GEORGIA FORESTRY COMMISSION

A Program of the Georgia Forestry Commission with support from Georgia Tech.

Georgia Institute of Technology

Economic Benefits of the Forestry Industry in Georgia 2007
Final Report

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Final Report

Prepared for
Georgia Forestry Commission
Macon, Georgia

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September 2008

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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 purpose of this analysis is 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) assess the degree of forestry dependence of Georgia's counties.

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 SIC to NAICS) used by data collection agencies (primarily the Georgia Department of Labor) that provide much of the data used in these analyses.

The forestry industry components, and the level of economic activity represented by them, are shown in Table E-1 for 2007. Economic activity is measured by output (similar to sales revenue), employment, and compensation (defined as wages and salaries including benefits plus proprietor income). These measures are traditionally used in this type of analysis.

Table E-1 shows the forestry industry employed 64,192 in all industry sectors combined, paid an annual compensation of almost $3.4 billion, and had estimated total revenue of almost $18.5 billion. The activities in the sectors 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.

Table E-1: Georgia Forestry Industry Economic Activity 2007

Sector	Output	Employment	Compensation
Forestry Management, Logging, and Misc. Forest Products	$1,806,862,272	5,914	$273,307,536
Lumber and Wood Preservation	$2,099,945,996	8,773	$390,881,854
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,321,714,784	6,004	$290,712,656
Prefabricated Wood Buildings and Manufactured Housing	$523,282,896	3,581	$119,088,100
Pulp and Paper Products	$10,131,473,013	21,651	$1,602,173,672
Woodworking and Paper Industries Machinery	$60,710,076	304	$18,732,410
Wooden Furniture and Cabinets	$1,197,442,044	8,914	$340,697,882
Windows and Doors	$516,655,904	3,043	$115,219,296
Containers, Showcases, Partitions, and Shelving	$624,186,992	4,733	$190,620,928
Custom Architectural and Miscellaneous Wood Products	$176,638,616	1,275	$52,764,385
Total	$18,458,912,593	64,192	$3,394,198,719

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 income and is shown in Table E-2. Total economic activity supported by the forestry industry in Georgia (including the multiplier effect and federal payments to landowners of about $12.3 million) is over $28.5 billion. This activity employs 141,155 people whose compensation is almost $6.7 billion.

Table E-2: Total Benefits by Major Industry Sector 2007

Sector	Output	Employment	Compensation
Agriculture, Forestry, Fishing and Hunting	$2,121,796,736	14,138	$449,783,040
Mining	$9,071,678	39	$2,429,163
Utilities	$494,897,184	725	$102,905,168
Construction	$68,460,944	623	$27,370,942
Manufacturing	$17,923,817,472	61,549	$3,322,228,480
Wholesale Trade	$1,407,730,816	7,324	$533,253,024
Transportation and Warehousing	$937,203,648	7,731	$362,464,320
Retail Trade	$619,328,000	9,272	$251,028,640
Information	$307,665,216	860	$75,633,352
Finance and Insurance	$740,812,224	3,539	$244,182,688
Real Estate and Rental	$492,653,120	2,754	$85,854,560
Professional, Technical, and Scientific Services	$710,224,320	4,624	$286,874,368
Management of Companies	$398,028,800	1,984	$184,293,872
Administrative and Waste Services	$260,618,256	4,344	$125,709,472
Educational Services	$70,678,272	1,229	$40,261,068
Health and Social Services	$537,158,336	6,366	$286,155,264
Arts, Entertainment and Recreation	$74,889,168	1,396	$30,953,586
Accommodation and Food Services	$354,933,344	6,268	$121,684,176
Other Services	$353,237,664	5,683	$134,958,832
Government and Non-NAICS Industries	$660,072,512	707	$27,723,508
Total	$28,547,185,557	141,155	$6,695,747,523

Another way to examine the forestry industry in Georgia is to compare it with other manufacturing sectors. Table E-3 lists 2007 income and employment totals for each major industry sector sorted by total wages. These data show that forestry ranks second in total income generated, and third in total employment. Food processing ranks first in income and second in employment; textiles (dominated by carpet) ranks first in employment and third in income. Forestry's second rank in income is very close to first-ranked food processing in income, reflecting forestry's relatively higher average wages.

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

[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.

the forestry industry’s total economic activity and subtracting the costs associated with providing state services to Georgia’s households and companies. Revenues include individual and corporate income tax, 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 generates an estimated $580 million per year in revenues for the state budget. When the costs of providing services to all employees are deducted from these revenues, net annual state revenues are almost $193 million per year.

Table E-3: Comparison of Georgia Industries 2007

Sector	Employment	Wages & Salaries
Food Processing	72,188	$3,044,130,479
Forestry Industry	64,192	$2,655,122,080
Transportation Equipment	42,892	$2,351,785,278
Textiles	64,785	$2,324,049,150
Fabricated Metal Products	29,101	$1,134,770,230
Machinery	24,371	$1,078,843,863
Chemicals	21,651	$1,242,269,565
Printing	20,907	$920,581,830
Electrical Equipment and Appliances	15,207	$895,779,998
Computers and Electronic Products	14,929	$972,445,698
Apparel	5,356	$173,052,321

Table E-5 extracts information from several tables to present a comparison of the overall results obtained in each impact analysis conducted from 2003 through 2007. All measures show growth between 2003 and 2004 and between 2004 and 2005. The highest growth rates are in industry output which grew between 10 and 14 percent depending on the year and whether it is being calculated for forestry industry activity or total activity. Compensation also increased for these periods. In the 2003 to 2004 period, forestry industry compensation increased by 9.7 percent and total compensation increased by 12 percent without considering inflation. From 2004 to 2005, the rate of increase was somewhat lower – 4 percent for the forestry industry and 9 percent for total impacts. Employment increases are more modest, increasing 3 percent and 7 percent for forestry industry and total impacts, respectively, in the 2003 to 2004 period. Although employment from total impacts grew an estimated 6 percent between 2004 and 2005, forestry industry employment was essentially flat.

In the 2006 to 2007 period, forestry industry employment declined by 5.2 percent and employment from total impacts fell by 5.5 percent. The two sectors which declined the most (in percentage terms) were prefabricated buildings and veneer, plywood, and reconstituted wood products. Productivity increases are 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.

