



The Economic Impact of Privately-Owned Forests in the United States



Forest2Market

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Prepared for:

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Date: April 14, 2016

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Table of Contents

List of Tables	5
List of Figures	6
1 Executive Summary	7
1.1 Overview and Objectives	7
1.2 Study Scope	7
1.3 Summary of Findings	9
1.3.1 Forest and Timberland	11
1.3.2 Employment and Payroll	12
1.3.3 Value of Timber Sales and Manufacturing Shipments	12
1.3.4 Contribution to GDP	12
2 Forests, Timberland and Timberland Ownership in the Study Area	13
2.1 Forest Types in the United States	13
2.2 Forested Land by Region	14
2.3 Timberland by Region	14
2.4 Timberland Ownership by Region	15
2.5 Timberland Ownership by State	17
3 Economic Impact of Working Forests	19
3.1 National Economic Impacts	19
3.1.1 Employment and Payroll	19
3.1.2 Value of Timber Sales and Manufacturing Shipments	19
3.1.3 Contribution to Gross Domestic Product (GDP)	19
3.2 Regional Economic Impacts	20
3.2.1 Employment and Payroll	20
3.2.2 Value of Timber Sales and Manufacturing Shipments	23
3.2.3 Contribution to GDP	24
3.3 State Economic Impacts	25
3.3.1 Employment	25

3.3.2	Payroll	27
3.3.3	Value of Timber Sales and Manufacturing Shipments	28
3.3.4	Contribution to GDP	29
4	Conclusion	32
Appendix A: Methodology and Data Sources		33
Research Identification		33
Time Period		33
Industries		34
Geographic Study Area		34
Indicators		36
Data Collection		36
Forest2Market: Proprietary Databases		36
Bureau of Labor Statistics: Quarterly Census of Employment and Wages		36
U.S. Census Bureau: County Business Patterns		37
U.S. Census Bureau: Annual Survey of Manufactures		37
U.S. Forest Service: Forest Inventory and Analysis		37
Bureau of Economic Analysis: National Income and Product Accounts		37
Impact Analysis		37
Forest2Market Analysis		37
Bureau of Economic Analysis: RIMS II Multipliers		37
Appendix B: Glossary		38
Appendix C: Per Acre Contributions		39

List of Tables

Table 1-1 Forestry-Related Businesses.....	7
Table 1-2 National Economic Impact of Forestry-Related Businesses.....	9
Table 1-3 National Economic Impact of Forestry-Related Businesses by State and Region.....	10
Table 2-1 Public and Private Timberland Acres by State	18
Table 3-1 National Economic Impact of Forestry-Related Businesses.....	19
Table 3-2 Direct and Total (DII) Employment by State and Timberland Ownership.....	26
Table 3-3 Direct and Total (DII) Payroll by State and Timberland Ownership.....	27
Table 3-4 Value of Timber Sales and Manufacturing Shipments by State and Timberland Ownership	28
Table 3-5 GDP Contribution by State.....	30
Table 3-6 GDP Contribution by State and Timberland Ownership	31
Table 4-1 Summary of National Economic Impact by Timberland Ownership	32

List of Figures

Figure 1-1 Map of Study Area	8
Figure 1-2 Million Acres and Percent of Land Classification	11
Figure 1-3 Million Acres and Percent of Timberland by Ownership.....	11
Figure 1-4 Total Employment (Million Jobs) Impact for Forestry-Related Businesses	12
Figure 1-5 Total Payroll (Billion Dollars) Contributions Associated with Forestry-Related Businesses	12
Figure 2-1 Forest Types in the United States.....	13
Figure 2-2 Forested Land vs. Non-Forested Land by Region, millions of acres	14
Figure 2-3 Million Acres and Percent of Forestland.....	15
Figure 2-4 Timberland vs. Other Forest by Region, millions of acres.....	15
Figure 2-5 Million Acres and Percent of Timberland by Ownership.....	16
Figure 2-6 Private vs. Public Timberland Acres by Region, millions	16
Figure 3-1 Direct Employment by Region, thousands.....	20
Figure 3-2 Private vs. Public Direct Employment by Region, thousands	20
Figure 3-3 Total (DII) Employment by Region, thousands	21
Figure 3-4 Private vs. Public Total (DII) Employment by Region, thousands	21
Figure 3-5 Direct Payroll by Region, billions.....	21
Figure 3-6 Private vs. Public Direct Payroll by Region, billions	21
Figure 3-7 Total (DII) Payroll by Region, billions	22
Figure 3-8 Private vs. Public Total (DII) Payroll by Region, billions	22
Figure 3-9 Value of Timber Sales by Region, billions	23
Figure 3-10 Value of Paper, Wood & Furniture Mfg. Shipments by Region, billions	23
Figure 3-11 Value of Timber Sales and Manufacturing Shipments by Region, billions	23
Figure 3-12 Paper, Wood & Furniture Manufacturing Contribution to GDP, billions	24
Figure 3-13 Private vs. Public Paper, Wood & Furniture Manufacturing Contribution to GDP, billions	24

1 Executive Summary

1.1 Overview and Objectives

Economic activity derived from public and private timberland is an important part of the U.S. economy. Owners of these forests employ active management techniques such as land management planning, fertilizing, planting, thinning and harvesting to produce timber, logs, pulpwood, chips and wood fuel. These intermediate outputs are then manufactured into wood products, paper products, furniture, energy and other higher value products.

In order to quantify the contributions of forestry-related businesses to state, regional and national economies, the National Alliance of Forest Owners (NAFO) has contracted Forest2Market, Inc. (Forest2Market) to analyze the most forested regions of the United States based on the most recent year of data available, which is 2013. This report updates previous reports that analyzed data from 2010 (published in 2013) and 2006 (published in 2009) and quantifies the following:

- Employment levels
- Payroll contributions
- Value of timber sales
- Value of manufacturing shipments
- Manufacturing contribution to Gross Domestic Product

1.2 Study Scope

For the purposes of this report, forestry-related businesses are defined as businesses categorized under the North American Industrial Classification System (NAICS) codes listed in Table 1-1. Forestry businesses throughout the supply chain, from forestry and logging operations through lumber and paper merchant wholesalers,¹ are included.

Table 1-1 Forestry-Related Businesses

NAICS Code	Industry
113	Forestry and logging
1153	Support activities for forestry
321	Wood product manufacturing
322	Paper manufacturing
33711	Wood kitchen cabinet and countertop manufacturing
337122	Non-upholstered wood household furniture manufacturing
337211	Wood office furniture manufacturing
337212	Custom architectural woodwork and millwork manufacturing
42331	Lumber, plywood, millwork, and wood panel merchant wholesalers
4241	Paper and paper product merchant wholesalers

The states included in the study area for the analysis were selected based on the number of forested acres and the productivity level of the forests within each state. In total, 32 states across 5 regions are included in the analysis representing 91.3% of all timberland in the contiguous U.S. (Figure 1-1, next page).

¹ See Appendix A for additional information regarding changes in the industries included in each report in this series.

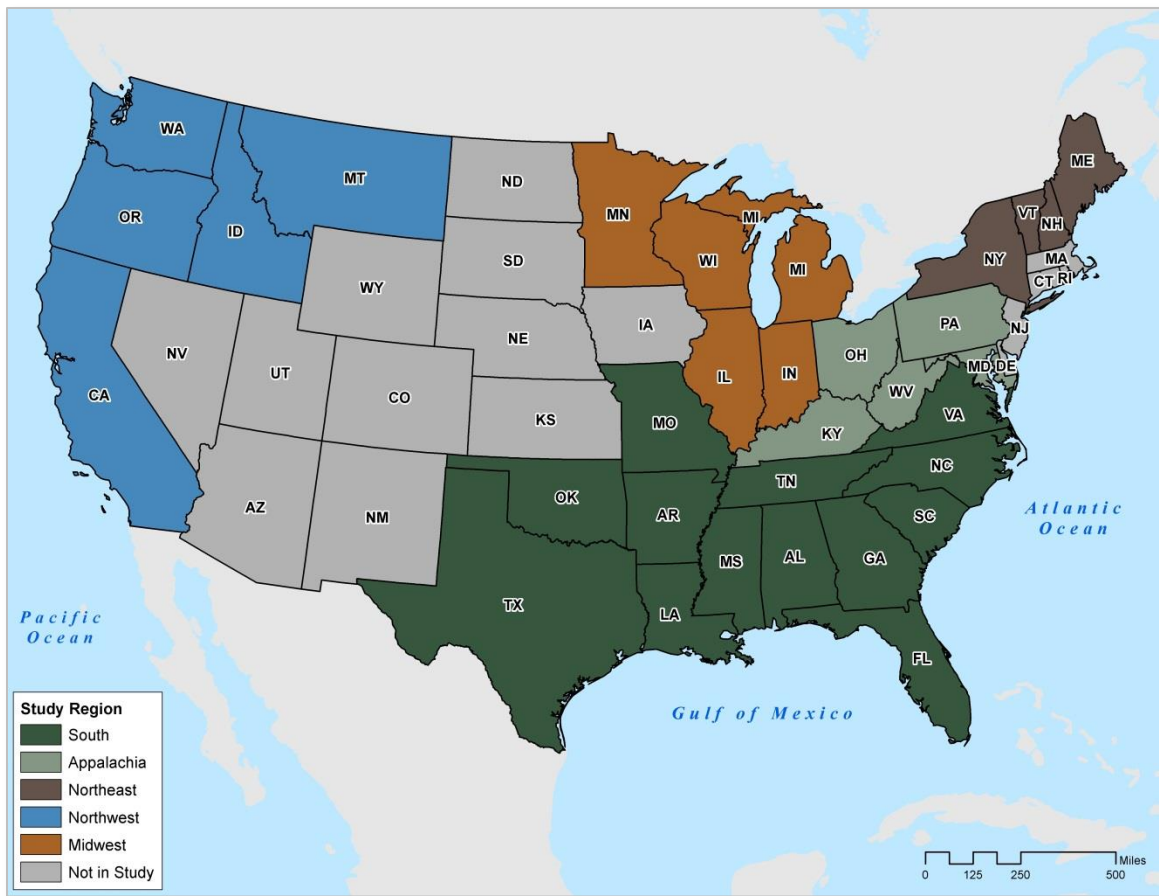


Figure 1-1 Map of Study Area

Within the study area, there are 13 states² in the South, 5 in Appalachia, 4 in the Northeast, 5 in the Northwest and 5 in the Midwest regions. Direct comparisons between regions should consider that the regions are not all the same geographic size. Therefore, some differences between the regions can be attributed to differences in the size of the region.

² See Appendix A for additional information regarding changes in the states included in each report in this series.

1.3 Summary of Findings

Table 1-2 summarizes the primary findings associated with this study. Table 1-3 (next page) summarizes the economic impact of all forestry-related businesses in the U.S. by state and region.

Table 1-2 National Economic Impact of Forestry-Related Businesses

National Economic Impact Indicator	All Timberland	Private Timberland	Public Timberland
Total Timberland Acres	457,849,322	337,735,909	120,113,413
Percent of Total		74%	26%
Total (DII) Employment	2,728,784	2,391,929	336,855
Direct Employment	1,041,927	913,306	128,621
Total (DII) Payroll	\$112,650,319,660	\$98,744,184,148	\$13,906,135,513
Direct Payroll	\$48,821,189,215	\$42,794,450,230	\$6,026,738,984
Value of Timber Sales & Manufacturing Shipments	\$320,522,459,731	\$280,955,516,882	\$39,566,942,848
Value of Timber Sales	\$8,233,087,731	\$7,216,752,988	\$1,016,334,743
Value of Paper, Wood & Furniture Mfg. Shipments	\$312,289,372,000	\$273,738,763,895	\$38,550,608,105
Paper, Wood & Furniture Manufacturing Contribution to GDP	\$92,773,000,000	\$81,320,623,178	\$11,452,376,822
Share of Manufacturing GDP	5.3%	4.6%	0.7%

Table 1-3 National Economic Impact of Forestry-Related Businesses by State and Region

