cabin logs	Northern	Board feet	Cubic feet	Log rule
House/cabin logs	Northern	Board feet (lumber tally)	Cubic feet	None
House/cabin logs	Northern	Cubic feet	Board feet	None
House/cabin logs	Northern	Green tons	Cubic feet	None
House/cabin logs	Northern	Lake States cords	Cubic feet	None
House/cabin logs	Northern	Linear feet	Cubic feet	None
House/cabin logs	Northern	Pieces	Cubic feet	None
House/cabin logs	Northern	Standard cords	Cubic feet	None
House/cabin logs (cants)	Southern	Board feet (log rule)	Board feet (log rule)	Log rule, log size
House/cabin logs (cants)	Southern	Board feet (lumber tally)	Board feet – International ¼-inch	None
House/cabin logs (cants)	Southern	Cubic feet	Board feet – International ¼-inch	State, species type
House/cabin logs (peeled)	Southern	Cubic feet	Pieces	Log size

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
House/cabin logs (cants)	Southern	Dry tons	Board feet – International ¼-inch	Species type
House/cabin logs (cants)	Southern	Green tons	Board feet – International ¼-inch	Species type
House/cabin logs (peeled)	Southern	Pounds	Pieces	Log size
House/cabin logs (cants)	Southern	Standard cords	Board feet – International ¼-inch	Species type
House/cabin logs	Western	Board feet – Scribner	Board feet – International ¼-inch	None
House/cabin logs	Western	Cubic feet	Dry pounds	None
House/cabin logs	Western	Cubic feet	Green pounds	Product type
House/cabin logs	Western	Cubic feet	Board feet – Scribner	State, survey year, product type
House/cabin logs	Western	Cunits	Cubic feet	None
House/cabin logs	Western	Cunits	Cubic meter	None
House/cabin logs	Western	Standard cords	Green pounds	Bark presence, product type
House/cabin logs	Western	Standard cords	Green tons	Bark presence, product type
House/cabin logs	Western	Standard cords	Cubic feet	Bark presence, product type
Residential fuelwood	Northern	1/2-ton truck	Standard cords	None
Residential fuelwood	Northern	10x cords	Standard cords	None
Residential fuelwood	Northern	Car trunk	Standard cords	None
Residential fuelwood	Northern	Cubic feet	Standard cords	None
Residential fuelwood	Northern	Dry pounds	Standard cords	None
Residential fuelwood	Northern	Dry tons	Standard cords	None
Residential fuelwood	Northern	Face cord 4 x 8 x 12 inches	Standard cords	None
Residential fuelwood	Northern	Face cord 4 x 8 x 16 inches	Standard cords	None
Residential fuelwood	Northern	Face cord 4 x 8 x 18 inches	Standard cords	None
Residential fuelwood	Northern	Face cord 4 x 8 x 24 inches	Standard cords	None
Residential fuelwood	Northern	Green pounds	Standard cords	None
Residential fuelwood	Northern	Green tons	Standard cords	None
Residential fuelwood	Northern	Lake States cords	Standard cords	None
Residential fuelwood	Northern	Pallets	Standard cords	None
Residential fuelwood	Northern	Pieces	Standard cords	None

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Residential fuelwood	Northern	Small bundle	Standard cords	None
Residential fuelwood	Northern	Small car trunk	Standard cords	None
Residential fuelwood	Northern	Small hatchback	Standard cords	None
Residential fuelwood	Northern	Small truck	Standard cords	None
Residential fuelwood	Northern	Small van	Standard cords	None
Residential fuelwood	Northern	Small wagon	Standard cords	None
Residential fuelwood	Northern	Standard cords	Cubic feet	None
Residential fuelwood	Northern	Standard cords	Board feet – International ¼-inch	None
Residential fuelwood	Northern	Station wagon	Standard cords	None
Residential fuelwood	Northern	Suburban	Standard cords	None
Residential fuelwood	Northern	Trees	Standard cords	Average tree diameter
Residential fuelwood	Northern	Van	Standard cords	None
Residential fuelwood	Southern	Cubic feet	Standard cords	Species type
Residential fuelwood	Southern	Green tons	Standard cords	Species type
Residential fuelwood	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Residential fuelwood	Western	Cubic feet	Dry pounds	None
Residential fuelwood	Western	Cubic feet	Green pounds	None
Residential fuelwood	Western	Cubic feet	Board feet – Scribner	State, survey year
Residential fuelwood	Western	Cunits	Cubic feet	None
Residential fuelwood	Western	Cunits	Cubic meter	None
Residential fuelwood	Western	Standard cords	Green pounds	Bark presence
Residential fuelwood	Western	Standard cords	Green tons	Bark presence
Residential fuelwood	Western	Standard cords	Cubic feet	Bark presence
Other products	Northern	Board feet	Cubic feet	Log rule
Other products	Northern	Board feet (lumber tally)	Cubic feet	None
Other products	Northern	Cubic feet	Board feet	None
Other products	Northern	Cubic yards	Cubic feet	None
Other products	Northern	Green tons	Cubic feet	None

(Continued)

Table 57 *(Continued)*—Roundwood and residue variability sources by region, roundwood type, and input/output units of measure for Forest Inventory and Analysis Timber Product Output data conversions

Roundwood type or residue	Region	Input units of measure	Output units of measure	Variability sources
Other products	Northern	Lake States cords	Cubic feet	None
Other products	Northern	Lath bundle	Cubic feet	Pieces per bundle
Other products	Northern	Linear feet	Cubic feet	None
Other products	Northern	Pieces	Cubic feet	None
Other products	Northern	Standard cords	Cubic feet	None
Other products	Southern	Green tons	Cubic feet	Species type
Other products	Western	Board feet – Scribner	Board feet – International ¼-inch	None
Other products	Western	Cubic feet	Dry pounds	Product type
Other products	Western	Cubic feet	Green pounds	Product type
Other products	Western	Cubic feet	Board feet – Scribner	State, survey year, product type
Other products	Western	Cunits	Cubic feet	None
Other products	Western	Cunits	Cubic meter	None
Other products	Western	Standard cords	Green pounds	Bark presence, product type
Other products	Western	Standard cords	Green tons	Bark presence, product type
Other products	Western	Standard cords	Cubic feet	Bark presence, product type
Residues	Northern	1,000 green pounds	Standard cords	Species type
Residues	Northern	4,600-pound cord	Standard cords	Species type
Residues	Northern	Cubic feet	Standard cords	None
Residues	Northern	Cubic meter	Standard cords	None
Residues	Northern	Cunits	Standard cords	None
Residues	Northern	Dry metric tonnes	Standard cords	None
Residues	Northern	Dry tons	Standard cords	None
Residues	Northern	Green metric tonnes	Standard cords	Species type
Residues	Northern	Green tons	Standard cords	Species type
Residues	Northern	Lake States cords	Standard cords	None
Residues	Northern	Standard cords	Cubic feet	None
Residues	Northern	Standard cords	Board feet	None
Residues	Southern	Green tons	Dry tons	None
Residues	Southern	Green tons	Standard cords	Species type
Residues	Southern	Standard cords	Cubic feet	State, species type
Residues	Western	200 CFU	BDU	Residue type
Residues	Western	200 CFU	Pounds	Residue type
Residues	Western	200 CFU	Cubic feet (SWE)	Residue type
Residues	Western	BDU	Green tons	None
Residues	Western	BDU	Pounds	None
Residues	Western	BDU	Cubic feet (SWE)	None
Residues	Western	BDU	Cubic yards (SWE)	None
Residues	Western	BDU	BDT	None

Table 58—Roundwood-to-residue variability sources by region, roundwood type, residue type, and roundwood/residue units of measure for Forest Inventory and Analysis Timber Product Output data conversions[a]

Region	Roundwood type	Residue type	Input units of measure	Residue units of measure	Variability sources
Northern	Saw logs	Bark	MBF	Green/dry tons, cubic feet	Bark thickness
Northern	Saw logs	Coarse	MBF	Green/dry tons, cubic feet	None
Northern	Saw logs	Fine	MBF	Green/dry tons, cubic feet	Product source
Southern	Saw logs	Bark	MBF	Green tons	State, species type
Southern	Saw logs	Coarse	MBF	Green tons	State, species type
Southern	Saw logs	Fine (sawdust)	MBF	Green tons	State, species type
Southern	Saw logs	Fine (shavings)	MBF	Green tons	Species type
Western	Saw logs	Bark	MBF	BDU	State, survey year
Western	Saw logs	Coarse	MBF	BDU	State, survey year
Western	Saw logs	Fine (sawdust)	MBF	BDU	State, survey year
Western	Saw logs	Fine (shavings)	MBF	BDU	State, survey year
Northern	Veneer logs	Bark	MBF	Green/dry tons, cubic feet	Bark thickness
Northern	Veneer logs	Coarse	MBF	Green/dry tons, cubic feet	None
Northern	Veneer logs	Fine	MBF	Green/dry tons, cubic feet	None
Southern	Veneer logs	All Types	MBF	Green tons	State, species type
Northern	Pulp mill logs	Bark	Standard cords	Green/dry tons, cubic feet	Bark thickness
Northern	Pulp mill logs	Fine	Standard cords	Green/dry tons, cubic feet	None
Southern	Pulp mill logs	Bark	MCF	Green tons	Species type
Northern	Composite/ engineered	Bark	Standard cords	Green/dry tons, cubic feet	Bark thickness
Northern	Composite/ engineered	Fine	Standard cords	Green/dry tons, cubic feet	None
Southern	Composite/ engineered	Bark	Standard cords	Green tons	State, species type
Southern	Bioenergy/ industrial fuelwood	Bark	MCF	Green tons	Species type
Northern	Poles	Bark	Pieces	Green/dry tons, cubic feet	Bark thickness
Northern	Poles	Coarse	Pieces	Green/dry tons, cubic feet	None
Northern	Poles	Fine	Pieces	Green/dry tons, cubic feet	None
Southern	Poles	Bark	C-pieces	Green tons	None
Southern	Poles	Coarse	C-pieces	Green tons	Species type
Northern	Pilings	Bark	MLF	Green/dry tons, cubic feet	Bark thickness
Northern	Pilings	Coarse	MLF	Green/dry tons, cubic feet	None
Northern	Pilings	Fine	MLF	Green/dry tons, cubic feet	None
Southern	Pilings	Bark	C-pieces	Green tons	None
Southern	Pilings	Coarse	C-pieces	Green tons	Species type
Northern	Posts	Bark	M-pieces	Green/dry tons, cubic feet	Bark thickness
Northern	Posts	Coarse	M-pieces	Green/dry tons, cubic feet	None
Northern	Posts	Fine	M-pieces	Green/dry tons, cubic feet	None
Southern	Posts	Bark	M-pieces	Green tons	None
Northern	House/cabin logs	Bark	MCF	Green/dry tons, cubic feet	Bark thickness
Northern	House/cabin logs	Coarse	MCF	Green/dry tons, cubic feet	None
Northern	House/cabin logs	Fine	MCF	Green/dry tons, cubic feet	None
Southern	House/cabin logs	Bark	C-pieces	Green tons	None
Southern	House/cabin logs	Coarse	C-pieces	Green tons	Species type
Northern	Other products	Bark	MCF	Green/dry tons, cubic feet	Bark thickness
Northern	Other products	Coarse	MCF	Green/dry tons, cubic feet	None
Northern	Other products	Fine	MCF	Green/dry tons, cubic feet	None
Southern	Other products	Bark	MCF	Green tons	Species type

[a] The Western Region has roundwood-to-residue conversion factors for saw logs only.

