GEORGIA FORESTRY
COMMISSION

2015 Economic Benefits of the Forestry Industry in Georgia

Prepared by:
Enterprise Innovation Institute
Georgia Institute of Technology

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Executive Summary

Georgia's forestry industry has many components, which interact with all other sectors of the economy in complex ways. The purposes of this analysis are to: (1) quantify the level of economic activity conducted by the components of the forestry industry, (2) estimate economic activity supported in all Georgia sectors by the industry's activities, (3) compare the level of activity in the forestry industry with other industries, and (4) quantify the economic activity of forestry industry sectors within each of the 12 regional commissions in Georgia.

This report is the latest in a series that began in 2002, but underwent a significant restructuring in 2003 to reflect the change in industry classification systems from Standard Industrial Classification (SIC) to North American Industry Classification System (NAICS) used by data collection agencies (primarily the Georgia Department of Labor) that provide much of the data used in these analyses. Also, some minor adjustments were made in the 2011 NAICS list to reflect the changes in the new 2012 NAICS code definitions.

The forestry industry components, and the level of economic activity represented by them in 2015, are shown in Table E-1. Economic activity is measured by output (similar to sales revenue), employment, and compensation (defined as wages and salaries including benefits). These measures are traditionally used in this type of analysis.

Table E-1 shows that the forestry industry in 2015 employed 50,385 workers in all industry sectors combined, paid an annual compensation (as defined by wages and salaries) of more than $3.5 billion, and generated an estimated total revenue of $19.2 billion.

Table E-1: Georgia Forestry Industry Economic Activity (2015)

Sector	Output	Employment	Wages & Salaries
Forestry Management and Logging	$605,038,186	5,820	$344,619,630
Bioenergy	$438,536,846	693	$48,726,408
Lumber and Wood Preservation	$1,674,283,094	5,527	$341,591,072
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,361,540,795	3,947	$253,462,248
Prefabricated Wood Buildings and Manufactured Housing	$311,545,156	1,618	$66,918,918
Pulp and Paper Products	$12,460,683,347	18,919	$1,796,041,178
Woodworking and Paper Industries Machinery	$125,535,977	526	$35,194,277
Wooden Furniture, Cabinets, Custom Arch. & Millwork, Windows and Doors	$1,493,638,187	9,008	$448,775,695
Containers, Showcases, Partitions, and Shelving	$731,784,635	4,326	$217,625,051
Total	**$19,202,586,221**	**50,385**	**$3,552,954,477**

The industry's activities bring dollars into the state, which recirculate in a process called the "multiplier effect." The recirculation touches all major industry sectors as goods and services are bought and sold to meet increased demands by businesses and households resulting from the new resources brought into the state by the forestry industry.

The result of the multiplier effect, given by total impacts (which includes the economic activity in Table E-1[1]), is also measured by output, employment, and wages and salaries and is shown in Table E-2. Total economic activity supported by the forestry industry in Georgia (including the multiplier effect and forestry-related bioenergy firms) was nearly $32.2 billion in 2015. These activities supported the employment of 133,256 people whose compensation was $7.9 billion (including benefits).

Table E-2: Total Benefits by Major Industry (2015)

Sector	Output	Employment	Wages & Salaries
Agriculture, Forestry, Fish & Hunting	$1,029,593,099	10,011	$565,716,007
Mining	$52,859,676	253	$10,559,578
Utilities	$1,281,357,317	1,205	$130,981,918
Construction	$301,168,478	1,838	$86,430,337
Manufacturing	$19,027,827,816	46,104	$3,302,651,794
Wholesale Trade	$1,645,627,665	6,590	$568,709,664
Retail Trade	$583,004,053	7,614	$240,868,898
Transportation & Warehousing	$1,120,983,559	6,678	$401,098,760
Information	$761,853,124	1,648	$164,433,514
Finance & Insurance	$1,063,142,859	4,734	$316,513,089
Real Estate & Rental	$1,384,037,243	3,613	$100,578,994
Professional, Scientific & Tech Services	$903,814,738	6,905	$498,016,151
Management of companies	$613,374,963	2,587	$306,450,943
Administrative & Waste Services	$549,356,469	9,479	$289,268,083
Educational Services	$108,808,101	1,450	$61,856,532
Health & Social Services	$780,525,728	7,858	$425,801,721
Arts, Entertainment & Recreation	$116,305,010	1,833	$40,721,889
Accommodation & Food Services	$411,624,933	7,161	$154,282,416
Other Services	$413,359,894	5,670	$193,848,165
Government & non-NAICS Industries	$5,275,069	25	$1,465,495
TOTAL	**$32,153,899,792**	**133,256**	**$7,860,253,948**

Another way to examine the forestry industry in Georgia is to compare it with the state's other manufacturing sectors. Table E-3 lists 2015 employment and income totals for each major manufacturing sector sorted by employment. These data show that forestry ranked second in total employment, moving up from ranking 3rd in 2014. The sector ranked first in terms of wages and salaries. Food processing ranked first in employment and second in wages and salaries, and textiles (mostly carpet) dropped to third in employment and fourth in wages and salaries.

[1] The economic activity in Table E-1 contains more than just the direct impacts because some of the inter-industry purchasing (indirect impacts) is necessarily contained in the estimates of economic activity.

Table E-3: Comparison to Georgia's Other Manufacturing Sectors (2015)

Industry Sectors	Employment	Wages & Salaries
Food Processing	64,264	$3,482,724,648
Forestry Industry	**50,385**	**$3,552,954,477**
Textiles	50,381	$2,105,478,544
Transportation Equipment	49,343	$3,345,254,848
Fabricated Metal Products	34,797	$1,671,333,456
Machinery	23,690	$1,335,111,440
Chemicals	19,959	$1,430,558,896
Printing	13,592	$618,332,208
Electrical Equipment and Appliances	12,534	$934,494,288
Computers and Electronic Products	6,935	$723,558,992
Apparel	2,824	$95,136,028

Of particular importance to Georgia's state government is how the forestry industry affects its annual budget. This is investigated by estimating the revenues associated with the forestry industry's total economic activity and subtracting the costs associated with providing state services to Georgia's households and companies associated with that activity. Revenues include individual and corporate income taxes, sales and use taxes, highway taxes, fees, and miscellaneous revenues. Costs include education; public health, safety, and welfare; highways; administration; and miscellaneous. Table E-4 provides the fiscal impact estimates based on total impacts. The forestry industry generated an estimated $753 million in revenues for the state budget in 2015. When the costs of providing services to all employees are deducted from these revenues, net annual state revenues were $360.3 million for 2015.

Table E-4: Fiscal Impact Analysis (2015)	
Annual State Government Revenues	**$753,085,463**
Annual State Government Costs	**$392,764,429**
Net Annual Revenues	**$360,321,034**

Table E-5 compares the overall results obtained in each impact analysis conducted from 2005 through 2015. As the table shows, the forestry industry's output, employment, and wages and salaries grew at a much faster pace when compared to previous years. Compared to 2014, the industry's 2015 output grew by 14 percent, employment grew by 3 percent, and wages and salaries increased by 17 percent. The industry's increased activity resulted in higher net revenues for the state government.

Table E-5: Comparison of Results 2005 to 2015

(Dollars in millions; Employment in persons)

Forestry Industry Direct Economic Impact	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Output*	$16,150	$17,760	$18,459	$18,270	$16,906	$14,495	$15,082	$16,072	$16,564	$16,843	$19,203
Employment	67,694	67,733	64,192	57,812	48,519	43,425	46,378	47,123	48,139	48,740	50,385
Wages & Salaries*	$3,422	$3,513	$3,394	$3,131	$2,770	$2,624	$2,972	$2,917	$2,938	$3,030	$3,553
Year to Year Percent Change											
Output		10.0%	3.9%	-1.0%	-7.5%	-14.3%	4.0%	6.6%	3.1%	1.7%	14.0%
Employment		0.1%	-5.2%	-9.9%	-16.1%	-10.5%	6.8%	1.6%	2.2%	1.2%	3.4%
Wages & Salaries		2.7%	-3.4%	-7.7%	-11.5%	-5.3%	13.3%	-1.9%	0.7%	3.1%	17.3%

Total Impacts	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Output*	$25,972	$27,738	$28,547	$28,723	$27,200	$23,643	$24,975	$27,469	$28,014	$28,674	$32,154
Employment	154,147	149,347	141,155	128,388	118,423	108,112	118,459	120,260	127,750	129,329	133,256
Wages & Salaries*	$6,827	$6,773	$6,696	$6,514	$5,561	$5,377	$6,491	$6,540	$6,898	$7,119	$7,860
Year to Year Percent Change											
Output		6.8%	2.9%	0.6%	-5.3%	-13.1%	5.6%	10.0%	2.0%	2.4%	12.1%
Employment		-3.1%	-5.5%	-9.0%	-7.8%	-8.7%	9.6%	1.5%	6.2%	1.2%	3.0%
Wages & Salaries		-0.8%	-1.1%	-2.7%	-14.6%	-3.3%	20.7%	0.8%	5.5%	3.2%	10.4%