Table E-4: Fiscal Impact Analysis 2007	
Annual State Government Revenues	$565,752,222
Annual State Government Costs	$373,046,158
Net Annual Revenues	$192,706,064

Table E-5: Comparison of Results 2003 to 2007

Forestry Industry Economic Activity	2003	2004	2005	2006	2007
Output	$12,679,309,984	$14,162,671,796	$16,150,427,177	$17,760,458,777	$18,458,912,593
Employment	65,706	67,633	67,694	67,733	64,192
Compensation	$3,007,249,626	$3,299,211,578	$3,421,577,066	$3,512,948,218	$3,394,198,719
Percent Change		2003-2004	2004-2005	2005-2006	2006-2007
Output		11.70%	14.04%	9.97%	3.93%
Employment		2.93%	0.09%	0.06%	-5.23%
Compensation		9.71%	3.71%	2.67%	-3.38%
Total Impacts	**2003**	**2004**	**2005**	**2006**	**2007**
Output	$20,199,375,517	$22,729,379,114	$25,972,228,986	$27,737,507,105	$28,547,185,557
Employment	136,022	144,944	154,147	149,347	141,155
Compensation	$5,600,491,974	$6,276,217,393	$6,826,524,997	$6,772,549,782	$6,695,747,523
Percent Change		2003-2004	2004-2005	2005-2006	2006-2007
Output		12.53%	14.27%	6.80%	2.92%
Employment		6.56%	6.35%	-3.11%	-5.49%
Compensation		12.07%	8.77%	-0.79%	-1.13%
Fiscal Impact	**2003**	**2004**	**2005**	**2006**	**2007**
State Revenues	$514,089,031	$546,361,719	$590,558,427	$579,916,979	$565,752,222
State Costs	$367,579,485	$391,523,592	$414,483,229	$399,560,260	$373,046,158
Net Revenues	$146,509,546	$154,838,126	$176,075,198	$180,356,718	$192,706,064
Source: EII impact assessments and Georgia Department of Labor, Current Employment and Wages.					

Forestry Dependent Communities

The economies of Georgia's counties are all dependent upon their ability to bring resources into their areas. There is no clear definition of "dependence" so two measures were developed. The first is based on employment where "critically dependent" counties have more than 10 percent of their total private-sector employment in the forestry industry. "Very dependent" counties have between 6 percent and 10 percent of their employment in forestry industries and "moderately dependent," "somewhat dependent," and "not dependent" have between 4 percent and 5.9 percent, 1.6 percent and 3.9 percent, and less than 1.6 percent of their employment in forestry industries, respectively. Figure

E-1 depicts the degree of economic dependence on forestry, as measured by its proportion of total employment.

Another measure of dependence is provided by wages and salaries. For this measure, counties are considered “critically dependent” if more than 15 percent of total private-sector wages and salaries are from forestry-related industries. “Very dependent” counties have between 10 percent and 15 percent of their employment in forestry industries and “moderately dependent,” “somewhat dependent,” and “not dependent” have between 5 percent and 10 percent, 2 percent and 5 percent, and less than 2 percent of their wages and salaries from forestry industries, respectively. Figure E-2 depicts the degree of economic dependence on forestry, as measured by its proportion of total wages and salaries.

Figure E-1
Forestry Dependency Based on Employment 2007

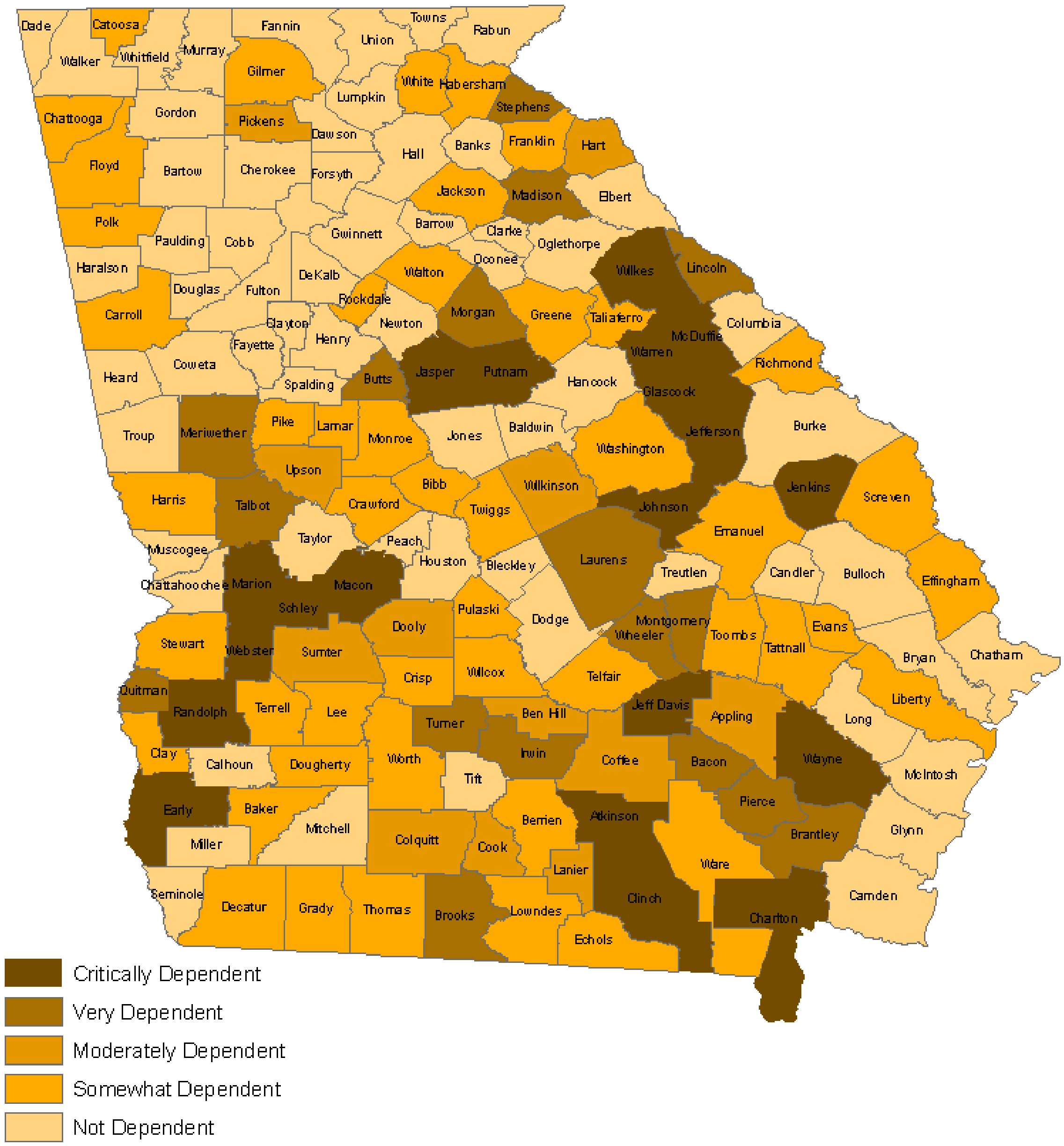
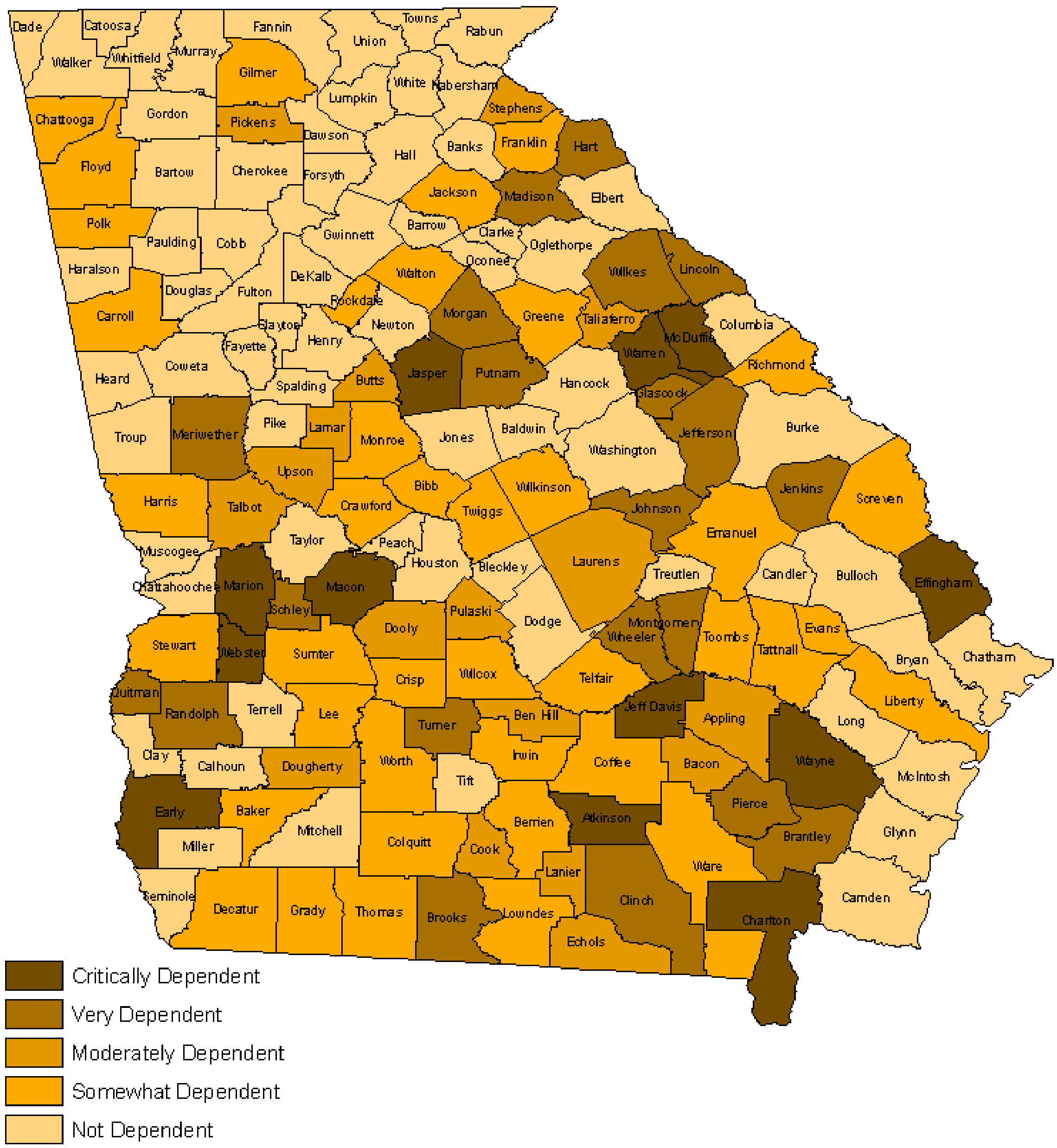