Geographic Area	Timberland Acres	Total (DII) Employment	Total (DII) Payroll	Value of Timber Sales & Mfg. Shipments	Paper, Wood & Furniture Mfg. Contribution to GDP	Share of Mfg. GDP
Alabama	22,810,247	97,652	\$3,512,515,063	\$14,412,766,963	\$4,090,000,000	12.0%
Arkansas	18,441,183	62,830	\$2,421,920,237	\$8,843,333,644	\$2,665,000,000	16.2%
Florida	15,356,654	93,934	\$3,413,198,484	\$8,970,879,959	\$2,792,000,000	7.0%
Georgia	24,164,204	163,926	\$6,924,915,882	\$18,667,071,023	\$5,559,000,000	10.9%
Louisiana	14,679,603	50,560	\$2,024,370,459	\$8,109,382,539	\$2,324,000,000	4.5%
Mississippi	19,284,936	43,340	\$1,612,921,224	\$8,403,860,539	\$2,245,000,000	14.7%
Missouri	14,909,631	80,363	\$2,456,156,861	\$7,127,124,635	\$1,848,000,000	5.3%
North Carolina	17,887,864	158,876	\$6,137,983,821	\$18,655,032,606	\$4,950,000,000	5.3%
Oklahoma	7,282,172	23,780	\$1,020,375,897	\$3,584,027,016	\$913,000,000	5.4%
South Carolina	12,876,009	76,579	\$3,003,839,242	\$11,778,815,770	\$3,726,000,000	12.6%
Tennessee	13,407,151	101,707	\$4,496,652,093	\$9,640,476,958	\$3,905,000,000	8.3%
Texas	14,128,995	182,679	\$7,383,054,332	\$16,332,376,392	\$4,610,000,000	2.0%
Virginia	15,308,778	85,705	\$3,330,444,530	\$8,920,413,822	\$2,751,000,000	6.6%
South	210,537,427	1,221,931	\$47,738,348,126	\$143,445,561,867	\$42,378,000,000	6.0%
Kentucky	12,260,840	63,284	\$2,500,202,504	\$8,144,565,993	\$1,901,000,000	5.4%
Maryland	2,199,414	24,020	\$1,047,472,532	\$2,599,111,324	\$613,000,000	3.3%
Ohio	7,813,832	128,314	\$5,442,112,950	\$12,339,339,839	\$3,268,000,000	3.4%
Pennsylvania	16,410,736	162,154	\$7,227,886,638	\$19,703,922,837	\$5,813,000,000	7.5%
West Virginia	11,820,188	19,234	\$736,640,071	\$1,427,754,405	\$475,000,000	6.5%
Appalachia	50,505,010	397,006	\$16,954,314,696	\$44,214,694,398	\$12,070,000,000	5.2%
Maine	17,027,849	31,878	\$1,177,793,840	\$5,442,806,614	\$1,171,000,000	22.9%
New Hampshire	4,498,435	11,276	\$507,668,540	\$886,651,104	\$264,000,000	3.4%
New York	15,778,522	92,514	\$4,240,469,304	\$10,359,334,388	\$3,095,000,000	4.5%
Vermont	4,282,010	9,984	\$384,023,331	\$623,275,786	\$276,000,000	9.7%
Northeast	41,586,816	145,652	\$6,309,955,016	\$17,312,067,891	\$4,806,000,000	5.7%
California	16,616,065	185,600	\$8,318,324,984	\$21,019,874,229	\$6,262,000,000	2.6%
Idaho	16,414,590	27,652	\$1,055,224,249	\$3,125,991,931	\$659,000,000	8.7%
Montana	19,803,699	11,192	\$451,371,903	\$969,668,443	\$294,000,000	9.4%
Oregon	23,672,384	95,405	\$3,811,341,419	\$12,125,266,925	\$3,045,000,000	5.8%
Washington	17,824,653	89,867	\$4,253,640,350	\$10,452,218,713	\$3,035,000,000	5.4%
Northwest	94,331,391	409,716	\$17,889,902,905	\$47,693,020,241	\$13,295,000,000	3.7%
Illinois	4,587,823	118,551	\$5,523,426,145	\$10,813,252,584	\$3,472,000,000	3.6%
Indiana	4,716,192	95,149	\$3,853,130,996	\$10,954,862,082	\$3,047,000,000	3.4%
Michigan	19,356,131	95,522	\$3,841,114,608	\$14,906,175,801	\$4,667,000,000	5.4%
Minnesota	15,650,872	77,225	\$3,315,498,845	\$9,291,835,823	\$2,969,000,000	7.0%
Wisconsin	16,577,660	168,032	\$7,224,628,323	\$21,890,989,043	\$6,069,000,000	11.3%
Midwest	60,888,678	554,479	\$23,757,798,918	\$67,857,115,333	\$20,224,000,000	5.5%
National	457,849,322	2,728,784	\$112,650,319,660	\$320,522,459,731	\$92,773,000,000	5.3%

1.3.1 Forest and Timberland

- Of the 1.2 billion acres of land³ in the study area, 564.2 million acres (45%) are forested (Figure 1-2).
 - Most (81%) of this forested land is timberland.
 - Nineteen percent is unproductive forestland.
- Timberland covers 457.8 million acres (37%) of the study area.
 - 46% of timberland is located in the South, which also contains 48% of all forested land.
- Appalachia and the Midwest have the highest ratios of timberland per forested acre at 0.97 and 0.94 respectively. The Pacific Northwest has the lowest at 0.72. The South's ratio is 0.78, and the Northeast's is 0.91.
- Most (74%) timberland acres are owned by private entities, such as investment organizations, corporations and individuals (Figure 1-3). There are 2.8 acres of private timberland for every acre of timberland owned by national, state, county or local governments.

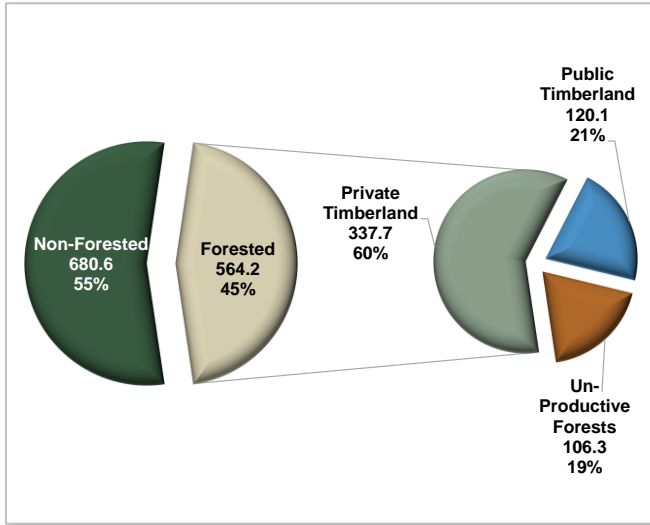


Figure 1-2 Million Acres and Percent of Land Classification

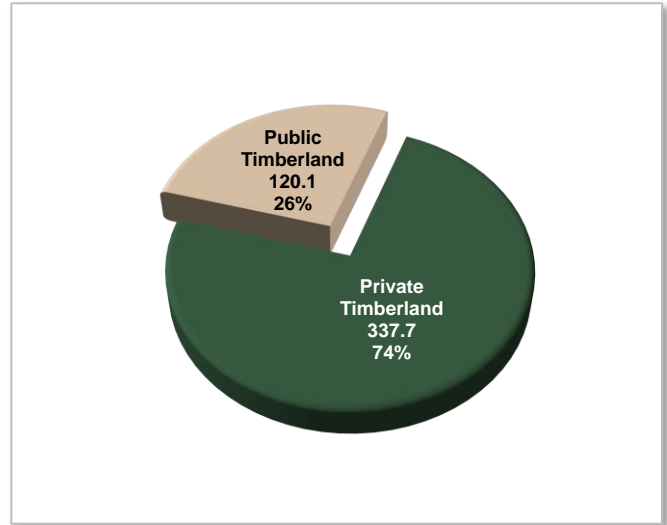


Figure 1-3 Million Acres and Percent of Timberland by Ownership

³ Total land area in the study area is 1,244,803,523 acres. This excludes water.

1.3.2 Employment and Payroll

- Total employment impact for forestry-related businesses is over 2.7 million jobs.
 - Forestry-related businesses directly employ more than 1.0 million people.
 - These direct jobs support nearly 1.7 million additional jobs via indirect and induced⁴ impacts.
- Total payroll contributions associated with forestry-related businesses are nearly \$112.7 billion.
 - Direct payroll contributions surpass \$48.8 billion.
 - An additional \$63.8 billion⁵ in payroll contributions is associated with the indirect and induced impacts from these industries.
- Private timberland accounts for 87.7 % of the total employment and of the total payroll associated with all timberland.

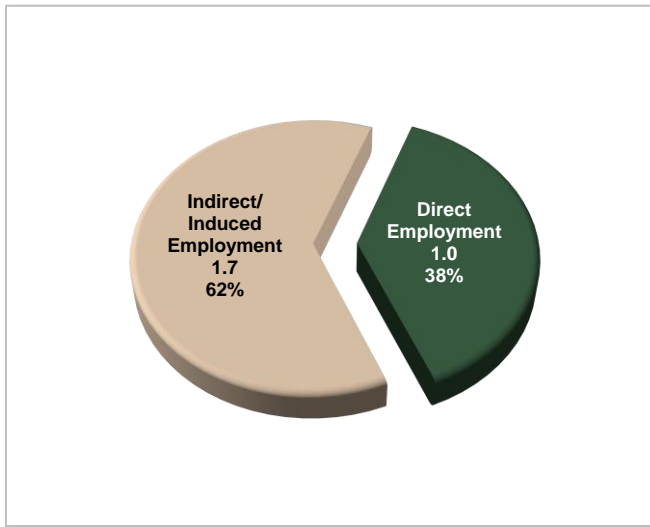


Figure 1-4 Total Employment (Million Jobs) Impact for Forestry-Related Businesses

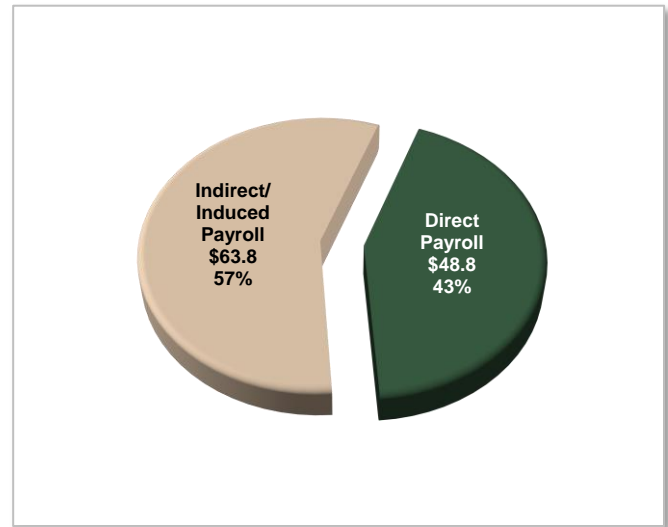


Figure 1-5 Total Payroll (Billion Dollars) Contributions Associated with Forestry-Related Businesses

1.3.3 Value of Timber Sales and Manufacturing Shipments

- Timber sales total approximately \$8.2 billion.
- Paper, wood and furniture manufacturing shipments are valued at \$312.3 billion.
- Timber sales from private timberland total \$7.2 billion.
- Approximately \$273.7 billion of the manufacturing shipments are associated with private timberland.

1.3.4 Contribution to GDP

- GDP associated with paper, wood and furniture manufacturing industries totals nearly \$92.8 billion.
- Nationally, paper, wood and furniture manufacturing industries are 5.3% of total manufacturing GDP.
- Approximately \$81.3 billion of forestry-related businesses' contribution to GDP is associated with private timberland.
- Private timberland is associated with approximately 4.6% of manufacturing GDP.

⁴ Indirect impacts are the production, employment and income changes occurring in other businesses that supply inputs to the industry under consideration. Induced impacts are the effects of spending by households as the result of direct and indirect effects. The induced effects arise when direct employees spend their income in the community.

⁵ May not sum to total due to rounding.

2 Forests, Timberland and Timberland Ownership in the Study Area

2.1 Forest Types in the United States

Figure 2-1, adapted from a U.S. Forest Service map, shows the types of forests that predominate in the contiguous (Lower 48) states. Conifer (softwood) species are commonly used in manufacturing lumber, plywood, panels, paper and paperboard. Hardwood species are commonly used for making furniture, flooring, veneer, millwork, pallets and printing grades of paper.

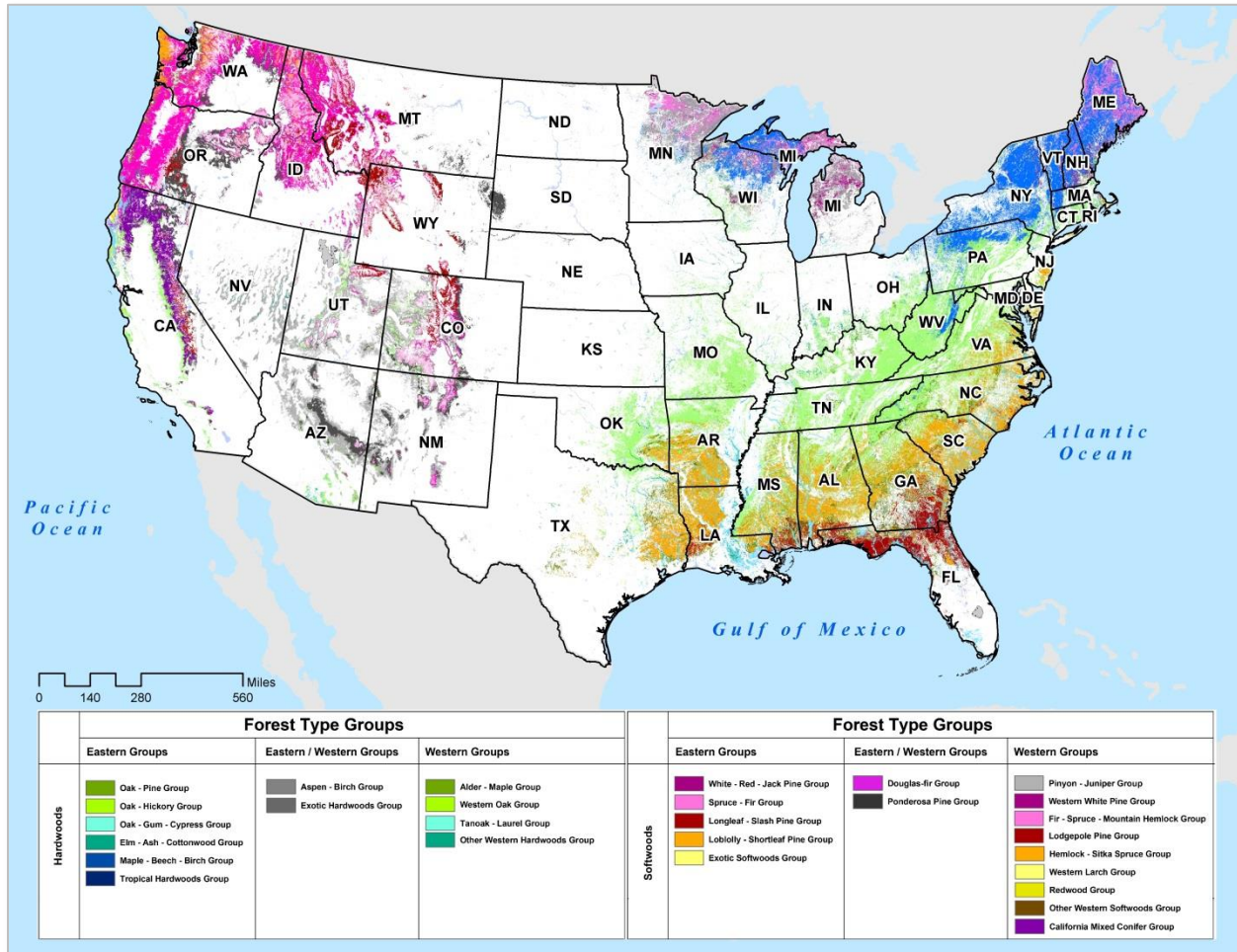


Figure 2-1 Forest Types in the United States

Softwood forest types, such as Loblolly/Shortleaf Pine and Longleaf/Slash Pine, predominate in the coastal plain regions of the South while the Oak/Hickory hardwood forest type is more common in the northern, more mountainous areas. The Oak/Hickory forest type continues into Appalachia where scattered pockets of the Maple/Beech/Birch hardwood forest type also occur.

