Economic Benefits of the Forestry Industry in Georgia: 2005

Final Report

Prepared for
Georgia Forestry Commission
Macon, Georgia

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Table of Contents

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.

The forestry industry components, and the level of economic activity represented by them, are shown in Table E-1 for 2005. 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 67,694 in all industry sectors combined, paid an annual compensation of over $3.4 billion, and had estimated total revenue of over $16.1 billion.

The activities in the sectors shown in Table E-1 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 direct impacts), is also measured by output, employment, and income (Table E-2).

Economic activity, including the multiplier effect and federal payments to landowners of about $12.2 million, supported by the forestry industry in Georgia is almost $26 billion. This activity employs 154,147 people whose compensation is over $6.8 billion.

Another way to examine the forestry industry in Georgia is to compare it with other manufacturing sectors. Table E-3 lists the income and employment totals for each major industry sector sorted by total income for 2005. 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 the forestry industry's 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 estimated include education, public health, safety and

welfare costs, highways, administration, and miscellaneous costs. Table E-4 provides these estimates for both direct and total impacts. The forestry industry generates an estimated $591 million per year in revenues for the state budget. When the costs of providing services to the employees (such as educating their children) of the forestry industry, and the economic activity supported by the forestry industry, are deducted from these revenues, the net annual fiscal benefit from the forestry industry is over $176 million per year.

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

Table E-1: Georgia Forestry Industry Economic Activity 2005

Sector	Output	Employment	Compensation
Logging and Nurseries	$1,447,089,632	6,133	$254,133,792
Lumber and Wood Preservation	$1,811,062,188	8,839	$384,895,901
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,290,298,688	7,110	$340,977,212
Prefabricated Wood Buildings and Manufactured Housing	$561,314,328	4,531	$164,212,402
Pulp and Paper Products	$8,808,187,803	23,150	$1,594,677,218
Woodworking and Paper Industries Machinery	$53,197,020	319	$20,414,041
Wooden Furniture and Cabinets	$1,065,724,056	8,867	$323,074,793
Windows and Doors	$405,603,168	2,446	$104,375,704
Containers, Showcases, Partitions, and Shelving	$532,826,960	4,788	$169,143,160
Custom Architectural and Miscellaneous Wood Products	$175,123,334	1,511	$65,672,843
Total	$16,150,427,177	67,694	$3,421,577,066

Source: Georgia Department of Labor (ES202) and Georgia Tech's Enterprise Innovation Institute.

Table E-2: Total Benefits by Major Industry Sector 2005			
Sector	**Output**	**Employment**	**Compensation**
Forestry, Fishing and Hunting	$1,784,738,944	14,232	$434,053,728
Mining	$9,394,378	38	$2,995,445
Utilities	$533,866,176	781	$106,254,760
Construction	$99,402,200	1,080	$42,347,132
Manufacturing	$15,910,316,032	65,910	$3,407,663,872
Wholesale Trade	$1,289,656,448	8,622	$549,861,504
Transportation and Warehousing	$852,411,392	7,936	$340,051,072
Retail Trade	$588,485,056	10,678	$273,429,504
Information	$303,962,496	988	$81,761,304
Finance and Insurance	$697,990,720	3,911	$240,504,544
Real Estate and Rental	$474,355,360	2,792	$87,963,824
Professional, Technical, and Scientific Services	$598,519,744	4,497	$251,611,200
Management of Companies	$380,044,384	2,365	$174,653,744
Administrative and Waste Services	$241,766,112	4,223	$115,325,168
Educational Services	$61,162,432	1,226	$34,649,672
Health and Social Services	$523,545,248	6,895	$288,163,648
Arts, Entertainment and Recreation	$80,402,360	1,591	$35,431,024
Accommodation and Food Services	$345,511,904	7,203	$119,162,568
Other Services	$531,631,808	8,282	$198,512,976
Government and Non-NAICS Industries	$664,610,176	897	$42,128,308
Total	$25,972,228,986	154,147	$6,826,524,997

Source: Georgia Tech's Enterprise Innovation Institute

Table E-3: Comparison of Georgia Industries 2005		
Sector	**Employment**	**Wages & Salaries**
Food Processing	72,612	$2,783,868,279
Forestry Industry	67,694	$2,673,104,764
Textiles	75,255	$2,443,653,242
Transportation Equipment	46,228	$2,398,616,545
Chemicals	21,067	$1,149,183,174
Machinery	24,457	$998,240,612
Printing	20,791	$876,206,298
Computers and Electronic Products	13,260	$840,675,611
Apparel	7,743	$203,440,262

Source: Georgia Department of Labor (ES202)

Table E-4: Fiscal Impact Analysis 2005	
Annual State Government Revenues	$590,558,427
Annual State Government Costs	$414,483,229
Net Annual Revenues	$176,075,198