Figure E-2
Forestry Dependency Based on Income 2006



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 household income where economic output is defined as business revenues and household compensation is defined as wages, salaries (including benefits), and proprietor income. Additional factors considered include how the manufacturing components in the forestry industry compare to other manufacturing sectors, and how the industry affects state government costs and revenues.

The first step in this process is to define the limits of what constitutes the "forestry industry." This is not as simple a task as it may appear 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 examines how important the forestry components are to the existing industry base in each of Georgia's counties and divides counties into five categories according to their degree of dependence on forestry.

This report is the latest of a series of reports begun with an analysis of the 2002 impacts and continues 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 is based on the Standard Industry Classification system (SIC) and the later data sets use the North American Industrial Classification System (NAICS).

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 2007 North American Industrial Classification System (NAICS) is 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

NAICS Code	Description
113	*Forestry and Logging*
1131	*Timber Tract Operations*
11311	*Timber Tract Operations*
1132	*Forest Nurseries and Gathering of Forest Products*
11321	*Forest Nurseries and Gathering of Forest Products*
1133	*Logging*
11331	*Logging*
321	*Wood Product Manufacturing*
3211	*Sawmills and Wood Preservation*
32111	*Sawmills and Wood Preservation*
321113	*Sawmills*
321114	*Wood Preservation*
3212	*Veneer, Plywood, and Engineered Wood Product Manufacturing*
32121	*Veneer, Plywood, and Engineered Wood Product Manufacturing*
321211	*Hardwood Veneer and Plywood Manufacturing*
321212	*Softwood Veneer and Plywood Manufacturing*
321213	*Engineered Wood Member (except Truss) Manufacturing*
321214	*Truss Manufacturing*
321219	*Reconstituted Wood Product Manufacturing*
3219	*Other Wood Product Manufacturing*
32191	*Millwork*
321911	*Wood Window and Door Manufacturing*
321912	*Cut Stock, Resawing Lumber, and Planing*

321918	*Other Millwork (including Flooring)*
32192	*Wood Container and Pallet Manufacturing*
32199	*All Other Wood Product Manufacturing*
321991	*Mobile Homes*
321992	*Prefabricated Wood Building Manufacturing*
321999	*All Other Miscellaneous Wood Product Manufacturing*
322	*Paper Manufacturing*
3221	*Pulp, Paper, and Paperboard Mills*
32211	*Pulp Mills*
32212	*Paper Mills*
322121	*Paper (except Newsprint) Mills*
322122	*Newsprint Mills*
32213	*Paperboard Mills*
3222	*Converted Paper Product Manufacturing*
32221	*Paperboard Container Manufacturing*
322211	*Corrugated and Solid Fiber Box Manufacturing*
322212	*Folding Paperboard Box Manufacturing*
322213	*Setup Paperboard Box Manufacturing*
322214	*Fiber Can, Tube, Drum, and Similar Products Manufacturing*
322215	*Non-folding Sanitary Food Container Manufacturing*
32222	*Paper Bag and Coated and Treated Paper Manufacturing*
322221	*Coated and Laminated Packaging Paper and Plastics Film Manufacturing*
322222	*Coated and Laminated Paper Manufacturing*
322223	*Plastics, Foil, and Coated Paper Bag Manufacturing*
322224	*Uncoated Paper and Multiwall Bag Manufacturing*
322225	*Laminated with Foil for Flexible Packaging*
322226	*Surface-Coated Paperboard Manufacturing*
32223	*Stationery Product Manufacturing*
322231	*Die-Cut Paper and Paperboard Office Supplies Manufacturing*
322232	*Envelope Manufacturing*
322233	*Stationery, Tablet, and Related Product Manufacturing*
32229	*Other Converted Paper Product Manufacturing*
322291	*Sanitary Paper Product Manufacturing*
322299	*All Other Converted Paper Product Manufacturing*
33321	*Sawmill and Woodworking Machinery Manufacturing*
333291	*Paper Industry Machinery Manufacturing*
337	Furniture & Related Product Manufacturing
3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing
33711	*Wood Kitchen Cabinet and Countertop Manufacturing*
33712	Household and Institutional Furniture Making
337121	*Upholstered Household Furniture Manufacturing*