Extending north from Appalachia, the Maple/Beech/Birch hardwood forest type dominates the Northeast where the softwood Spruce/Fir forest type also occurs. Like the Northeast, the Midwest is a mixture of hardwood forest types, including Aspen/Birch and Maple/Beech/Birch, and softwood forest types, such as White/Red/Jack Pine and Spruce/Fir. Some scattered areas of Oak/Hickory exist in the lower Midwest.

Due to differences in climate and elevation, forest types in the Pacific Northwest vary from those in the other regions. The most common forest types are the softwood species of Douglas-fir, Fir/Spruce/Mountain Hemlock, Hemlock/Sitka Spruce, Ponderosa Pine and Mixed Conifer.

2.2 Forested Land by Region

Of the 1.2 billion acres of land area included in the study area, 564.2 million acres, or approximately 45%, are forested. At 270.3 million acres, southern forests account for 48% of the forestland included in the study. The amount of forested land (colored bars⁶) relative to non-forested land area (gray bars) for each region is shown in Figure 2-2.

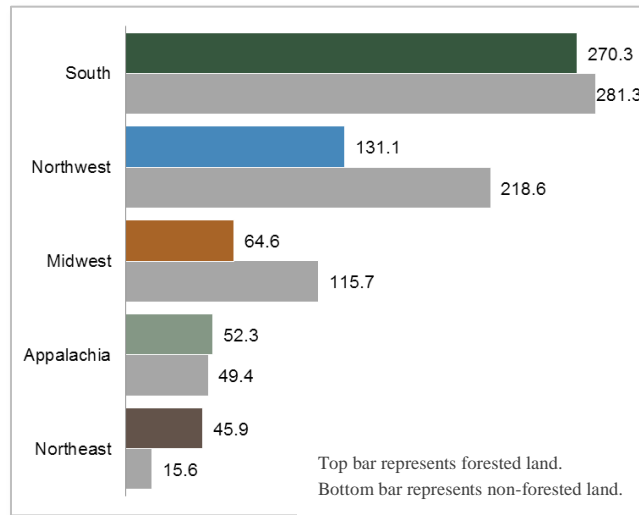


Figure 2-2 Forested Land vs. Non-Forested Land by Region, millions of acres

At a regional level, the Northeast has the highest percentage of forested land at 75% (45.9 million acres) while the Midwest has the lowest percentage of forested land at 36% (64.6 million acres). Approximately 49% of the land area in the South, 51% of Appalachian land area and 37% of the Pacific Northwest land area is forested.

2.3 Timberland by Region

Not all forests are productive. The U.S. Forest Service classifies any forest capable of producing 20 cubic feet of wood per acre per year at culmination of mean annual increment as “timberland.” This category excludes reserved forestland, which will never be subject to harvest. Of the 564.2 million acres of forestland, approximately 457.8 million acres (or 81%) are timberland (Figure 2-3). Figure 2-4 shows the amount of timberland relative to other forest land by region.

⁶ Bar colors represent the colors of regions and states contained within, denoted by the map in Figure 1-1.

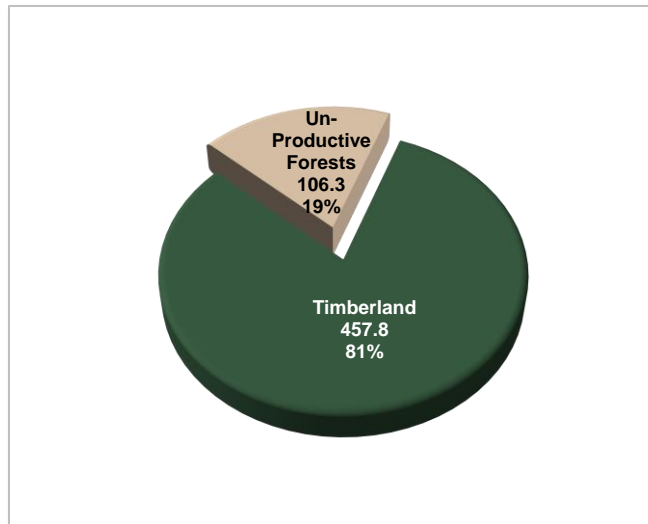


Figure 2-3 Million Acres and Percent of Forestland

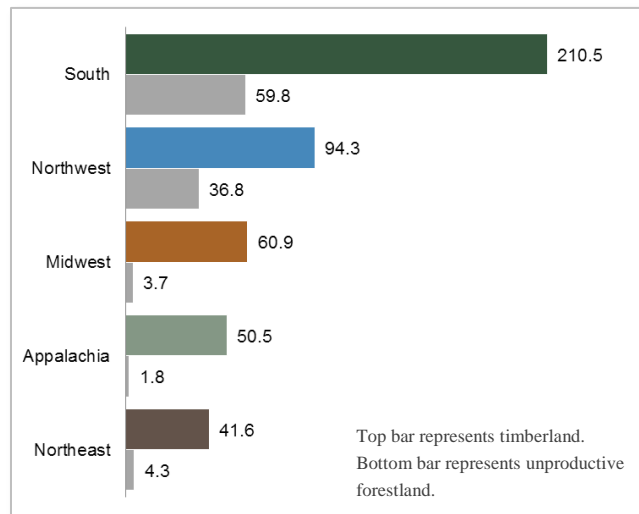


Figure 2-4 Timberland vs. Other Forest by Region, millions of acres

Regionally, the South has the most timberland at 210.5 million acres, which is 46% of the total U.S. timberland included in the study. At least 72% of each region’s forests are considered timberland. The Pacific Northwest has the lowest percentage of timberland at 72%, and Appalachia has the highest at 97%. Approximately 91% and 94% of Northeastern and Midwestern forests, respectively, are timberland. Around 78% of Southern forests are timberland.

2.4 Timberland Ownership by Region

As a whole, 74% of timberland in the study area is owned by private entities, such as Timberland Investment Management Organizations (TIMOs), Real Estate Investment Trusts (REITs), corporate entities and private landowners (Figure 2-5). Figure 2-6 shows the relative amounts of privately-owned timberland acres (colored bars) relative to publicly-owned timberland in each region.

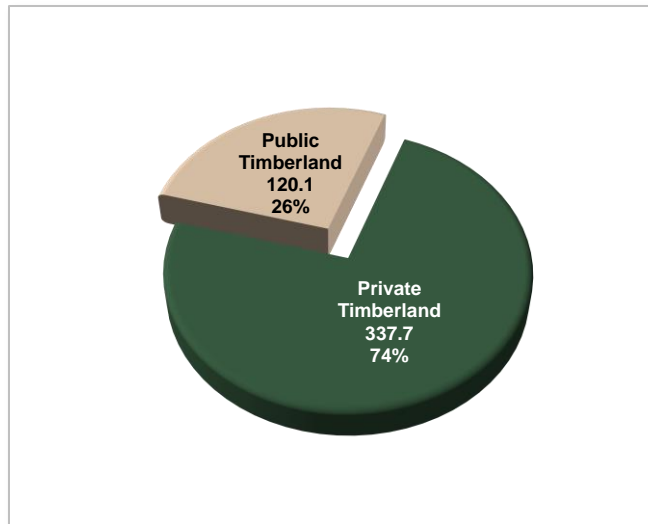


Figure 2-5 Million Acres and Percent of Timberland by Ownership

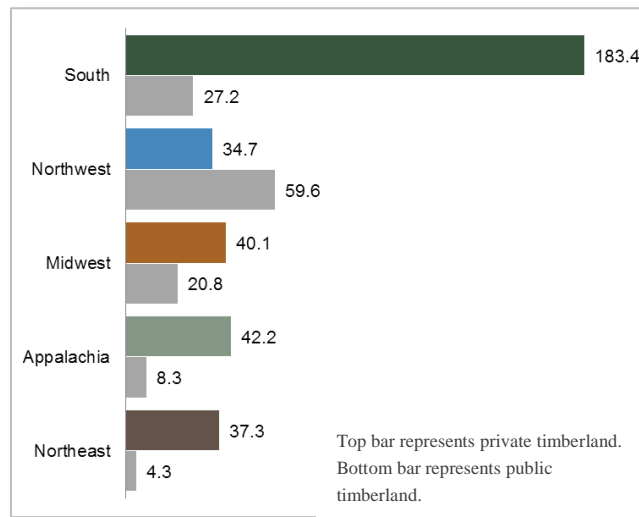


Figure 2-6 Private vs. Public Timberland Acres by Region, millions

Roughly 54% of privately-owned timberland in the study area is located in the South. Regionally, the Northeast and South have the highest percentages of private ownership at 90% and 87%, respectively. Appalachia has a slightly lower percentage of private ownership at 84%, and 66% of timberland is privately-owned in the Midwest. Only 37% of timberland in the Northwest is privately-owned.

2.5 Timberland Ownership by State

Table 2-1 on the next page shows the total timberland acres, privately-owned acres, publicly-owned acres and the percent private *versus* public acres by state. In the South, Georgia has the highest number of private timberland acres at nearly 22.2 million while Oklahoma has the fewest at just under 6.4 million acres. Alabama has the highest percentage of privately-owned timberland acres at 94% and the second highest number of private acres (21.4 million). Florida has the lowest rate of private ownership at 71% and the second fewest private acres at just under 11 million.

In the Appalachian region, Pennsylvania has the most private timberland acres (11.9 million), and Maryland has the fewest (1.8 million). At 90%, Kentucky has the highest percentage of privately-owned timberland while Pennsylvania has the lowest percentage at 73%.

In the Northeast, Maine has both the most private acres (16.2 million) and the highest percentage of private ownership (95%). New Hampshire has the fewest private acres (3.5 million) and the lowest private ownership rate (77%).

In the Pacific Northwest, Oregon's nearly 9.4 million acres make it the most prolific for private ownership, but Washington is a close second at almost 9.3 million acres of private timberland. At 52%, Washington has the highest rate of private ownership in this region. Idaho has the lowest at 17%.

In the Midwest, Illinois and Indiana have the fewest private timberland acres at around 4.1 million acres each. However, they also have the highest rates of private ownership in this region at 88% and 86%, respectively. Michigan has 12.5 million privately-owned timberland acres, which is the highest in this region. Minnesota has the lowest rate of private ownership at 49%.

Table 2-1 Public and Private Timberland Acres by State

Geographic Area	Timberland Acres	Private Acres	Public Acres	Private (%)	Public (%)
Alabama	22,810,247	21,391,752	1,418,495	94%	6%
Arkansas	18,441,183	15,288,108	3,153,075	83%	17%
Florida	15,356,654	10,972,816	4,383,838	71%	29%
Georgia	24,164,204	22,157,999	2,006,205	92%	8%
Louisiana	14,679,603	12,982,601	1,697,002	88%	12%
Mississippi	19,284,936	17,142,630	2,142,306	89%	11%
Missouri	14,909,631	12,575,252	2,334,379	84%	16%
North Carolina	17,887,864	15,419,165	2,468,699	86%	14%
Oklahoma	7,282,172	6,375,598	906,574	88%	12%
South Carolina	12,876,009	11,460,577	1,415,432	89%	11%
Tennessee	13,407,151	11,643,127	1,764,024	87%	13%
Texas	14,128,995	12,945,517	1,183,478	92%	8%
Virginia	15,308,778	13,023,261	2,285,517	85%	15%
South	210,537,427	183,378,403	27,159,024	87%	13%
Kentucky	12,260,840	10,993,554	1,267,286	90%	10%
Maryland	2,199,414	1,806,642	392,772	82%	18%
Ohio	7,813,832	6,942,878	870,954	89%	11%
Pennsylvania	16,410,736	11,931,499	4,479,237	73%	27%
West Virginia	11,820,188	10,539,441	1,280,747	89%	11%
Appalachia	50,505,010	42,214,014	8,290,996	84%	16%
Maine	17,027,849	16,222,103	805,746	95%	5%
New Hampshire	4,498,435	3,470,332	1,028,103	77%	23%
New York	15,778,522	14,044,217	1,734,305	89%	11%
Vermont	4,282,010	3,576,527	705,483	84%	16%
Northeast	41,586,816	37,313,179	4,273,637	90%	10%
California	16,616,065	7,257,856	9,358,209	44%	56%
Idaho	16,414,590	2,830,747	13,583,843	17%	83%
Montana	19,803,699	5,970,644	13,833,055	30%	70%
Oregon	23,672,384	9,374,921	14,297,463	40%	60%
Washington	17,824,653	9,284,739	8,539,914	52%	48%
Northwest	94,331,391	34,718,907	59,612,484	37%	63%
Illinois	4,587,823	4,051,698	536,125	88%	12%
Indiana	4,716,192	4,076,657	639,535	86%	14%
Michigan	19,356,131	12,508,553	6,847,578	65%	35%
Minnesota	15,650,872	7,625,849	8,025,023	49%	51%
Wisconsin	16,577,660	11,848,649	4,729,011	71%	29%
Midwest	60,888,678	40,111,406	20,777,272	66%	34%
National	457,849,322	337,735,909	120,113,413	74%	26%

3 Economic Impact of Working Forests

3.1 National Economic Impacts

Table 3-1 summarizes the national economic impacts of forests in the study area.