Source: Georgia Tech's Enterprise Innovation Institute

Table E-5: Comparison of Results 2003 to 2005			
Industry Economic Activity	**2003**	**2004**	**2005**
Output	$12,679,309,984	$14,162,671,796	$16,150,427,177
Employment	65,706	67,633	67,694
Compensation	$3,007,249,626	$3,299,211,578	$3,421,577,066
Total Benefits	**2003**	**2004**	**2005**
Output	$20,199,375,517	$22,729,379,114	$25,972,228,986
Employment	136,022	144,944	154,147
Compensation	$5,600,491,974	$6,276,217,393	$6,826,524,997
Fiscal Impact	**2003**	**2004**	**2005**
State Revenues	$514,089,031	$546,361,719	$590,558,427
State Costs	$367,579,485	$391,523,592	$414,483,229
Net Revenues	$146,509,546	$154,838,126	$176,075,198

Source: Georgia Tech's Enterprise Innovation Institute

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 (according to ES202 data) 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

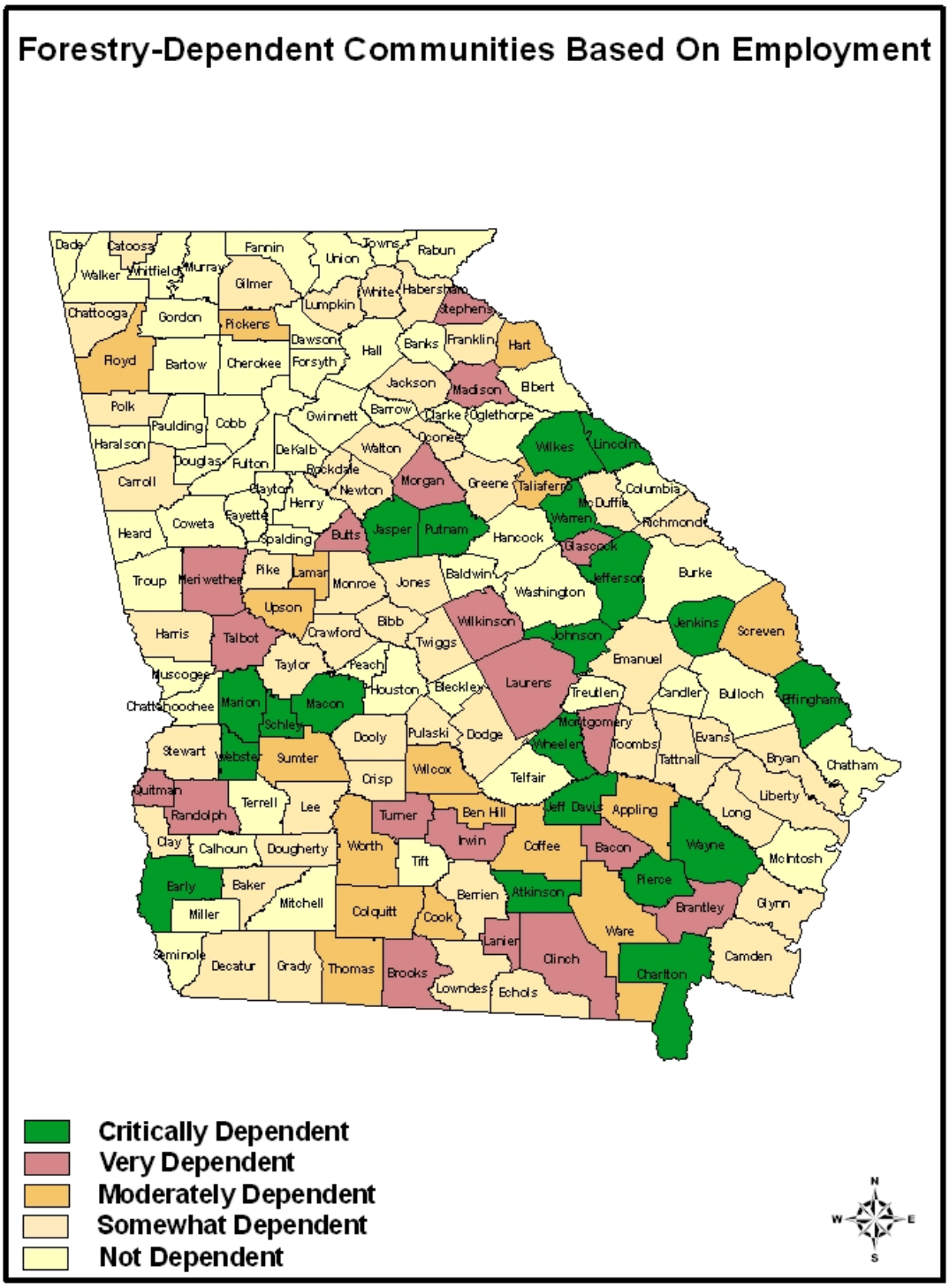
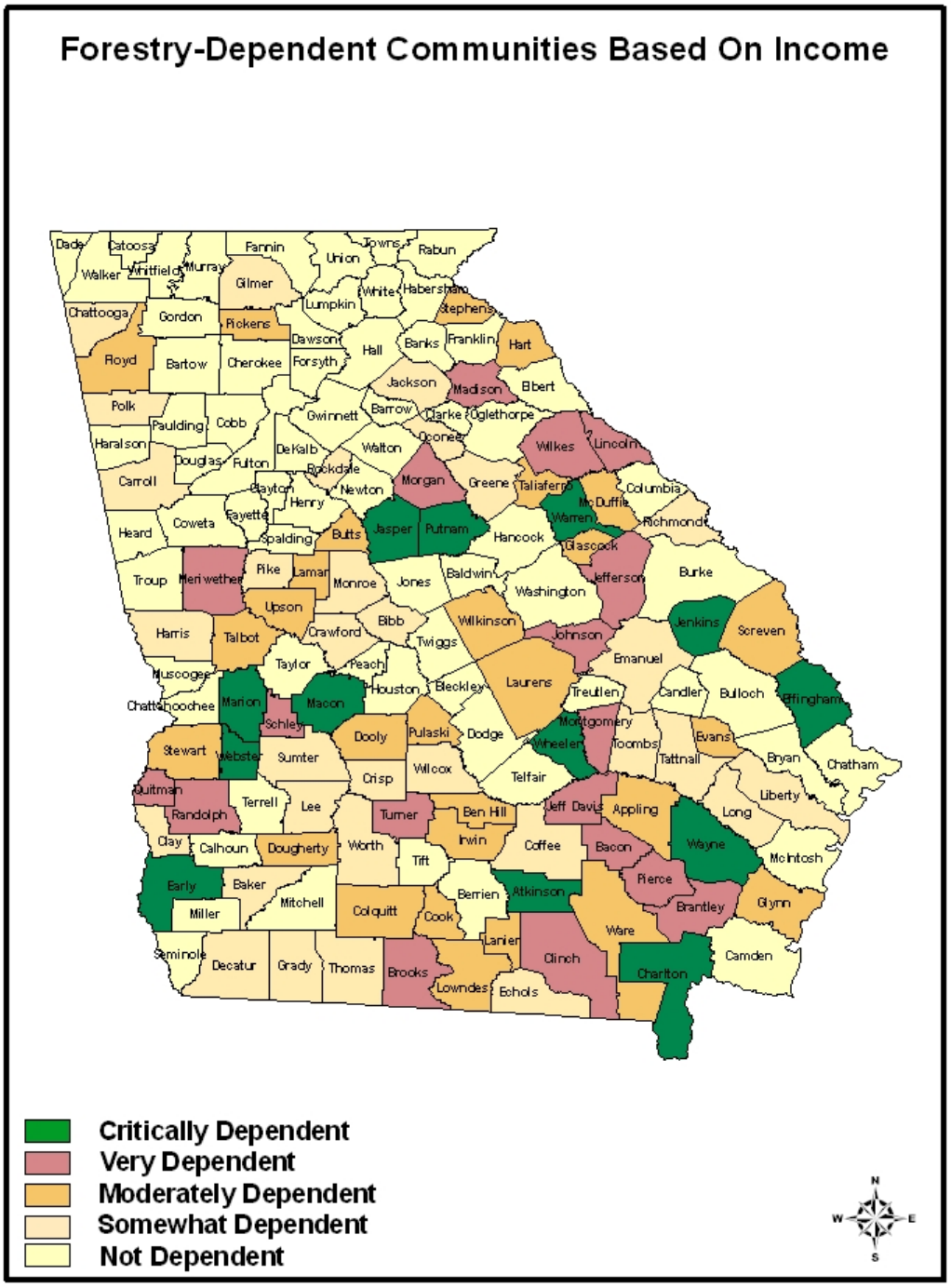