337122	*Non-Upholstered Wood Household Furniture Manufacturing*
337127	*Institutional Furniture Manufacturing*
337129	*Wood Television, Radio, and Sewing Machine Cabinet Manufacturing*
337211	*Wood Office Furniture Manufacturing*
337212	*Custom Architectural Woodwork and Millwork Manufacturing*
337215	*Showcase, Partition, Shelving, and Locker Manufacturing*
333	Machinery Manufacturing
3332	Industrial Machinery Manufacturing
33321	*Sawmill and Woodworking Machinery Manufacturing*
33329	Other Industrial Machinery Manufacturing
333291	*Paper Industry Machinery Manufacturing*
339	Miscellaneous Manufacturing
3399	Other Miscellaneous Manufacturing
33999	All Other Miscellaneous Manufacturing
339995	*Burial Casket Manufacturing*
Source: North American Industrial Classification System, and Georgia Tech's Enterprise Innovation Institute	

The organization of industries on this list is hierarchical, that is, the NAICS code digits increase as the level of detail increases. The highest level of detail is the six-digit level. In some cases, however, the six-digit industry is the same as the five-digit industry, so these duplications are not presented in Table 2-1. For example, industry 11311 (timber tract operations) does not break down into smaller components, so the six-digit industry (which would be 113110) is omitted because it's redundant.

In some cases, the higher-level NAICS industries contain components that are not a part of the forestry industry. For example, metal furniture is included in NAICS 3371, but is not included at the six-digit level used to define the forestry industry. Each component containing only forestry-related industries is indicated by italicized text in the table. Non-forestry-related components have been eliminated.

The level of economic activity in each forestry industry component is measured by output, employment, and income. Measures for the 2007 calendar year appear in Table 2-2, which aggregates the numerous categories from Table 2-1 to a more manageable number. This table shows that total employment in all of the forestry industry sectors is 64,192 and these jobs earned annual compensation (total wages and salaries including benefits) of almost $3.4 billion from estimated total revenue of almost $18.5 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 21,651 workers followed by wooden furniture and cabinets with 8,914. Several additional segments have employment exceeding 5,000, including wood lumber and wood preservation, veneer and plywood, and logging and nurseries. Compensation, like employment, is dominated by pulp and paper with over $1.6 billion (about half the total) followed distantly by lumber and wood preservation (almost $391 million), and wood furniture and cabinets at almost $341 million. The largest outputs are produced by pulp and paper (about $10.1 billion) followed by lumber and logging, (about $2.1 and $1.8 billion, respectively) and veneer and plywood at over $1.3 billion.

Table 2-2: Georgia Forestry Industry Economic Activity 2007

Sector	Output	Employment	Compensation
Forestry Management, Logging, and Misc. Forest Products	$1,806,862,272	5,914	$273,307,536
Lumber and Wood Preservation	$2,099,945,996	8,773	$390,881,854
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,321,714,784	6,004	$290,712,656
Prefabricated Wood Buildings and Manufactured Housing	$523,282,896	3,581	$119,088,100
Pulp and Paper Products	$10,131,473,013	21,651	$1,602,173,672
Woodworking and Paper Industries Machinery	$60,710,076	304	$18,732,410
Wooden Furniture and Cabinets	$1,197,442,044	8,914	$340,697,882
Windows and Doors	$516,655,904	3,043	$115,219,296
Containers, Showcases, Partitions, and Shelving	$624,186,992	4,733	$190,620,928
Custom Architectural and Miscellaneous Wood Products	$176,638,616	1,275	$52,764,385
Total	$18,458,912,593	64,192	$3,394,198,719

Table 2-3 provides a comparison of the forestry industry activity for 2004 to 2007. Three measures are included in the comparison: output, employment, and compensation. Output (an estimate of the firms' revenues) increased slightly over the 2006-2007 period, but the increase was uneven across industry sectors with some (such as manufactured housing) showing declines.

Overall employment dropped between 2006 and 2007 with the largest number of jobs lost in the pulp and paper sector, which has shown consistent declines over the years shown. Other sectors showing losses include the manufactured housing and plywood, veneer and reconstituted wood products sectors. These latter declines are probably due to the problems seen in the current housing markets, but this is countered by an increase in window and door employment.

Changes in employee compensation are generally negative over the most recent period, but with a few exceptions. From 2006 to 2007, the largest declines are in the same sectors as the declines in employment (manufactured housing, and veneer & plywood) and the smaller increases found in containers, showcases, partitions and shelving, and in wooden windows and doors.

Table 2-3: Forestry Industry Activity 2004 - 2007 Comparison

	Output			
Sector	**2004**	**2005**	**2006**	**2007**
Forestry Management, Logging, and Misc. Forest Products	$1,384,113,152	$1,447,089,632	$1,845,804,352	$1,806,862,272
Lumber and Wood Preservation	$1,481,513,824	$1,811,062,188	$2,057,422,972	$2,099,945,996
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,062,298,144	$1,290,298,688	$1,259,775,984	$1,321,714,784
Prefabricated Wood Buildings and Manufactured Housing	$388,201,924	$561,314,328	$595,598,848	$523,282,896
Pulp and Paper Products	$7,887,861,361	$8,808,187,803	$9,589,567,207	$10,131,473,013
Woodworking and Paper Industries Machinery	$46,696,992	$53,197,020	$52,269,742	$60,710,076
Wooden Furniture and Cabinets	$841,050,860	$1,065,724,056	$1,176,198,972	$1,197,442,044
Windows and Doors	$343,669,472	$405,603,168	$445,641,376	$516,655,904
Containers, Showcases, Partitions, and Shelving	$453,711,824	$532,826,960	$548,023,952	$624,186,992
Custom Architectural and Miscellaneous Wood Products	$273,554,243	$175,123,334	$190,155,372	$176,638,616
Total	$14,162,673,800	$16,150,427,177	$17,760,458,777	$18,458,912,593
	Employment			
	2004	**2005**	**2006**	**2007**
Forestry Management, Logging, and Misc. Forest Products	6,005	6,133	6,152	5,914
Lumber and Wood Preservation	8,505	8,839	8,957	8,773
Veneer, Plywood, Reconstituted, and Engineered Wood	6,588	7,110	6,963	6,004
Prefabricated Wood Buildings and Manufactured Housing	3,494	4,531	4,500	3,581
Pulp and Paper Products	25,032	23,150	22,861	21,651
Woodworking and Paper Industries Machinery	292	319	314	304
Wooden Furniture and Cabinets	8,685	8,867	9,308	8,914
Windows and Doors	2,522	2,446	2,598	3,043
Containers, Showcases, Partitions, and Shelving	5,031	4,788	4,618	4,733
Custom Architectural and Miscellaneous Wood Products	1,479	1,511	1,462	1,275
Total	67,633	67,694	67,733	64,192
	Compensation			
	2004	**2005**	**2006**	**2007**
Forestry Management, Logging, and Misc. Forest Products	$234,098,548	$254,133,792	$267,437,328	$273,307,536
Lumber and Wood Preservation	$352,721,316	$384,895,901	$399,561,280	$390,881,854
Veneer, Plywood, Reconstituted, and Engineered Wood	$312,041,524	$340,977,212	$352,537,400	$290,712,656
Prefabricated Wood Buildings and Manufactured Housing	$121,569,812	$164,212,402	$165,216,458	$119,088,100
Pulp and Paper Products	$1,616,422,198	$1,594,677,218	$1,630,396,895	$1,602,173,672
Woodworking and Paper Industries Machinery	$18,023,702	$20,414,041	$18,256,298	$18,732,410
Wooden Furniture and Cabinets	$301,810,254	$323,074,793	$342,927,437	$340,697,882
Windows and Doors	$104,148,424	$104,375,704	$100,483,456	$115,219,296
Containers, Showcases, Partitions, and Shelving	$180,908,656	$169,143,160	$175,315,696	$190,620,928
Custom Architectural and Miscellaneous Wood Products	$57,467,145	$65,672,843	$60,815,971	$52,764,385
Total	$3,299,213,583	$3,421,577,066	$3,512,948,218	$3,394,198,719