Table 59—Inter-State percentage differences in saw log conversion factors (MCF to MBF) used in the Southern Region of the United States[a]

State 1	Species type	State 2											
		AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Hardwood	3.7%	**3.0%**	**1.8%**	1.2%	0.6%	**0.0%**	2.4%	1.8%	1.2%	**1.2%**	1.2%	0.6%
	Softwood	1.2%	**1.2%**	**0.6%**	1.2%	1.2%	**0.6%**	2.4%	0.6%	0.6%	**1.2%**	0.6%	2.4%
AR	Hardwood		6.7%	5.5%	2.5%	**4.3%**	**3.7%**	6.1%	**5.5%**	2.5%	**2.5%**	**2.5%**	3.1%
	Softwood		0.0%	0.6%	2.4%	**0.0%**	**0.6%**	1.2%	**0.6%**	0.6%	**0.0%**	**0.6%**	1.2%
FL	Hardwood			**1.2%**	4.2%	2.4%	3.0%	0.6%	1.2%	4.2%	4.2%	4.2%	3.6%
	Softwood			**0.6%**	2.4%	0.0%	0.6%	1.2%	0.6%	0.6%	0.0%	0.6%	1.2%
GA	Hardwood				3.0%	1.2%	1.8%	**0.6%**	0.0%	**3.0%**	**3.0%**	3.0%	2.4%
	Softwood				1.8%	0.6%	0.0%	**1.8%**	0.0%	**0.0%**	**0.6%**	0.0%	1.8%
KY	Hardwood					1.8%	1.2%	3.6%	3.0%	0.0%	**0.0%**	0.0%	**0.6%**
	Softwood					2.4%	1.8%	3.6%	1.8%	1.8%	**2.4%**	1.8%	**3.6%**
LA	Hardwood						**0.6%**	1.8%	1.2%	1.8%	1.8%	**1.8%**	1.2%
	Softwood						**0.6%**	1.2%	0.6%	0.6%	0.0%	**0.6%**	1.2%
MS	Hardwood							2.4%	1.8%	1.2%	**1.2%**	1.2%	0.6%
	Softwood							1.8%	0.0%	0.0%	**0.6%**	0.0%	1.8%
NC	Hardwood								0.6%	**3.6%**	**3.6%**	3.6%	**3.0%**
	Softwood								1.8%	**1.8%**	**1.2%**	1.8%	**0.0%**
OK	Hardwood									3.0%	3.0%	**3.0%**	2.4%
	Softwood									0.0%	0.6%	**0.0%**	1.8%
SC	Hardwood										0.0%	0.0%	0.6%
	Softwood										0.6%	0.0%	1.8%
TN	Hardwood											0.0%	**0.6%**
	Softwood											0.6%	**1.2%**
TX	Hardwood												0.6%
	Softwood												1.8%

[a] Bold text indicates States that share a geographical border.

Table 60—Inter-State percentage differences in average yearly saw log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

State 1	State 2										
	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	4.2%	2.4%	10.6%	17.4%	34.8%	7.9%	4.6%	25.9%	5.6%	27.1%	6.0%
AZ		**6.5%**	**14.8%**	21.5%	38.8%	**12.1%**	**0.4%**	30.0%	**9.8%**	31.2%	10.2%
CA			8.2%	15.0%	32.5%	**5.6%**	7.0%	**23.6%**	3.2%	24.8%	3.7%
CO				6.8%	24.4%	2.7%	**15.2%**	15.4%	**5.0%**	16.6%	**4.6%**
ID					**17.7%**	**9.5%**	21.9%	**8.7%**	**11.8%**	**9.9%**	**11.3%**
MT						27.0%	39.2%	9.0%	29.3%	7.8%	**28.9%**
NV							12.5%	**18.1%**	**2.3%**	19.3%	1.9%
NM								30.4%	**10.2%**	31.6%	10.6%
OR									20.4%	**1.2%**	20.0%
UT										21.6%	**0.4%**
WA											21.2%

[a] Bold text indicates States that share a geographical border.

Table 61—Inter-State percentage differences in veneer log conversion factors (MCF to MBF) used in the Southern Region of the United States[a]

State 1	Species type	State 2											
		AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Hardwood	3.7%	**1.8%**	**1.2%**	1.2%	2.5%	**1.2%**	1.8%	5.0%	1.2%	**1.8%**	1.2%	0.6%
	Softwood	1.2%	**0.6%**	**0.6%**	1.8%	1.2%	**0.6%**	1.8%	0.6%	1.2%	**1.2%**	1.2%	1.8%
AR	Hardwood		5.5%	2.5%	2.5%	**1.3%**	**2.5%**	5.5%	**1.3%**	2.5%	**1.9%**	**2.5%**	3.1%
	Softwood		0.6%	0.6%	3.0%	**0.0%**	**0.6%**	0.6%	**0.6%**	0.0%	**0.0%**	**0.0%**	0.6%
FL	Hardwood			**3.0%**	3.0%	4.3%	3.0%	0.0%	6.8%	3.0%	3.6%	3.0%	2.4%
	Softwood			**0.0%**	2.4%	0.6%	0.0%	1.2%	0.0%	0.6%	0.6%	0.6%	1.2%
GA	Hardwood				0.0%	1.2%	0.0%	**3.0%**	3.8%	**0.0%**	**0.6%**	0.0%	0.6%
	Softwood				2.4%	0.6%	0.0%	**1.2%**	0.0%	**0.6%**	**0.6%**	0.6%	1.2%
KY	Hardwood					1.2%	0.0%	3.0%	3.8%	0.0%	**0.6%**	0.0%	**0.6%**
	Softwood					3.0%	2.4%	3.6%	2.4%	3.0%	**3.0%**	3.0%	**3.6%**
LA	Hardwood						**1.2%**	4.3%	2.5%	1.2%	0.6%	**1.2%**	1.8%
	Softwood						**0.6%**	0.6%	0.6%	0.0%	0.0%	**0.0%**	0.6%
MS	Hardwood							3.0%	3.8%	0.0%	**0.6%**	0.0%	0.6%
	Softwood							1.2%	0.0%	0.6%	**0.6%**	0.6%	1.2%
NC	Hardwood								6.8%	**3.0%**	**3.6%**	3.0%	**2.4%**
	Softwood								1.2%	**0.6%**	**0.6%**	0.6%	**0.0%**
OK	Hardwood									3.8%	3.1%	**3.8%**	4.4%
	Softwood									0.6%	0.6%	**0.6%**	1.2%
SC	Hardwood										0.6%	0.0%	0.6%
	Softwood										0.0%	0.0%	0.6%
TN	Hardwood											0.6%	**1.2%**
	Softwood											0.0%	**0.6%**
TX	Hardwood												0.6%
	Softwood												0.6%

[a] Bold text indicates States that share a geographical border.

Table 62—Inter-State percentage differences in average yearly veneer log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

State 1	State 2										
	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AZ		**NA**	**NA**	NA	NA	**NA**	**NA**	NA	**NA**	NA	NA
CA			NA	10.9%	0.5%	**NA**	NA	**9.4%**	NA	7.0%	8.0%
CO				NA	NA	NA	**NA**	NA	**NA**	NA	**NA**
ID					**11.3%**	**NA**	NA	**20.2%**	**NA**	**17.8%**	**18.8%**
MT						NA	NA	8.9%	NA	6.5%	**7.5%**
NV							NA	**NA**	**NA**	NA	NA
NM								NA	**NA**	NA	NA
OR									NA	**2.4%**	1.4%
UT										NA	**NA**
WA											1.0%

[a] Bold text indicates States that share a geographical border.

Table 63—Inter-State percentage differences in pulp mill log conversion factors (standard cords to MBF) used in the Southern Region of the United States[a]

State 1	Species type	State 2											
		AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Hardwood	1.4%	**0.7%**	**2.5%**	1.2%	0.7%	**0.7%**	2.0%	1.4%	6.7%	**1.4%**	6.7%	1.1%
	Softwood	0.6%	**1.3%**	**0.0%**	0.4%	1.3%	**0.5%**	0.7%	0.0%	2.6%	**0.0%**	2.6%	0.9%
AR	Hardwood		2.1%	1.0%	0.3%	**2.1%**	**2.1%**	0.5%	**0.0%**	8.2%	**0.0%**	**8.2%**	0.4%
	Softwood		2.0%	0.6%	0.3%	**2.0%**	**1.2%**	1.3%	**0.6%**	3.3%	**0.6%**	**3.3%**	1.6%
FL	Hardwood			**3.1%**	1.8%	0.0%	0.0%	2.6%	2.1%	6.0%	2.1%	6.0%	1.7%
	Softwood			**1.3%**	1.7%	0.0%	0.8%	0.7%	1.3%	1.3%	1.3%	1.3%	0.4%
GA	Hardwood				1.3%	3.1%	3.1%	**0.5%**	1.0%	**9.2%**	**1.0%**	9.2%	1.4%
	Softwood				0.4%	1.3%	0.5%	**0.7%**	0.0%	**2.6%**	**0.0%**	2.6%	0.9%
KY	Hardwood					1.8%	1.8%	0.8%	0.3%	7.9%	**0.3%**	7.9%	**0.1%**
	Softwood					1.7%	0.9%	1.0%	0.4%	3.0%	**0.4%**	3.0%	**1.3%**
LA	Hardwood						**0.0%**	2.6%	2.1%	6.0%	2.1%	**6.0%**	1.7%
	Softwood						**0.8%**	0.7%	1.3%	1.3%	1.3%	**1.3%**	0.4%
MS	Hardwood							2.6%	2.1%	6.0%	**2.1%**	6.0%	1.7%
	Softwood							0.1%	0.5%	2.1%	**0.5%**	2.1%	0.4%
NC	Hardwood								0.5%	**8.7%**	**0.5%**	8.7%	**0.9%**
	Softwood								0.7%	**2.0%**	**0.7%**	2.0%	**0.3%**
OK	Hardwood									8.2%	0.0%	**8.2%**	0.4%
	Softwood									2.6%	0.0%	**2.6%**	0.9%
SC	Hardwood										8.2%	0.0%	7.8%
	Softwood										2.6%	0.0%	1.7%
TN	Hardwood											8.2%	**0.4%**
	Softwood											2.6%	**0.9%**
TX	Hardwood												7.8%
	Softwood												1.7%

[a] Bold text indicates States that share a geographical border.

Table 64—Mean, ranges, maximum percentage difference from the mean (PDM), and number of observations for species group conversion factors used to convert pulp mill logs to standard cords in the Northern Region of the United States

Input unit of measure	Species type	Mean	Lower	Upper	PDM max	N
Green tons	Hardwood	0.409770	0.344400	0.516700	26.1%	23
	Softwood	0.465207	0.395600	0.632900	36.0%	15
Dry tons	Hardwood	0.768421	0.592160	1.033400	34.5%	23
	Softwood	0.907483	0.772380	1.265800	39.5%	16
Green metric tonnes	Hardwood	0.451690	0.379630	0.569560	26.1%	23
	Softwood	0.515291	0.436070	0.697650	35.4%	16
Dry metric tonnes	Hardwood	0.847030	0.652740	1.139120	34.5%	23
	Softwood	1.000317	0.851390	1.395290	39.5%	16
4,600-pound cord	Hardwood	0.942463	0.792100	1.188400	26.1%	23
	Softwood	1.075163	0.909900	1.455700	35.4%	16
Peeled dry tons	Hardwood	0.854151	0.438470	1.233790	48.7%	21
	Softwood	1.099098	0.882810	1.430380	30.1%	10
Peeled green tons	Hardwood	0.452833	0.257920	0.616890	43.0%	22
	Softwood	0.559559	0.477100	0.715190	27.8%	11
Peeled metric green tonnes	Hardwood	0.498667	0.284310	0.680000	43.0%	21
	Softwood	0.616367	0.525900	0.788350	27.9%	10
Peeled metric dry tonnes	Hardwood	0.941532	0.483330	1.360010	48.7%	21
	Softwood	1.211538	0.973130	1.576710	30.1%	10
Peeled Lake States cords	Hardwood	1.193170	1.114,600	1.281300	7.4%	23
	Softwood	1.231031	1.177100	1.310500	6.5%	16
Peeled standard cords	Hardwood	1.145409	1.070000	1.230000	7.4%	23
	Softwood	1.181750	1.130000	1.258000	6.5%	16

Table 65—Species groups associated with lower and upper ranges and maximum percentage difference from the mean (PDM) for conversion factors used to convert pulp mill logs to standard cords in the Northern Region of the United States[a]

Input unit of measure	Species type	Lower	Upper
Green tons	Hardwood	Red oak	**Basswood**
	Softwood	Tamarack/larch	**Cedar/juniper (northern white-cedar)**
Dry tons	Hardwood	Hickory	**Basswood**
	Softwood	Tamarack/larch	**Cedar/juniper (northern white-cedar)**
Green metric tonnes	Hardwood	Red oak	**Basswood**
	Softwood	Tamarack/larch	**Cedar/juniper (northern white-cedar)**
Dry metric tonnes	Hardwood	Hickory	**Basswood**
	Softwood	Tamarack/larch	**Cedar/juniper (northern white-cedar)**
4,600-pound cord	Hardwood	Red oak	**Basswood**
	Softwood	Cypress, loblolly/shortleaf, Longleaf/slash	**Cedar/juniper (northern white-cedar)**
Peeled dry tons	Hardwood	**Ash**	Basswood
	Softwood	Tamarack/larch	**Cedar/juniper (northern white-cedar)**
Peeled green tons	Hardwood	**Ash**	Basswood
	Softwood	Loblolly/shortleaf	**Cedar/juniper (northern white-cedar)**
Peeled metric green tonnes	Hardwood	**Ash**	Basswood
	Softwood	Loblolly/shortleaf	**Cedar/juniper (northern white-cedar)**
Peeled metric dry tonnes	Hardwood	**Ash**	Basswood
	Softwood	Tamarack/larch	**Cedar/juniper (northern white-cedar)**
Peeled Lake States cords	Hardwood	Beech	**White oak**
	Softwood	Cypress, cedar/juniper	**Hemlock**
Peeled standard cords	Hardwood	Beech	**White oak**
	Softwood	Cypress, cedar/juniper	**Hemlock**

[a] Bold text indicates States that share a geographical border.