Forestry-Dependent Communities Based On Employment
Dade
Catoosa
Fannin
Towns
Rabun
Union
Walker
Whitfield
Murray
Gilmer
White
Habersham
Stephens
Chattooga
Gordon
Pickens
Lumpkin
Dawson
Hall
Banks
Franklin
Hart
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Polk
Paulding
Cobb
Gwinnett
Barrow
Clarke
Oglethorpe
Oconee
Haralson
DeKalb
Walton
Wilkes
Lincoln
Douglas
Fulton
Rockdale
Carroll
Clayton
Newton
Morgan
Greene
Taliaferro
Columbia
Henry
McDuffie
Warren
Fayette
Coweta
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Richmond
Troup
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Washington
Jefferson
Burke
Upson
Wilkinson
Harris
Talbot
Crawford
Bibb
Twiggs
Johnson
Jenkins
Screven
Taylor
Peach
Emanuel
Muscogee
Houston
Bleckley
Laurens
Treutlen
Candler
Bulloch
Effingham
Chattahoochee
Marion
Macon
Schley
Dooly
Pulaski
Dodge
Montgomery
Wheeler
Toombs
Evans
Stewart
Webster
Sumter
Wilcox
Tattnall
Bryan
Chatham
Quitman
Crisp
Telfair
Terrell
Lee
Turner
Ben Hill
Jeff Davis
Appling
Liberty
Long
Randolph
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Early
Baker
Berrien
Atkinson
Pierce
Brantley
Glynn
Miller
Mitchell
Colquitt
Cook
Ware
Seminole
Decatur
Grady
Thomas
Brooks
Lanier
Clinch
Camden
Lowndes
Echols
Charlton
Critically Dependent
Very Dependent
Moderately Dependent
Somewhat Dependent
Not Dependent
N
W
E
S

Figure E-2


Forestry-Dependent Communities Based On Income
Dade
Catoosa
Fannin
Towns
Rabun
Union
Walker
Whitfield
Murray
Gilmer
White
Habersham
Stephens
Lumpkin
Chattooga
Gordon
Pickens
Dawson
Banks
Franklin
Hart
Hall
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Polk
Barrow
Clarke
Oglethorpe
Gwinnett
Paulding
Cobb
Oconee
Haralson
Wilkes
Lincoln
Walton
DeKalb
Douglas
Fulton
Rockdale
Morgan
Greene
Taliaferro
Columbia
Carroll
Clayton
Newton
Henry
McDuffie
Warren
Fayette
Coweta
Richmond
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Troup
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Jefferson
Burke
Washington
Upson
Wilkinson
Jenkins
Screven
Harris
Talbot
Crawford
Bibb
Twiggs
Johnson
Emanuel
Taylor
Peach
Muscogee
Houston
Bleckley
Laurens
Treutlen
Candler
Bulloch
Effingham
Chattahoochee
Marion
Macon
Schley
Dooly
Pulaski
Dodge
Montgomery
Wheeler
Toombs
Evans
Stewart
Webster
Sumter
Crisp
Wilcox
Telfair
Tattnall
Bryan
Chatham
Quitman
Terrell
Lee
Turner
Ben Hill
Jeff Davis
Appling
Liberty
Long
Randolph
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Early
Baker
Berrien
Atkinson
Pierce
Brantley
Glynn
Mitchell
Miller
Colquitt
Cook
Ware
Seminole
Decatur
Grady
Thomas
Brooks
Lanier
Clinch
Charlton
Camden
Lowndes
Echols
Critically Dependent
Very Dependent
Moderately Dependent
Somewhat Dependent
Not Dependent
N
W
E
S

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 four categories according to their degree of dependence on forestry.

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 coding system follows the North American Industrial Classification System (NAICS) that replaced the Standard Industrial Classification (SIC) system in 1997. The NAICS codes and descriptions comprising the detailed definition appear in Table 2-1.

The organization of the industries on this list resembles the SIC system in that the number of digits of the NAICS codes increases as the level of detail increases. The highest level of detail practicable is the six-digit level, which roughly equals the four-digit level in the older SIC system. 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.

Table 2-1: Forestry Industry Definition Components: NAICS

NAICS	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 level of economic activity in each forestry industry component is measured by output, employment, and income. Measures for the 2005 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 67,694 and these jobs earned annual compensation (total wages and salaries including benefits) of over $3.4 billion from estimated total revenue of almost $16.2 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 23,150 workers followed by wooden furniture and cabinets with 8,867. 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 almost $1.6 billion (about half the total) followed distantly by lumber and wood preservation (almost $385 million) and veneer and plywood at almost $341 million. The largest outputs are produced by pulp and paper (about $8.8 billion) followed by lumber and plywood, (about $1.8 billion) and logging and nurseries at almost $1.5 billion.