SECTION 3

Economic Benefits

Economic impact analyses have used basically the same methods for over 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 model (I/O).

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 I/O model used in this analysis is called IMPLAN, devised by the Minnesota IMPLAN Group. It is a nationally recognized model that uses Georgia data to tailor its estimates to the state economy. Still, the model must be modified somewhat to account for differences in specific industry sectors revealed by more current data. For example, the wage and salary data used in this analysis is from 2007, whereas the wage and salary data available to IMPLAN is from 2006.

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 25 percent was assumed for this analysis, based on the latest available U.S. Bureau of Labor Statistics compensation cost data for all civilian employment.

The analytical process includes three steps after the industry sectors are defined, 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 are used to accomplish this.

The best source for employment and wages is 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 advantage of being current, allowing an estimate of the economic benefits occurring in 2007. 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 governmental employees.

The second task is to divide the forestry industry output into two categories, (1) output that is 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 is 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 is to use the I/O model to estimate total impacts, which are 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 2007 – roughly equivalent to a measure of sales revenue. The second measure is income, including all household income and employee benefits. The third measure is employment, or number of jobs, in each forestry-related industry.

Results

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, Logging, and Misc. Forest Products 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.

The largest industry segment by far is "Pulp and Paper", which includes all pulping and paper-making activities representing about half of the total industry. The entire forestry industry (totals in Table 3-1) is estimated to export (to a non-Georgia destination) almost $16.4 billion with this activity supporting 55,559 jobs with an employee compensation of over $3.0 billion.

Recirculation of dollars brought into Georgia's economy (as measured by the direct impacts) support a higher level of economic activity. This higher level is estimated by applying the IMPLAN input-output model to the direct impacts provided in Table 3-1. The results of this analysis are presented in Table 3-2. Because all industries in Georgia are affected by the forestry industry, 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.

Table 3-1: Direct Impacts by Forest Industry Sector 2007

Sector	Output	Employment	Compensation
Forestry Management, Logging, and Misc. Forest Products	$546,537,344	799	$55,566,132
Lumber and Wood Preservation	$1,522,831,656	6,509	$293,829,793
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,190,529,728	5,503	$263,517,812
Prefabricated Wood Buildings and Manufactured Housing	$523,282,896	3,581	$119,088,100
Pulp and Paper Products	$10,117,197,570	21,614	$1,600,087,059
Woodworking and Paper Industries Machinery	$51,612,988	262	$15,970,305
Wooden Furniture and Cabinets	$1,165,399,654	8,661	$331,298,712
Windows and Doors	$502,563,776	2,960	$112,076,616
Containers, Showcases, Partitions, and Shelving	$602,243,904	4,556	$183,943,416
Custom Architectural and Miscellaneous Wood Products	$152,564,216	1,114	$46,609,172
Total	$16,374,763,732	55,559	$3,021,987,117

The largest sector impacts are seen, not surprisingly, in the manufacturing sector, with some $17 billion in output, 61,549 employees, and about $3.3 billion in compensation. A distant second is held by agriculture, forestry, fishing and hunting (which includes logging and nurseries), with over $2.1 billion in output, 14,138 employees, and almost $450 million in compensation. Together, the economic activity supported by Georgia's forestry industry (including federal payments to landowners of about $12.3 million) totals over $28.5 billion, involving employment of 141,155 people whose compensation is about $6.7 billion. This employment represents about 3.3 percent and 3.1 percent of total Georgia employment, and wages and salaries, respectively.

Table 3-2: Total Benefits by Major Industry Sector 2007			
Sector	**Output**	**Employment**	**Compensation**
Agriculture, Forestry, Fishing and Hunting	$2,121,796,736	14,138	$449,783,040
Mining	$9,071,678	39	$2,429,163
Utilities	$494,897,184	725	$102,905,168
Construction	$68,460,944	623	$27,370,942
Manufacturing	$17,923,817,472	61,549	$3,322,228,480
Wholesale Trade	$1,407,730,816	7,324	$533,253,024
Transportation and Warehousing	$937,203,648	7,731	$362,464,320
Retail Trade	$619,328,000	9,272	$251,028,640
Information	$307,665,216	860	$75,633,352
Finance and Insurance	$740,812,224	3,539	$244,182,688
Real Estate and Rental	$492,653,120	2,754	$85,854,560
Professional, Technical, and Scientific Services	$710,224,320	4,624	$286,874,368
Management of Companies	$398,028,800	1,984	$184,293,872
Administrative and Waste Services	$260,618,256	4,344	$125,709,472
Educational Services	$70,678,272	1,229	$40,261,068
Health and Social Services	$537,158,336	6,366	$286,155,264
Arts, Entertainment and Recreation	$74,889,168	1,396	$30,953,586
Accommodation and Food Services	$354,933,344	6,268	$121,684,176
Other Services	$353,237,664	5,683	$134,958,832
Government and Non-NAICS Industries	$660,072,512	707	$27,723,508
Total	$28,547,185,557	141,155	$6,695,747,523
Source: Georgia Tech's Enterprise Innovation Institute			

Comparison of the Forestry Industry with Other Industry 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 3-3, which shows that the forestry industry is the third largest industry sector in Georgia, (behind food processing and textiles) in employment and the second largest in wages and salaries.

Table 3-3: Comparison of Georgia Industries 2007

Sector	Employment	Wages & Salaries
Food Processing	72,188	$3,044,130,479
Forestry Industry	64,192	$2,655,122,080
Transportation Equipment	42,892	$2,351,785,278
Textiles	64,785	$2,324,049,150
Fabricated Metal Products	29,101	$1,134,770,230
Machinery	24,371	$1,078,843,863
Chemicals	21,651	$1,242,269,565
Printing	20,907	$920,581,830
Electrical Equipment and Appliances	15,207	$895,779,998
Computers and Electronic Products	14,929	$972,445,698
Apparel	5,356	$173,052,321

SECTION 4

Economic Dependence

What Is Economic Dependence?