Forestry Industry Fiscal Impact	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
State Revenues	$591	$580	$566	$539	$472	$448	$487	$691	$700	$721	$753
State Costs	$414	$400	$373	$333	$314	$282	$308	$358	$360	$370	$393
Net Revenues*	$176	$180	$193	$206	$158	$166	$179	$333	$340	$351	$360

Source: Enterprise Innovation Institute (EI2)impact assessments and Georgia Department of Labor, Current Employment and Wages

**Output, Wages and Salaries and Revenues are not adjusted for inflation*

Impact by Region

Quantifying the economic benefits of the forestry industry at the local level is difficult given the limitations in employment and wages and salaries data (non-disclosed data). In previous reports, the approach was to group counties with no disclosed data and report aggregate employment, and compensation. In 2011, we began quantifying the impact of the forestry industry in 12 jurisdictions consistent with the state's regional commissions. Figure E-1 shows the map of the 12 regions and counties located within each region.

Figure E-1: Map of Regional Commissions

Table E-6 shows the impact of the forestry industry in terms of output, employment, and compensation in each region.

Table E-6: Forestry Industry's Regional Impact (2015)			
Regions	**Output**	**Employment**	**Wages & Salaries**
Atlanta Regional Commission	$4,319,318,546	11,333	$934,509,990
Central Savannah River Area	$1,262,967,663	3,314	$247,751,697
Coastal	$1,690,000,407	4,434	$401,506,772
Georgia Mountains	$1,056,973,548	2,773	$142,307,474
Heart of Georgia Altamaha	$1,734,748,192	4,552	$312,309,628
Middle Georgia	$1,091,305,900	2,863	$197,467,880
Northeast Georgia	$1,178,486,930	3,092	$188,365,423
Northwest Georgia	$1,498,279,292	3,931	$252,714,292
River Valley	$769,584,755	2,019	$133,650,948
Southern Georgia	$1,854,332,790	4,865	$263,413,539
Southwest Georgia	$1,535,311,942	4,028	$276,960,592
Three Rivers	$1,211,276,256	3,178	$201,996,241
Total	**$19,202,586,221**	**50,385**	**$3,552,954,477**

SECTION 1

Introduction

Georgia's forestry industry contains many components and supports a significant proportion of the state's economic activity. This analysis quantifies that activity in terms of economic output, employment, and employee compensation. Economic output is defined as business revenues, and employee compensation is defined as wages and salaries including benefits paid by employers. Additional factors considered include how the manufacturing components in the forestry industry compare to other manufacturing sectors, and how the forestry industry affects state government costs and revenues.

The first step in this process was to define the limits of what constitutes the "forestry industry." This was not a simple task because the borders of one industry overlap those of other industries. How this was done and its results appear in Section 2, which also contains estimates of how much economic activity is occurring in each component of the forestry industry.

After the industry was defined and activities quantified, the total economic activity supported by the forestry industry was estimated. Total activity is generally referred to as the "multiplier effect." This effect occurs whenever dollars are brought into the state's economy and recirculated before leaking out. Section 3 explains the methodology used to estimate total economic activity and provides perspective on how important these activities are in the overall Georgia economy.

Section 4 quantifies the industry's output, employment, and compensation in the state's 12 regional commissions.

This report is the latest of a series of reports that began with an analysis of the 2002 impacts and continuing annually to the present analysis. The 2002 analysis is not comparable to the subsequent analyses, however, because of a significant change in the industry classification systems implemented in the 2003 data set. The 2002 analysis was based on the Standard Industry Classification system (SIC), and the later data sets used the North American Industrial Classification System (NAICS). Industry classification changes introduced by NAICS 2012 code required minor adjustments in the NAICS code selection in the 2011 analysis. The new classification was also used in this year's analysis.

The 2014 report includes revisions of 2012 and 2013 historical data were made as result of a more objective and efficient methodology of retrieving data from the ES202 database provided by the Georgia Department of Labor.

SECTION 2

Definition of the Forestry Industry in Georgia

The forestry industry in Georgia has many diverse components. A general definition would include all service and manufacturing activity related to the growth, harvesting, and use of forest materials that would not exist in Georgia without the presence of extensive forests or forest industries. For example, the papermaking industry would be a part of the forestry industry definition, but retail sales of that paper would not. States without commercial forests still sell paper within their borders.

Therefore, the forestry industry definition used in this analysis includes these broad sectors: forestry, logging, wood products (such as dimension lumber), paper products, manufactured housing, furniture, other miscellaneous wood products, and woodworking and papermaking machinery. The 2012 North American Industrial Classification System (NAICS) was used to define the components of the forestry industry. The NAICS codes and descriptions comprising the detailed definition appear in Table 2-1.

Table 2-1: Forestry Industry Definition Components: NAICS

Grouping	Industry Description	NAICS CODE
Forestry Management and Logging	Timber Tract Operations	113110
	Forest Nursery and Gathering Forest Products	113210
	Logging	113310
	Support Activities for Forestry	115310
Bioenergy	Bioenergy Derived from Forest Products	321113 321999 221112 221117
Lumber and Wood Preservation	Sawmills	321113
	Wood Preservation	321114
Veneer, Plywood, Reconstituted and Engineered Wood	Hardwood Veneer and Plywood Manufacturing	321211
	Softwood Veneer and Plywood Manufacturing	321212
	Reconstituted Wood Product Manufacturing	321219
	Engineered Wood Member Manufacturing	321213
	Truss Manufacturing	321214
Prefabricated Wood Buildings and Manufactured Housing	Manufactured Home, Mobile Home, Manufacturing	321991
	Prefabricated Wood Building Manufacturing	321992
	Pulp Mills	322110

Pulp and Paper Products	Paper, Except Newsprint, Mills	322121
	Newsprint Mills	322122
	Paperboard Mills	322130
	Corrugated and Solid Fiber Box Manufacturing	322211
	Folding Paperboard Box Manufacturing	322212
	Other Paperboard Container Manufacturing	322219
	Paper Bag and Coated and Treated Paper Manufacturing	322220
	Stationery Product Manufacturing	322230
	Sanitary Paper Product Manufacturing	322291
	All Other Converted Paper Product Manufacturing	322299
Woodworking and Paper Industries Machinery	Sawmill, Woodworking, and Paper Machinery Manufacturing	333243
Wooden Furniture, Cabinets, Custom Arch. & Millwork, Windows and Doors	Wood Kitchen Cabinet and Countertop Manufacturing	337110
	Upholstered Household Furniture Manufacturing	337121
	Non-upholstered Wood Household Furniture Manufacturing	337122
	Institutional Furniture Manufacturing	337127
	Wood Office Furniture Manufacturing	337211
	Custom Architectural Woodwork and Millwork	337212
	Wood Window and Door Manufacturing	321911
	Cut Stock, Re-sawing Lumber, and Planing	321912
	Other Millwork, Including Flooring	321918
	Burial Casket Manufacturing	339995
	All Other Miscellaneous Wood Product Manufacturing	321999
Containers, Showcases, Partitions and Shelving	Wood Container and Pallet Manufacturing	321920
	Showcases, Partitions, Shelving, and Lockers	337215

Source: North American Industrial Classification System; Georgia Tech's Enterprise Innovation Institute

As in previous years, this analysis includes all firms producing products related to bioenergy that are derived from forest products. This relatively new industry sector is represented by 15 firms in Georgia. The total employment for this sector in 2015 was 693.

The level of economic activity in each forestry industry component is measured by output, employment, and wages and salaries. Measures for 2015 appear in Table 2-2, which aggregates the numerous categories from Table 2-1 to a more manageable number.[2] This table shows that total employment in all of the forestry industry sectors was 50,385 and these jobs earned annual compensation

[2] There were two changes to the breakdown of categories that were introduced in the 2012 report: *bioenergy* is shown as a separate sector and *windows and doors* sector is combined with *wooden furniture, cabinets, custom archwork & millwork, windows and doors*.

(total wages and salaries including benefits) of more than $3.5 billion from estimated total revenue of $19.2 billion.

Within the industry, Georgia companies have representatives in each of the sectors and subsectors down to the NAICS six-digit level. Based on this aggregation scheme, the highest employment is seen in *pulp and paper* with 18,919 workers, followed by *wooden furniture, cabinets, custom arch. & millwork, windows and doors* with 9,008 employees.