Table 2-2: Georgia Forestry Industry Economic Activity 2005

Sector	Output	Employment	Compensation
Logging and Nurseries	$1,447,089,632	6,133	$254,133,792
Lumber and Wood Preservation	$1,811,062,188	8,839	$384,895,901
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,290,298,688	7,110	$340,977,212
Prefabricated Wood Buildings and Manufactured Housing	$561,314,328	4,531	$164,212,402
Pulp and Paper Products	$8,808,187,803	23,150	$1,594,677,218
Woodworking and Paper Industries Machinery	$53,197,020	319	$20,414,041
Wooden Furniture and Cabinets	$1,065,724,056	8,867	$323,074,793
Windows and Doors	$405,603,168	2,446	$104,375,704
Containers, Showcases, Partitions, and Shelving	$532,826,960	4,788	$169,143,160
Custom Architectural and Miscellaneous Wood Products	$175,123,334	1,511	$65,672,843
Total	$16,150,427,177	67,694	$3,421,577,066

Source: Georgia Tech's Enterprise Innovation Institute

Table 2-3 provides a comparison of the forestry industry activity for 2004 and 2005. Three measures are included in the comparison: output, employment, and compensation. Output increased in all industry segments except custom architectural and miscellaneous wood products. The overall increase was a healthy 14 percent. Employment also increased in most sectors except for pulp and paper, windows and doors, and containers, showcases, partitions and shelving. Compensation, however, appears to have increased in all sectors except pulp and paper with an overall increase of about 4 percent.

Table 2-3: Foresty Industry Activity 2004 and 2005 Comparison

	Output	
Sector	**2004**	**2005**
Logging and Nurseries	$1,384,113,152	$1,447,089,632
Lumber and Wood Preservation	$1,481,513,824	$1,811,062,188
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,062,298,144	$1,290,298,688
Prefabricated Wood Buildings and Manufactured Housing	$388,201,924	$561,314,328
Pulp and Paper Products	$7,887,861,361	$8,808,187,803
Woodworking and Paper Industries Machinery	$46,696,992	$53,197,020
Wooden Furniture and Cabinets	$841,050,860	$1,065,724,056
Windows and Doors	$343,669,472	$405,603,168
Containers, Showcases, Partitions, and Shelving	$453,711,824	$532,826,960
Custom Architectural and Miscellaneous Wood Products	$273,554,243	$175,123,334
Total	$14,162,673,800	$16,150,427,177

	Employment	
	2004	**2005**
Logging and Nurseries	6,005	6,133
Lumber and Wood Preservation	8,505	8,839
Veneer, Plywood, Reconstituted, and Engineered Wood	6,588	7,110
Prefabricated Wood Buildings and Manufactured Housing	3,494	4,531
Pulp and Paper Products	25,032	23,150
Woodworking and Paper Industries Machinery	292	319
Wooden Furniture and Cabinets	8,685	8,867
Windows and Doors	2,522	2,446
Containers, Showcases, Partitions, and Shelving	5,031	4,788
Custom Architectural and Miscellaneous Wood Products	1,479	1,511
Total	67,633	67,694

	Compensation	
	2004	**2005**
Logging and Nurseries	$234,098,548	$254,133,792
Lumber and Wood Preservation	$352,721,316	$384,895,901
Veneer, Plywood, Reconstituted, and Engineered Wood	$312,041,524	$340,977,212
Prefabricated Wood Buildings and Manufactured Housing	$121,569,812	$164,212,402
Pulp and Paper Products	$1,616,422,198	$1,594,677,218
Woodworking and Paper Industries Machinery	$18,023,702	$20,414,041
Wooden Furniture and Cabinets	$301,810,254	$323,074,793
Windows and Doors	$104,148,424	$104,375,704
Containers, Showcases, Partitions, and Shelving	$180,908,656	$169,143,160
Custom Architectural and Miscellaneous Wood Products	$57,467,145	$65,672,843
Total	$3,299,213,583	$3,421,577,066

Source: Georgia Tech's Enterprise Innovation Institute

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 2005, whereas the wage and salary data available to IMPLAN is from 2004.

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, it has the advantage of being current, allowing an estimate of the economic benefits occurring in 2005. 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 are 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 benefits.

Three measures of economic benefits are provided. The first, output, is a measure of how much each industry or sector produced in 2005 – 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 provided by the firms 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 Table 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 logging and nurseries industry segment because most of it seems 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. Together, the forestry industry exports over $14 billion with this activity supporting 57,684 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 benefits by aggregated industry codes (used in the input-output model), which are roughly equivalent to two-digit NAICS code.

Table 3-1: Direct Impacts by Forest Industry Sector 2005

Sector	Output	Employment	Compensation
Logging and Nurseries	$461,689,184	840	$50,211,004
Lumber and Wood Preservation	$1,178,992,646	5,930	$260,002,575
Veneer, Plywood, Reconstituted, and Engineered Wood	$1,154,336,800	6,479	$304,675,472
Prefabricated Wood Buildings and Manufactured Housing	$561,314,328	4,531	$164,212,402
Pulp and Paper Products	$8,760,899,363	22,985	$1,585,581,324
Woodworking and Paper Industries Machinery	$46,050,741	283	$17,945,508
Wooden Furniture and Cabinets	$1,014,317,336	8,492	$308,026,795
Windows and Doors	$391,010,784	2,358	$100,620,576
Containers, Showcases, Partitions, and Shelving	$504,576,208	4,527	$160,289,520
Custom Architectural and Miscellaneous Wood Products	$148,282,738	1,259	$54,532,419
Total	$14,221,470,128	57,684	$3,006,097,596