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 those sectors within an economy that are 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, and it also pays wages to 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

There is no clear delineation between economic dependence and non-dependence, and there are many possible facets that can be examined to depict the spectrum that describes the degree of dependence. This analysis examines the proportion of the county-level employment and income (as defined by wages and salaries) indicated by the ES202 data that is attributable directly to forestry industries. Multiplier effects are difficult to distribute to individual counties, and were therefore not included in the definition of forestry-related industries. This exclusion serves to underestimate the true proportion of the county economy supported by forestry.

The ranges of county employment attributable to forestry-related industries used to define the degree of dependence is provided in Table 4-1, which also provided the definitions used to define dependence according to the percentage of income (wages and salaries) attributable to forestry-related industries. These ranges were developed judgmentally, and are intended to define "dependence" in a very general sense.

Applying these criteria to Georgia's counties results in a distribution of counties as depicted in Table 4-2 for employment and income. While most (110 for both employment and income) counties are considered either not, or somewhat, dependent on forestry industries, the remaining counties, concentrated in south Georgia, owe significant proportions of their livelihood to forestry.

Figure 4-1 depicts the degree of forestry-related dependence based on employment and Figure 4-2 depicts the degree of dependence based on income. Table 4-3 provides the percentages of forestry to county employment and wages and salaries used to assign the degree of dependence.

Table 4-1: Definitions of Levels of Dependence

	Forestry Employment	Forestry Wages & Salaries
Critically Dependent	> 10%	> 15%
Very Dependent	6% - 9.9%	10% - 14.9%
Moderately Dependent	4% - 5.9%	9.9% - 5%
Somewhat Dependent	1.6% - 3.9%	2% - 4.9%
Not Dependent	< 1.6%	< 2%

Table 4-2: Distribution of Georgia Counties by Level of Dependence

	Number of Counties	
	Employment	Wages & Salaries
Critically Dependent	20	12
Very Dependent	17	21
Moderately Dependent	12	17
Somewhat Dependent	48	40
Not Dependent	62	69
Total	159	159

Source: EII estimates using Georgia Department of Labor, Current Employment and Wages data.

Tables 4-3 and 4-4 show how overall dependency has changed (for dependency based on employment and income, respectively) over the three years these statistics have been produced. Generally, the number of counties in each of the dependency categories has remained quite stable. The year 2006, however, shows an increase in those counties considered critically dependent largely at the expense of counties considered very dependent.

Table 4-3 Forestry Dependency Over Time: Employment

	Number of Counties			
	2004	2005	2006	2007
Critically Dependent	19	19	22	20
Very Dependent	18	18	15	17
Moderately Dependent	20	20	18	12
Somewhat Dependent	49	49	50	48
Not Dependent	53	53	54	62

Table 4-4 Forestry Dependency Over Time: Income

	Number of Counties			
	2004	**2005**	**2006**	**2007**
Critically Dependent	14	14	16	12
Very Dependent	17	17	13	21
Moderately Dependent	26	26	26	17
Somewhat Dependent	42	42	42	40
Not Dependent	60	60	62	69