Compensation, like employment, is dominated by *pulp and paper* at nearly $1.8 billion (more than half the total), followed distantly by *wooden furniture, cabinets, custom archwork & millwork* at $449 million and *forestry management and logging* at $345 million. The largest outputs are produced by *pulp and paper* ($12.5 billion), followed by *lumber and wood preservation* ($1.7 billion) and *wooden furniture, cabinets, custom archwork & millwork, windows and doors* ($1.5 billion).

Table 2-2: Georgia Forestry Industry Economic Activity (2015)

Sector	Output	Employment	Wages & Salaries
Forestry Management and Logging	$605,038,186	5,820	$344,619,630
Bioenergy	$438,536,846	693	$48,726,408
Lumber and Wood Preservation	$1,674,283,094	5,527	$341,591,072
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,361,540,795	3,947	$253,462,248
Prefabricated Wood Buildings and Manufactured Housing	$311,545,156	1,618	$66,918,918
Pulp and Paper Products	$12,460,683,347	18,919	$1,796,041,178
Woodworking and Paper Industries Machinery	$125,535,977	526	$35,194,277
Wooden Furniture, Cabinets, Custom Arch. & Millwork, Windows and Doors	$1,493,638,187	9,008	$448,775,695
Containers, Showcases, Partitions, and Shelving	$731,784,635	4,326	$217,625,051
Total	**$19,202,586,221**	**50,385**	**$3,552,954,477**

Table 2-3 provides a comparison of the forestry industry activity from 2006 through 2015. Three measures are included in the comparison: output, employment, and compensation. Output (an estimate of the firms' revenues) continued to increase over the 2012-2014 period, reversing a declining trend that started over the 2007-2008 period. The total output in 2015 increased by 14 percent from 2014 rate. However, the increase in activity was not consistent among all sectors. All forestry sectors reported growth, except the *bioenergy* sector that continued to show a declining trend.

Employment, like output, improved in 2015 with the state's forestry industry reporting an increase of 1,644 jobs, or 3.4 percent from 2014. The majority of the jobs were in the *pulp and paper products* sector. The *prefabricated wood buildings and manufactured housing* sector saw the highest percentage growth.

Wages and salaries increased in all sectors, except the *woodworking and paper industries machinery* sector that reported a decrease of 8 percent, and the v*eneer, plywood, reconstituted, and engineered wood* sector which remained unchanged.

Table 2-3: Forestry Industry Activity 2006 - 2015 Comparison

Output (Millions of Dollars)

Sector	2006	2007	2008	2009	2010	2011	2012*	2013*	2014	2015
Forestry Management and Logging	$1,846	$1,807	$1,698	$1,454	$902	$805	$662	$580	$582	$605
Bioenergy	-	-	-	-	-	-	-	$782	$688	$439
Lumber and Wood Preservation	$2,057	$2,100	$1,732	$1,359	$1,176	$1,264	$1,332	$1,272	$1,307	$1,674
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,260	$1,322	$961	$664	$667	$590	$583	$1,010	$1,071	$1,362
Prefabricated Wood Buildings and Manufactured Housing	$596	$523	$427	$252	$189	$180	$174	$174	$206	$312
Pulp and Paper Products	$9,590	$10,131	$10,856	$11,018	$9,663	$10,426	$11,297	$10,752	$10,936	$12,461
Woodworking and Paper Industries Machinery	$52	$61	$67	$86	$113	$117	$90	$111	$118	$126
Wooden Furniture, Cabinets, Custom Arch. & Millwork	$1,366	$1,374	$1,153	$996	$872	$627	$1,224	$1,249	$1,301	$1,494
Windows and Doors	$446	$517	$721	$497	$390	$494				
Containers, Showcases, Partitions, and Shelving	$548	$624	$654	$579	$524	$578	$710	$624	$634	$732
Total**	**$17,760**	**$18,459**	**$18,270**	**$16,906**	**$14,495**	**$15,082**	**$16,072**	**$16,564**	**$16,843**	**$19,205**

Employment

Sector	2006	2007	2008	2009	2010	2011	2012*	2013*	2014	2015
Forestry Management and Logging	6,152	5,914	5,529	5,119	5,050	5,036	5,500	5,714	5,720	5,820
Bioenergy	-	-	-	-	-	-	-	300	673	693
Lumber and Wood Preservation	8,957	8,773	6,477	5,469	4,902	5,538	5,279	5,177	5,242	5,527
Veneer, Plywood, Reconstituted, and Engineered Wood	6,963	6,004	4,448	3,137	3,025	2,916	2,898	3,651	3,848	3,947
Prefabricated Wood Buildings and Manufactured Housing	4,500	3,581	2,983	1,949	1,409	1,365	1,285	1,252	1,376	1,618
Pulp and Paper Products	22,861	21,651	20,816	18,936	16,939	19,012	19,659	18,754	18,538	18,919
Woodworking and Paper Industries Machinery	314	304	295	300	473	536	479	506	522	526
Wooden Furniture, Cabinets, Custom Arch. & Millwork	10,770	10,189	8,235	6,827	5,905	4,724	7,985	8,434	8,676	9,008
Windows and Doors	2,598	3,043	3,967	2,973	2,252	3,156				
Containers, Showcases, Partitions, and Shelving	4,618	4,733	4,506	3,809	3,470	4,095	4,017	4,135	4,145	4,326
Total**	**67,733**	**64,192**	**57,812**	**48,519**	**43,425**	**46,378**	**47,102**	**47,941**	**48,740**	**50,385**

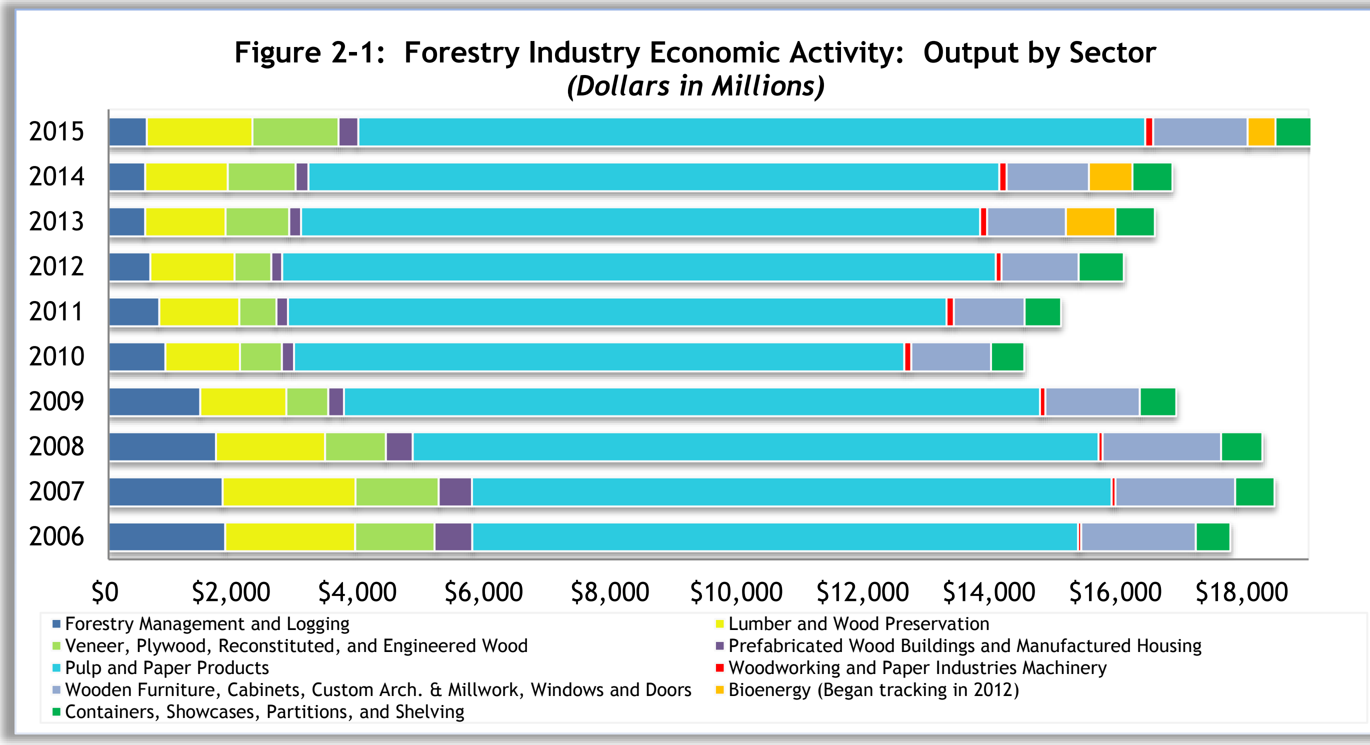
Wages and Salaries (Millions of Dollars)										
Sector	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012***	**2013***	**2014**	**2015**
Forestry Management and Logging	$267	$273	$255	$238	$239	$262	$305	$251	$255	$345
Bioenergy	-	-	-	-	-	-		$39	$45	$49
Lumber and Wood Preservation	$400	$391	$282	$250	$238	$290	$255	$259	$267	$342
Veneer, Plywood, Reconstituted, and Engineered Wood	$353	$291	$211	$158	$163	$162	$150	$238	$253	$253
Prefabricated Wood Buildings and Manufactured Housing	$165	$119	$99	$66	$44	$49	$44	$51	$56	$67
Pulp and Paper Products	$1,630	$1,602	$1,565	$1,494	$1,412	$1,636	$1,620	$1,544	$1,575	$1,796
Woodworking and Paper Industries Machinery	$18	$19	$18	$17	$28	$34	$26	$36	$38	$35
Wooden Furniture, Cabinets, Custom Arch. & Millwork	$404	$393	$330	$271	$249	$205	$331	$344	$362	$449
Windows and Doors	$100	$115	$173	$126	$100	$148				
Containers, Showcases, Partitions, and Shelving	$175	$191	$172	$150	$151	$188	$186	$176	$179	$218
Total**	**$3,513**	**$3,394**	**$3,131**	**$2,770**	**$2,624**	**$2,973**	**$2,917**	**$2,938**	**$3,030**	**$3,553**