Table 66—Inter-State percentage differences in average yearly pulp mill log conversion factors and composite panel/engineered wood product logs (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	NA	59.2%	70.2%	49.5%	56.9%	NA	127.4%	59.6%	76.7%	57.4%	NA
AZ		**NA**	**NA**	NA	NA	**NA**	**NA**	NA	**NA**	NA	NA
CA			12.3%	10.4%	2.5%	**NA**	84.1%	**0.5%**	19.8%	1.9%	NA
CO				22.6%	14.8%	NA	**73.7%**	11.8%	**7.5%**	14.2%	**NA**
ID					**7.9%**	**NA**	92.4%	**10.9%**	**30.0%**	**8.5%**	**NA**
MT						NA	86.1%	3.0%	22.3%	0.6%	**NA**
NV							NA	**NA**	**NA**	NA	NA
NM								83.7%	**67.1%**	85.7%	NA
OR									19.3%	**2.4%**	NA
UT										21.7%	**NA**
WA											NA

[a] Bold text indicates States that share a geographical border.

Table 67—Inter-State percentage differences in conversion factors (MCF to standard cords) for logs manufactured into composite panels or engineered wood products in the Southern Region of the United States[a]

State 1	Species type	State 2											
		AR	**FL**	**GA**	**KY**	**LA**	**MS**	**NC**	**OK**	**SC**	**TN**	**TX**	**VA**
AL	Hardwood	3.5%	**1.3%**	**1.3%**	3.2%	1.3%	**1.3%**	3.5%	3.5%	4.8%	**1.9%**	4.8%	3.1%
	Softwood	0.9%	**0.5%**	**0.3%**	0.1%	1.0%	**2.4%**	1.0%	1.0%	0.6%	**1.2%**	0.6%	0.1%
AR	Hardwood		2.1%	2.1%	0.3%	**2.1%**	**2.1%**	0.0%	**0.0%**	8.3%	**5.4%**	**8.3%**	0.4%
	Softwood		0.4%	0.6%	0.8%	**0.1%**	**3.3%**	0.1%	**0.1%**	0.3%	**0.3%**	**0.3%**	1.0%
FL	Hardwood			**0.0%**	1.8%	0.0%	0.0%	2.1%	2.1%	6.2%	3.3%	6.2%	1.7%
	Softwood			**0.3%**	0.4%	0.5%	2.9%	0.5%	0.5%	0.1%	0.6%	0.1%	0.6%
GA	Hardwood				1.8%	0.0%	0.0%	**2.1%**	2.1%	**6.2%**	**3.3%**	6.2%	1.7%
	Softwood				0.1%	0.8%	2.6%	**0.8%**	0.8%	**0.4%**	**0.9%**	0.4%	0.4%
KY	Hardwood					1.8%	1.8%	0.3%	0.3%	8.0%	**5.1%**	8.0%	**0.1%**
	Softwood					0.9%	2.5%	0.9%	0.9%	0.5%	**1.0%**	0.5%	**0.3%**
LA	Hardwood						**0.0%**	2.1%	2.1%	6.2%	3.3%	**6.2%**	1.7%
	Softwood						**3.4%**	0.0%	0.0%	0.4%	0.1%	**0.4%**	1.2%
MS	Hardwood							2.1%	2.1%	6.2%	**3.3%**	6.2%	1.7%
	Softwood							3.4%	3.4%	3.0%	**3.5%**	3.0%	2.2%
NC	Hardwood								0.0%	**8.3%**	**5.4%**	8.3%	**0.4%**
	Softwood								0.0%	**0.4%**	**0.1%**	0.4%	**1.2%**
OK	Hardwood									8.3%	5.4%	**8.3%**	0.4%
	Softwood									0.4%	0.1%	**0.4%**	1.2%
SC	Hardwood										2.9%	0.0%	7.9%
	Softwood										0.5%	0.0%	0.8%
TN	Hardwood											2.9%	**5.0%**
	Softwood											0.5%	**1.3%**
TX	Hardwood												7.9%
	Softwood												0.8%

[a] Bold text indicates States that share a geographical border.

Table 68—Inter-State percentage differences in average yearly energywood log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	90.1%	120.4%	37.6%	30.7%	47.1%	88.8%	NA	45.8%	NA	41.6%	82.7%
AZ		**41.6%**	**57.3%**	63.8%	48.1%	**1.6%**	**NA**	49.4%	**NA**	53.5%	9.1%
CA			93.3%	98.9%	85.4%	**43.1%**	NA	**86.5%**	NA	90.1%	50.2%
CO				7.2%	9.9%	55.8%	**NA**	8.5%	**NA**	4.1%	**48.9%**
ID					**17.1%**	**62.4%**	NA	**15.7%**	**NA**	**11.3%**	**55.6%**
MT						46.5%	NA	1.4%	NA	5.8%	**39.4%**
NV							NA	**47.9%**	**NA**	52.0%	7.5%
NM								NA	**NA**	NA	NA
OR									NA	**4.5%**	40.8%
UT										NA	**NA**
WA											45.0%

[a] Bold text indicates States that share a geographical border.

Table 69—Inter-State percentage differences in average yearly post and pole log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AZ		**111.9%**	**28.1%**	34.1%	26.8%	**22.0%**	**10.9%**	90.0%	**42.0%**	92.2%	41.2%
CA			91.0%	86.0%	92.0%	**95.8%**	119.2%	**29.3%**	79.3%	26.7%	80.0%
CO				6.2%	1.3%	6.2%	**38.7%**	66.1%	**14.3%**	68.5%	**13.5%**
ID					**7.5%**	**12.3%**	44.6%	**60.5%**	**8.1%**	**63.0%**	**7.3%**
MT						4.9%	37.5%	67.2%	15.6%	69.6%	**14.8%**
NV							32.7%	**71.5%**	**20.4%**	73.9%	19.6%
NM								98.5%	**52.3%**	100.5%	51.5%
OR									53.0%	**2.7%**	53.8%
UT										55.6%	**0.8%**
WA											56.3%

[a] Bold text indicates States that share a geographical border.

Table 70—Inter-State percentage differences in average yearly utility pole and piling roundwood conversion factors (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AZ		**NA**	**NA**	NA	NA	**NA**	**NA**	NA	**NA**	NA	NA
CA			NA	24.5%	NA	**NA**	32.5%	**19.5%**	NA	14.1%	3.4%
CO				NA	NA	NA	**NA**	NA	**NA**	NA	**NA**
ID					**NA**	**NA**	8.2%	**5.1%**	**NA**	**10.5%**	**21.1%**
MT						NA	NA	NA	NA	NA	**NA**
NV							NA	**NA**	**NA**	NA	NA
NM								13.3%	**NA**	18.7%	29.2%
OR									NA	**5.4%**	16.1%
UT										NA	**NA**
WA											10.7%

[a] Bold text indicates States that share a geographical border.

Table 71—Inter-State percentage differences in average yearly house/cabin log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

State 1	State 2										
	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	3.8%	16.7%	11.1%	22.2%	14.5%	NA	14.4%	25.3%	9.6%	15.6%	5.1%
AZ		**12.9%**	**7.3%**	18.4%	10.7%	**NA**	**10.6%**	21.5%	**5.8%**	11.8%	1.3%
CA			5.6%	5.6%	2.2%	**NA**	2.3%	**8.7%**	7.1%	1.1%	11.6%
CO				11.2%	3.4%	NA	**3.3%**	14.3%	**1.4%**	4.5%	**6.0%**
ID					**7.8%**	**NA**	7.9%	**3.1%**	**12.6%**	**6.7%**	**17.2%**
MT						NA	0.1%	10.9%	4.9%	1.1%	**9.4%**
NV							NA	**NA**	**NA**	NA	NA
NM								11.0%	**4.8%**	1.2%	9.3%
OR									15.7%	**9.8%**	20.3%
UT										5.9%	**4.6%**
WA											10.5%

[a] Bold text indicates States that share a geographical border.

Table 72—Inter-State percentage differences in average yearly viga/latilla log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

State 1	State 2										
	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AZ		**NA**	**48.7%**	NA	NA	**NA**	**32.7%**	NA	**NA**	NA	36.5%
CA			NA	NA	NA	**NA**	NA	**NA**	NA	NA	NA
CO				NA	NA	NA	**16.6%**	NA	**NA**	NA	**12.8%**
ID					**NA**	**NA**	NA	**NA**	**NA**	**NA**	**NA**
MT						NA	NA	NA	NA	NA	**NA**
NV							NA	**NA**	**NA**	NA	NA
NM								NA	**NA**	NA	3.8%
OR									NA	**NA**	NA
UT										NA	**NA**
WA											NA

[a] Bold text indicates States that share a geographical border.

Table 73—Inter-State percentage differences in average yearly firewood log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

State 1	State 2										
	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	32.5%	4.3%	44.7%	40.4%	43.9%	66.1%	51.1%	14.8%	35.9%	20.5%	33.3%
AZ		**36.6%**	**12.7%**	8.2%	11.9%	**35.5%**	**19.5%**	17.9%	**3.5%**	12.2%	0.8%
CA			48.7%	44.5%	48.0%	**69.9%**	55.1%	**19.1%**	40.1%	24.7%	37.4%
CO				4.5%	0.8%	23.1%	**6.9%**	30.3%	**9.1%**	24.7%	**11.8%**
ID					**3.7%**	**27.5%**	11.4%	**25.9%**	**4.6%**	**20.3%**	**7.3%**
MT						23.9%	7.6%	29.6%	8.4%	24.0%	**11.1%**
NV							16.3%	**52.5%**	**32.1%**	47.2%	34.7%
NM								37.0%	**16.0%**	31.5%	18.7%
OR									21.4%	**5.7%**	18.7%
UT										15.7%	**2.7%**
WA											13.0%

[a] Bold text indicates States that share a geographical border.

Table 74—Inter-State percentage differences in average yearly furniture log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	96.3%	43.0%	34.0%	16.5%	28.9%	NA	95.6%	11.2%	22.4%	16.4%	92.9%
AZ		**126.3%**	**67.8%**	83.1%	72.5%	**NA**	**0.9%**	104.7%	**78.1%**	83.2%	4.4%
CA			74.3%	58.5%	69.7%	**NA**	125.7%	**32.2%**	63.9%	58.4%	123.6%
CO				17.8%	5.3%	NA	**67.0%**	44.8%	**11.8%**	17.9%	**63.9%**
ID					**12.5%**	**NA**	82.3%	**27.6%**	**6.0%**	**0.1%**	**79.4%**
MT						NA	71.6%	39.8%	6.5%	12.6%	**68.6%**
NV							NA	**NA**	**NA**	NA	NA
NM								104.0%	**77.3%**	82.4%	3.5%
OR									33.4%	**27.5%**	101.4%
UT										6.1%	**74.3%**
WA											79.5%

[a] Bold text indicates States that share a geographical border.

Table 75—Inter-State percentage differences in average yearly cedar log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	NA	2.5%	NA	42.5%	33.7%	NA	NA	28.5%	NA	31.9%	41.9%
AZ		**NA**	**NA**	NA	NA	**NA**	**NA**	NA	**NA**	NA	NA
CA			NA	44.9%	36.2%	**NA**	NA	**31.0%**	NA	34.4%	44.3%
CO				NA	NA	NA	**NA**	NA	**NA**	NA	**NA**
ID					**9.1%**	**NA**	NA	**14.4%**	**NA**	**10.9%**	**0.6%**
MT						NA	NA	5.3%	NA	1.9%	**8.4%**
NV							NA	**NA**	**NA**	NA	NA
NM								NA	**NA**	NA	NA
OR									NA	**3.5%**	13.7%
UT										NA	**NA**
WA											10.3%

[a] Bold text indicates States that share a geographical border.

able 76—Inter-State percentage differences in average yearly fiber log conversion factors (MCF to MBF) used in the Western Region of the United States[a]

	State 2										
State 1	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
AK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AZ		**85.7%**	**19.2%**	2.8%	NA	**19.8%**	**27.9%**	10.8%	**9.8%**	20.5%	4.9%
CA			100.7%	83.4%	NA	**68.9%**	61.5%	**76.7%**	93.5%	68.2%	81.7%
CO				22.0%	NA	38.6%	**46.5%**	29.8%	**9.4%**	39.3%	**24.0%**
ID					**NA**	**17.0%**	25.1%	**8.0%**	**12.6%**	**17.7%**	**2.1%**
MT						NA	NA	NA	NA	NA	**NA**
NV							8.3%	**9.0%**	**29.4%**	0.7%	14.9%
NM								17.2%	**37.4%**	7.5%	23.1%
OR									20.5%	**9.7%**	5.9%
UT										30.1%	**14.7%**
WA											15.6%

[a] Bold text indicates States that share a geographical border.