Figure 4-1
Forestry Dependency Based on Employment 2007

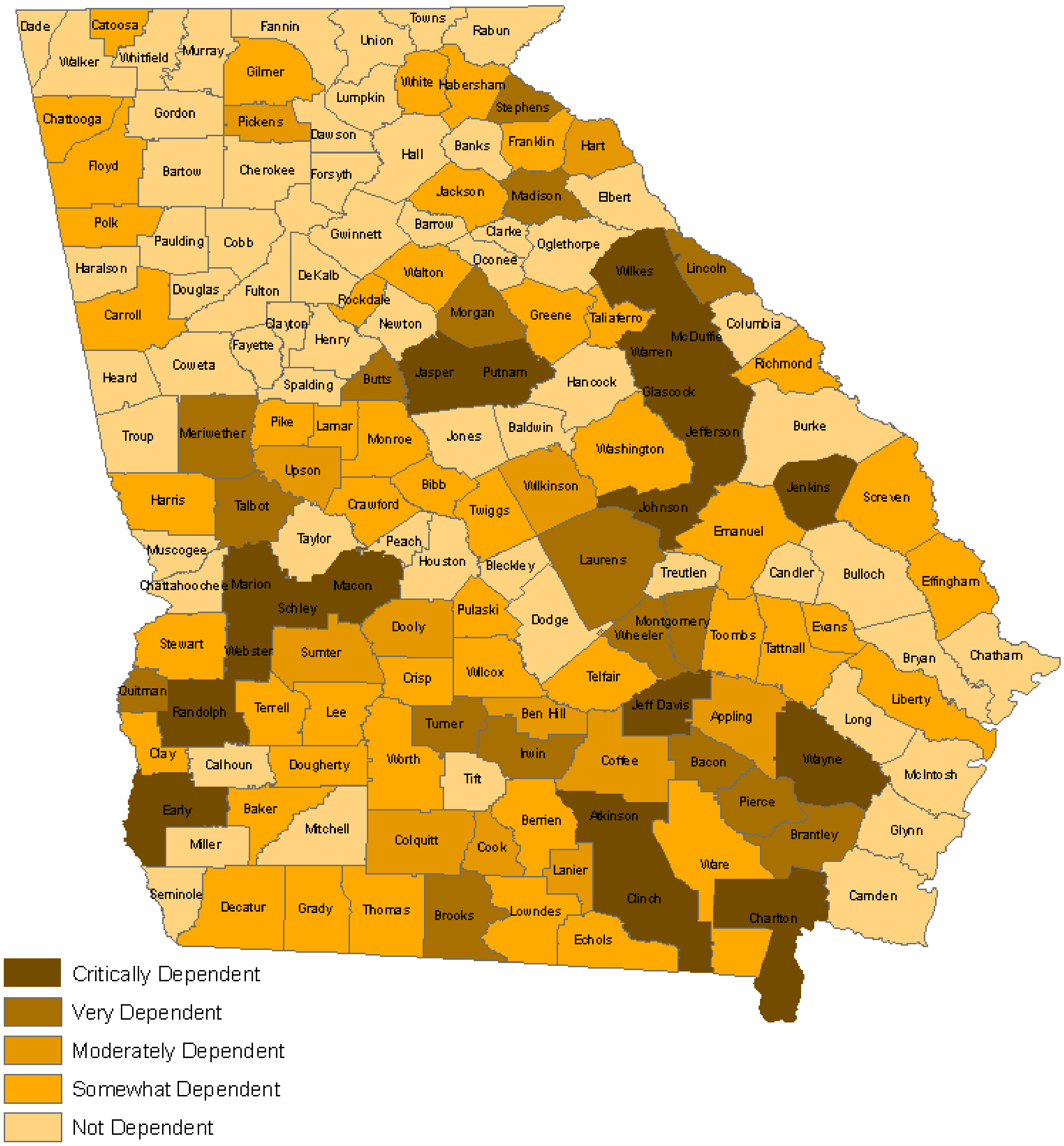


Figure 4-2
Forestry Dependency Based on Income

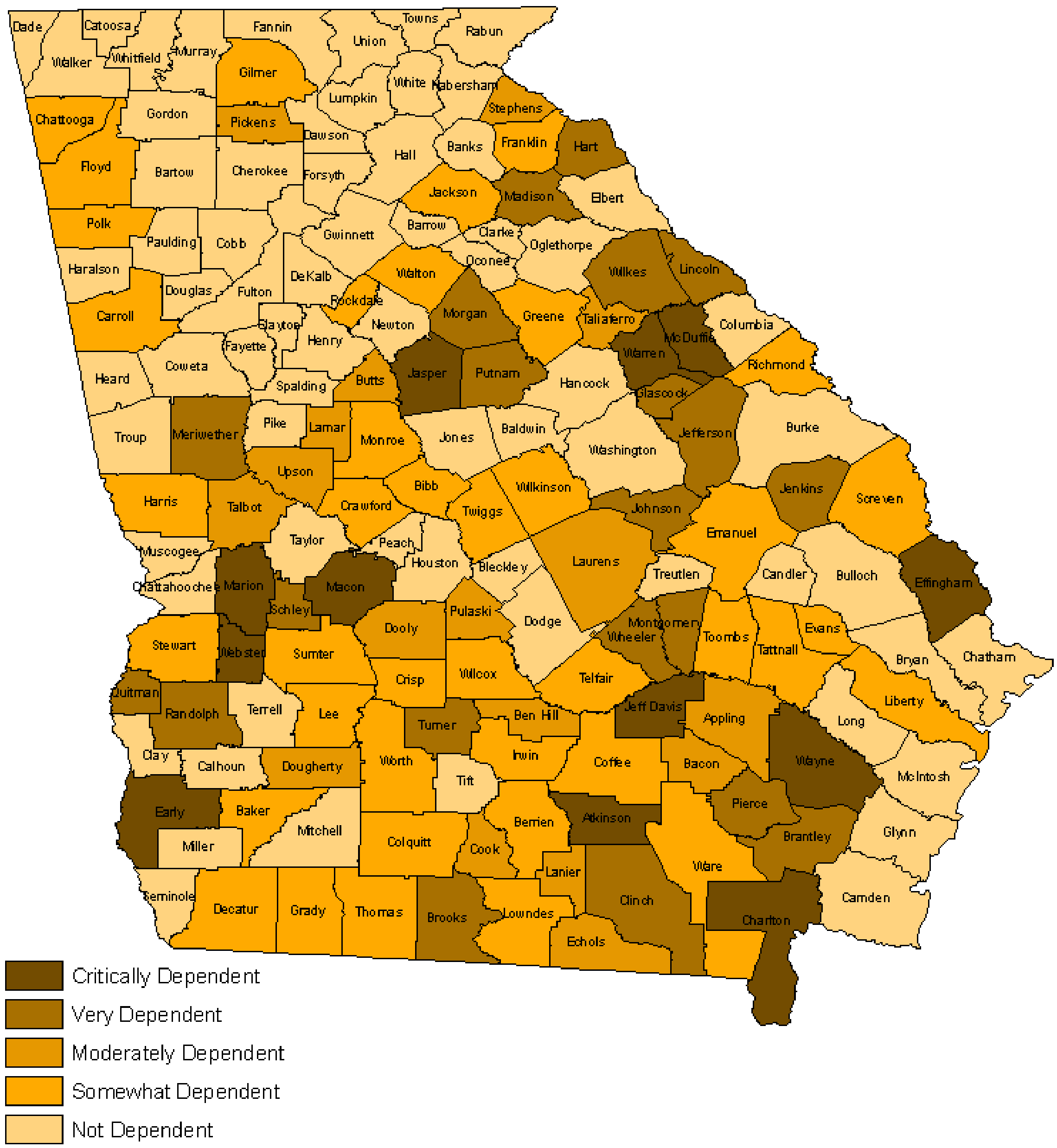


Table 4-5: Level and Percent of Forestry in County Economies Based on Employment and Income: 2007

	Level of Forestry:		Percent of Forestry to Total:	
County	Employment	Wages and Salaries	Employment	Wages and Salaries
Appling	346	$13,603,364	5.4%	6.3%
Atkinson	528	$16,313,260	30.0%	38.4%
Bacon	313	$9,021,858	8.3%	9.8%
Baker	12	$391,172	2.1%	2.7%
Baldwin	214	$6,122,461	1.1%	1.1%
Banks	55	$1,322,406	1.1%	1.0%
Barrow	176	$8,080,268	1.0%	1.5%
Bartow	494	$17,953,216	1.4%	1.5%
Ben Hill	424	$13,694,178	5.6%	6.6%
Berrien	120	$2,997,947	2.3%	2.1%
Bibb	1,634	$90,984,971	1.9%	3.1%
Bleckley	51	$1,807,443	1.4%	1.4%
Brantley	203	$6,102,128	9.7%	12.1%
Brooks	221	$7,797,853	7.4%	10.5%
Bryan	86	$3,039,656	1.3%	1.6%
Bulloch	336	$10,558,824	1.4%	1.6%
Burke	27	$708,575	0.4%	0.3%
Butts	462	$12,155,458	7.8%	7.5%
Calhoun	7	$56,038	0.5%	0.2%
Camden	236	$9,745,076	1.5%	1.9%
Candler	23	$610,319	0.7%	0.8%
Carroll	987	$47,345,187	2.4%	3.5%
Catoosa	285	$8,327,889	1.8%	1.8%
Charlton	677	$12,716,328	25.5%	19.2%
Chatham	1,430	$89,090,942	1.0%	1.7%
Chattahoochee	1	$21,840	0.1%	0.0%
Chattooga	154	$4,966,578	2.3%	2.7%
Cherokee	669	$21,057,481	1.3%	1.3%
Clarke	537	$24,192,689	0.8%	1.0%
Clay	15	$355,373	1.6%	1.7%
Clayton	339	$14,819,482	0.3%	0.3%
Clinch	260	$8,309,346	10.5%	12.4%
Cobb	3,413	$129,497,468	1.0%	0.9%
Coffee	707	$19,359,274	4.1%	4.1%
Colquitt	750	$19,203,851	4.7%	4.6%
Columbia	387	$13,728,193	1.3%	1.5%
Cook	247	$7,097,325	4.8%	5.9%