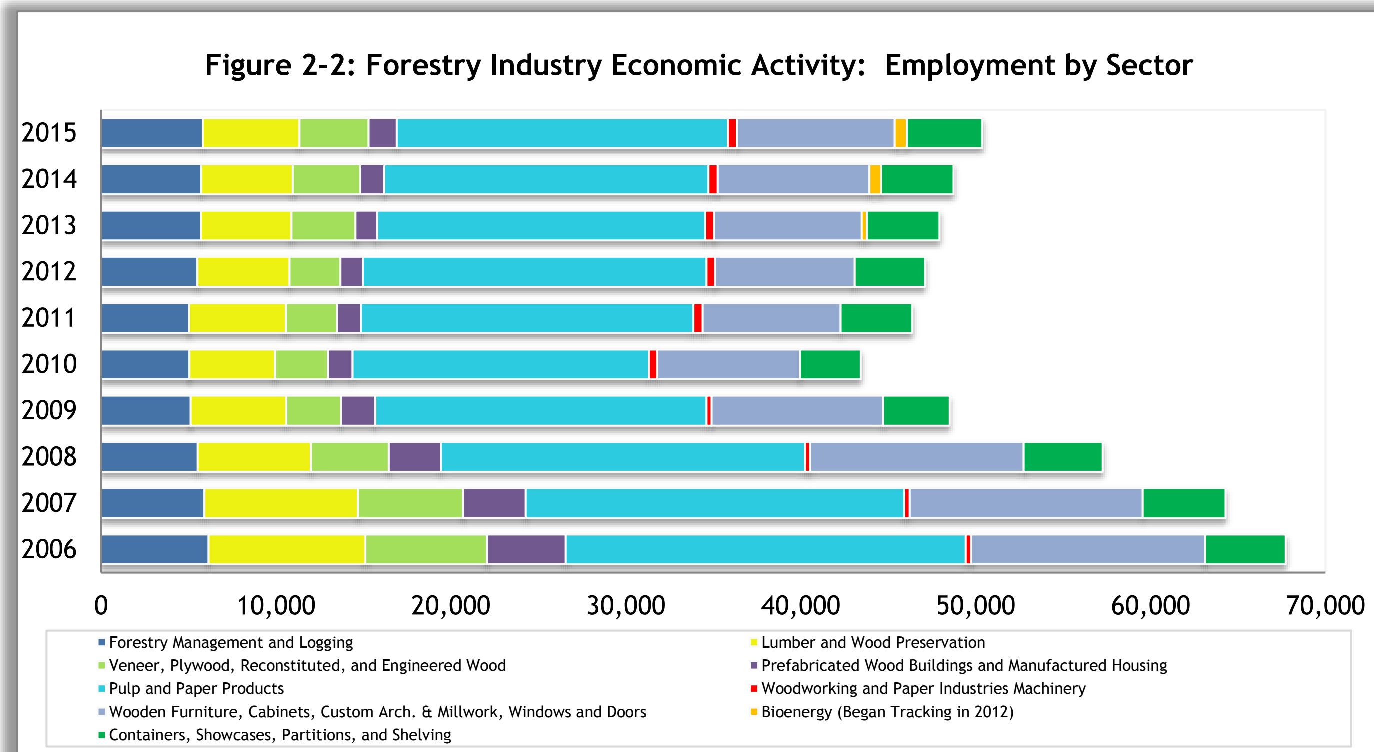
**Revised data*

***Totals may not add up due to rounding*

****Output and Wages and Salaries are not adjusted for inflation*

*Figures 2-1 through 2-3 show output, employment, and compensation changes for each forestry industry sector from 2006 through 2015.





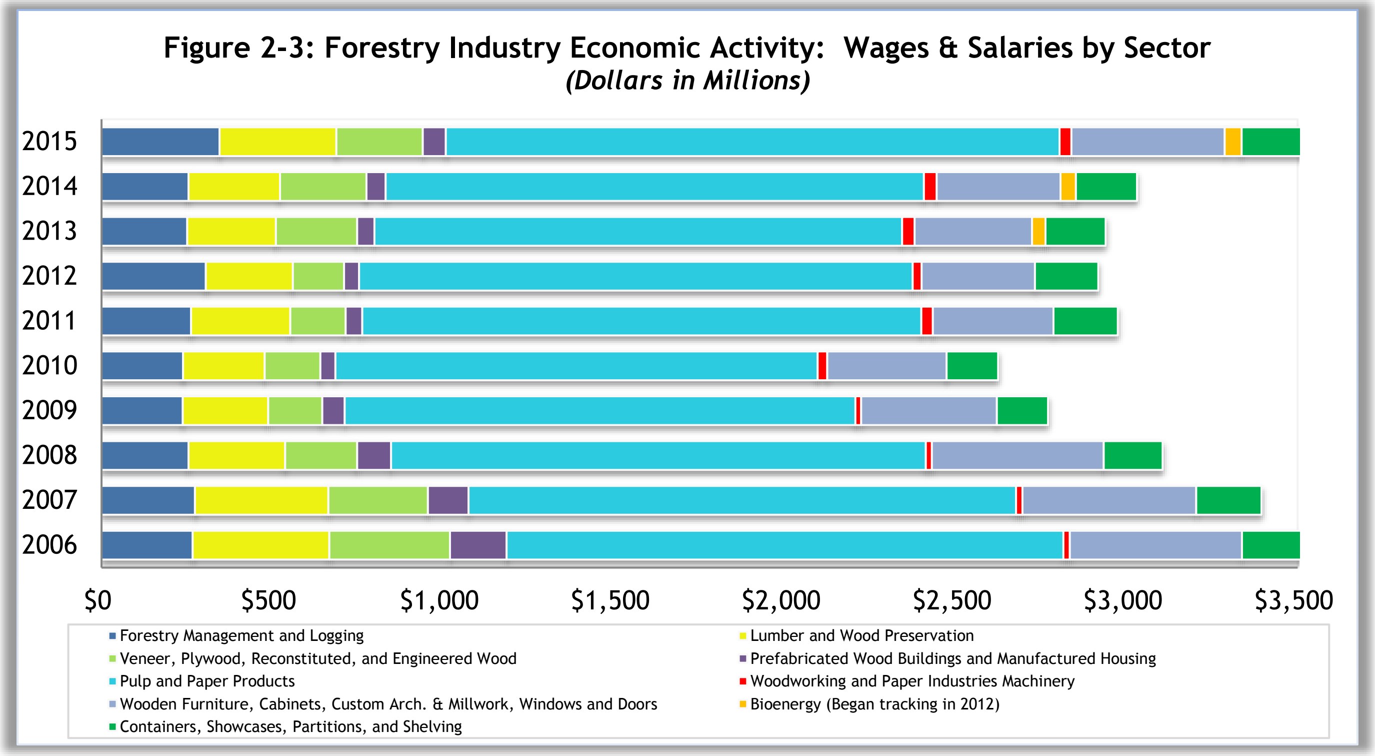


Figure 2-3: Forestry Industry Economic Activity: Wages & Salaries by Sector
(Dollars in Millions)
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
$0
$500
$1,000
$1,500
$2,000
$2,500
$3,000
$3,500
Forestry Management and Logging
Lumber and Wood Preservation
Veneer, Plywood, Reconstituted, and Engineered Wood
Prefabricated Wood Buildings and Manufactured Housing
Pulp and Paper Products
Woodworking and Paper Industries Machinery
Wooden Furniture, Cabinets, Custom Arch. & Millwork, Windows and Doors
Bioenergy (Began tracking in 2012)
Containers, Showcases, Partitions, and Shelving

Section 3

Economic Benefits

Economic impact analyses have used basically the same methods for more than 40 years. The tools, although greatly improved in quality and ease of use, are also similar to those in long-time use.