Table 77—Inter-State percentage differences in average yearly log conversion factors (MCF to MBF) for other logs used in the Western Region of the United States[a]

	State 2										
State 1	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	104.5%	19.4%	70.9%	59.7%	70.6%	NA	96.8%	19.1%	69.5%	NA	51.6%
AZ		**89.6%**	**41.2%**	53.1%	41.6%	**NA**	**10.4%**	89.9%	**42.8%**	NA	61.2%
CA			53.3%	41.5%	52.9%	**NA**	81.1%	**0.3%**	51.8%	NA	32.9%
CO				12.5%	0.4%	NA	**31.2%**	53.6%	**1.7%**	NA	**21.3%**
ID					**12.1%**	**NA**	43.3%	**41.8%**	**10.9%**	**NA**	**8.8%**
MT						NA	31.6%	53.2%	1.3%	NA	**20.9%**
NV							NA	**NA**	**NA**	NA	NA
NM								81.4%	**32.8%**	NA	51.6%
OR									52.1%	**NA**	33.3%
UT										NA	**19.7%**
WA											NA

[a] Bold text indicates States that share a geographical border.

Table 78—Inter-State percentage differences in residue conversion factors (standard cords to MCF) in the Southern Region of the United States[a]

		State 2											
State 1	Species type	AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Hardwood	2.1%	**0.0%**	**0.0%**	1.5%	0.0%	**6.2%**	2.1%	0.0%	2.1%	**2.1%**	2.1%	1.5%
	Softwood	0.0%	**2.2%**	**0.0%**	1.0%	2.2%	**5.6%**	0.0%	0.0%	0.0%	**0.0%**	0.0%	1.0%
AR	Hardwood		2.1%	2.1%	0.7%	**2.1%**	**8.3%**	0.0%	**2.1%**	0.0%	**0.0%**	**0.0%**	0.7%
	Softwood		2.2%	0.0%	1.0%	**2.2%**	**5.6%**	0.0%	**0.0%**	0.0%	**0.0%**	**0.0%**	1.0%
FL	Hardwood			**0.0%**	1.5%	0.0%	6.2%	2.1%	0.0%	2.1%	2.1%	2.1%	1.5%
	Softwood			**2.2%**	3.1%	0.0%	3.4%	2.2%	2.2%	2.2%	2.2%	2.2%	3.1%
GA	Hardwood				1.5%	0.0%	6.2%	**2.1%**	0.0%	**2.1%**	**2.1%**	2.1%	1.5%
	Softwood				1.0%	2.2%	5.6%	**0.0%**	0.0%	**0.0%**	**0.0%**	0.0%	1.0%
KY	Hardwood					1.5%	7.6%	0.7%	1.5%	0.7%	**0.7%**	0.7%	**0.0%**
	Softwood					3.1%	6.6%	1.0%	1.0%	1.0%	**1.0%**	1.0%	**0.0%**
LA	Hardwood						**6.2%**	2.1%	0.0%	2.1%	2.1%	**2.1%**	1.5%
	Softwood						**3.4%**	2.2%	2.2%	2.2%	2.2%	**2.2%**	3.1%
MS	Hardwood							8.3%	6.2%	8.3%	**8.3%**	8.3%	7.6%
	Softwood							5.6%	5.6%	5.6%	**5.6%**	5.6%	6.6%
NC	Hardwood								2.1%	**0.0%**	**0.0%**	0.0%	**0.7%**
	Softwood								0.0%	**0.0%**	**0.0%**	0.0%	**1.0%**
OK	Hardwood									2.1%	2.1%	**2.1%**	1.5%
	Softwood									0.0%	0.0%	**0.0%**	1.0%
SC	Hardwood										0.0%	0.0%	0.7%
	Softwood										0.0%	0.0%	1.0%
TN	Hardwood											0.0%	**0.7%**
	Softwood											0.0%	**1.0%**
TX	Hardwood												0.7%
	Softwood												1.0%

[a] Bold text indicates States that share a geographical border.

Table 79—Inter-State percentage differences in roundwood-to-residue conversion factors for saw logs (MBF to green tons) in the Southern Region of the United States[a]

State 1	Residue type[b]	Species Type	State 2											
			AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Bark	Hardwood	13.0%	**0.0%**	**0.0%**	13.0%	0.0%	**0.0%**	13.0%	13.0%	0.0%	**13.0%**	13.0%	13.0%
		Softwood	29.2%	**0.0%**	**0.0%**	29.2%	0.0%	**0.0%**	29.2%	29.2%	0.0%	**29.2%**	29.2%	29.2%
AR	Bark	Hardwood		13.0%	13.0%	0.0%	**13.0%**	**13.0%**	0.0%	**0.0%**	13.0%	**0.0%**	**0.0%**	0.0%
		Softwood		29.2%	29.2%	0.0%	**29.2%**	**29.2%**	0.0%	**0.0%**	29.2%	**0.0%**	**0.0%**	0.0%
FL	Bark	Hardwood			**0.0%**	13.0%	0.0%	0.0%	13.0%	13.0%	0.0%	13.0%	13.0%	13.0%
		Softwood			**0.0%**	29.2%	0.0%	0.0%	29.2%	29.2%	0.0%	29.2%	29.2%	29.2%
GA	Bark	Hardwood				13.0%	0.0%	0.0%	**13.0%**	13.0%	**0.0%**	**13.0%**	13.0%	13.0%
		Softwood				29.2%	0.0%	0.0%	**29.2%**	29.2%	**0.0%**	**29.2%**	29.2%	29.2%
KY	Bark	Hardwood					13.0%	13.0%	0.0%	0.0%	13.0%	**0.0%**	0.0%	**0.0%**
		Softwood					29.2%	29.2%	0.0%	0.0%	29.2%	**0.0%**	0.0%	**0.0%**
LA	Bark	Hardwood						**0.0%**	13.0%	13.0%	0.0%	13.0%	**13.0%**	13.0%
		Softwood						**0.0%**	29.2%	29.2%	0.0%	29.2%	**29.2%**	29.2%
MS	Bark	Hardwood							13.0%	13.0%	0.0%	**13.0%**	13.0%	13.0%
		Softwood							29.2%	29.2%	0.0%	**29.2%**	29.2%	29.2%
NC	Bark	Hardwood								0.0%	**13.0%**	**0.0%**	0.0%	**0.0%**
		Softwood								0.0%	**29.2%**	**0.0%**	0.0%	**0.0%**
OK	Bark	Hardwood									13.0%	0.0%	**0.0%**	0.0%
		Softwood									29.2%	0.0%	**0.0%**	0.0%
SC	Bark	Hardwood										13.0%	13.0%	13.0%
		Softwood										29.2%	29.2%	29.2%
TN	Bark	Hardwood											0.0%	**0.0%**
		Softwood											0.0%	**0.0%**
TX	Bark	Hardwood												0.0%
		Softwood												0.0%
AL	Coarse	Hardwood	10.6%	**3.1%**	**0.0%**	5.4%	3.1%	**0.0%**	10.6%	10.6%	8.8%	**10.6%**	10.6%	5.4%
		Softwood	5.0%	**3.0%**	**0.0%**	13.1%	3.0%	**0.0%**	5.0%	5.0%	17.6%	**5.0%**	5.0%	13.1%
AR	Coarse	Hardwood		7.5%	10.6%	5.2%	**7.5%**	**10.6%**	0.0%	**0.0%**	1.8%	**0.0%**	**0.0%**	5.2%
		Softwood		1.9%	5.0%	8.2%	**1.9%**	**5.0%**	0.0%	**0.0%**	12.7%	**0.0%**	**0.0%**	8.2%
FL	Coarse	Hardwood			**3.1%**	2.3%	0.0%	3.1%	7.5%	7.5%	5.7%	7.5%	7.5%	2.3%
		Softwood			**3.0%**	10.1%	0.0%	3.0%	1.9%	1.9%	14.6%	1.9%	1.9%	10.1%
GA	Coarse	Hardwood				5.4%	3.1%	0.0%	**10.6%**	10.6%	**8.8%**	**10.6%**	10.6%	5.4%
		Softwood				13.1%	3.0%	0.0%	**5.0%**	5.0%	**17.6%**	**5.0%**	5.0%	13.1%
KY	Coarse	Hardwood					2.3%	5.4%	5.2%	5.2%	3.4%	**5.2%**	5.2%	**0.0%**
		Softwood					10.1%	13.1%	8.2%	8.2%	4.5%	**8.2%**	8.2%	**0.0%**
LA	Coarse	Hardwood						**3.1%**	7.5%	7.5%	5.7%	7.5%	**7.5%**	2.3%
		Softwood						**3.0%**	1.9%	1.9%	14.6%	1.9%	**1.9%**	10.1%
MS	Coarse	Hardwood							10.6%	10.6%	8.8%	**10.6%**	10.6%	5.4%
		Softwood							5.0%	5.0%	17.6%	**5.0%**	5.0%	13.1%
NC	Coarse	Hardwood								0.0%	**1.8%**	**0.0%**	0.0%	**5.2%**
		Softwood								0.0%	**12.7%**	**0.0%**	0.0%	**8.2%**
OK	Coarse	Hardwood									1.8%	0.0%	**0.0%**	5.2%
		Softwood									12.7%	0.0%	**0.0%**	8.2%
SC	Coarse	Hardwood										1.8%	1.8%	3.4%
		Softwood										12.7%	12.7%	4.5%
TN	Coarse	Hardwood											0.0%	**5.2%**
		Softwood											0.0%	**8.2%**

(Continued)

Table 79 *(Continued)*—Inter-State percentage differences in roundwood-to-residue conversion factors for saw logs (MBF to green tons) in the Southern Region of the United States[a]

State 1	Residue type[b]	Species Type	State 2											
			AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
TX	Coarse	Hardwood												5.2%
		Softwood												8.2%
AL	Sawdust	Hardwood	7.5%	**0.0%**	**0.0%**	7.5%	0.0%	**0.0%**	7.5%	7.5%	0.0%	**7.5%**	7.5%	7.5%
		Softwood	16.8%	**0.0%**	**0.0%**	16.8%	0.0%	**0.0%**	16.8%	16.8%	0.0%	**16.8%**	16.8%	16.8%
AR	Sawdust	Hardwood		7.5%	7.5%	0.0%	**7.5%**	**7.5%**	0.0%	**0.0%**	7.5%	**0.0%**	**0.0%**	0.0%
		Softwood		16.8%	16.8%	0.0%	**16.8%**	**16.8%**	0.0%	**0.0%**	16.8%	**0.0%**	**0.0%**	0.0%
FL	Sawdust	Hardwood			**0.0%**	7.5%	0.0%	0.0%	7.5%	7.5%	0.0%	7.5%	7.5%	7.5%
		Softwood			**0.0%**	16.8%	0.0%	0.0%	16.8%	16.8%	0.0%	16.8%	16.8%	16.8%
GA	Sawdust	Hardwood				7.5%	0.0%	0.0%	**7.5%**	7.5%	**0.0%**	**7.5%**	7.5%	7.5%
		Softwood				16.8%	0.0%	0.0%	**16.8%**	16.8%	**0.0%**	**16.8%**	16.8%	16.8%
KY	Sawdust	Hardwood					7.5%	7.5%	0.0%	0.0%	7.5%	**0.0%**	0.0%	**0.0%**
		Softwood					16.8%	16.8%	0.0%	0.0%	16.8%	**0.0%**	0.0%	**0.0%**
LA	Sawdust	Hardwood						**0.0%**	7.5%	7.5%	0.0%	7.5%	**7.5%**	7.5%
		Softwood						**0.0%**	16.8%	16.8%	0.0%	16.8%	**16.8%**	16.8%
MS	Sawdust	Hardwood							7.5%	7.5%	0.0%	**7.5%**	7.5%	7.5%
		Softwood							16.8%	16.8%	0.0%	**16.8%**	16.8%	16.8%
NC	Sawdust	Hardwood								0.0%	**7.5%**	**0.0%**	0.0%	**0.0%**
		Softwood								0.0%	**16.8%**	**0.0%**	0.0%	**0.0%**
OK	Sawdust	Hardwood									7.5%	0.0%	**0.0%**	0.0%
		Softwood									16.8%	0.0%	**0.0%**	0.0%
SC	Sawdust	Hardwood										7.5%	7.5%	7.5%
		Softwood										16.8%	16.8%	16.8%
TN	Sawdust	Hardwood											0.0%	**0.0%**
		Softwood											0.0%	**0.0%**
TX	Sawdust	Hardwood												0.0%
		Softwood												0.0%

[a] Bold text indicates States that share a geographical border.

[b] Shavings are not included in the table as conversion factors only vary by species type.