Source: Georgia Tech's Enterprise Innovation Institute

The largest sector benefits are seen, not surprisingly, in the manufacturing sector, with some $16 billion in output, 65,910 employees, and about $3.4 billion in compensation. A distant second is held by forestry, fishing and hunting (which includes logging and nurseries), with almost $1.8 billion in output, 14,232 employees, and over $434 million in compensation. Together, the economic activity supported by Georgia's forestry industry (including federal payments to landowners of about $12.2 million) totals almost $26 billion, involving employment of 154,147 people whose compensation exceeds $6.8

billion. This employment represents about 3.8 percent of total Georgia employment and 3.6 percent of household income when compared to 2005 ES202 totals.

Table 3-2: Total Benefits by Major Industry Sector 2005

Sector	Output	Employment	Compensation
Forestry, Fishing and Hunting	$1,784,738,944	14,232	$434,053,728
Mining	$9,394,378	38	$2,995,445
Utilities	$533,866,176	781	$106,254,760
Construction	$99,402,200	1,080	$42,347,132
Manufacturing	$15,910,316,032	65,910	$3,407,663,872
Wholesale Trade	$1,289,656,448	8,622	$549,861,504
Transportation and Warehousing	$852,411,392	7,936	$340,051,072
Retail Trade	$588,485,056	10,678	$273,429,504
Information	$303,962,496	988	$81,761,304
Finance and Insurance	$697,990,720	3,911	$240,504,544
Real Estate and Rental	$474,355,360	2,792	$87,963,824
Professional, Technical, and Scientific Services	$598,519,744	4,497	$251,611,200
Management of Companies	$380,044,384	2,365	$174,653,744
Administrative and Waste Services	$241,766,112	4,223	$115,325,168
Educational Services	$61,162,432	1,226	$34,649,672
Health and Social Services	$523,545,248	6,895	$288,163,648
Arts, Entertainment and Recreation	$80,402,360	1,591	$35,431,024
Accommodation and Food Services	$345,511,904	7,203	$119,162,568
Other Services	$531,631,808	8,282	$198,512,976
Government and Non-NAICS Industries	$664,610,176	897	$42,128,308
Total	$25,972,228,986	154,147	$6,826,524,997

Source: Georgia Tech's Enterprise Innovation Institute

Table 3-3 provides a comparison between the output, employment and compensation estimates derived in the 2004 and current study. All sectors showed increases over the 2004 estimates, with the largest increases seen in the manufacturing sector.

Table 3-3: Benefits by Major Sector, Comparison of 2004 and 2005		
	Output	
Sector	2004	2005
Agriculture	$1,553,836,160	$1,794,109,056
Mining	$612,409,472	$634,884,992
Construction	$4,999,219	$5,723,917
Manufacturing	$17,525,110,784	$20,046,708,736
Transportation, Communication, Utilities	$391,299,520	$454,680,992
Retail and Wholesale Trade	$529,759,104	$689,694,464
Finance, Insurance, Real Estate	$152,917,152	$181,780,064
Services	$1,959,047,659	$2,164,645,824
Total	$22,729,379,070	$25,972,228,045
	Employment	
	2004	2005
Agriculture	11,530	14,270
Mining	1,780	1,863
Construction	8	6
Manufacturing	96,814	100,348
Transportation, Communication, Utilities	3,663	4,116
Retail and Wholesale Trade	5,382	5,568
Finance, Insurance, Real Estate	2,614	2,780
Services	23,154	25,195
Total	144,944	154,147
	Compensation	
	2004	2005
Agriculture	$342,135,648	$437,044,128
Mining	$145,096,208	$148,742,928
Construction	$395,829	$368,455
Manufacturing	$4,637,560,832	$4,962,042,368
Transportation, Communication, Utilities	$208,758,032	$233,997,280
Retail and Wholesale Trade	$252,744,736	$275,616,448
Finance, Insurance, Real Estate	$71,216,608	$77,673,416
Services	$618,309,504	$691,040,256
Total	$6,276,217,397	$6,826,525,279

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 3-4, which shows that the forestry industry is the third largest industry sector in Georgia, behind food processing and textiles, and exceeding industries such as transportation equipment.