The conceptual basis for estimating economic benefits of an industry is that resources brought into Georgia's economy by the industry raise the level of economic activity. This additional economic activity, commonly called the multiplier effect, supports increased employment, income, and business revenues. These increases are estimated from an input-output (I/O) model.

The purpose of an I/O model is to estimate the flows of resources among various economic sectors by using the "recipes" followed by producers. These recipes provide the type and amount of goods and services purchased during production, which are produced by other firms. For example, a pulp mill purchases wood from a logger. The logger, in turn, purchases equipment and fuel from firms, that, in turn, purchase their raw materials from still other firms. Combined with estimates of what percentages of these items are supplied by Georgia firms, the recipes can be used to estimate how much of each item is purchased from Georgia firms and how much is purchased from outside Georgia.

Purchases from sources outside the Georgia economy are known as "leakage," which puts the brakes on the multiplier effect; the higher the leakage, the lower the multiplier effect.

The impact is calculated with IMPLAN I/O model. IMPLAN is a nationally recognized economic model that uses Georgia data to tailor its estimates to the state economy.[3]

The analytical process includes three steps following the definition of the industry sectors, as described in the previous section. The first step is to quantify employment, income, and output associated with each of the defined sectors. Several data sources were used to accomplish this.

The best source for employment and wages was the employment security data collected and maintained by the Georgia Department of Labor. Commonly called ES202 data or, more recently CEW (covered employment and wages) data, it has the

[3] One area of uncertainty that persists, however, is the level of benefits provided to workers in each of the forestry industry sectors. The available wage and salary information does not include benefits, but the I/O model bases its analysis on wages and salaries that include benefits. An average of 28.9 percent was assumed for this analysis, based on the latest available U.S. Bureau of Labor Statistics compensation cost data for all civilian employment.

advantage of being current thus allowing an estimate of the economic benefits occurring in 2015. It has the drawback, however, of not including single proprietorships (because they have no employees), and it also does not include employees not covered by unemployment insurance, such as some governmental employees.

The second task was to divide the forestry industry output into two categories; (1) output sold to another Georgia firm and (2) output sold outside the state. Another way to look at this is to recall that the multiplier effect starts from dollars brought into the Georgia economy. Output not sold to another Georgia firm is, by definition, bringing in resources from outside the Georgia economy, and it is these "exports" that fuel the multiplier effect. Forestry industry output used as an input to another Georgia forestry-industry firm is already accounted for in the multiplier effect; counting it again would result in double-counting and would imply a level of production from the input-supplying industry higher than actually observed. For example, if the multiplier effect was calculated for the paper industry, it will include some of the activities of Georgia logging operations. If the entire output from logging was then added to the multiplier effect for paper, it would double-count the logging output that went to the paper industry. The I/O model is used iteratively for these estimations, with the resulting estimates called "direct impacts." Direct impacts are measures of the output from, in this case, forestry industries that is exported to entities outside Georgia (these are considered exports even if they only go to Alabama).

The third step was to use the I/O model to estimate total impacts, which were divided into three components. The first is the *direct* impacts (the value of resources brought into the state); the second is *indirect* impacts (impacts from recirculation of resources resulting from forestry industry purchases from other industries; and the third is *induced* impacts, which result from activities in the household sector. Adding direct, indirect, and induced impacts yields total impacts.

Three measures of economic impacts are provided. The first, output, is a measure of how much each industry or sector produced in 2015 – roughly equivalent to a measure of sales revenue. The second measure is compensation, including all household income and employee benefits. The third measure is employment, or number of jobs, in each forestry-related industry.

Findings

Table 3-1 provides estimates of direct impacts for each of the forestry industry sectors contained in the industry's definition. These differ from the level of economic activity shown in Tables 2-2 and 2-3 because Table 3-1 eliminates production consumed by another sector. This eliminates the double counting of production in the multiplier effect of the consuming-industry sector. For example, Table 3-1 does not contain much output from the forestry management and logging industry segment because most of it appears to be consumed by the various Georgia wood-using industries such as paper and lumber. Logging operations are included primarily as part of the multiplier effect by these consuming industries, not as a direct impact separate from them.

Another way to interpret Table 3-1 is to consider the direct impacts to be estimates of the exports of forestry-related industries. This exporting (to anyone outside Georgia) brings resources into the state to support the increase in economic activity estimated by the multiplier effect.

Pulp and paper, which includes all pulping and paper-making activities, continued to be the largest industry segment in 2015 representing 41 percent of the total industry in employment and 68 percent of the entire industry output. The entire forestry industry (totals in Table 3-1) exported (to a non-Georgia destination) output valued at $17.5 billion in 2015. These activities supported 43,475 jobs with more than $3.1 billion in wages and salaries.

Table 3-1: Direct Impacts by Forest Industry Sector (2015)

Sector	Output	Employment	Wages and Salaries
Forestry Management and Logging	$247,743,182	2,323	$142,535,659
Bioenergy	$416,908,406	632	$44,826,241
Lumber and Wood Preservation	$1,229,895,995	4,060	$250,926,198
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,203,970,682	3,547	$227,417,180
Prefabricated Wood Buildings and Manufactured Housing	$306,361,731	1,591	$65,841,970
Pulp and Paper Products	$11,805,148,369	17,979	$1,702,114,275
Woodworking and Paper Industries Machinery	$116,944,161	490	$32,785,543
Wooden Furniture, Cabinets, Custom Arch. & Millwork, Windows and Doors	$1,456,430,191	8,834	$440,202,055
Containers, Showcases, Partitions, and Shelving	$685,316,826	4,019	$202,314,668
Total	**$17,468,719,544**	**43,475**	**$3,108,963,790**

In addition to direct employment, Georgia's forestry industry generates economic activity and supports jobs in other sectors of the state's economy. The total impact is estimated by applying the IMPLAN input-output model to the direct impacts (provided in Table 3-1.) Table 3-2 summarizes the impacts by aggregated industry codes (used in the input-output model), which are roughly equivalent to two-digit NAICS codes.

As shown, all industries in Georgia are impacted by the activity of the forestry industry. Manufacturing continued to see the biggest benefits, with $19 billion in output, 46,104 employees, and $3.3 billion in wages and salaries in 2015. A distant second (in employment) was agriculture, forestry, fishing and hunting (which includes logging and nurseries), with 10,011 employees and $565.7 million in compensation. The total economic activity supported by Georgia's forestry industry totaled nearly $32.2 billion. This activity supported the employment of 133,256 people who earned nearly $7.9 billion in 2015.

Table 3-2: Total Benefits by Major Industry (2015)

Sector	Output	Employment	Wages & Salaries
Agriculture, Forestry, Fish & Hunting	$1,029,593,099	10,011	$565,716,007
Mining	$52,859,676	253	$10,559,578
Utilities	$1,281,357,317	1,205	$130,981,918
Construction	$301,168,478	1,838	$86,430,337
Manufacturing	$19,027,827,816	46,104	$3,302,651,794
Wholesale Trade	$1,645,627,665	6,590	$568,709,664
Retail Trade	$583,004,053	7,614	$240,868,898
Transportation & Warehousing	$1,120,983,559	6,678	$401,098,760
Information	$761,853,124	1,648	$164,433,514
Finance & Insurance	$1,063,142,859	4,734	$316,513,089
Real Estate & Rental	$1,384,037,243	3,613	$100,578,994
Professional, Scientific & Tech Services	$903,814,738	6,905	$498,016,151
Management of companies	$613,374,963	2,587	$306,450,943
Administrative & Waste Services	$549,356,469	9,479	$289,268,083
Educational Services	$108,808,101	1,450	$61,856,532
Health & Social Services	$780,525,728	7,858	$425,801,721
Arts, Entertainment & Recreation	$116,305,010	1,833	$40,721,889
Accommodation & Food Services	$411,624,933	7,161	$154,282,416
Other Services	$413,359,894	5,670	$193,848,165
Government & non-NAICS Industries	$5,275,069	25	$1,465,495
TOTAL	**$32,153,899,792**	**133,256**	**$7,860,253,948**

Table 3-3 extracts information from several previous tables to compare the overall results obtained in each impact analysis conducted from 2005 through 2015. All measures show growth from 2005 to 2006. The highest growth rates occurred in industry output which grew 10 percent for the direct and 7 percent for the total forestry industry activity. During this period, compensation for the direct forestry industry activity increased at a lower rate (3 percent) and decreased by nearly 1 percent for total impacts. Employment from direct impacts was essentially flat while employment from total impacts declined by 3 percent.