Table 80—Inter-State percentage differences in roundwood-to-residue conversion factors for veneer logs (MBF to green tons) in the Southern Region of the United States[a]

State 1	Residue type	Species type	State 2											
			AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Bark	Hardwood	13.0%	**0.0%**	**0.0%**	13.0%	0.0%	**0.0%**	13.0%	13.0%	0.0%	**13.0%**	13.0%	13.0%
		Softwood	29.2%	**0.0%**	**0.0%**	29.2%	0.0%	**0.0%**	29.2%	29.2%	0.0%	**29.2%**	29.2%	29.2%
AR	Bark	Hardwood		13.0%	13.0%	0.0%	**13.0%**	**13.0%**	0.0%	**0.0%**	13.0%	**0.0%**	**0.0%**	0.0%
		Softwood		29.2%	29.2%	0.0%	**29.2%**	**29.2%**	0.0%	**0.0%**	29.2%	**0.0%**	**0.0%**	0.0%
FL	Bark	Hardwood			**0.0%**	13.0%	0.0%	0.0%	13.0%	13.0%	0.0%	13.0%	13.0%	13.0%
		Softwood			**0.0%**	29.2%	0.0%	0.0%	29.2%	29.2%	0.0%	29.2%	29.2%	29.2%
GA	Bark	Hardwood				13.0%	0.0%	0.0%	**13.0%**	13.0%	**0.0%**	**13.0%**	13.0%	13.0%
		Softwood				29.2%	0.0%	0.0%	**29.2%**	29.2%	**0.0%**	**29.2%**	29.2%	29.2%
KY	Bark	Hardwood					13.0%	13.0%	0.0%	0.0%	13.0%	**0.0%**	0.0%	**0.0%**
		Softwood					29.2%	29.2%	0.0%	0.0%	29.2%	**0.0%**	0.0%	**0.0%**
LA	Bark	Hardwood						**0.0%**	13.0%	13.0%	0.0%	13.0%	**13.0%**	13.0%
		Softwood						**0.0%**	29.2%	29.2%	0.0%	29.2%	**29.2%**	29.2%
MS	Bark	Hardwood							13.0%	13.0%	0.0%	**13.0%**	13.0%	13.0%
		Softwood							29.2%	29.2%	0.0%	**29.2%**	29.2%	29.2%
NC	Bark	Hardwood								0.0%	**13.0%**	**0.0%**	0.0%	**0.0%**
		Softwood								0.0%	**29.2%**	**0.0%**	0.0%	**0.0%**
OK	Bark	Hardwood									13.0%	0.0%	**0.0%**	0.0%
		Softwood									29.2%	0.0%	**0.0%**	0.0%
SC	Bark	Hardwood										13.0%	13.0%	13.0%
		Softwood										29.2%	29.2%	29.2%
TN	Bark	Hardwood											0.0%	**0.0%**
		Softwood											0.0%	**0.0%**
TX	Bark	Hardwood												0.0%
		Softwood												0.0%
AL	Coarse	Hardwood	60.0%	**3.1%**	**0.0%**	60.0%	3.1%	**0.0%**	60.0%	60.0%	8.8%	**60.0%**	60.0%	60.0%
		Softwood	3.5%	**3.0%**	**0.0%**	3.5%	3.0%	**0.0%**	3.5%	3.5%	17.6%	**3.5%**	3.5%	3.5%
AR	Coarse	Hardwood		62.7%	60.0%	0.0%	**62.7%**	**60.0%**	0.0%	**0.0%**	67.8%	**0.0%**	**0.0%**	0.0%
		Softwood		6.5%	3.5%	0.0%	**6.5%**	**3.5%**	0.0%	**0.0%**	21.0%	**0.0%**	**0.0%**	0.0%
FL	Coarse	Hardwood			**3.1%**	62.7%	0.0%	3.1%	62.7%	62.7%	5.7%	62.7%	62.7%	62.7%
		Softwood			**3.0%**	6.5%	0.0%	3.0%	6.5%	6.5%	14.6%	6.5%	6.5%	6.5%
GA	Coarse	Hardwood				60.0%	3.1%	0.0%	**60.0%**	60.0%	**8.8%**	**60.0%**	60.0%	60.0%
		Softwood				3.5%	3.0%	0.0%	**3.5%**	3.5%	**17.6%**	**3.5%**	3.5%	3.5%
KY	Coarse	Hardwood					62.7%	60.0%	0.0%	0.0%	67.8%	**0.0%**	0.0%	**0.0%**
		Softwood					6.5%	3.5%	0.0%	0.0%	21.0%	**0.0%**	0.0%	**0.0%**
LA	Coarse	Hardwood						**3.1%**	62.7%	62.7%	5.7%	62.7%	**62.7%**	62.7%
		Softwood						**3.0%**	6.5%	6.5%	14.6%	6.5%	**6.5%**	6.5%
MS	Coarse	Hardwood							60.0%	60.0%	8.8%	**60.0%**	60.0%	60.0%
		Softwood							3.5%	3.5%	17.6%	**3.5%**	3.5%	3.5%
NC	Coarse	Hardwood								0.0%	**67.8%**	**0.0%**	0.0%	**0.0%**
		Softwood								0.0%	**21.0%**	**0.0%**	0.0%	**0.0%**
OK	Coarse	Hardwood									67.8%	0.0%	**0.0%**	0.0%
		Softwood									21.0%	0.0%	**0.0%**	0.0%
SC	Coarse	Hardwood										67.8%	67.8%	67.8%
		Softwood										21.0%	21.0%	21.0%
TN	Coarse	Hardwood											0.0%	**0.0%**
		Softwood											0.0%	**0.0%**

(Continued)

Table 80 *(Continued)*—Inter-State percentage differences in roundwood-to-residue conversion factors for veneer logs (MBF to green tons) in the Southern Region of the United States[a]

State 1	Residue type	Species type	State 2											
			AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
TX	Coarse	Hardwood												0.0%
		Softwood												0.0%
AL	Sawdust/ shavings	Hardwood	112.3%	**0.0%**	**0.0%**	112.3%	0.0%	**0.0%**	112.3%	112.3%	0.0%	**112.3%**	112.3%	112.3%
		Softwood	75.3%	**0.0%**	**0.0%**	75.3%	0.0%	**0.0%**	75.3%	75.3%	0.0%	**75.3%**	75.3%	75.3%
AR	Sawdust/ shavings	Hardwood		112.3%	112.3%	0.0%	**112.3%**	**112.3%**	0.0%	**0.0%**	112.3%	**0.0%**	**0.0%**	0.0%
		Softwood		75.3%	75.3%	0.0%	**75.3%**	**75.3%**	0.0%	**0.0%**	75.3%	**0.0%**	**0.0%**	0.0%
FL	Sawdust/ shavings	Hardwood			**0.0%**	112.3%	0.0%	0.0%	112.3%	112.3%	0.0%	112.3%	112.3%	112.3%
		Softwood			**0.0%**	75.3%	0.0%	0.0%	75.3%	75.3%	0.0%	75.3%	75.3%	75.3%
GA	Sawdust/ shavings	Hardwood				112.3%	0.0%	0.0%	**112.3%**	112.3%	**0.0%**	**112.3%**	112.3%	112.3%
		Softwood				75.3%	0.0%	0.0%	**75.3%**	75.3%	**0.0%**	**75.3%**	75.3%	75.3%
KY	Sawdust/ shavings	Hardwood					112.3%	112.3%	0.0%	0.0%	112.3%	**0.0%**	0.0%	**0.0%**
		Softwood					75.3%	75.3%	0.0%	0.0%	75.3%	**0.0%**	0.0%	**0.0%**
LA	Sawdust/ shavings	Hardwood						**0.0%**	112.3%	112.3%	0.0%	112.3%	**112.3%**	112.3%
		Softwood						**0.0%**	75.3%	75.3%	0.0%	75.3%	**75.3%**	75.3%
MS	Sawdust/ shavings	Hardwood							112.3%	112.3%	0.0%	**112.3%**	112.3%	112.3%
		Softwood							75.3%	75.3%	0.0%	**75.3%**	75.3%	75.3%
NC	Sawdust/ shavings	Hardwood								0.0%	**112.3%**	**0.0%**	0.0%	**0.0%**
		Softwood								0.0%	**75.3%**	**0.0%**	0.0%	**0.0%**
OK	Sawdust/ shavings	Hardwood									112.3%	0.0%	**0.0%**	0.0%
		Softwood									75.3%	0.0%	**0.0%**	0.0%
SC	Sawdust/ shavings	Hardwood										112.3%	112.3%	112.3%
		Softwood										75.3%	75.3%	75.3%
TN	Sawdust/ shavings	Hardwood											0.0%	**0.0%**
		Softwood											0.0%	**0.0%**
TX	Sawdust/ shavings	Hardwood												0.0%
		Softwood												0.0%

[a] Bold text indicates States that share a geographical border.

Table 81—Inter-State percentage differences in roundwood-to-bark residue conversion factors for composite panel/engineered wood product logs (standard cords to green tons) in the Southern Region of the United States[a]

State 1	Species type	State 2											
		AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
AL	Hardwood	2.2%	**0.0%**	**0.0%**	1.5%	0.0%	**0.0%**	2.2%	2.2%	6.2%	**2.2%**	2.2%	1.4%
	Softwood	0.0%	**2.2%**	**0.0%**	0.9%	2.2%	**0.0%**	0.0%	0.0%	5.7%	**0.0%**	0.0%	0.9%
AR	Hardwood		2.2%	2.2%	0.8%	**2.2%**	**2.2%**	0.0%	**0.0%**	8.4%	**0.0%**	**0.0%**	0.8%
	Softwood		2.2%	0.0%	0.9%	**2.2%**	**0.0%**	0.0%	**0.0%**	5.7%	**0.0%**	**0.0%**	0.9%
FL	Hardwood			**0.0%**	1.5%	0.0%	0.0%	2.2%	2.2%	6.2%	2.2%	2.2%	1.4%
	Softwood			**2.2%**	3.1%	0.0%	2.2%	2.2%	2.2%	3.5%	2.2%	2.2%	3.1%
GA	Hardwood				1.5%	0.0%	0.0%	**2.2%**	2.2%	**6.2%**	**2.2%**	2.2%	1.4%
	Softwood				0.9%	2.2%	0.0%	**0.0%**	0.0%	**5.7%**	**0.0%**	0.0%	0.9%
KY	Hardwood					1.5%	1.5%	0.8%	0.8%	7.6%	**0.8%**	0.8%	**0.0%**
	Softwood					3.1%	0.9%	0.9%	0.9%	6.6%	**0.9%**	0.9%	**0.0%**
LA	Hardwood						**0.0%**	2.2%	2.2%	6.2%	2.2%	**2.2%**	1.4%
	Softwood						**2.2%**	2.2%	2.2%	3.5%	2.2%	**2.2%**	3.1%
MS	Hardwood							2.2%	2.2%	6.2%	**2.2%**	2.2%	1.4%
	Softwood							0.0%	0.0%	5.7%	**0.0%**	0.0%	0.9%
NC	Hardwood								0.0%	**8.4%**	**0.0%**	0.0%	**0.8%**
	Softwood								0.0%	**5.7%**	**0.0%**	0.0%	**0.9%**
OK	Hardwood									8.4%	0.0%	**0.0%**	0.8%
	Softwood									5.7%	0.0%	**0.0%**	0.9%
SC	Hardwood										8.4%	8.4%	7.6%
	Softwood										5.7%	5.7%	6.6%
TN	Hardwood											0.0%	**0.8%**
	Softwood											0.0%	**0.9%**
TX	Hardwood												0.8%
	Softwood												0.9%

[a] Bold text indicates States that share a geographical border.