Table 3-4: Comparison of Georgia Industries 2005		
Sector	**Employment**	**Wages & Salaries**
Food Processing	72,612	$2,783,868,279
Forestry Industry	67,694	$2,673,104,764
Textiles	75,255	$2,443,653,242
Transportation Equipment	46,228	$2,398,616,545
Chemicals	21,067	$1,149,183,174
Machinery	24,457	$998,240,612
Printing	20,791	$876,206,298
Computers and Electronic Products	13,260	$840,675,611
Apparel	7,743	$203,440,262

Source: Georgia Department of Labor

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 flow of resources into and out of it. 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 are available to be spent 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 of 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 (103 using employment and 101 using 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

	Percentage of County Direct Forestry:	
	Employment	**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%

Source: Georgia Tech's Enterprise Innovation Institute

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

	Number of Counties Based On:	
	Employment	**Wages & Salaries**
Critically Dependent	19	14
Very Dependent	18	17
Moderately Dependent	20	26
Somewhat Dependent	49	42
Not Dependent	53	60
Total	159	159

Source: Georgia Tech's Enterprise Innovation Institute

Figure 4-1

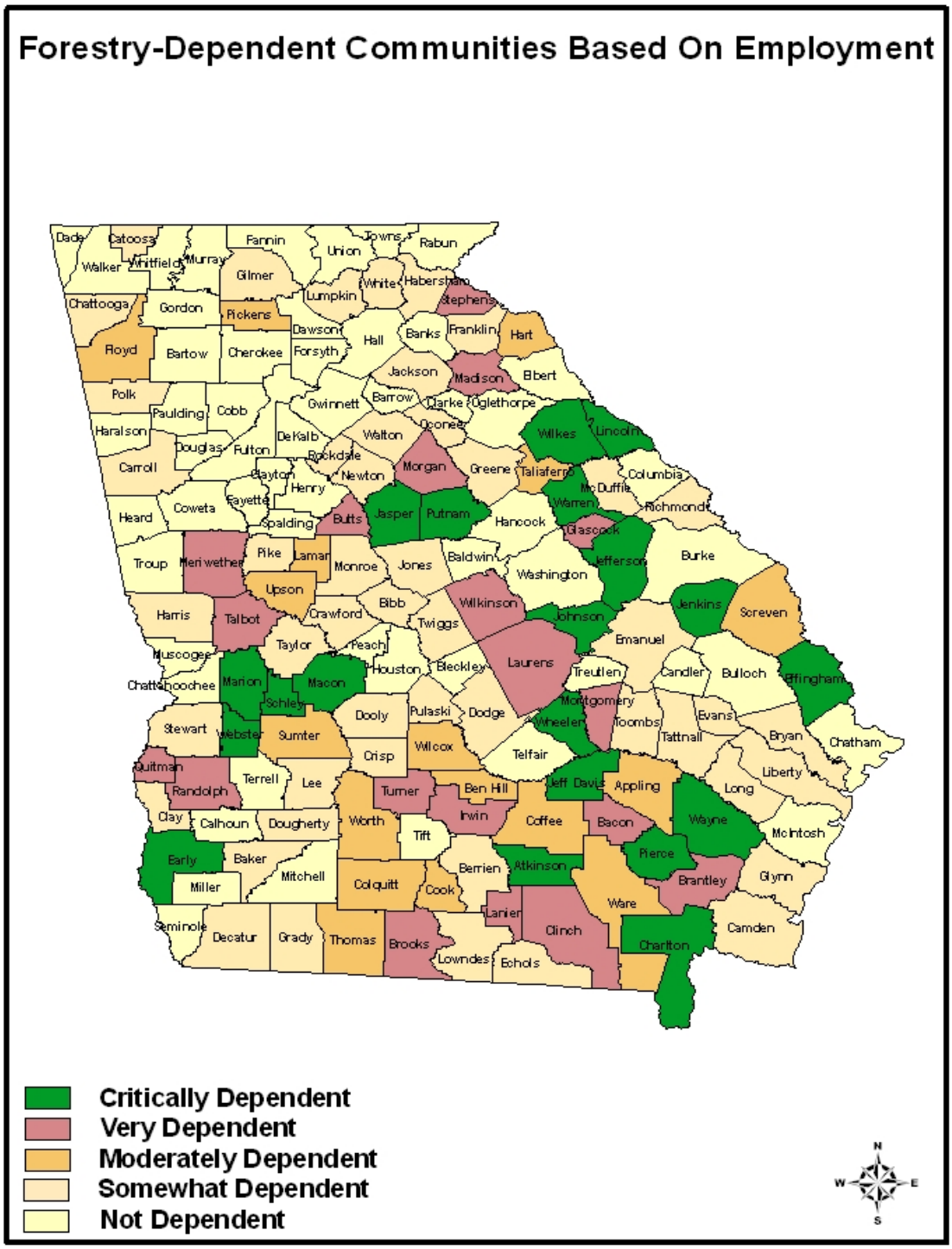

Forestry-Dependent Communities Based On Employment
Critically Dependent
Very Dependent
Moderately Dependent
Somewhat Dependent
Not Dependent
N
W
E
S