Coweta	206	$6,706,952	0.6%	0.6%
Crawford	42	$1,698,594	2.7%	4.2%
Crisp	223	$6,636,577	2.4%	2.8%
Dade	15	$389,914	0.4%	0.4%
Dawson	27	$941,429	0.3%	0.5%
Decatur	298	$8,455,591	2.9%	3.2%
DeKalb	2,134	$100,858,858	0.7%	0.7%
Dodge	42	$1,073,892	0.6%	0.7%
Dooly	146	$7,270,611	4.1%	7.4%
Dougherty	1,548	$94,800,468	2.9%	5.4%
Douglas	289	$15,798,823	0.7%	1.3%
Early	639	$48,913,047	14.6%	32.0%
Echols	22	$869,727	3.2%	6.1%
Effingham	280	$87,915,534	2.8%	27.4%
Elbert	39	$1,253,439	0.6%	0.6%
Emanuel	209	$6,875,524	2.6%	3.5%
Evans	164	$6,071,715	3.5%	4.6%
Fannin	47	$1,154,974	0.8%	0.8%
Fayette	290	$15,367,047	0.7%	1.0%
Floyd	1,029	$31,327,523	2.5%	2.4%
Forsyth	738	$28,860,908	1.3%	1.2%
Franklin	243	$6,535,169	3.1%	2.9%
Fulton	3,826	$204,715,286	0.5%	0.5%
Gilmer	226	$5,702,690	2.5%	2.3%
Glascock	46	$1,168,682	11.3%	13.4%
Glynn	262	$11,953,338	0.7%	0.9%
Gordon	123	$3,398,295	0.5%	0.5%
Grady	218	$6,077,934	3.3%	3.6%
Greene	130	$4,397,082	2.2%	2.6%
Gwinnett	3,012	$114,286,259	0.9%	0.8%
Habersham	270	$6,831,242	1.8%	1.6%
Hall	968	$32,420,889	1.3%	1.2%
Hancock	9	$188,794	0.7%	0.6%
Haralson	30	$881,008	0.4%	0.4%
Harris	77	$2,528,899	1.8%	2.5%
Hart	404	$21,119,411	6.0%	10.8%
Heard	35	$1,416,939	1.5%	1.6%
Henry	311	$16,392,117	0.6%	1.0%
Houston	308	$12,109,312	0.5%	0.5%
Irwin	155	$2,345,146	6.3%	3.8%
Jackson	441	$22,518,892	2.3%	3.9%
Jasper	640	$23,765,880	22.9%	30.3%
Jeff Davis	549	$18,537,397	12.6%	15.6%

Jefferson	665	$21,511,528	12.0%	13.4%
Jenkins	432	$8,006,648	19.3%	14.9%
Johnson	222	$5,635,776	11.2%	11.8%
Jones	56	$1,357,441	1.5%	1.3%
Lamar	138	$5,902,031	3.7%	5.5%
Lanier	85	$2,124,302	5.6%	5.5%
Laurens	1,247	$59,016,228	6.1%	9.3%
Lee	97	$3,146,632	1.8%	2.1%
Liberty	478	$25,080,725	2.8%	4.5%
Lincoln	145	$4,722,488	9.4%	12.6%
Long	11	$333,104	1.3%	1.6%
Lowndes	1,627	$65,836,140	3.1%	4.6%
Lumpkin	101	$2,130,888	1.5%	1.1%
McDuffie	985	$66,181,019	11.4%	24.4%
McIntosh	6	$137,109	0.2%	0.2%
Macon	371	$23,670,908	10.6%	23.6%
Madison	277	$11,204,061	7.3%	10.8%
Marion	318	$7,877,357	18.8%	18.7%
Meriwether	398	$16,502,350	8.1%	12.5%
Miller	4	$73,780	0.2%	0.2%
Mitchell	109	$2,967,690	1.2%	1.4%
Monroe	167	$6,333,734	2.6%	3.2%
Montgomery	155	$5,935,657	8.0%	11.0%
Morgan	455	$19,610,068	7.0%	10.4%
Murray	116	$2,966,853	0.9%	0.8%
Muscogee	515	$18,888,893	0.5%	0.5%
Newton	325	$14,349,319	1.5%	1.9%
Oconee	123	$3,234,124	1.4%	1.2%
Oglethorpe	24	$495,839	1.3%	1.1%
Paulding	196	$5,487,153	0.9%	0.9%
Peach	12	$449,345	0.1%	0.2%
Pickens	358	$23,667,015	4.5%	9.7%
Pierce	395	$12,896,040	9.2%	11.4%
Pike	37	$1,113,509	1.6%	1.8%
Polk	293	$10,619,197	2.4%	3.0%
Pulaski	88	$4,545,722	2.7%	5.1%
Putnam	892	$25,175,478	12.4%	12.0%
Quitman	41	$1,587,936	8.9%	14.2%
Rabun	53	$1,440,841	1.0%	1.0%
Randolph	223	$6,448,775	10.5%	11.6%
Richmond	2,108	$112,801,585	2.0%	3.0%
Rockdale	1,189	$53,348,647	3.5%	4.6%
Schley	184	$6,176,824	12.4%	13.8%

Screven	155	$4,264,645	4.0%	4.1%
Seminole	4	$86,760	0.2%	0.1%
Spalding	245	$9,292,107	1.0%	1.3%
Stephens	767	$24,567,383	7.6%	8.1%
Stewart	32	$1,213,826	2.4%	3.6%
Sumter	510	$13,889,598	4.0%	3.9%
Talbot	66	$1,778,813	7.6%	6.9%
Taliaferro	8	$368,331	3.5%	7.5%
Tattnall	163	$4,602,156	2.9%	3.2%
Taylor	28	$444,309	1.5%	0.8%
Telfair	113	$3,256,258	2.4%	3.2%
Terrell	44	$680,145	1.7%	1.0%
Thomas	931	$23,907,682	3.9%	3.2%
Tift	294	$9,710,088	1.5%	1.6%
Toombs	421	$14,003,852	3.5%	4.3%
Towns	8	$137,509	0.2%	0.1%
Treutlen	7	$255,904	0.6%	1.0%
Troup	246	$7,725,873	0.8%	0.7%
Turner	192	$5,806,533	7.6%	10.0%
Twiggs	38	$1,043,596	3.2%	2.5%
Union	63	$1,509,400	0.9%	0.8%
Upson	325	$11,456,152	4.1%	5.3%
Walker	27	$772,145	0.2%	0.2%
Walton	377	$13,740,974	1.8%	2.1%
Ware	629	$17,697,589	3.9%	4.1%
Warren	302	$10,378,372	23.4%	29.8%
Washington	133	$4,628,604	1.6%	1.9%
Wayne	1,198	$77,450,796	13.0%	25.2%
Webster	262	$7,846,941	46.8%	51.9%
Wheeler	157	$4,811,577	9.9%	12.7%
White	137	$2,759,907	2.0%	1.5%
Whitfield	751	$23,591,315	1.2%	1.1%
Wilcox	49	$793,024	3.6%	2.5%
Wilkes	401	$9,809,380	11.8%	11.4%
Wilkinson	168	$4,809,520	5.4%	4.3%
Worth	124	$2,520,202	3.4%	2.6%
Non-County	1,566	$755,909,169		
State Total	64,192	$3,394,198,719		

References

Georgia Department of Labor, ES202 Wage and Employment Data: 2007.

U.S. Bureau of the Census, "Census of Manufacturers 2002," http://www.census.gov/epcd/ec97/ga/GA000.HTM

U.S. Department of Labor, Bureau of Labor Statistics, "Employer Costs for Employee Compensation," http://data.bls.gov/cgi-bin/surveymost

North American Industrial Classification System (NAICS), http://www.census.gov/epcd/www/naicstab.htm

Bureau of Economic Analysis Input-Output Sectors as contained in "IMPLAN Pro: Data Guide," Minnesota IMPLAN Group, Inc., Stillwater, Minn., 1997.

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