Table 82—Inter-State percentage differences in average yearly roundwood-to-residue conversion factors (MBF lumber tally to BDU) for western sawmills[a]

State 1	Residue type	State 2										
		AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
AK	Bark	24.5%	24.5%	24.5%	17.4%	21.7%	NA	24.5%	2.0%	24.5%	NA	25.6%
	Coarse	0.0%	50.0%	0.0%	39.4%	30.0%	NA	0.0%	48.3%	0.0%	NA	30.8%
	Sawdust	16.2%	15.9%	16.2%	12.5%	17.9%	NA	16.2%	31.8%	16.2%	NA	55.3%
	Planer shavings	15.4%	15.4%	15.4%	8.0%	68.3%	NA	15.4%	11.8%	15.4%	NA	71.4%
AZ	Bark		**0.0%**	**0.0%**	7.1%	45.6%	**NA**	**0.0%**	26.5%	**0.0%**	NA	1.1%
	Coarse		**50.0%**	**0.0%**	39.4%	30.0%	**NA**	**0.0%**	48.3%	**0.0%**	NA	30.8%
	Sawdust		**31.9%**	**0.0%**	28.6%	1.7%	**NA**	**0.0%**	47.4%	**0.0%**	NA	40.0%
	Planer shavings		**0.0%**	**0.0%**	7.4%	54.3%	**NA**	**0.0%**	27.0%	**0.0%**	NA	57.6%
CA	Bark			0.0%	7.1%	45.6%	**NA**	0.0%	**26.5%**	0.0%	NA	1.1%
	Coarse			50.0%	11.1%	20.7%	**NA**	50.0%	**1.8%**	50.0%	NA	20.0%
	Sawdust			31.9%	3.4%	33.5%	**NA**	31.9%	**16.1%**	31.9%	NA	69.7%
	Planer shavings			0.0%	7.4%	54.3%	**NA**	0.0%	**27.0%**	0.0%	NA	57.6%
CO	Bark				7.1%	45.6%	NA	**0.0%**	26.5%	**0.0%**	NA	**1.1%**
	Coarse				39.4%	30.0%	NA	**0.0%**	48.3%	**0.0%**	NA	**30.8%**
	Sawdust				28.6%	1.7%	NA	**0.0%**	47.4%	**0.0%**	NA	**40.0%**
	Planer shavings				7.4%	54.3%	NA	**0.0%**	27.0%	**0.0%**	NA	**57.6%**
ID	Bark					**38.8%**	**NA**	7.1%	**19.4%**	**7.1%**	**NA**	**8.3%**
	Coarse					**9.7%**	**NA**	39.4%	**9.3%**	**39.4%**	**NA**	**8.9%**
	Sawdust					**30.2%**	**NA**	28.6%	**19.5%**	**28.6%**	**NA**	**66.7%**
	Planer shavings					**61.1%**	**NA**	7.4%	**19.7%**	**7.4%**	**NA**	**64.3%**
MT	Bark						NA	45.6%	19.8%	45.6%	NA	**46.7%**
	Coarse						NA	30.0%	18.9%	30.0%	NA	**0.8%**
	Sawdust						NA	1.7%	49.0%	1.7%	NA	**38.4%**
	Planer shavings						NA	54.3%	78.5%	54.3%	NA	**3.6%**
NV	Bark							NA	**NA**	**NA**	NA	NA
	Coarse							NA	**NA**	**NA**	NA	NA
	Sawdust							NA	**NA**	**NA**	NA	NA
	Planer shavings							NA	**NA**	**NA**	NA	NA
NM	Bark								26.5%	**0.0%**	NA	1.1%
	Coarse								48.3%	**0.0%**	NA	30.8%
	Sawdust								47.4%	**0.0%**	NA	40.0%
	Planer shavings								27.0%	**0.0%**	NA	57.6%
OR	Bark									26.5%	**NA**	27.6%
	Coarse									48.3%	**NA**	18.2%
	Sawdust									47.4%	**NA**	83.5%
	Planer shavings									27.0%	**NA**	81.5%
UT	Bark										NA	**1.1%**
	Coarse										NA	**30.8%**
	Sawdust										NA	**40.0%**
	Planer shavings										NA	**57.6%**
WA	Bark											NA
	Coarse											NA
	Sawdust											NA
	Planer shavings											NA

[a] Bold text indicates States that share a geographical border.

Summary

In order to determine the source and volume of raw materials used by the U.S. forest products industry, the Forest Service FIA program conducts surveys of primary wood-using mills. Surveys are administered through regional coordinators in the Southern, Northern, and Western Regions. A primary goal of the regional surveys is to determine the volume of roundwood received at mills by product type, species, and source location of the roundwood received. In addition, mill surveys provide information on the type, volume, and disposition of residues produced during roundwood processing. The measurement units for reported volumes, however, can vary from mill to mill. To account for the inconsistency in reported measurement units, each region has developed conversion factors for transforming raw mill data to regional and national standards.

This report provides a compilation of all roundwood and residue conversion factors used by FIA in regional and national data processing systems, as well as examples of each conversion type. In addition, a quantitative analysis of conversion factor variability within and between regions is provided, and sources of variability are compared to what would be expected for each type of conversion. Expected variability sources are limited to data currently collected from regional mill surveys. Results of the comparative analysis indicate that many of the variability sources associated with conversion factors currently used in TPO data processing don't align with expected sources of variability. It's important to note, however, that the significance of each variability source is difficult to determine, and it's likely that some variables carry more weight than others or that the contributions from some variables are insignificant. The purpose of the variability analysis is to identify areas where conversion factor accuracy and consistency can be improved upon at both the regional and national levels.

We recommend that the FIA TPO program improve the consistency and accuracy of conversion factors nationwide using the analysis presented in this report as a guide. Specific questions that may guide conversion factor improvement are:

1. Are the regional and national standard units of measure consistent with actual usage by mills?
2. What is the origin of the conversion factor used?
3. What technological advances have been incorporated in the milling process, and do the conversion factors appropriately incorporate the technical advances?
4. Specific gravity and density estimates (e.g., pounds per cubic foot) for the range of species used for products are available in the literature. How consistent are conversion factors with published densities?

Literature Cited

Bond, B. 2011. Understanding log scales and log rules. PB 1650. Knoxville, TN: University of Tennessee, Institute of Agriculture, UT Extension. 8 p.

Clark, A.; Daniels, R.F. 2000. Estimating moisture content of tree-length roundwood. In: Pulping/process and product quality conference; Sheraton Boston. [Place of publication unknown]: Technical Association of the Pulp and Paper Industry. [Pages unknown].

Clark, A.; Phillips, D.R.; Frederick, D.J. 1985. Weight, volume, and physical properties of major hardwood species in the Gulf and Atlantic Coastal Plains. Res. Pap. SE-250. Asheville, NC: U.S. Department of Agriculture Forest Service, Southeastern Forest Experiment Station. 72 p.

Clark, A.; Phillips, D.R.; Frederick, D.J. 1986a. Weight, volume, and physical properties of major hardwood species in the Upland-South. Res. Pap. SE-257. Asheville, NC: U.S. Department of Agriculture Forest Service, Southeastern Forest Experiment Station. 61 p.

Clark, A.; Phillips, D.R.; Frederick, D.J. 1986b. Weight, volume, and physical properties of major hardwood species in the Piedmont. Res. Pap. SE-255. Asheville, NC: U.S. Department of Agriculture Forest Service, Southeastern Forest Experiment Station. 84 p.

Clark, A.; Souter, R.A.; Schlaegel, B.E. 1991. Stem profile equations for southern tree species. Res. Pap. SE-282. Asheville, NC: U.S. Department of Agriculture Forest Service, Southeastern Forest Experiment Station. 113 p.

Coulston, J.W.; Westfall, J.A.; Wear, D.N. [and others]. 2018. Annual monitoring of U.S. timber production: rationale and design. Forest Science. 64(5): 533–543.

Doruska, P.; Patterson, D.; Hartley, J; Hurd, M. 2006. Outside-bark green tons per thousand board feet: a case study using sawtimber-sized hardwood trees in Arkansas. Journal of Forestry. 104(7): 345–351.

Fonseca, M.A. 2005. The measurement of roundwood: methodologies and conversion ratios. Wallingford, Oxfordshire, UK: CABI Publishing. 269 p.

Freese, F. 1973. A collection of log rules. Gen. Tech. Rep. FPL-01. Madison, WI: U.S. Department of Agriculture Forest Service, Forest Products Laboratory. 65 p.

Glass, S.V.; Zelinka, S.L. 2010. Moisture relations and physical properties of wood. In: Ross, R.J., ed. Wood handbook: wood as an engineering material. Centennial ed. Gen. Tech. Rep. FPL-190. Madison, WI: U.S. Department of Agriculture Forest Service, Forest Products Laboratory: 4.1–4.19. Chapter 4.

Miles, P.D.; Smith, W.B. 2009. Specific gravity and other properties of wood and bark for 156 tree species found in North America. Res. Note NRS-38. Newtown Square, PA: U.S. Department of Agriculture Forest Service, Northern Research Station. 35 p.

Ross, R.J., ed. 2010. Wood handbook: wood as an engineering material. Gen. Tech. Rep. FPL-190. Madison, WI: U.S. Department of Agriculture Forest Service, Forest Products Laboratory. 509 p.

Spelter, H. 2003. Challenges in converting among log scaling methods. Res. Pap. FPL-611. Madison, WI: U.S. Department of Agriculture Forest Service, Forest Products Laboratory. 8 p.

Definition of Terms

Bark mill residue—Bark and wood fragments removed from roundwood products as a result of the debarking process.

Bioenergy—The creation of energy (electricity, heat, steam, etc.) from plant or animal materials.

Bolt—Section of a tree bucked into specific lengths which are <8 feet.

Byproducts—Secondary wood products (e.g., pulp chips, animal bedding, fuelwood, etc.) recycled from mill residues.

Cant—A partially sawn log with at least one flat side.

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

Composite products—Roundwood products manufactured into chips, wafers, strands, flakes, shavings, or sawdust and then reconstituted into a variety of panel and engineered lumber products.

Conversion factor—A numerical factor used to convert a quantity from one unit of measure to another.

Fiber products—Byproducts used in the manufacture of pulp, paper, paperboard, and composite products, like waferboard, chip board, etc.

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

Fuelwood—Roundwood products and mill residue byproducts used to produce some form of energy (heat, steam, etc.) in residential, industrial, or institutional settings.

Furniture logs—Roundwood timber products, regardless of size or quality, used to directly manufacture furniture. Furniture logs are often used to produce rustic western furniture.

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

House/cabin logs—Roundwood used in the primary construction of log homes or cabins. Logs can either be peeled and used in roundwood form or sawn into cants.

Industrial roundwood products—Roundwood products (e.g., saw logs, pulpwood, veneer logs, etc.) intended to be processed into primary wood products (e.g., lumber, wood pulp, sheathing, etc.) at primary wood-using mills.

Latillas—A peeled branch or piece of wood laid between beams of a ceiling or above the vigas for decoration.

Log—Section of a tree bucked into lengths of 8 feet or more.

Log rule—A table or formula showing the estimated net yield for logs of a given diameter and length.

Lumber tally—A record of lumber giving the number of boards or pieces by size, grade, and species, often expressed in board feet.

Mill residues—Wood materials (coarse and fine) and bark generated at manufacturing plants (primary wood-using mills) when roundwood products are processed into primary wood products, including slabs, edgings, trimmings, sawdust, veneer clippings and cores, and pulp screenings. (Note: Includes mill residues recycled as byproducts as well as those left unutilized and disposed of as waste.)

Other products—A miscellaneous category of roundwood products (cooperage, excelsior, shingles, etc.) and mill residue byproducts (bedding, mulch, etc.).

Posts, poles, and pilings—Roundwood products milled (cut, peeled, etc.) into standard sizes (lengths and circumferences) to be put in the ground to provide vertical and lateral support in buildings, foundations, utility lines, and fences. May also include nonindustrial (unmilled) products.

Primary wood products—The rough and finished products (lumber, wood pulp, veneer sheathing, handles, etc.) manufactured from roundwood products at primary wood-using mills.

Primary wood-using mills—Mills that convert roundwood products (saw logs, veneer logs, pulpwood, etc.) into primary wood products, like lumber, sheathing, wood pulp, etc. (also known as roundwood receiving facilities).

Pulpwood—Roundwood logs, bolts, or chips reduced to individual wood fibers by chemical or mechanical means for the manufacture of a variety of paper and paperboard products.

Reporting unit—Units of measure applied to roundwood products for reporting purposes.

Residential fuelwood—Wood used as a source of fuel for households.

Roundwood products—Logs, bolts, or chips cut from trees for industrial and nonindustrial uses (saw logs, veneer logs, pulpwood, fuelwood, etc.).

Saw log—A roundwood product, usually 8 feet in length or longer, processed into a variety of sawn products (lumber, cants, blocks, squares, etc.).

Sawdust—Wood particles resulting from the cutting and breaking action of saw teeth, finer than chips but coarser than wood flour.

Scaling diameter—The inside-bark diameter of the small end of a log used in the determination of log volume.

Shavings—Small, thin slices of wood, usually curled, that develop from wood-machining operations such as planing, molding, shaping, boring, routing, and turning.

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

Species type—Tree species classification of hardwood or softwood.

Specific gravity—The ratio of the ovendry weight of wood to the weight of an equal volume of water.

Standard unit—A unit of measure applied to roundwood products. If units of measure are anything but the standard units, they are typically converted.

Stud logs—Logs typically from smaller trees 8–12 inches diameter at breast height (DBH) or from larger diameter tree "top logs." Products derived from stud logs are generally smaller dimension products such as 2 by 2s, 2 by 4s, 2 by 6s, or 2 by 8s.

Timber Product Output—The total volume of roundwood products harvested from all sources plus the volume of byproducts recovered from mill residues.

Unit of measure—A standardized and reproducible unit that can be used to measure any physical property.

Veneer/plywood log—A roundwood product peeled, sliced, stamped, or sawn into a variety of veneer products (sheathing, plywood, panels, containers, sticks, etc.).

Vigas—A rough-hewn roof timber or rafter, especially in an adobe building.