During the 2006-2007 period, output from direct and total impacts grew by 4 and 3 percent respectively. Compensation and output for both impacts declined during this time period. In the 2008-to-2009 period, forestry industry output declined by 7.5 percent, and employment and wages and salaries from total impacts fell by 16 and 11.5 percent, respectively. The decline was not a surprise given that the U.S economy was in recession. The two sectors that declined the most (in percentage terms) were prefabricated buildings and veneer, plywood, and reconstituted wood products. Productivity increases were apparent in forestry industry sectors (pulp and paper products, for example) as well as sectors stimulated by the multiplier effect, which would serve to allow output increases with employment declines.

From 2009 to 2010, the decline in industry activity accelerated with output declining by about 14 percent. Employment and compensation, however, declined by smaller percentages, compared to the previous year, with declines of almost 11 percent and 5.3 percent, respectively. Total impacts did not decline as much in percentage terms in all parameters, probably because compensation declined the least, and induced impacts almost always depend on income. In the fiscal impact analysis, both revenues and costs declined, but because the cost decline was slightly larger than the revenue decline, net revenues actually increased slightly.

The forestry industry's activity picked up pace in 2011, showing growth after three years of continuous decline. Output increased by 4 percent, nearly the same growth rate as in the 2006-2007 period. Employment and compensation also showed improvement, with 7 percent and 13 percent growth rates, respectively. These improvements were also reflected in total impacts which showed higher growth in percentage terms than direct impact. In the 2010 to 2011 period output increased by nearly 6 percent, employment increased by nearly 10 percent, and wages and salaries increased by an impressive 21 percent.

The trend of positive growth continued in the 2011-2012 period. Output increased by nearly 7 percent, employment increased by 2 percent. However, compensation showed a slight decline. During the 2012-2013 period and 2013-2014 period, the direct and total economic impacts of the forestry industry showed positive growth.

In 2014-2015 period, the forestry industry showed solid growth. Direct and total output impacts showed the highest in percent, 14 and 12 percent respectively. Compensation grew by 17 percent for direct impact and 10 percent for total impacts. Employment also showed positive growth, albeit at lower levels – 3 percent for both direct and total impacts.

The annual percent-change information in Table 3-3 is presented graphically below for output, employment, and compensation, measuring levels of direct economic activity (Figure 3-1). This followed by a similar graph measuring total economic impact (Figure 3-2). It should be noted that these data are in nominal dollars and have not been adjusted for inflation. As the graphs show, all direct and total impact metrics, output, employment, and wages and salaries are showing high levels of growth with wages and salaries and output seeing the highest increase compared to 2014 rates.

Table 3-3: Comparison of Results 2005 to 2015

Dollars in millions; Employment in persons)

Forestry Industry Direct Economic Impact											
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Output*	$16,150	$17,760	$18,459	$18,270	$16,906	$14,495	$15,082	$16,072	$16,564	$16,843	$19,203
Employment	67,694	67,733	64,192	57,812	48,519	43,425	46,378	47,123	48,139	48,740	50,385
Wages & Salaries*	$3,422	$3,513	$3,394	$3,131	$2,770	$2,624	$2,972	$2,917	$2,938	$3,030	$3,553
Year to Year Percent Change											
Output		10.0%	3.9%	-1.0%	-7.5%	-14.3%	4.0%	6.6%	3.1%	1.7%	14.0%
Employment		0.1%	-5.2%	-9.9%	-16.1%	-10.5%	6.8%	1.6%	2.2%	1.2%	3.4%
Wages & Salaries		2.7%	-3.4%	-7.7%	-11.5%	-5.3%	13.3%	-1.9%	0.7%	3.1%	17.3%
Total Impacts											
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Output*	$25,972	$27,738	$28,547	$28,723	$27,200	$23,643	$24,975	$27,469	$28,014	$28,674	$32,154
Employment	154,147	149,347	141,155	128,388	118,423	108,112	118,459	120,260	127,750	129,329	133,256
Wages & Salaries*	$6,827	$6,773	$6,696	$6,514	$5,561	$5,377	$6,491	$6,540	$6,898	$7,119	$7,860
Year to Year Percent Change											
Output		6.8%	2.9%	0.6%	-5.3%	-13.1%	5.6%	10.0%	2.0%	2.4%	12.1%
Employment		-3.1%	-5.5%	-9.0%	-7.8%	-8.7%	9.6%	1.5%	6.2%	1.2%	3.0%
Wages & Salaries		-0.8%	-1.1%	-2.7%	-14.6%	-3.3%	20.7%	0.8%	5.5%	3.2%	10.4%
Forestry Industry Fiscal Impact											
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
State Revenues	$591	$580	$566	$539	$472	$448	$487	$691	$700	$721	$753
State Costs	$414	$400	$373	$333	$314	$282	$308	$358	$360	$370	$393
Net Revenues*	$176	$180	$193	$206	$158	$166	$179	$333	$340	$351	$360

Source: Enterprise Innovation Institute (EI2)impact assessments and Georgia Department of Labor, Current Employment and Wages

Figure 3-1: Annual Percent Change in Direct Economic Activity

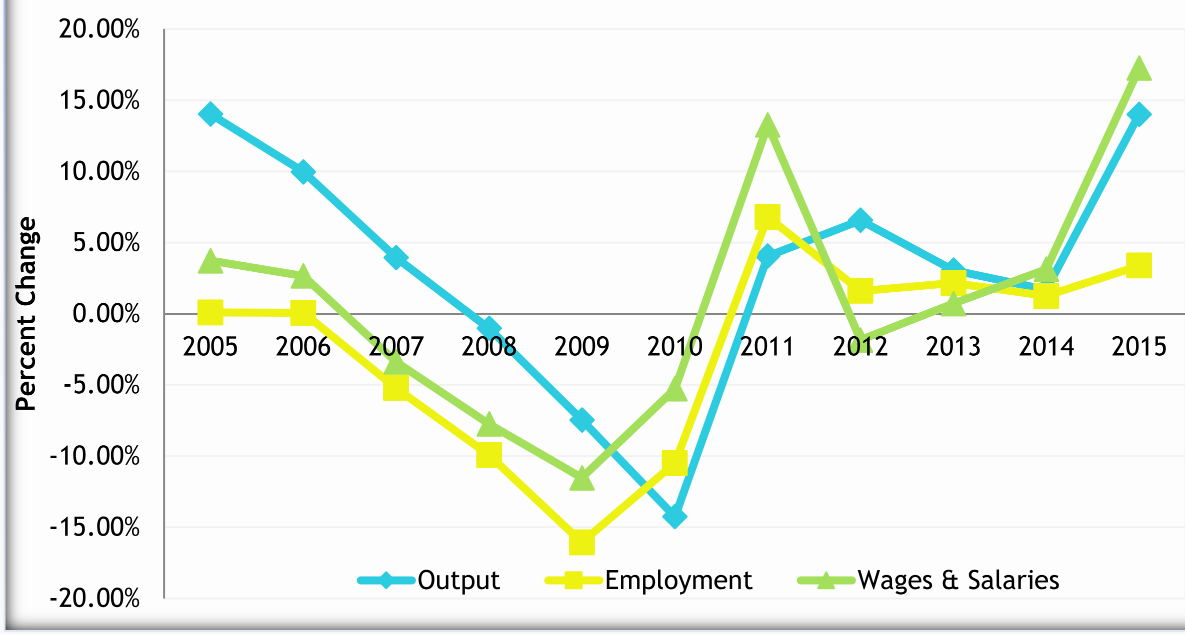


Figure 3-2: Annual Percent Change in Total Economic Activity

Comparison of the Forestry Industry with Other Manufacturing Sectors

It is difficult to appreciate the significance of the impacts generated by the forestry industry without some basis of comparison. This comparison is provided in Table 3-4, which shows that the forestry industry is the second largest industry sector in Georgia (behind food processing) in employment and the top industry in wages and salaries.