Table 3-1 National Economic Impact of Forestry-Related Businesses

National Economic Impact Indicator	All Timberland	Private Timberland	Public Timberland
Total (DII) Employment	2,728,784	2,391,929	336,855
Direct Employment	1,041,927	913,306	128,621
Total (DII) Payroll	\$112,650,319,660	\$98,744,184,148	\$13,906,135,513
Direct Payroll	\$48,821,189,215	\$42,794,450,230	\$6,026,738,984
Value of Timber Sales & Manufacturing Shipments	\$320,522,459,731	\$280,955,516,882	\$39,566,942,848
Value of Timber Sales	\$8,233,087,731	\$7,216,752,988	\$1,016,334,743
Value of Paper, Wood & Furniture Mfg. Shipments	\$312,289,372,000	\$273,738,763,895	\$38,550,608,105
Paper, Wood & Furniture Manufacturing Contribution to GDP	\$92,773,000,000	\$81,320,623,178	\$11,452,376,822
Share of Manufacturing GDP	5.3%	4.6%	0.7%

3.1.1 Employment and Payroll

Direct employment refers to the number of full- and part-time jobs at forestry-related businesses. *Direct payroll* refers to the payroll contributions associated with direct employment. Forestry-related businesses support over 1 million direct jobs, which are associated with over \$48.8 billion in direct payroll (Table 3-1).

In addition to direct employment and payroll, forestry-related businesses create further employment opportunities via both indirect and induced impacts.

- *Indirect impacts* are the production, employment and income changes occurring in other businesses that supply inputs to the industry under consideration.
- *Induced impacts* are the effects of spending by households as the result of direct and indirect effects. The induced effects arise when direct employees spend their income in the community.

The combined effect of direct, indirect and induced impacts is referred to as *total employment* and *total payroll*. Forestry-related businesses support 2.7 million total jobs and are associated with \$112.7 billion in total payroll (Table 3-1).

3.1.2 Value of Timber Sales and Manufacturing Shipments

Timber sales are valued at over \$8.2 billion, and paper, wood and furniture manufacturing shipments are valued at roughly \$312.3 billion (Table 3-1). Private timberland was responsible for \$7.2 billion or 87.7% of total timber sales in the U.S.

3.1.3 Contribution to Gross Domestic Product (GDP)

Paper, wood and furniture manufacturing industries contribute approximately \$92.8 billion to Gross Domestic Product (Table 3-1). This is equivalent to 5.3% of manufacturing GDP. Private timberland contributed 4.6%.

3.2 Regional Economic Impacts

3.2.1 Employment and Payroll

Direct Employment

Regionally, the South supports the most direct employment in forestry-related businesses with nearly 445.7 thousand jobs (Figure 3-1). The Midwest and Pacific Northwest have the next highest direct employment at 200.3 and 177.3 thousand jobs, respectively. Appalachia supports roughly 151.6 thousand direct jobs, and the Northeast supports 67.1 thousand direct jobs.

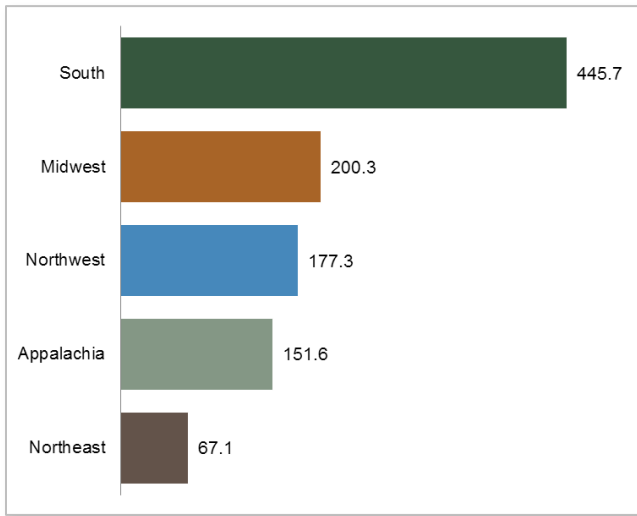


Figure 3-1 Direct Employment by Region, thousands

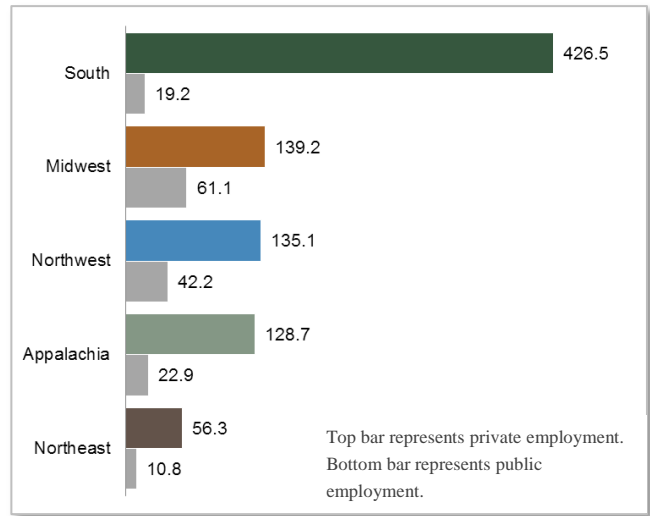


Figure 3-2 Private vs. Public Direct Employment by Region, thousands

Approximately 426.5 thousand direct jobs in the South are attributable to privately-owned timberland (Figure 3-2 above). The Midwest and the Pacific Northwest have the next highest direct employment associated with private timberland at just over 139.2 and 135.1 thousand jobs, respectively. Private timberland supports around 128.7 thousand direct jobs in Appalachia and 56.3 thousand jobs in the Northeast.

Total (DII) Employment

Including direct, indirect and induced employment, forestry-related businesses support over 1.2 million jobs in the South, 554.5 thousand jobs in the Midwest, 409.7 thousand jobs in the Pacific Northwest, 397.0 thousand jobs in Appalachia and 145.7 thousand jobs in the Northeast (Figure 3-3). Approximately 45% of the direct, indirect and induced jobs in the study area are attributable to the South.

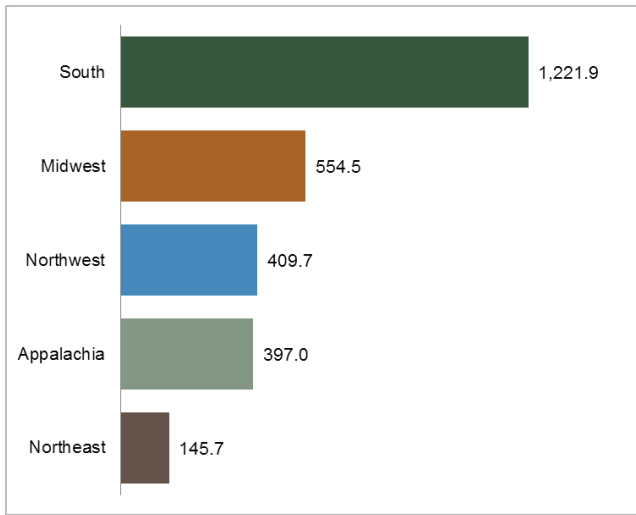


Figure 3-3 Total (DII) Employment by Region, thousands

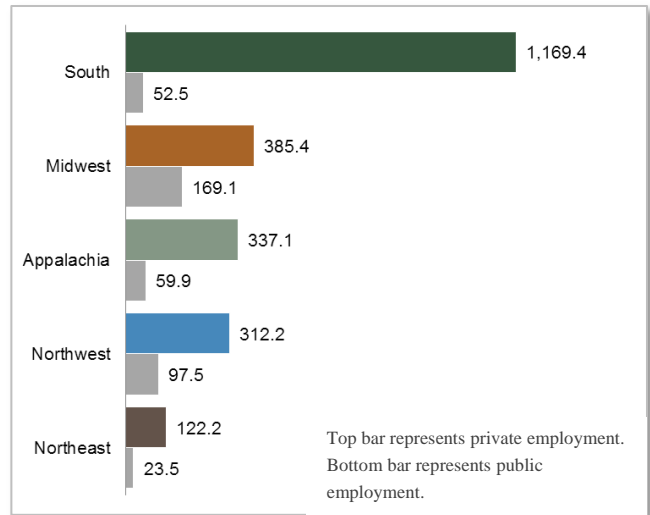


Figure 3-4 Private vs. Public Total (DII) Employment by Region, thousands

Private timberland supports around 1.2 million jobs in the South, 385.4 thousand jobs in the Midwest, 337.1 thousand jobs in Appalachia, 312.2 thousand jobs in the Pacific Northwest and 122.2 thousand jobs in the Northeast (Figure 3-4 above).

Direct Payroll

Direct payroll contributions in forestry-related industries total over \$20.1 billion in the South, \$9.8 billion in the Midwest, \$8.6 billion in the Pacific Northwest, \$7.0 billion in Appalachia and \$3.3 billion in the Northeast (Figure 3-5).

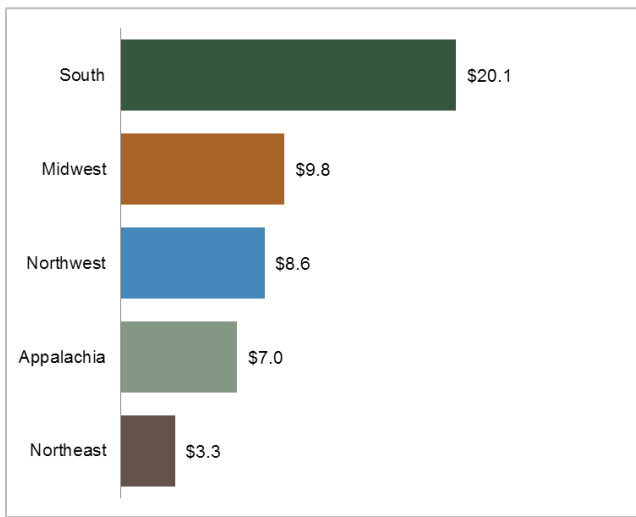


Figure 3-5 Direct Payroll by Region, billions

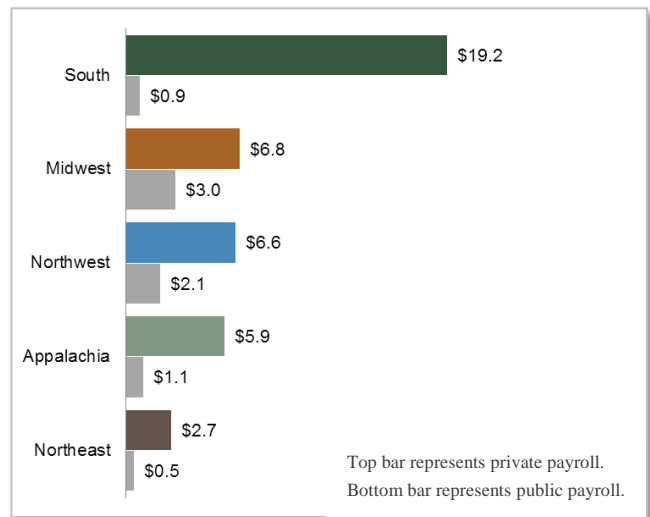


Figure 3-6 Private vs. Public Direct Payroll by Region, billions

Direct payroll contributions associated with private timberland amount to \$19.2 billion in the South, \$6.8 billion in the Midwest, \$6.6 billion in the Pacific Northwest, \$5.9 billion in Appalachia and \$2.7 billion in the Northeast (Figure 3-6 above).

Total (DII) Payroll

Total payroll in forestry-related businesses is \$47.7 billion in the South, \$23.8 billion in the Midwest, \$17.9 billion in the Pacific Northwest, \$17.0 billion in Appalachia and \$6.3 billion in the Northeast (Figure 3-7).

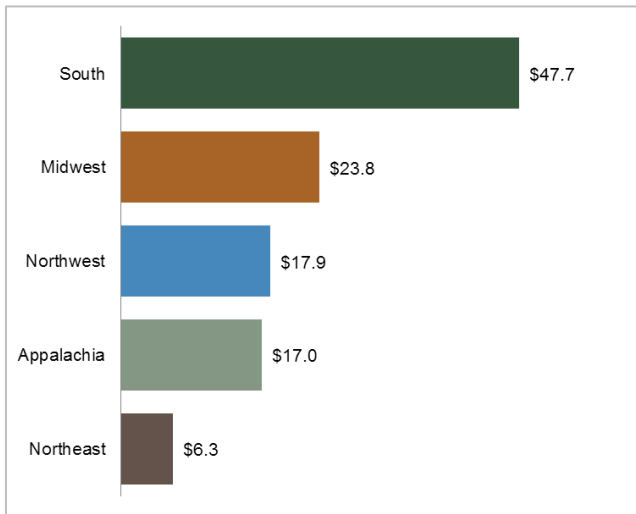


Figure 3-7 Total (DII) Payroll by Region, billions

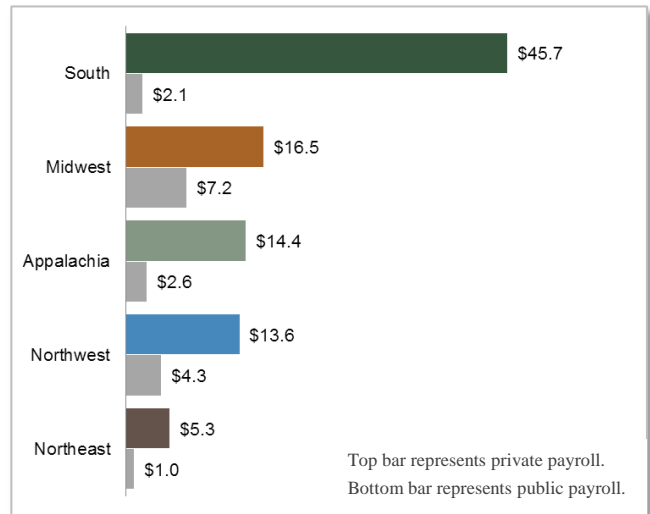


Figure 3-8 Private vs. Public Total (DII) Payroll by Region, billions

Total payroll contributions attributable to private timberland are \$45.7 billion in the South, \$16.5 billion in the Midwest, \$14.4 billion in Appalachia, \$13.6 billion in the Pacific Northwest and \$5.3 billion in the Northeast (Figure 3-8 above).