List of Abreviations

BDT	Bone dry tons
BDU	Bone dry units
C-pieces	Hundred pieces
CFU	Cubic foot units
M-pieces	Thousand pieces
MBF	Thousand board feet
MCF	Thousand cubic feet
MLF	Thousand linear feet
SWE	Solid wood equivalent

Appendix A: Conversion factor tables

Table A.1—Quick reference for tables containing roundwood conversion factors by roundwood type and region

	Region		
Product type	**Southern**	**Northern**	**Western**
Saw logs	2, 3, 4, 5	6	7
Stud logs	NA	NA	8
Veneer logs	2, 3, 4, 9	10	11
Pulp mill logs	12	13, 14	15
Composite/engineered products	16	13, 14	17
Bioenergy/industrial fuelwood	18	19	20
Posts, poles, pilings	21, 22	23, 24, 25	26, 27
House/cabin logs	2, 3, 4, 5, 21	28	29
Vigas/latillas	NA	NA	30, 31
Residential fuelwood	32	33	34
Furniture logs	NA	NA	36
Cedar logs	NA	NA	37
Fiber logs	NA	NA	38
Other products	See “Other Products” section	35	39

Table A.2—Quick reference for tables containing residue conversion factors by roundwood type and region

	Region		
Product type	**Southern**	**Northern**	**Western**
Saw logs	40, 44	45	54
Stud logs	NA	NA	55
Veneer logs	41, 44	46	55
Pulp mill logs	43, 44	47, 53	55
Composite/engineered products	42, 44	47, 53	55
Bioenergy/industrial fuelwood	43, 44	NA	55
Posts, poles, pilings	43, 44	49, 50, 51	55
House/cabin logs	43, 44	48	55
Vigas/latillas	NA	NA	55
Residential fuelwood	NA	NA	55
Furniture logs	NA	NA	55
Cedar logs	NA	NA	55
Fiber logs	NA	NA	55
Other products	43, 44	52	55

Appendix B: Measurement unit descriptions

The following is a brief explanation of each measurement unit referenced in this report. For more detailed information on measurement units and log rules, see Fonseca (2005) and Freese (1973). Note that some of the less common units of measure for residential fuelwood in the Northern Region are not included.

102-inch cord

A 102-inch cord is a volume measure of stacked wood that is 4 feet high x 4 feet wide x 102 inches long and occupies a space of 136 cubic feet. The measure includes wood, bark, and air space and is occasionally used for saw logs in the Northern United States.

104-inch cord

A 104-inch cord is a volume measure of stacked wood that is 4 feet high x 4 feet wide x 104 inches long and occupies a space of approximately 139 cubic feet. The measure includes wood, bark, and air space and is occasionally used for veneer logs in the Northern United States.

200-cubic-foot unit

A 200-cubic-foot unit is a volume unit of measurement used primarily for residues in the Western United States. As the name implies, a 200-cubic-foot unit is equivalent to 200 cubic feet. In this paper, all references to this unit of measure refer to the solid wood equivalent, or the roundwood equivalent volume of wood fiber. Solid wood equivalent assumes a green volume of wood, prior to any shrinkage.

4,600-pound cord

A 4,600-pound cord is a standard cord which weighs 4,600 pounds or 2.3 tons. This unit of measure is used occasionally in the Northern United States by pulpwood mills who buy wood by the pound but convert it to standard cord volume. It can also be used as a measure of mill residues.

Board foot

A board foot is equivalent to a board with dimensions 12 inches x 12 inches x 1 inch. Post-processing, board foot volume of lumber can be determined by simply tallying the lumber sawn from logs (lumber tally). In terms of logs, board foot volume is an estimate of the amount of lumber that can be sawn from the log. In order to estimate board foot volume, logs must be scaled using a specific log rule. A log rule is a mathematical formula or volume table that gives an estimate of the net yield of lumber in board feet for logs given a specific diameter and length. In general, log rules have allowances for yield losses due to saw kerf, slabs, edging, and shrinkage. Below are descriptions of log rules mentioned in this report.

Cedar log rule

The cedar log rule is a species-specific rule used primarily in the Southern United States for scaling eastern redcedar logs. The following formula is used to scale cedar logs:

$$(D2 \times L) / 27$$

where

D = the inside bark small-end diameter in inches

L = the log length in feet

Doyle log rule

The Doyle log rule is a formula-based log rule commonly used in the Central and Eastern United States. The formula used to estimate board foot log volume is:

$$(D - 4)^2 \times L / 16$$

where

D = the inside bark small-end diameter in inches
L = the log length in feet

This rule assumes a cylinder with a 4-inch slab loss and a 25-percent loss from shrinkage and saw kerf.

International ¼-inch log rule

The International ¼-inch rule is a formula-based log rule used primarily in the Eastern United States. This rule has a ¼-inch saw kerf allowance and takes into account log taper. The rule assumes a taper of ½ inch in 4 feet of nominal log length. The formulas used to calculate board foot volume differ by log length, and all calculated values are rounded to the nearest 5 board feet. For 4-foot logs, the formula is: $0.199 \times D^2 - 0.642 \times D$. For 8-foot logs, the formula is: $0.398 \times D^2 - 1.086 \times D - 0.27$. For 12-foot logs, the formula is: $0.597 \times D^2 - 1.330 \times D - 0.72$. For 16-foot logs, the formula is: $0.796 \times D^2 - 1.375 \times D - 1.23$. For 20-foot logs, the formula is: $0.995 \times D^2 - 1.221 \times D - 1.72$. In all formulas, D = the inside bark small-end diameter in inches. As the formulas are somewhat cumbersome, board foot volume determination using the International ¼-inch rule is typically done with a volume table.

Scribner log rule

The Scribner log rule is primarily used in the Western United States and for pine saw logs in the Southern United States. It is a diagram-based rule for 1-inch-thick lumber with a ¼-inch allowance for saw kerf. Taper is not accounted for in the rule, so it tends to underestimate volumes for logs >16 feet in length. There are two variations of the Scribner log rule. The eastside rule has a maximum log-scaling length of 20 feet, while the westside rule, used almost exclusively west of the Cascade Mountains in the Pacific Northwest, has a maximum scaling length of 40 feet. In this report, all references to the Scribner log rule refer to the eastside (short log) rule. Though several formulas have been developed to approximate the Scribner rule, volume tables are most widely used.

Scribner Decimal C log rule

The Scribner Decimal C log rule is a variation of the Scribner log rule in which all volumes are rounded to the nearest 10 board feet.

Bone dry ton

A bone dry ton is a weight measure used primarily for chips and mill residues that represents 2,000 pounds of dried biomass (0-percent moisture content). The term "bone dry ton" is mostly used in the Western United States but is equivalent to the term "dry ton," which is used in other regions.

Bone dry unit

A bone dry unit is a quantity of wood residue which weighs 2,400 pounds at 0-percent moisture content.

Cubic foot

A cubic foot is a volume unit of measurement equivalent to 1 foot x 1 foot x 1 foot. Cubic scaling of roundwood estimates the entire volume minus bark and makes no assumption as to product output (slabs, saw kerf, edgings, etc.). Some scaling systems make deductions for unusable volume, but in terms of cubic measures of roundwood in this report, no deductions are assumed. The cubic foot volumes represent the entirety of the log inside the bark. For residues, all references to cubic foot volume in this

report refer to the solid wood equivalent, or the roundwood equivalent volume of wood fiber. Solid wood equivalent assumes a green volume of wood, prior to any shrinkage.

Cubic meter

A cubic meter is a volume unit of measurement equivalent to 1 meter x 1 meter x 1 meter, or 27 cubic feet. Cubic scaling of roundwood estimates the entire volume minus bark and makes no assumption as to product output (slabs, saw kerf, edgings, etc.). Some scaling systems make deductions for unusable volume, but in terms of cubic measures of roundwood in this paper, no deductions are assumed. The cubic meter volumes represent the entirety of the log inside the bark. For residues, all references to cubic meter volume in this report refer to the solid wood equivalent, or the roundwood equivalent volume of wood fiber. Solid wood equivalent assumes a green volume of wood, prior to any shrinkage.

Cubic yard

A cubic yard is a volume unit of measurement equivalent to 1 yard x 1 yard x 1 yard, or 35.3147 cubic feet, and is primarily used for chips or mill residues. For residues, all references to cubic yard volume in this report refer to the solid wood equivalent, or the roundwood equivalent volume of wood fiber. Solid wood equivalent assumes a green volume of wood, prior to any shrinkage.

Cunit

A cunit is a volume unit of measurement equivalent to 100 cubic feet. For roundwood, a cunit is a measure of the entirety of a log inside the bark. For residues, all references to cunit volume in this report refer to the solid wood equivalent, or the roundwood equivalent volume of wood fiber. Solid wood equivalent assumes a green volume of wood, prior to any shrinkage.

Dry metric tonne

A dry metric tonne is a weight measure primarily used for chips and mill residues. A dry metric tonne represents 1000 kg or 2,205 pounds of dried biomass (0-percent moisture content).

Dry pound

A dry pound is a weight measure of dried biomass (0-percent moisture content) used primarily for chips and mill residues.

Dry ton

A dry ton is a weight measure used primarily for chips and mill residues. A dry ton represents 2,000 pounds of dried biomass (0-percent moisture content).

Green metric tonne

A green metric tonne is a weight measure primarily used for pulp mill logs, chips and mill residues. A green metric tonne represents 1000 kg or 2,205 pounds of undried biomass.

Green pound

A green pound is a weight measure of undried biomass used for roundwood, chips, and mill residues.

Green ton

A green ton is a weight measure used for roundwood, chips, and mill residues. A green ton represents 2,000 pounds of undried biomass. For roundwood, this includes the entire volume of the log including bark.

Lake States cord

A Lake States cord is a volume measure of stacked wood that is 4 feet high x 4 feet wide x 100 inches long and occupies a space of approximately 133 cubic feet. The measure includes wood, bark, and air space and is most commonly used for pulpwood and firewood in the Lake States of the Northern United States. As a measure of residues, a Lake States cord represents the solid wood equivalent of stacked roundwood.

Linear foot
A linear foot is an output-based measurement unit used primarily for pilings and house/cabin logs. It represents 1 foot in length along the primary mill product.

Peeled dry ton
A peeled dry ton is a weight measure used primarily for pulp mill logs. A peeled dry ton represents 2,000 pounds of dried biomass. This weight measure includes the entire volume of the log minus bark.

Peeled green ton
A peeled green ton is a weight measure used primarily for pulp mill logs or house/cabin logs. A peeled green ton represents 2,000 pounds of undried biomass. This weight measure includes the entire volume of the log minus bark.

Peeled Lake States cord
A peeled Lake States cord is a volume measure of stacked wood (bark removed) that is 4 feet high x 4 feet wide x 100 inches long and occupies a space of approximately 133 cubic feet. The measure includes wood and air space and is most commonly used for pulpwood in the Lake States of the Northern United States.

Peeled metric dry tonne
A peeled metric dry tonne is a weight measure used primarily for pulp mill logs. A peeled metric dry tonne represents 1000 kg or 2,205 pounds of dried biomass. This weight measure includes the entire volume of the log minus bark.

Peeled metric green tonne
A peeled metric green tonne is a weight measure used primarily for pulp mill logs. A peeled metric green tonne represents 1000 kg or 2,205 pounds of undried biomass. This weight measure includes the entire volume of the log minus bark.

Peeled standard cord
A peeled standard cord is a volume measure of stacked wood (bark removed) that is 4 feet high x 4 feet wide x 8 feet long and occupies a space of 128 cubic feet. The measure includes wood and air space and is most commonly used for pulpwood.

Piece
A piece is an output-based measurement unit primarily used for poles, posts, pilings, and cabin logs, where the primary product is of a standard size. A piece equals one unit of the primary product manufactured.

Standard cord
A standard cord is a volume measure of stacked wood that is 4 feet high x 4 feet wide x 8 feet long and occupies a space of 128 cubic feet. The measure includes wood, bark, and air space and is most commonly used for pulpwood and firewood. As a measure of residues, a standard cord represents the solid wood equivalent of stacked roundwood.