Table 3-4: Comparison to Georgia's Other Manufacturing Sectors (2015)

Industry Sectors	Employment	Wages & Salaries
Food Processing	64,264	$3,482,724,648
Forestry Industry	**50,385**	**$3,552,954,477**
Textiles	50,381	$2,105,478,544
Transportation Equipment	49,343	$3,345,254,848
Fabricated Metal Products	34,797	$1,671,333,456
Machinery	23,690	$1,335,111,440
Chemicals	19,959	$1,430,558,896
Printing	13,592	$618,332,208
Electrical Equipment and Appliances	12,534	$934,494,288
Computers and Electronic Products	6,935	$723,558,992
Apparel	2,824	$95,136,028

SECTION 4

Economic Impact by Regional Commission

Regional Economies

Economies are interwoven in a complex web. In general, however, a local economy's economic health depends on the inflow and outflow of resources. Economic base theory calls economic sectors responsible for bringing resources in "basic" or "traded" sectors. The resources that are brought in are then (at least partially) recirculated within the local economy to support the "non-basic" sectors. For example, a sawmill will generally sell its products to builders or lumber supply houses outside the local economy. The revenue it receives from these sales is then used to purchase logs from, perhaps, a local logging firm. It also pays its employees who spend their wages in local restaurants, grocery stores, and the like. As the basic sector grows or declines, so does the non-basic sector.

Forestry industry components are very much part of Georgia's basic industry sector, with products sold worldwide. As such, it is one of the key sources of funds flowing into many local Georgia economies. Where the local economy has many sources of such flows, the growth or decline of any specific sector, such as forestry, may not have significant effects. However, in those communities where forestry is a large proportion of the local basic industry, all economic support activities, such as retail, are likewise generally dependent.

Approach

Employment and income data limitations at the county level make it difficult to quantify the local economic impact of the forestry industry. Instead, this report shows the forestry industry's impact of Georgia's 12 regional commissions. Table 4-1 shows a list of the regional commissions and their respective counties.

Table 4-1: Regional Commissions

Regions	Counties
Northwest Georgia	Bartow, Catoosa, Chattooga, Dade, Fannin, Floyd, Gilmer, Gordon, Haralson, Murray, Paulding, Pickens, Polk, Walker, Whitfield
Georgia Mountains	Banks, Dawson, Forsyth, Franklin, Habersham, Hall, Hart, Lumpkin, Rabun, Stephens, Towns, Union, White

ATL Regional Commission	Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, Rockdale
Three Rivers	Butts, Carroll, Coweta, Heard, Lamar, Meriwether, Pike, Spalding, Troup, Upson
Northeast Georgia	Barrow, Clarke, Elbert, Green, Jackson, Jasper, Madison, Morgan, Newton, Oconee, Oglethorpe, Walton
Middle Georgia	Baldwin, Bibb, Crawford, Houston, Jones, Monroe, Peach, Pulaski, Putnam, Twiggs, Wilkinson
Central Savannah River Area	Burke, Columbia, Glascock, Hancock, Jefferson, Jenkins, Lincoln, McDuffie, Richmond, Taliaferro, Warren, Washington, Wilkes
River Valley	Chattahoochee, Clay, Crisp, Dooly, Harris, Macon, Marion, Muscogee, Quitman, Randolph, Schley, Stewart, Sumter, Talbot, Taylor, Webster
Heart of Georgia Altamaha	Appling, Bleckley, Candler, Dodge, Emanuel, Evans, Jeff Davis, Johnson, Laurens, Montgomery, Tattnall, Telfair, Toombs, Treutlen, Wayne, Wheeler, Wilcox
Southwest Georgia	Baker, Calhoun, Colquitt, Decatur, Dougherty, Early, Grady, Lee, Miller, Mitchell, Seminole, Terrell, Thomas, Worth
Southern Georgia	Atkinson, Bacon, Ben Hill, Berrien, Brantley, Brooks, Charlton, Clinch, Coffee, Cook, Echols, Irwin, Lanier, Lowndes, Pierce, Tift, Turner, Ware
Coastal	Bryan, Bulloch, Camden, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, Screven
Source: Georgia Department of Community Affairs	

This analysis examines the proportion of each region's output, employment, and compensation (as defined by wages and salaries) indicated by the ES202 data that is attributable directly to forestry industries. These figures were calculated using 6-digit NAICS level data and should be considered as approximate estimates. Table 4-2 shows that as in the previous years, the Atlanta Regional Commission, Southern Georgia and the Heart of the Georgia Altamaha are the top three regions with the largest employment in the forestry industry. See Figures A-1 through A-3 in the Appendix for maps showing each region's output, employment, and wages and salaries.

Table 4-2: Forestry Industry's Regional Impact (2015)			
Regions	**Output**	**Employment**	**Wages & Salaries**
Atlanta Regional Commission	$4,319,318,546	11,333	$934,509,990
Central Savannah River Area	$1,262,967,663	3,314	$247,751,697
Coastal	$1,690,000,407	4,434	$401,506,772
Georgia Mountains	$1,056,973,548	2,773	$142,307,474
Heart of Georgia Altamaha	$1,734,748,192	4,552	$312,309,628
Middle Georgia	$1,091,305,900	2,863	$197,467,880
Northeast Georgia	$1,178,486,930	3,092	$188,365,423
Northwest Georgia	$1,498,279,292	3,931	$252,714,292
River Valley	$769,584,755	2,019	$133,650,948
Southern Georgia	$1,854,332,790	4,865	$263,413,539
Southwest Georgia	$1,535,311,942	4,028	$276,960,592
Three Rivers	$1,211,276,256	3,178	$201,996,241
Total	**$19,202,586,221**	**50,385**	**$3,552,954,477**