3.2.2 Value of Timber Sales and Manufacturing Shipments

Of the \$8.2 billion of timber sold in 2013, \$4.0 billion originated from the South, \$2.7 billion from the Northwest, \$0.8 billion from the Midwest, \$0.4 billion from the Northeast and \$0.4 billion from Appalachia (Figure 3-9).

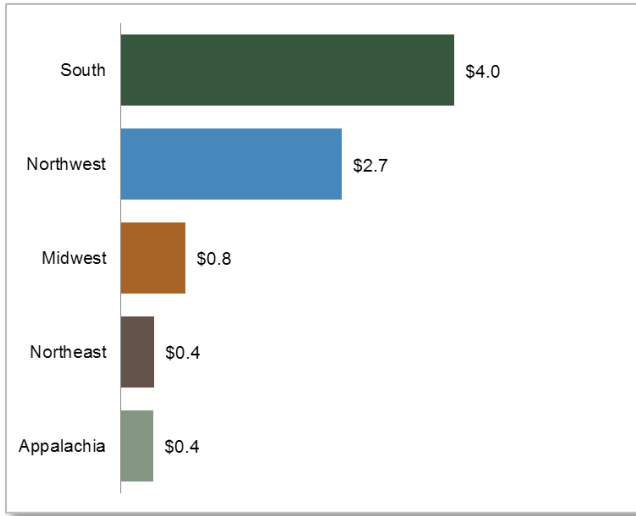


Figure 3-9 Value of Timber Sales by Region, billions

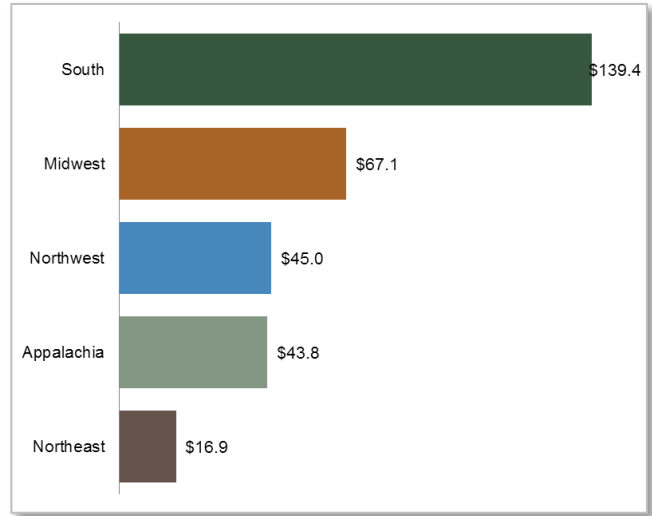


Figure 3-10 Value of Paper, Wood & Furniture Mfg. Shipments by Region, billions

The value of paper, wood product and furniture manufacturing shipments total \$139.4 billion in the South, \$67.1 billion in the Midwest, \$45.0 billion in the Pacific Northwest, \$43.8 billion in Appalachia, and \$16.9 billion in the Northeast (Figure 3-10). Approximately 45% of the total value of manufacturing shipments in the study area was produced in the South.

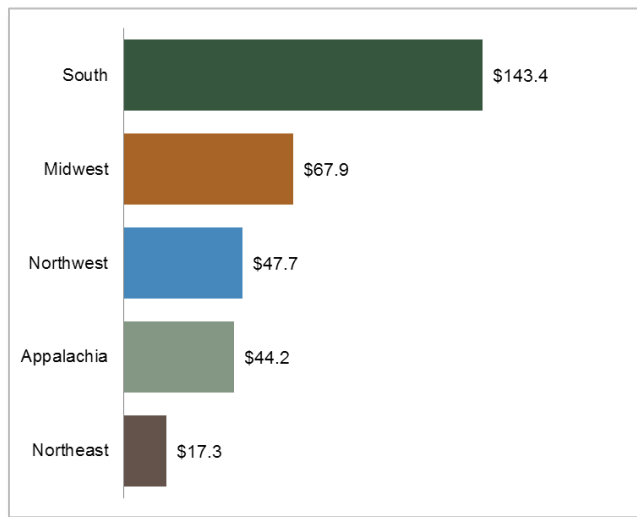


Figure 3-11 Value of Timber Sales and Manufacturing Shipments by Region, billions

Figure 3-11 above shows the combined value of timber sales and manufacturing shipments associated with forestry-related businesses by region. The South has the highest combined value at \$143.4 billion followed by the Midwest at \$67.9 billion. The Northwest has a combined value of \$47.7 billion while Appalachia has a combined value of \$44.2 billion, and the Northeast has a combined value of \$17.3 billion.

3.2.3 Contribution to GDP

Figure 3-12 shows the contribution of paper, wood product and furniture manufacturing businesses to GDP by region. These businesses contribute \$42.4 billion to GDP in the South, \$20.2 billion in the Midwest, \$13.3 billion in the Northwest, \$12.1 billion in Appalachia and \$4.8 billion in the Northeast. The South contributes more than twice as much to GDP as any other region.

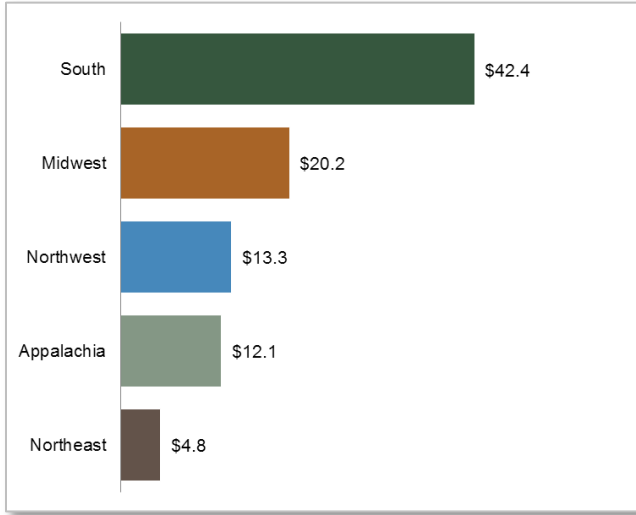


Figure 3-12 Paper, Wood & Furniture Manufacturing Contribution to GDP, billions

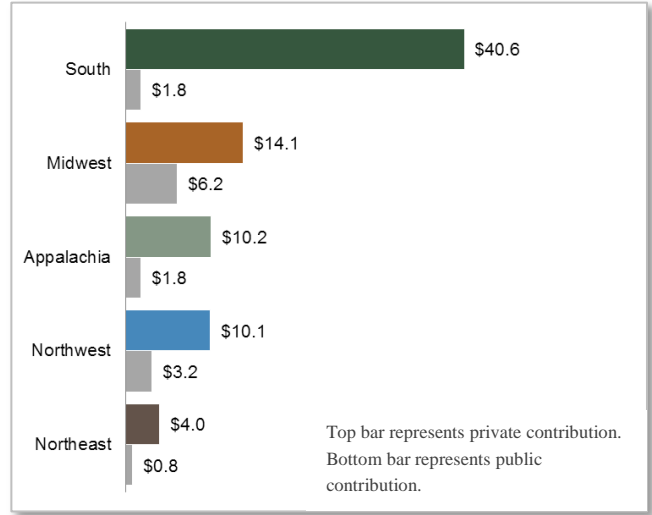


Figure 3-13 Private vs. Public Paper, Wood & Furniture Manufacturing Contribution to GDP, billions

Privately-held timberland contributes approximately \$40.6 billion to GDP in the South, \$14.1 billion in the Midwest, \$10.2 billion in Appalachia, \$10.1 billion in the Pacific Northwest and \$4.0 billion in the Northeast (Figure 3-13).

3.3 State Economic Impacts

3.3.1 Employment

Table 3-2 (next page) shows the direct and total (direct, indirect and induced) employment associated with all private and public timberland. Nationwide, California and Texas have the most total employment attributable to forestry-related businesses with over 180 thousand jobs each. This is largely attributable to the higher populations and greater presence of wholesaling industries in these states.

In the South, Texas, Georgia and North Carolina each have over 158 thousand total jobs associated with forestry-related businesses. These states also have the most employment associated with private timberlands in the South. Oklahoma and Mississippi have the fewest total jobs at 23.8 and 43.3 thousand, respectively.

In Appalachia, Pennsylvania has the most total jobs at 162.2 thousand, and Ohio has the second highest number of total jobs at 128.3 thousand. West Virginia has the fewest total jobs at 19.2 thousand. Most jobs associated with private timberland can be found in Ohio (111.6 thousand) and Pennsylvania (111.3 thousand).

In the Northeast, New York has the most total jobs at 92.5 thousand of which approximately 65.3 thousand are associated with private timberland. At just under 10 thousand, Vermont has the fewest total jobs.

In the Pacific Northwest, California has the most total jobs at 185.6 thousand. Oregon and Washington have a total employment contribution of 95.4 and 89.9 thousand, respectively. Private timberland is associated with approximately 161.5 thousand jobs in California, 78.0 thousand in Oregon and 59.9 thousand in Washington.

In the Midwest, total employment is highest in Wisconsin at just over 168 thousand and lowest in Minnesota at around 77.2 thousand. The greatest contributions to total employment from private timberland are in Wisconsin and Illinois at just under 125.0 and 107.0 thousand, respectively.

Table 3-2 Direct and Total (DII) Employment by State and Timberland Ownership

Geographic Area	All Timberland		Private Timberland		Public Timberland	
	Direct Employment	Total (DII) Employment	Direct Employment	Total (DII) Employment	Direct Employment	Total (DII) Employment
Alabama	35,876	97,652	34,795	94,711	1,081	2,941
Arkansas	23,379	62,830	21,747	58,445	1,632	4,385
Florida	38,319	93,934	36,040	88,347	2,279	5,587
Georgia	52,045	163,926	50,870	160,224	1,175	3,702
Louisiana	19,279	50,560	18,816	49,345	463	1,215
Mississippi	18,667	43,340	18,065	41,943	602	1,397
Missouri	33,643	80,363	28,529	68,148	5,114	12,215
North Carolina	54,160	158,876	52,923	155,248	1,237	3,628
Oklahoma	9,675	23,780	9,174	22,548	501	1,232
South Carolina	24,977	76,579	23,028	70,602	1,949	5,977
Tennessee	33,726	101,707	30,028	90,555	3,698	11,152
Texas	67,795	182,679	66,194	178,365	1,601	4,314
Virginia	34,146	85,705	32,954	82,712	1,192	2,993
South	445,687	1,221,931	426,523	1,169,389	19,164	52,542
Kentucky	24,536	63,284	24,104	62,170	432	1,114
Maryland	10,948	24,020	8,101	17,774	2,847	6,246
Ohio	45,974	128,314	39,988	111,606	5,986	16,708
Pennsylvania	61,439	162,154	42,189	111,348	19,250	50,806
West Virginia	8,660	19,234	8,107	18,005	553	1,229
Appalachia	151,557	397,006	128,695	337,120	22,862	59,886
Maine	13,481	31,878	12,270	29,014	1,211	2,864
New Hampshire	5,168	11,276	4,582	9,997	586	1,279
New York	44,078	92,514	31,099	65,272	12,979	27,242
Vermont	4,420	9,984	3,815	8,617	605	1,367
Northeast	67,147	145,652	56,325	122,178	10,822	23,474
California	82,102	185,600	71,420	161,453	10,682	24,147
Idaho	12,147	27,652	9,191	20,922	2,956	6,730
Montana	5,402	11,192	2,993	6,202	2,409	4,990
Oregon	41,226	95,405	33,707	78,005	7,519	17,400
Washington	36,378	89,867	24,267	59,949	12,111	29,918
Northwest	177,255	409,716	135,054	312,170	42,201	97,546
Illinois	42,223	118,551	38,097	106,967	4,126	11,584
Indiana	38,677	95,149	33,728	82,973	4,949	12,176
Michigan	33,073	95,522	22,774	65,777	10,299	29,745
Minnesota	29,051	77,225	14,777	39,282	14,274	37,943
Wisconsin	57,257	168,032	42,587	124,981	14,670	43,051
Midwest	200,281	554,479	139,213	385,412	61,068	169,067
National	1,041,927	2,728,784	913,306	2,391,929	128,621	336,855

3.3.2 Payroll

Table 3-3 shows the direct and total payroll associated with all private and public timberland. Because total payroll is closely correlated to total employment, states' positions within each region are fairly similar to the employment data discussed in Section 3.3.1. Nationwide, California has the highest payroll contribution at \$8.3 billion annually. Texas, Pennsylvania and Wisconsin each have payroll contributions of over \$7.2 billion annually.

In the South, Texas, Georgia and North Carolina have the highest payroll contributions associated with forestry-related businesses while Oklahoma and Mississippi have the lowest. In Appalachia, Pennsylvania and Ohio have the highest payroll contributions while West Virginia has the lowest. In the Northeast, New York has the largest payroll, and Vermont and New Hampshire have the lowest. In the Pacific Northwest, California has the largest payroll, followed by Washington and Oregon; Montana has the lowest. In the Midwest, total payroll is highest in Wisconsin and lowest in Minnesota.