Appendix C: Northern tree species, species group, and bark thickness

Table C.1—Tree species found in the Northern Region of the United States, associated Forest Inventory and Analysis species group, and bark thickness

Species code	Species	Species group code	Species group	Bark thickness[a]
43	Atlantic white-cedar	1	Cedars	Thin
60	Redcedar	1	Cedars	Thin
66	Rocky Mountain juniper	1	Cedars	Thin
67	Southern redcedar	1	Cedars	Thin
68	Eastern redcedar	1	Cedars	Thin
241	Northern white-cedar	1	Cedars	Thin
221	Baldcypress	2	Cypress	Thick
222	Pondcypress	2	Cypress	Thick
202	Douglas-fir	3	Douglas-fir	Thick
10	Fir spp.	4	True firs	Thin
12	Balsam fir	4	True firs	Thin
16	Fraser fir	4	True firs	Thin
260	Hemlock spp.	5	Hemlock	Thick
261	Eastern hemlock	5	Hemlock	Thick
262	Carolina hemlock	5	Hemlock	Thick
70	Tamarack spp.	6	Larch	Thin
71	Tamarack	6	Larch	Thin
72	Larch (introduced)	6	Larch	Thin
73	Western larch	6	Larch	Thick
105	Jack pine	7	Jack pine	Thick
110	Shortleaf pine	8	Loblolly-shortleaf pine	Thick
131	Loblolly pine	8	Loblolly-shortleaf pine	Thick
109	Lodgepole pine	9	Lodgepole pine	Thick
111	Slash pine	10	Longleaf-slash pine	Thick
121	Longleaf pine	10	Longleaf-slash pine	Thick
122	Ponderosa pine	11	Ponderosa-Jeffrey pine	Thick
125	Red pine	12	Red pine	Thick
100	Pine spp.	14	White pine	Thick
119	Western white pine	14	White pine	Thick
129	Eastern white pine	14	White pine	Thick
107	Sand pine	15	Other pines	Thick
115	Spruce pine	15	Other pines	Thick
123	Table mountain pine	15	Other pines	Thick
126	Pitch pine	15	Other pines	Thick
128	Pond pine	15	Other pines	Thick
130	Scotch pine	15	Other pines	Thick
132	Virginia pine	15	Other pines	Thick
133	Austrian pine	15	Other pines	Thick
90	Spruce spp.	17	Spruce	Thin
91	Norway spruce	17	Spruce	Thin
93	Engelmann spruce	17	Spruce	Thin

(Continued)

Table C.1 *(Continued)*—Tree species found in the Northern Region of the United States, associated Forest Inventory and Analysis species group, and bark thickness

Species code	Species	Species group code	Species group	Bark thickness[a]
94	White spruce	17	Spruce	Thin
95	Black spruce	17	Spruce	Thin
96	Blue spruce	17	Spruce	Thin
97	Red spruce	17	Spruce	Thin
350	Alder spp.	18	Alder	Thick
540	Ash spp.	19	Ash	Thick
541	White ash	19	Ash	Thick
543	Black ash	19	Ash	Thick
544	Green ash	19	Ash	Thick
545	Pumpkin ash	19	Ash	Thick
546	Blue ash	19	Ash	Thick
741	Balsam poplar	20	Aspen	Thick
743	Bigtooth aspen	20	Aspen	Thick
746	Quaking aspen	20	Aspen	Thick
747	Aspen spp.	20	Aspen	Thick
950	Basswood spp.	21	Basswood	Thick
951	American basswood	21	Basswood	Thick
952	White basswood	21	Basswood	Thick
531	American beech	22	Beech	Thin
371	Yellow birch	23	Yellow birch	Thick
370	Birch spp.	24	Other birches	Thick
372	Sweet birch	24	Other birches	Thick
373	River birch	24	Other birches	Thick
374	Water birch	24	Other birches	Thick
375	Paper birch	24	Other birches	Thick
379	Gray birch	24	Other birches	Thick
762	Black cherry	25	Black cherry	Thick
740	Cottonwood spp.	26	Cottonwood	Thick
742	Eastern cottonwood	26	Cottonwood	Thick
744	Swamp cottonwood	26	Cottonwood	Thick
745	Plains cottonwood	26	Cottonwood	Thick
752	Silver poplar	26	Cottonwood	Thick
753	Narrowleaf cottonwood	26	Cottonwood	Thick
970	Elm spp.	27	Elm	Thick
971	Winged elm	27	Elm	Thick
972	American elm	27	Elm	Thick
973	Cedar elm	27	Elm	Thick
974	Siberian elm	27	Elm	Thick
975	Slippery elm	27	Elm	Thick
976	September elm	27	Elm	Thick
977	Rock elm	27	Elm	Thick
984	Water-elm	27	Elm	Thick
400	Hickory spp.	28	Hickory	Thick
401	Water hickory	28	Hickory	Thick
402	Bitternut Hickory	28	Hickory	Thick
403	Pignut hickory	28	Hickory	Thick
404	Pecan	28	Hickory	Thick
405	Shellbark hickory	28	Hickory	Thick
407	Shagbark hickory	28	Hickory	Thick

(Continued)

Table C.1 *(Continued)*—Tree species found in the Northern Region of the United States, associated Forest Inventory and Analysis species group, and bark thickness

Species code	Species	Species group code	Species group	Bark thickness[a]
408	Black hickory	28	Hickory	Thick
409	Mockernut hickory	28	Hickory	Thick
314	Black maple	29	Hard maple	Thick
318	Sugar maple	29	Hard maple	Thick
320	Hard maple	29	Hard maple	Thick
309	Maple spp.	30	Soft maple	Thick
310	Soft maple	30	Soft maple	Thick
311	Florida maple	30	Soft maple	Thick
313	Boxelder	30	Soft maple	Thick
315	Striped maple	30	Soft maple	Thick
316	Red maple	30	Soft maple	Thick
317	Silver maple	30	Soft maple	Thick
319	Mountain maple	30	Soft maple	Thick
321	Rocky Mountain maple	30	Soft maple	Thick
800	Oak spp.	31	Select red oaks	Thick
813	Cherrybark oak, swamp red oak	31	Select red oaks	Thick
814	Red oak group	31	Select red oaks	Thick
833	Northern red oak	31	Select red oaks	Thick
834	Shumard oak	31	Select red oaks	Thick
806	Scarlet oak	32	Other red oaks	Thick
809	Northern pin oak	32	Other red oaks	Thick
812	Southern red oak	32	Other red oaks	Thick
816	Bear oak, scrub oak	32	Other red oaks	Thick
817	Shingle oak	32	Other red oaks	Thick
819	Turkey oak	32	Other red oaks	Thick
820	Laurel oak	32	Other red oaks	Thick
824	Blackjack oak	32	Other red oaks	Thick
827	Water oak	32	Other red oaks	Thick
828	Nuttall oak	32	Other red oaks	Thick
830	Pin oak	32	Other red oaks	Thick
831	Willow oak	32	Other red oaks	Thick
837	Black oak	32	Other red oaks	Thick
840	Bluejack oak	32	Other red oaks	Thick
899	Scrub oak	32	Other red oaks	Thick
802	White oak	33	Select white oaks	Thick
804	Swamp white oak	33	Select white oaks	Thick
808	Durand oak	33	Select white oaks	Thick
815	White oak group	33	Select white oaks	Thick
823	Bur oak	33	Select white oaks	Thick
825	Swamp chestnut oak	33	Select white oaks	Thick
826	Chinkapin oak	33	Select white oaks	Thick
822	Overcup oak	34	Other white oaks	Thick
832	Chestnut oak	34	Other white oaks	Thick
835	Post oak	34	Other white oaks	Thick
836	Delta post oak	34	Other white oaks	Thick
838	Live oak	34	Other white oaks	Thick
611	Sweetgum	35	Sweetgum	Thick

(Continued)

Table C.1 *(Continued)*—Tree species found in the Northern Region of the United States, associated Forest Inventory and Analysis species group, and bark thickness

Species code	Species	Species group code	Species group	Bark thickness[a]
731	Sycamore	36	Sycamore	Thin
690	Gum spp.	37	Tupelo/black gum	Thick
691	Water tupelo	37	Tupelo/black gum	Thick
692	Ogeechee tupelo	37	Tupelo/black gum	Thick
693	Blackgum	37	Tupelo/black gum	Thick
694	Swamp tupelo	37	Tupelo/black gum	Thick
602	Black walnut	38	Black walnut	Thick
621	Yellow-poplar	39	Yellow-poplar	Thick
300	Acacia spp.	40	Other hardwoods	Thick
330	Buckeye, horsechestnut	40	Other hardwoods	Thick
331	Ohio buckeye	40	Other hardwoods	Thick
332	Yellow buckeye	40	Other hardwoods	Thick
333	Buckeye (except Ohio, yellow)	40	Other hardwoods	Thick
341	Ailanthus	40	Other hardwoods	Thick
355	Serviceberry	40	Other hardwoods	Thick
367	Pawpaw	40	Other hardwoods	Thick
381	Chittamwood, gum bumelia	40	Other hardwoods	Thick
391	American hornbeam, musclewood	40	Other hardwoods	Thick
421	American chestnut	40	Other hardwoods	Thick
422	Ashe chinkapin	40	Other hardwoods	Thick
423	Ozark chinkapin	40	Other hardwoods	Thick
430	Chinkapin spp.	40	Other hardwoods	Thick
450	Catalpa spp.	40	Other hardwoods	Thick
451	Southern catalpa	40	Other hardwoods	Thick
452	Northern catalpa	40	Other hardwoods	Thick
460	Hackberry spp.	40	Other hardwoods	Thick
461	Sugarberry	40	Other hardwoods	Thick
462	Hackberry	40	Other hardwoods	Thick
471	Eastern redbud	40	Other hardwoods	Thick
491	Flowering dogwood	40	Other hardwoods	Thick
500	Hawthorn spp.	40	Other hardwoods	Thick
521	Common persimmon	40	Other hardwoods	Thick
551	Waterlocust	40	Other hardwoods	Thick
552	Honeylocust	40	Other hardwoods	Thick
555	Loblolly-bay	40	Other hardwoods	Thick
571	Kentucky coffeetree	40	Other hardwoods	Thick
580	Silverbell spp.	40	Other hardwoods	Thick
582	Mountain silverbell	40	Other hardwoods	Thick
591	American holly	40	Other hardwoods	Thick
601	Butternut	40	Other hardwoods	Thick
641	Osage-orange	40	Other hardwoods	Thick
650	Magnolia spp.	40	Other hardwoods	Thick
651	Cucumbertree	40	Other hardwoods	Thick
652	Southern magnolia	40	Other hardwoods	Thick
653	Sweetbay	40	Other hardwoods	Thick
654	Bigleaf magnolia	40	Other hardwoods	Thick

(Continued)

Table C.1 *(Continued)*—Tree species found in the Northern Region of the United States, associated Forest Inventory and Analysis species group, and bark thickness

Species code	Species	Species group code	Species group	Bark thickness[a]
660	Apple spp.	40	Other hardwoods	Thick
680	Mulberry spp.	40	Other hardwoods	Thick
681	White mulberry	40	Other hardwoods	Thick
682	Red mulberry	40	Other hardwoods	Thick
701	Eastern hophornbeam, ironwood	40	Other hardwoods	Thick
711	Sourwood	40	Other hardwoods	Thick
712	Paulownia, empress tree	40	Other hardwoods	Thick
721	Redbay	40	Other hardwoods	Thick
760	Cherry, plum spp.	40	Other hardwoods	Thick
761	Pin cherry	40	Other hardwoods	Thick
763	Chokecherry	40	Other hardwoods	Thick
764	Plums, cherries, except black cherry	40	Other hardwoods	Thick
765	Canada plum	40	Other hardwoods	Thick
766	Wild plum	40	Other hardwoods	Thick
901	Black locust	40	Other hardwoods	Thick
920	Willow spp.	40	Other hardwoods	Thick
921	Peachleaf willow	40	Other hardwoods	Thick
922	Black willow	40	Other hardwoods	Thick
923	Diamond willow	40	Other hardwoods	Thick
925	Chinese tallowtree	40	Other hardwoods	Thick
931	Sassafras	40	Other hardwoods	Thick
934	Mountain-ash	40	Other hardwoods	Thick
935	American mountain-ash	40	Other hardwoods	Thick
936	European mountain-ash	40	Other hardwoods	Thick
980	Tung-oil tree	40	Other hardwoods	Thick
981	Sparkleberry	40	Other hardwoods	Thick
983	Chinaberry	40	Other hardwoods	Thick
985	Smoketree	40	Other hardwoods	Thick
986	Mesquite	40	Other hardwoods	Thick
998	Viburnum	40	Other hardwoods	Thick
999	Other/unknown hardwoods	40	Other hardwoods	Thick
1	Softwoods	41	Softwoods	Thick
2	Hardwoods	42	Hardwoods	Thick
3	Soft hardwoods	42	Hardwoods	Thick
4	Hard hardwoods	42	Hardwoods	Thick

[a] Used in the process to estimate residue volume from roundwood.

Winn, Matthew F.; Royer, Larry A.; Bentley, James W.; Piva, Ronald J.; Morgan, Todd A.; Berg, Erik C.; and Coulston, John W. 2020. Timber products monitoring: unit of measure conversion factors for roundwood receiving facilities. e-Gen. Tech. Rep. SRS-251. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 148 p.

The U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis (FIA) program surveys primary roundwood receiving facilities in the United States to determine industrial uses of roundwood. The questionnaires provide general mill information such as location, type, and size, as well as procurement information such as the volume of roundwood received by product type, species, and geographic origin. The questionnaires are also used to estimate the volume, type, and use of mill residues. For ease of reporting, few restrictions are placed on the units of measure, meaning mills can report volume estimates in whatever units they choose. Conversion factors or procedures are then used to transform the survey data into regional and national standardized units. These conversion factors can vary by region, State, product type, species, survey year, or other variables. This report provides a compilation and discussion of the regional conversion factors used by FIA to transform mill survey roundwood and residue volume estimates into standard units of measurement.

Keywords: Conversion factors, Forest Inventory and Analysis, mill residues, roundwood, timber products, unit of measurement.

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.