Figure 4-1: Map of Regional Commissions

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Appendix

Figure A-1: Regional Forestry Industry Employment: 2015

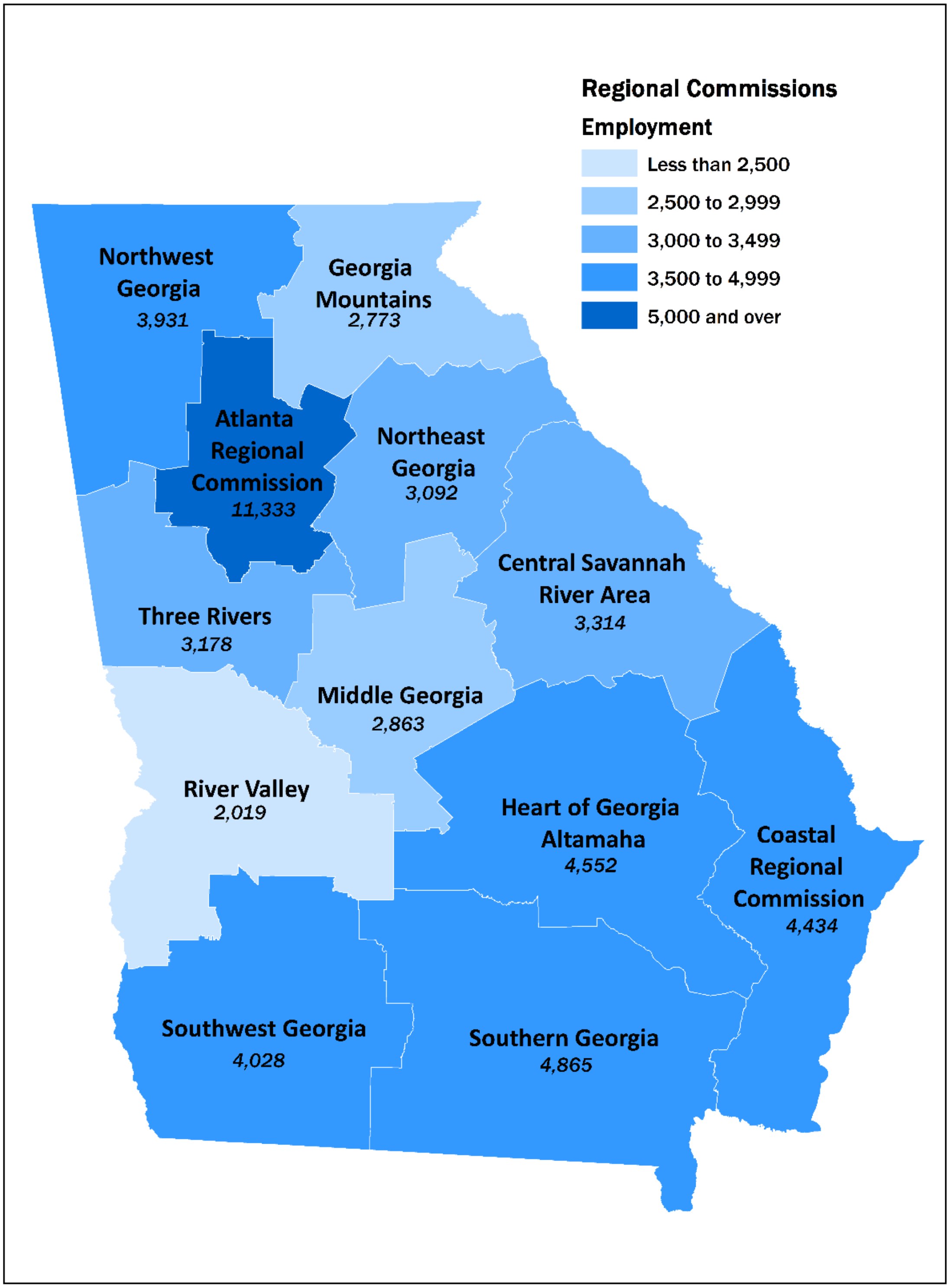


Figure A-2: Regional Forestry Industry Wages and Salaries: 2015

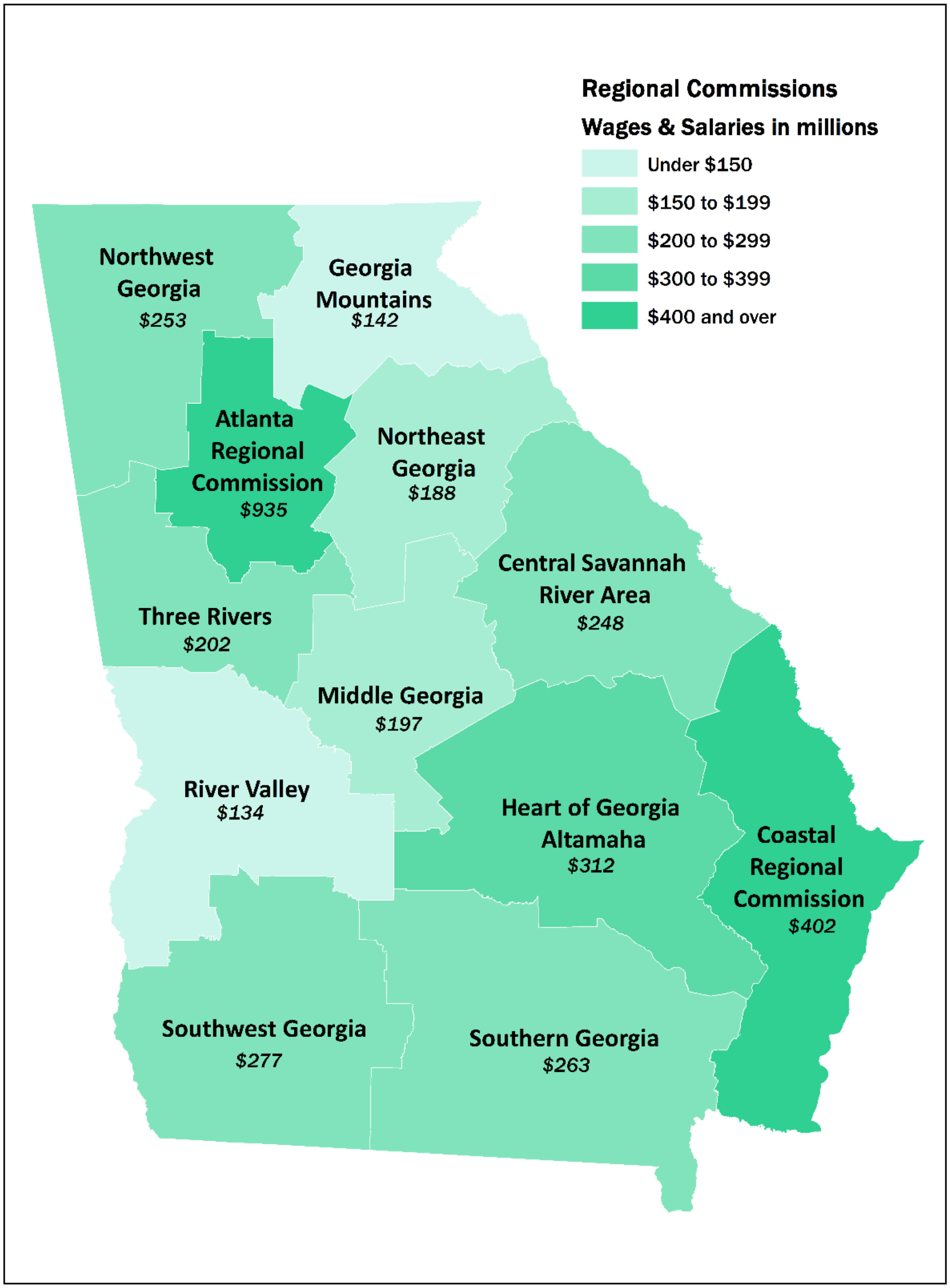
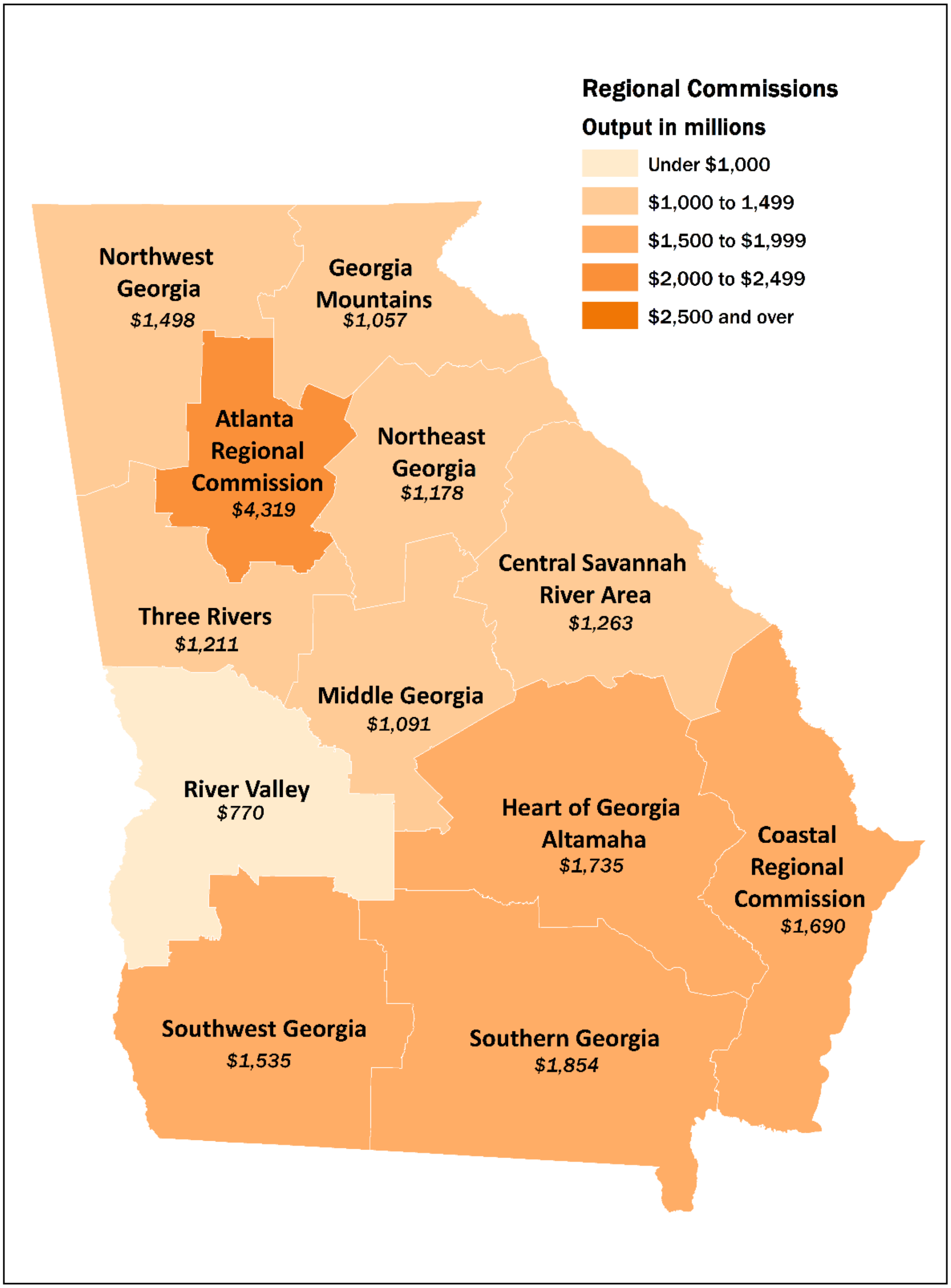


Figure A-3: Regional Forestry Industry Output: 2015



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5645 Riggins Mill Road
Dry Branch, GA 31020
1-800-GA TREES
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