Table 3-3 Direct and Total (DII) Payroll by State and Timberland Ownership

Geographic Area	All Timberland		Private Timberland		Public Timberland	
	Direct Payroll	Total (DII) Payroll	Direct Payroll	Total (DII) Payroll	Direct Payroll	Total (DII) Payroll
Alabama	\$1,524,442,959	\$3,512,515,063	\$1,478,526,962	\$3,406,718,628	\$45,915,997	\$105,796,435
Arkansas	\$1,026,995,118	\$2,421,920,237	\$955,322,505	\$2,252,897,669	\$71,672,613	\$169,022,568
Florida	\$1,701,250,710	\$3,413,198,484	\$1,600,067,891	\$3,210,196,632	\$101,182,819	\$203,001,852
Georgia	\$2,664,593,303	\$6,924,915,882	\$2,604,411,578	\$6,768,511,757	\$60,181,725	\$156,404,125
Louisiana	\$929,091,319	\$2,024,370,459	\$906,761,023	\$1,975,715,617	\$22,330,296	\$48,654,842
Mississippi	\$766,104,996	\$1,612,921,224	\$741,404,212	\$1,560,917,361	\$24,700,784	\$52,003,863
Missouri	\$1,160,369,541	\$2,456,156,861	\$983,998,550	\$2,082,831,982	\$176,370,991	\$373,324,879
North Carolina	\$2,410,078,875	\$6,137,983,821	\$2,355,046,178	\$5,997,826,665	\$55,032,696	\$140,157,156
Oklahoma	\$464,221,909	\$1,020,375,897	\$440,162,329	\$967,492,105	\$24,059,580	\$52,883,792
South Carolina	\$1,221,532,562	\$3,003,839,242	\$1,126,199,551	\$2,769,408,291	\$95,333,011	\$234,430,951
Tennessee	\$1,681,723,960	\$4,496,652,093	\$1,497,325,925	\$4,003,602,204	\$184,398,035	\$493,049,889
Texas	\$3,069,679,905	\$7,383,054,332	\$2,997,195,233	\$7,208,717,500	\$72,484,672	\$174,336,832
Virginia	\$1,484,010,943	\$3,330,444,530	\$1,432,192,626	\$3,214,152,913	\$51,818,317	\$116,291,617
South	\$20,104,096,101	\$47,738,348,126	\$19,239,644,959	\$45,685,658,497	\$864,451,142	\$2,052,689,629
Kentucky	\$1,062,997,979	\$2,500,202,504	\$1,044,278,837	\$2,456,174,531	\$18,719,142	\$44,027,972
Maryland	\$548,756,832	\$1,047,472,532	\$406,063,492	\$775,098,058	\$142,693,339	\$272,374,474
Ohio	\$2,135,268,162	\$5,442,112,950	\$1,857,227,724	\$4,733,477,148	\$278,040,438	\$708,635,802
Pennsylvania	\$2,917,361,893	\$7,227,886,638	\$2,003,300,592	\$4,963,261,368	\$914,061,302	\$2,264,625,271
West Virginia	\$329,719,779	\$736,640,071	\$308,659,029	\$689,587,412	\$21,060,750	\$47,052,660
Appalachia	\$6,994,104,645	\$16,954,314,696	\$5,939,081,914	\$14,396,848,328	\$1,055,022,732	\$2,557,466,368
Maine	\$615,759,919	\$1,177,793,840	\$560,447,108	\$1,071,994,345	\$55,312,811	\$105,799,495
New Hampshire	\$255,873,163	\$507,668,540	\$226,843,110	\$450,071,079	\$29,030,053	\$57,597,461
New York	\$2,212,722,536	\$4,240,469,304	\$1,561,153,876	\$2,991,800,817	\$651,568,660	\$1,248,668,487
Vermont	\$182,708,576	\$384,023,331	\$157,687,030	\$331,432,163	\$25,021,546	\$52,591,168
Northeast	\$3,267,064,193	\$6,309,955,016	\$2,740,523,895	\$5,293,003,587	\$526,540,299	\$1,016,951,428
California	\$4,036,805,066	\$8,318,324,984	\$3,511,609,158	\$7,236,095,307	\$525,195,908	\$1,082,229,676
Idaho	\$529,426,285	\$1,055,224,249	\$400,570,349	\$798,395,465	\$128,855,937	\$256,828,784
Montana	\$234,607,022	\$451,371,903	\$130,006,404	\$250,125,667	\$104,600,618	\$201,246,236
Oregon	\$1,861,413,286	\$3,811,341,419	\$1,521,935,160	\$3,116,242,134	\$339,478,127	\$695,099,285
Washington	\$1,971,575,318	\$4,253,640,350	\$1,315,201,020	\$2,837,523,920	\$656,374,299	\$1,416,116,430
Northwest	\$8,633,826,978	\$17,889,902,905	\$6,578,278,747	\$13,630,660,931	\$2,055,548,231	\$4,259,241,974
Illinois	\$2,355,433,985	\$5,523,426,145	\$2,125,282,699	\$4,983,727,880	\$230,151,287	\$539,698,265
Indiana	\$1,637,649,022	\$3,853,130,996	\$1,428,089,075	\$3,360,069,347	\$209,559,947	\$493,061,649
Michigan	\$1,559,568,903	\$3,841,114,608	\$1,073,935,685	\$2,645,032,252	\$485,633,218	\$1,196,082,356
Minnesota	\$1,420,212,463	\$3,315,498,845	\$722,413,153	\$1,686,480,041	\$697,799,311	\$1,629,018,804
Wisconsin	\$2,849,232,923	\$7,224,628,323	\$2,119,233,031	\$5,373,611,562	\$729,999,892	\$1,851,016,761
Midwest	\$9,822,097,297	\$23,757,798,918	\$6,827,222,282	\$16,513,761,699	\$2,994,875,015	\$7,244,037,220
National	\$48,821,189,215	\$112,650,319,660	\$42,794,450,230	\$98,744,184,148	\$6,026,738,984	\$13,906,135,513

3.3.3 Value of Timber Sales and Manufacturing Shipments

Table 3-4 shows the value of timber sales and manufacturing shipments associated with all private and public timberland. Nationwide, forestry-related businesses in Wisconsin, California, Pennsylvania, Georgia, North Carolina and Texas each produce over \$15 billion in timber, paper, wood or furniture products annually. Most of this is due to manufacturing shipments. Timber sales exceeded \$1.0 billion in Oregon, \$966 million in Washington and \$593 billion in Georgia in 2013.

Table 3-4 Value of Timber Sales and Manufacturing Shipments by State and Timberland Ownership

Geographic Area	All Timberland			Private Timberland	Public Timberland
	Value of Timber Sales	Value of Paper, Wood & Furniture Mfg. Shipments	Value of Timber Sales & Mfg. Shipments	Value of Timber Sales & Mfg. Shipments	Value of Timber Sales & Mfg. Shipments
Alabama	\$462,633,963	\$13,950,133,000	\$14,412,766,963	\$13,978,656,550	\$434,110,413
Arkansas	\$335,399,644	\$8,507,934,000	\$8,843,333,644	\$8,226,169,240	\$617,164,405
Florida	\$281,652,959	\$8,689,227,000	\$8,970,879,959	\$8,437,331,953	\$533,548,007
Georgia	\$593,033,023	\$18,074,038,000	\$18,667,071,023	\$18,245,462,017	\$421,609,006
Louisiana	\$353,155,539	\$7,756,227,000	\$8,109,382,539	\$7,914,477,141	\$194,905,398
Mississippi	\$371,183,539	\$8,032,677,000	\$8,403,860,539	\$8,132,902,974	\$270,957,566
Missouri	\$161,147,635	\$6,965,977,000	\$7,127,124,635	\$6,043,833,505	\$1,083,291,131
North Carolina	\$372,605,606	\$18,282,427,000	\$18,655,032,606	\$18,229,056,196	\$425,976,410
Oklahoma	\$43,900,016	\$3,540,127,000	\$3,584,027,016	\$3,398,274,940	\$185,752,076
South Carolina	\$305,271,770	\$11,473,544,000	\$11,778,815,770	\$10,859,552,533	\$919,263,237
Tennessee	\$170,093,958	\$9,470,383,000	\$9,640,476,958	\$8,583,415,839	\$1,057,061,119
Texas	\$310,240,392	\$16,022,136,000	\$16,332,376,392	\$15,946,718,285	\$385,658,108
Virginia	\$241,174,822	\$8,679,239,000	\$8,920,413,822	\$8,608,933,076	\$311,480,746
South	\$4,001,492,867	\$139,444,069,000	\$143,445,561,867	\$137,277,581,015	\$6,167,980,852
Kentucky	\$107,843,993	\$8,036,722,000	\$8,144,565,993	\$8,001,142,119	\$143,423,873
Maryland	\$17,828,324	\$2,581,283,000	\$2,599,111,324	\$1,923,263,931	\$675,847,393
Ohio	\$45,665,839	\$12,293,674,000	\$12,339,339,839	\$10,732,592,962	\$1,606,746,877
Pennsylvania	\$139,429,837	\$19,564,493,000	\$19,703,922,837	\$13,530,333,817	\$6,173,589,020
West Virginia	\$87,808,405	\$1,339,946,000	\$1,427,754,405	\$1,336,557,029	\$91,197,377
Appalachia	\$398,576,398	\$43,816,118,000	\$44,214,694,398	\$37,545,147,683	\$6,669,546,715
Maine	\$272,352,614	\$5,170,454,000	\$5,442,806,614	\$4,953,887,272	\$488,919,342
New Hampshire	\$19,907,104	\$866,744,000	\$886,651,104	\$786,056,230	\$100,594,873
New York	\$79,119,388	\$10,280,215,000	\$10,359,334,388	\$7,308,876,179	\$3,050,458,209
Vermont	\$30,218,786	\$593,057,000	\$623,275,786	\$537,919,510	\$85,356,276
Northeast	\$401,597,891	\$16,910,470,000	\$17,312,067,891	\$14,521,947,815	\$2,790,120,076
California	\$336,620,229	\$20,683,254,000	\$21,019,874,229	\$18,285,149,181	\$2,734,725,047
Idaho	\$233,592,931	\$2,892,399,000	\$3,125,991,931	\$2,365,163,409	\$760,828,522
Montana	\$51,756,443	\$917,912,000	\$969,668,443	\$537,337,315	\$432,331,128
Oregon	\$1,067,541,925	\$11,057,725,000	\$12,125,266,925	\$9,913,902,619	\$2,211,364,306
Washington	\$966,092,713	\$9,486,126,000	\$10,452,218,713	\$6,972,479,611	\$3,479,739,102
Northwest	\$2,655,604,241	\$45,037,416,000	\$47,693,020,241	\$36,338,228,951	\$11,354,791,290
Illinois	\$61,643,584	\$10,751,609,000	\$10,813,252,584	\$9,756,681,264	\$1,056,571,320
Indiana	\$112,372,082	\$10,842,490,000	\$10,954,862,082	\$9,553,035,263	\$1,401,826,819
Michigan	\$270,942,801	\$14,635,233,000	\$14,906,175,801	\$10,264,550,730	\$4,641,625,071
Minnesota	\$96,060,823	\$9,195,775,000	\$9,291,835,823	\$4,726,436,773	\$4,565,399,051
Wisconsin	\$234,797,043	\$21,656,192,000	\$21,890,989,043	\$16,282,314,682	\$5,608,674,361
Midwest	\$775,816,333	\$67,081,299,000	\$67,857,115,333	\$47,166,668,765	\$20,690,446,569
National	\$8,233,087,731	\$312,289,372,000	\$320,522,459,731	\$280,955,516,882	\$39,566,942,848

3.3.4 Contribution to GDP

Table 3-5 (next page) reports the contribution of paper, wood product and furniture manufacturing businesses to GDP relative to total manufacturing GDP and total state GDP.

In the South, forest products manufacturing industries contributed over \$4 billion to GDP in Georgia, North Carolina, Texas and Alabama. Forest products manufacturing companies in Oklahoma and Missouri contributed the least to GDP in the South at \$913 million and \$1.8 billion, respectively. Forest products manufacturing represented the largest share of total manufacturing GDP in Arkansas (16.2%), Mississippi (14.7%), South Carolina (12.6%), Alabama (12.0%) and Georgia (10.9%). Forest products manufacturing was over 2% of a state's total GDP output in Arkansas, Mississippi, South Carolina and Alabama.

In Appalachia, Pennsylvania has the highest forest products manufacturing contribution to GDP at \$5.8 billion, which is 7.5% of Pennsylvania's manufacturing GDP and 0.9% of total state GDP. Maryland forest products manufacturing companies contribute the least to state GDP at \$613 million, which is 3.3% of manufacturing GDP and 0.2% of total state GDP.

In the Northeast, New York's forest products manufacturing companies contribute just under \$3.1 billion to the state's GDP, which is the highest in this region. However, as a share of state manufacturing and total GDP, Maine's \$1.2 billion contribution represents 22.9% of the state's manufacturing GDP and 2.1% of total GDP. New Hampshire forest products companies contribute the least to their state's GDP at \$264 million annually (3.4% of manufacturing GDP and 0.4% of state GDP).

In the Northwest, forest products manufacturing companies in California contribute \$6.3 billion to GDP, which is 2.6% of state manufacturing GDP and only 0.3% of total state GDP. Oregon and Washington companies contribute over \$3 billion each to their states' GDP, and forest products manufacturing is 5.8% and 5.4% of total manufacturing GDP, respectively. Montana forest products companies contribute the least to GDP in terms of dollar output at only \$294 million, but this is 9.4% of Montana's manufacturing GDP, the highest share in this region.

In the Midwest, Wisconsin forest products manufacturing companies contribute nearly \$6.1 billion (2.1%) to their state's GDP, and forest products represent 11.3% of state manufacturing GDP. Minnesota companies contribute just under \$3.0 billion to their state's GDP, the lowest in the region. Illinois forest products manufacturing at \$3.5 billion represents only 0.5% of state GDP.

Table 3-5 GDP Contribution by State

Geographic Area	All Timberland		
	Paper, Wood & Furniture Mfg. Contribution to GDP	Share of Mfg. GDP	Share of Total GDP
Alabama	\$4,090,000,000	12.0%	2.1%
Arkansas	\$2,665,000,000	16.2%	2.2%
Florida	\$2,792,000,000	7.0%	0.3%
Georgia	\$5,559,000,000	10.9%	1.2%
Louisiana	\$2,324,000,000	4.5%	0.9%
Mississippi	\$2,245,000,000	14.7%	2.2%
Missouri	\$1,848,000,000	5.3%	0.7%
North Carolina	\$4,950,000,000	5.3%	1.1%
Oklahoma	\$913,000,000	5.4%	0.5%
South Carolina	\$3,726,000,000	12.6%	2.0%
Tennessee	\$3,905,000,000	8.3%	1.3%
Texas	\$4,610,000,000	2.0%	0.3%
Virginia	\$2,751,000,000	6.6%	0.6%
South	\$42,378,000,000	6.0%	0.8%
Kentucky	\$1,901,000,000	5.4%	1.0%
Maryland	\$613,000,000	3.3%	0.2%
Ohio	\$3,268,000,000	3.4%	0.6%
Pennsylvania	\$5,813,000,000	7.5%	0.9%
West Virginia	\$475,000,000	6.5%	0.7%
Appalachia	\$12,070,000,000	5.2%	0.7%
Maine	\$1,171,000,000	22.9%	2.1%
New Hampshire	\$264,000,000	3.4%	0.4%
New York	\$3,095,000,000	4.5%	0.2%
Vermont	\$276,000,000	9.7%	1.0%
Northeast	\$4,806,000,000	5.7%	0.3%
California	\$6,262,000,000	2.6%	0.3%
Idaho	\$659,000,000	8.7%	1.1%
Montana	\$294,000,000	9.4%	0.7%
Oregon	\$3,045,000,000	5.8%	1.5%
Washington	\$3,035,000,000	5.4%	0.7%
Northwest	\$13,295,000,000	3.7%	0.5%
Illinois	\$3,472,000,000	3.6%	0.5%
Indiana	\$3,047,000,000	3.4%	1.0%
Michigan	\$4,667,000,000	5.4%	1.1%
Minnesota	\$2,969,000,000	7.0%	1.0%
Wisconsin	\$6,069,000,000	11.3%	2.1%
Midwest	\$20,224,000,000	5.5%	1.0%
National	\$92,773,000,000	5.3%	0.7%

Forest products manufacturing GDP associated with private timberland is over \$5.4 billion in both California and Georgia and approximately \$4.0 billion or more in North Carolina, Wisconsin, Texas, Pennsylvania and Alabama (Table 3-6). As a percentage of total state GDP, forest products manufacturing associated with private timberland is 2.0% or more of state GDP in Arkansas, Mississippi, Alabama and Maine. It is 1.9% of state GDP in South Carolina, 1.6% in Wisconsin and between 1.0% and 1.2% each in Oregon, Tennessee, Georgia, North Carolina and Kentucky.

Table 3-6 GDP Contribution by State and Timberland Ownership

Geographic Area	Private Timberland			Public Timberland		
	Paper, Wood & Furniture Mfg. Contribution to GDP	Share of Mfg. GDP	Share of Total GDP	Paper, Wood & Furniture Mfg. Contribution to GDP	Share of Mfg. GDP	Share of Total GDP
Alabama	\$3,966,809,804	11.6%	2.0%	\$123,190,196	0.4%	0.1%
Arkansas	\$2,479,013,221	15.1%	2.1%	\$185,986,779	1.1%	0.2%
Florida	\$2,625,944,268	6.6%	0.3%	\$166,055,732	0.4%	0.0%
Georgia	\$5,433,446,052	10.7%	1.2%	\$125,553,948	0.2%	0.0%
Louisiana	\$2,268,143,695	4.4%	0.9%	\$55,856,305	0.1%	0.0%
Mississippi	\$2,172,616,631	14.2%	2.1%	\$72,383,369	0.5%	0.1%
Missouri	\$1,567,112,249	4.5%	0.6%	\$280,887,751	0.8%	0.1%
North Carolina	\$4,836,969,738	5.1%	1.0%	\$113,030,262	0.1%	0.0%
Oklahoma	\$865,681,259	5.1%	0.5%	\$47,318,741	0.3%	0.0%
South Carolina	\$3,435,208,898	11.6%	1.9%	\$290,791,102	1.0%	0.2%
Tennessee	\$3,476,823,709	7.4%	1.2%	\$428,176,291	0.9%	0.1%
Texas	\$4,501,143,589	1.9%	0.3%	\$108,856,411	0.0%	0.0%
Virginia	\$2,654,941,280	6.3%	0.6%	\$96,058,720	0.2%	0.0%
South	\$40,555,798,677	5.8%	0.8%	\$1,822,201,323	0.3%	0.0%
Kentucky	\$1,867,523,841	5.3%	1.0%	\$33,476,159	0.1%	0.0%
Maryland	\$453,601,498	2.4%	0.1%	\$159,398,502	0.8%	0.0%
Ohio	\$2,842,462,746	3.0%	0.5%	\$425,537,254	0.4%	0.1%
Pennsylvania	\$3,991,683,845	5.2%	0.6%	\$1,821,316,155	2.4%	0.3%
West Virginia	\$444,659,520	6.0%	0.6%	\$30,340,480	0.4%	0.0%
Appalachia	\$10,249,305,999	4.4%	0.6%	\$1,820,694,001	0.8%	0.1%
Maine	\$1,065,810,786	20.9%	2.0%	\$105,189,214	2.1%	0.2%
New Hampshire	\$234,047,918	3.0%	0.3%	\$29,952,082	0.4%	0.0%
New York	\$2,183,631,779	3.2%	0.2%	\$911,368,221	1.3%	0.1%
Vermont	\$238,202,395	8.4%	0.8%	\$37,797,605	1.3%	0.1%
Northeast	\$4,031,435,276	4.8%	0.3%	\$774,564,724	0.9%	0.1%
California	\$5,447,302,059	2.2%	0.2%	\$814,697,941	0.3%	0.0%
Idaho	\$498,607,393	6.6%	0.8%	\$160,392,607	2.1%	0.3%
Montana	\$162,918,750	5.2%	0.4%	\$131,081,250	4.2%	0.3%
Oregon	\$2,489,663,416	4.7%	1.2%	\$555,336,584	1.1%	0.3%
Washington	\$2,024,591,735	3.6%	0.5%	\$1,010,408,265	1.8%	0.2%
Northwest	\$10,129,716,077	2.8%	0.3%	\$3,165,283,923	0.9%	0.1%
Illinois	\$3,132,748,180	3.3%	0.4%	\$339,251,820	0.4%	0.0%
Indiana	\$2,657,094,013	2.9%	0.9%	\$389,905,987	0.4%	0.1%
Michigan	\$3,213,745,691	3.7%	0.7%	\$1,453,254,309	1.7%	0.3%
Minnesota	\$1,510,228,016	3.6%	0.5%	\$1,458,771,984	3.4%	0.5%
Wisconsin	\$4,514,065,930	8.4%	1.6%	\$1,554,934,070	2.9%	0.5%
Midwest	\$14,057,460,362	3.8%	0.7%	\$6,166,539,638	1.7%	0.3%
National	\$81,320,623,178	4.6%	0.6%	\$11,452,376,822	0.7%	0.1%

4 Conclusion

Of the 457.8 million acres of timberland within the 32-state study area, over 337.7 million acres (74%) are privately-owned while only 120.1 million acres (26%) are publicly-owned. This translates into a much stronger economic impact associated with private timberlands, as shown in Table 4-1.

Table 4-1 Summary of National Economic Impact by Timberland Ownership

National Economic Impact Indicator	All Timberland	Private Timberland	Public Timberland
Total Timberland Acres	457,849,322	337,735,909	120,113,413
Percent of Total		74%	26%
Total (DII) Employment	2,728,784	2,391,929	336,855
Direct Employment	1,041,927	913,306	128,621
Total (DII) Payroll	\$112,650,319,660	\$98,744,184,148	\$13,906,135,513
Direct Payroll	\$48,821,189,215	\$42,794,450,230	\$6,026,738,984
Value of Timber Sales & Manufacturing Shipments	\$320,522,459,731	\$280,955,516,882	\$39,566,942,848
Value of Timber Sales	\$8,233,087,731	\$7,216,752,988	\$1,016,334,743
Value of Paper, Wood & Furniture Mfg. Shipments	\$312,289,372,000	\$273,738,763,895	\$38,550,608,105
Paper, Wood & Furniture Manufacturing Contribution to GDP	\$92,773,000,000	\$81,320,623,178	\$11,452,376,822
Share of Manufacturing GDP	5.3%	4.6%	0.7%

Approximately 913 thousand of the 1.04 million direct jobs and \$42.8 of the \$48.8 billion of the direct payroll in forestry-related businesses is attributable to private timberlands (87.7%). The total direct, indirect and induced employment effect associated with private timberlands is around 2.4 million jobs and \$98.7 billion in annual payroll. Approximately \$7.2 of the \$8.2 billion in annual timber sales were sourced from private timberlands. Over \$273.7 of the \$312.3 billion in manufacturing shipments were likewise attributable to private timberlands. Finally, private timberlands contributed approximately \$81.3 billion of the total \$92.8 billion contribution of forestry-related businesses to GDP. On average, private timberlands supported 4.6% of manufacturing GDP and 0.6% of total GDP.

Appendix A: Methodology and Data Sources

The overall objective of this study was to quantify the contribution of forestry-related businesses to the economy. To achieve this goal, an economic impact analysis was conducted. Forest2Market analyzed multiple indicators, including employment, payroll, timber sales, value of manufacturing shipments and manufacturing's contribution to GDP, to measure the economic effects of forestry-related businesses at state, regional and national levels within the study area. This research is illustrated by Figure A-1 and discussed further in this appendix.

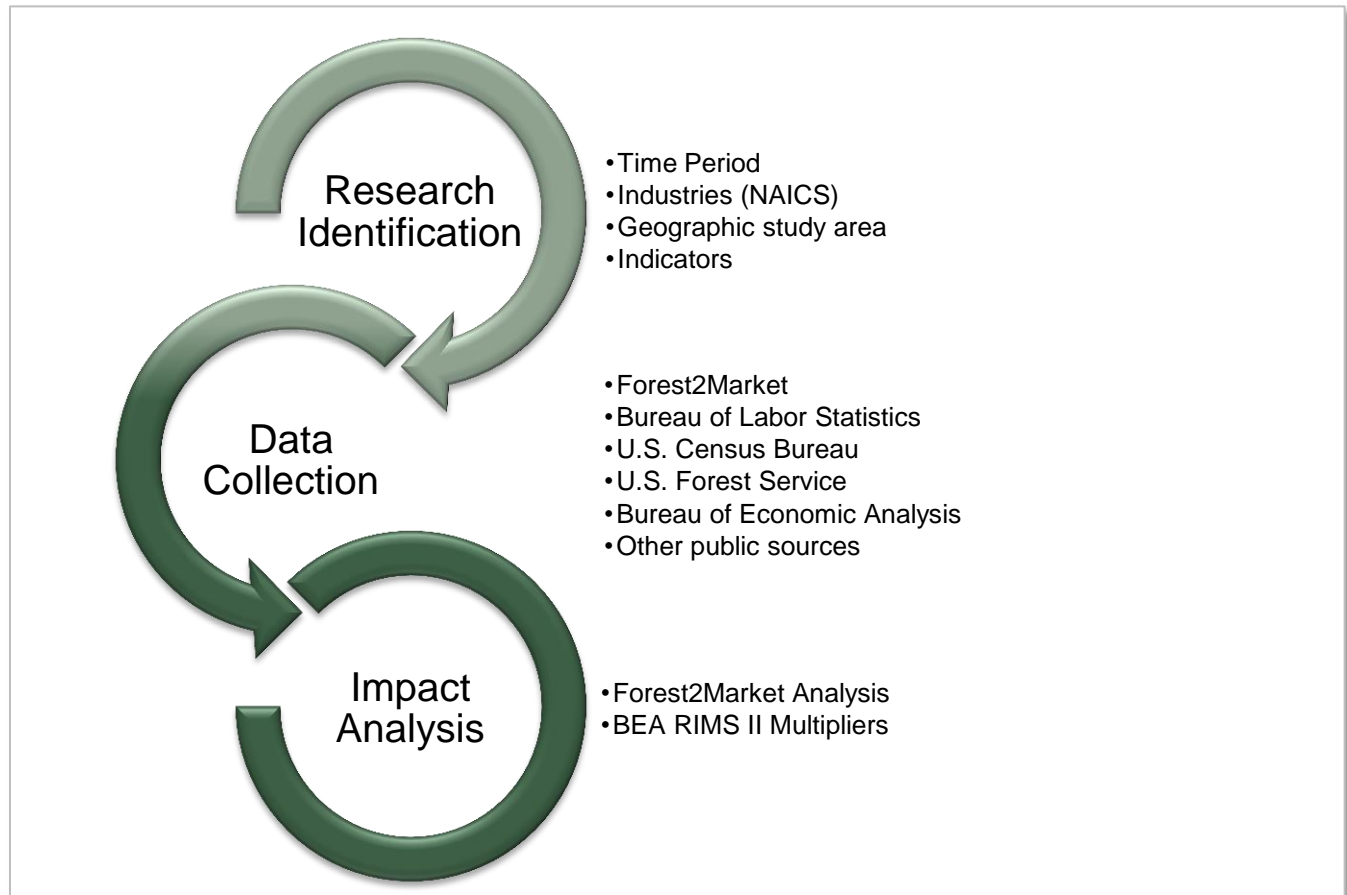


Figure A-1 Research Process Diagram

Research Identification

Time Period

Forest2Market reviewed the publically available data at both the state and federal level to understand the most recent year that complete data sets have been released. The latest data, and the data this study describes, is for 2013.

Industries

For the purposes of this report, forestry-related businesses are defined as businesses categorized under the North American Industrial Classification System (NAICS) codes listed in Table A-1. Forestry businesses throughout the supply chain, from forestry and logging operations through lumber and paper merchant wholesalers,⁷ are included.

Table A-1 Forestry-Related Businesses

NAICS Code	Industry
113	Forestry and logging
1153	Support activities for forestry
321	Wood product manufacturing
322	Paper manufacturing
33711	Wood kitchen cabinet and countertop manufacturing
337122	Non-upholstered wood household furniture manufacturing
337211	Wood office furniture manufacturing
337212	Custom architectural woodwork and millwork manufacturing
42331	Lumber, plywood, millwork, and wood panel merchant wholesalers
4241	Paper and paper product merchant wholesalers

Geographic Study Area

The states included in the study area for the analysis were selected based on the number of forested acres and the productivity level of the forests within each state. In total, 32 states⁸ across 5 regions in the contiguous U.S. are included in the analysis (Figure A-2, next page).

⁷ Prior reports used the Printing and Writing Paper Merchant Wholesalers Industry (42411). The current report expands this business category to the Industry Sub-Sector (4241). The current report also uses Industry 42331 instead of the functionally equivalent 423310, which was used for the 2010 data analysis (published in 2013). Wholesaling industries were not included in the first report (2006 data, published in 2009).

⁸ Illinois, Indiana and Missouri were not included in the first report (2006 data, published in 2009).

Indicators

Forest2Market analyzed the following indicators during its economic impact analysis:

- Acres of timberland by owner type
- Harvest removals from timberland by owner type
- Employment (jobs)
- Payroll contributions
- Value of timber sales
- Value of manufacturing shipments
- Manufacturing contribution to Gross Domestic Product

Data Collection

Forest2Market collected data from multiple proprietary and public databases. These sources are described below.

Forest2Market: Proprietary Databases

Forest2Market's *online stumpage price service*, launched in 2001, contains the cost and tract details of stumpage sales worth over \$3 billion, or approximately 154,000 timber transactions. These price points are used by landowners to evaluate bids, by stumpage buyers to prepare bids, and by timber appraisers as a basis for the timber valuation component of land appraisals. The Forest2Market online stumpage service has become the industry standard for price information and is used by large and small timberland owners (private and public managers), and by nearly every forest products company and TIMO in the US South.

In July of 2006, Forest2Market launched the industry's first *Delivered Raw Material Cost Benchmark*. Over 90% of the wood fiber that is sold on a delivered basis in the US South is represented in the benchmark. Innovative companies use the benchmark reports to measure the effects of strategic and operational changes over time. Many also use the benchmark as an index for supply agreements or to set intra-company transfer prices. This service was added for the Pacific

Northwest/Southwest Canada in 2007, in the Lake States in 2012 and the Northeast U.S./Southeast Canada in 2013. These databases and other public data sources provided stumpage price and roundwood consumption data that were used to calculate annual timber sales values.

The stumpage database is accessible with a subscription. More information about these services is available at <http://www.forest2market.com/products/forest2mill>.

Bureau of Labor Statistics: Quarterly Census of Employment and Wages

The Bureau of Labor Statistics (BLS) produces a quarterly and annual count of employment and wages that covers approximately 98% of U.S. jobs. These data, together with Census Bureau data, were used to calculate the direct jobs and wages for all industries included in this report.

Data are accessible at <http://www.bls.gov/cew/>.



U.S. Census Bureau: County Business Patterns

The U.S. Census Bureau reports annual employment and payroll information derived from administrative data in its Business Register and organizational surveys. These data, together with BLS data, were used to calculate the direct jobs and wages for all industries included in this report.

Data are accessible at <http://www.census.gov/econ/cbp/>.

U.S. Census Bureau: Annual Survey of Manufactures

Annually, the Census Bureau surveys manufacturing establishments to produce a variety of statistics, including data regarding the value of shipments by manufacturing industries. Data associated with paper, wood and furniture manufacturing were included in this report.

Data are accessible at <http://www.census.gov/manufacturing/asm/>.

U.S. Forest Service: Forest Inventory and Analysis

The United States Department of Agriculture (USDA) provides the principal source of timber resource information available for the United States *via* the U.S. Forest Service's Forest and Inventory Analysis (FIA) program. The Forest Service is mandated to conduct periodic assessments of timber inventories across the United States. During these assessments, measurements regarding forest characteristics (e.g. inventory, annual growth and annual removals) are taken for a portion of the FIA's sample plots in a state each year. In addition, FIA collects Timber Products Output (TPO) survey data, which tracks roundwood consumption at primary mills. FIA data were used to determine forested acres, timberland acres, private *versus* public acres and annual roundwood consumption from private *versus* public timberlands.

Data are accessible at <http://www.fia.fs.fed.us/tools-data/>.

Bureau of Economic Analysis: National Income and Product Accounts

The Bureau of Economic Analysis reports gross domestic product by state and industry using its regional economic accounts. Data associated with paper, wood and furniture manufacturing and total manufacturing were used to determine forestry-related businesses' contribution to manufacturing and total GDP.

Data are accessible at <http://www.bea.gov/regional/about.cfm/>.

Impact Analysis

Forest2Market Analysis

After collecting the data, Forest2Market estimated missing data, analyzed all data and summarized the findings for this report.

Bureau of Economic Analysis: RIMS II Multipliers

The Bureau of Economic Analysis (BEA) releases Regional Input-Output Modeling System (RIMS) II multipliers that are based on the BEA's national input-output (I-O) accounts and adjusted for regional variation. RIMS II multipliers provide a mechanism for tracking how goods and services produced by an industry are used by other industries and, therefore, the impact an industry has on other industries. RIMS II multipliers were used to estimate the indirect and induced employment and payroll effects associated with forestry-related businesses.

RIMS II Multipliers are accessible at <https://www.bea.gov/regional/rims/>.

Appendix B: Glossary

Annual timber or stumpage sales are the product of harvest volumes and stumpage prices over a year.

Direct impacts refer to the initial, immediate economic activities (employment and payrolls) generated by an industry.

Gross domestic product (GDP) is the market value of final goods and services produced in an economy over a period of time.

Indirect impacts are the production, employment and income changes occurring in other businesses in the community that supplies inputs to the industry under consideration.

Induced impacts are the effects of spending by the households in the economy as the result of direct and indirect effects.

North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

Timberland is forestland that is producing or capable of producing more than 20 cubic feet per acre per year of wood at culmination of mean annual increment. Timberland excludes reserved forestlands.

Total effect (DII effect) is the sum of the direct, indirect and induced (DII) effects.

Value of shipments includes the received or receivable net selling values of manufactured goods.

Appendix C: Per Acre Contributions

Table C-1 Total Employment (Direct, Indirect and Induced) per 1,000 Acres

Geographic Area	All Timberland	Private	Public
Alabama	4.3	4.4	2.1
Arkansas	3.4	3.8	1.4
Florida	6.1	8.1	1.3
Georgia	6.8	7.2	1.8
Louisiana	3.4	3.8	0.7
Mississippi	2.2	2.4	0.7
Missouri	5.4	5.4	5.2
North Carolina	8.9	10.1	1.5
Oklahoma	3.3	3.5	1.4
South Carolina	5.9	6.2	4.2
Tennessee	7.6	7.8	6.3
Texas	12.9	13.8	3.6
Virginia	5.6	6.4	1.3
South	5.8	6.4	1.9
Kentucky	5.2	5.7	0.9
Maryland	10.9	9.8	15.9
Ohio	16.4	16.1	19.2
Pennsylvania	9.9	9.3	11.3
West Virginia	1.6	1.7	1.0
Appalachia	7.9	8.0	7.2
Maine	1.9	1.8	3.6
New Hampshire	2.5	2.9	1.2
New York	5.9	4.6	15.7
Vermont	2.3	2.4	1.9
Northeast	3.5	3.3	5.5
California	11.2	22.2	2.6
Idaho	1.7	7.4	0.5
Montana	0.6	1.0	0.4
Oregon	4.0	8.3	1.2
Washington	5.0	6.5	3.5
Northwest	4.3	9.0	1.6
Illinois	25.8	26.4	21.6
Indiana	20.2	20.4	19.0
Michigan	4.9	5.3	4.3
Minnesota	4.9	5.2	4.7
Wisconsin	10.1	10.5	9.1
Midwest	9.1	9.6	8.1
National	6.0	7.1	2.8

Table C-2 Total Payroll Effect (DII) of Forestry-Related Businesses per Acre

Geographic Area	All Timberland	Private	Public
Alabama	\$154	\$159	\$75
Arkansas	\$131	\$147	\$54
Florida	\$222	\$293	\$46
Georgia	\$287	\$305	\$78
Louisiana	\$138	\$152	\$29
Mississippi	\$84	\$91	\$24
Missouri	\$165	\$166	\$160
North Carolina	\$343	\$389	\$57
Oklahoma	\$140	\$152	\$58
South Carolina	\$233	\$242	\$166
Tennessee	\$335	\$344	\$280
Texas	\$523	\$557	\$147
Virginia	\$218	\$247	\$51
South	\$227	\$249	\$76
Kentucky	\$204	\$223	\$35
Maryland	\$476	\$429	\$693
Ohio	\$696	\$682	\$814
Pennsylvania	\$440	\$416	\$506
West Virginia	\$62	\$65	\$37
Appalachia	\$336	\$341	\$308
Maine	\$69	\$66	\$131
New Hampshire	\$113	\$130	\$56
New York	\$269	\$213	\$720
Vermont	\$90	\$93	\$75
Northeast	\$152	\$142	\$238
California	\$501	\$997	\$116
Idaho	\$64	\$282	\$19
Montana	\$23	\$42	\$15
Oregon	\$161	\$332	\$49
Washington	\$239	\$306	\$166
Northwest	\$190	\$393	\$71
Illinois	\$1,204	\$1,230	\$1,007
Indiana	\$817	\$824	\$771
Michigan	\$198	\$211	\$175
Minnesota	\$212	\$221	\$203
Wisconsin	\$436	\$454	\$391
Midwest	\$390	\$412	\$349
National	\$246	\$292	\$116

Table C-3 Value of Timber Sales and Manufacturing Shipments per Acre

Geographic Area	All Timberland	Private	Public
Alabama	\$632	\$653	\$306
Arkansas	\$480	\$538	\$196
Florida	\$584	\$769	\$122
Georgia	\$773	\$823	\$210
Louisiana	\$552	\$610	\$115
Mississippi	\$436	\$474	\$126
Missouri	\$478	\$481	\$464
North Carolina	\$1,043	\$1,182	\$173
Oklahoma	\$492	\$533	\$205
South Carolina	\$915	\$948	\$649
Tennessee	\$719	\$737	\$599
Texas	\$1,156	\$1,232	\$326
Virginia	\$583	\$661	\$136
South	\$681	\$749	\$227
Kentucky	\$664	\$728	\$113
Maryland	\$1,182	\$1,065	\$1,721
Ohio	\$1,579	\$1,546	\$1,845
Pennsylvania	\$1,201	\$1,134	\$1,378
West Virginia	\$121	\$127	\$71
Appalachia	\$875	\$889	\$804
Maine	\$320	\$305	\$607
New Hampshire	\$197	\$227	\$98
New York	\$657	\$520	\$1,759
Vermont	\$146	\$150	\$121
Northeast	\$416	\$389	\$653
California	\$1,265	\$2,519	\$292
Idaho	\$190	\$836	\$56
Montana	\$49	\$90	\$31
Oregon	\$512	\$1,057	\$155
Washington	\$586	\$751	\$407
Northwest	\$506	\$1,047	\$190
Illinois	\$2,357	\$2,408	\$1,971
Indiana	\$2,323	\$2,343	\$2,192
Michigan	\$770	\$821	\$678
Minnesota	\$594	\$620	\$569
Wisconsin	\$1,321	\$1,374	\$1,186
Midwest	\$1,114	\$1,176	\$996
National	\$700	\$832	\$329

Table C-4 Contribution to GDP per Acre

Geographic Area	All Timberland	Private	Public
Alabama	\$179	\$185	\$87
Arkansas	\$145	\$162	\$59
Florida	\$182	\$239	\$38
Georgia	\$230	\$245	\$63
Louisiana	\$158	\$175	\$33
Mississippi	\$116	\$127	\$34
Missouri	\$124	\$125	\$120
North Carolina	\$277	\$314	\$46
Oklahoma	\$125	\$136	\$52
South Carolina	\$289	\$300	\$205
Tennessee	\$291	\$299	\$243
Texas	\$326	\$348	\$92
Virginia	\$180	\$204	\$42
South	\$201	\$221	\$67
Kentucky	\$155	\$170	\$26
Maryland	\$279	\$251	\$406
Ohio	\$418	\$409	\$489
Pennsylvania	\$354	\$335	\$407
West Virginia	\$40	\$42	\$24
Appalachia	\$239	\$243	\$220
Maine	\$69	\$66	\$131
New Hampshire	\$59	\$67	\$29
New York	\$196	\$155	\$525
Vermont	\$64	\$67	\$54
Northeast	\$116	\$108	\$181
California	\$377	\$751	\$87
Idaho	\$40	\$176	\$12
Montana	\$15	\$27	\$9
Oregon	\$129	\$266	\$39
Washington	\$170	\$218	\$118
Northwest	\$141	\$292	\$53
Illinois	\$757	\$773	\$633
Indiana	\$646	\$652	\$610
Michigan	\$241	\$257	\$212
Minnesota	\$190	\$198	\$182
Wisconsin	\$366	\$381	\$329
Midwest	\$332	\$350	\$297
National	\$203	\$241	\$95