Figure 4-2

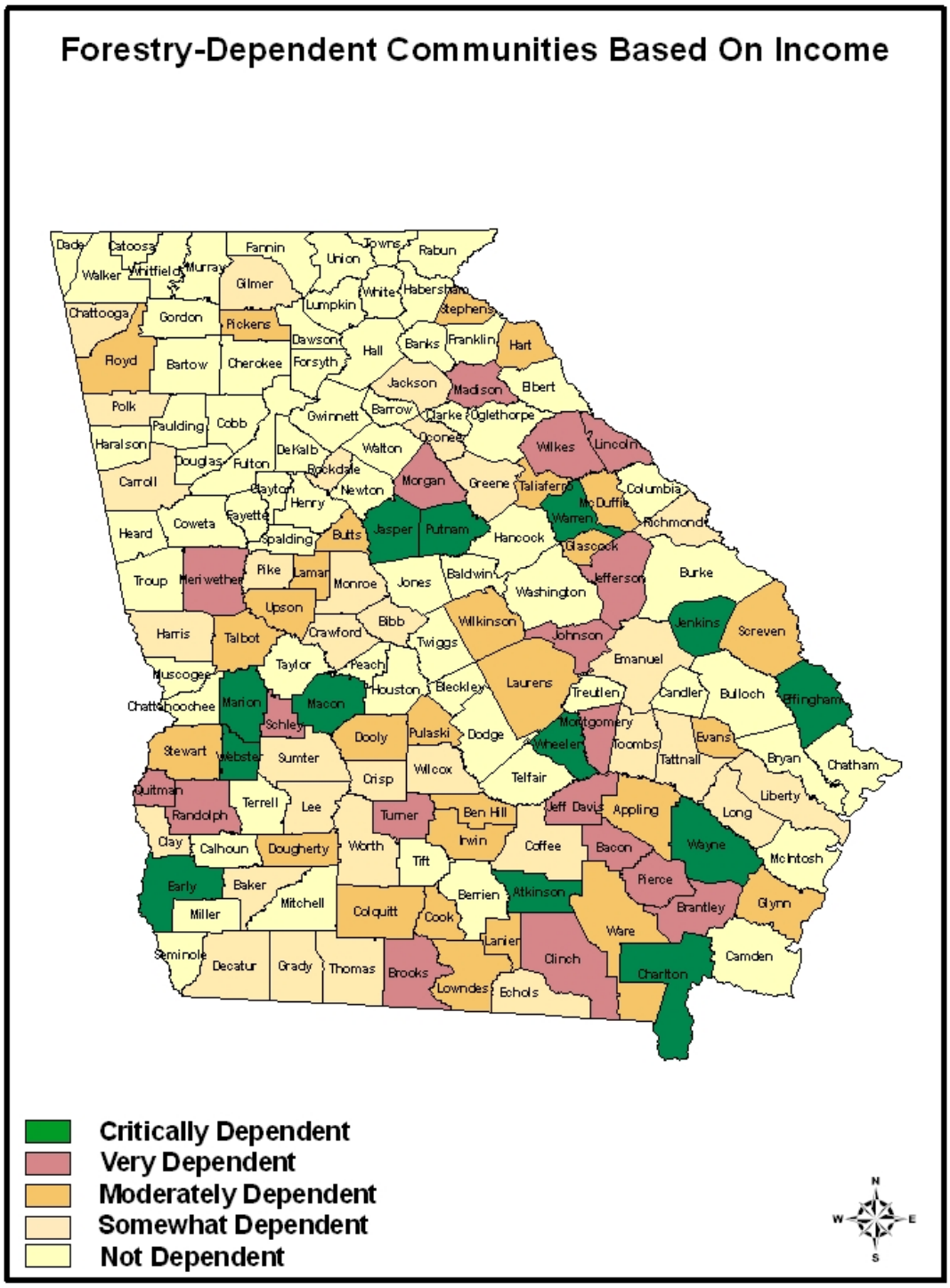

Forestry-Dependent Communities Based On Income
Critically Dependent
Very Dependent
Moderately Dependent
Somewhat Dependent
Not Dependent
N
W
E
S

Table 4-3: Level and Percent of Forestry in County Economies Based on Employment and Income

County	Level of Forestry: Employment	Level of Forestry: Wages and Salaries	Percent of Forestry to Total: Employment	Percent of Forestry to Total: Wages and Salaries
Appling	367	$14,180,561	5.5%	6.9%
Atkinson	626	$20,062,317	34.9%	44.7%
Bacon	371	$11,113,251	9.9%	12.7%
Baker	16	$382,760	2.8%	2.8%
Baldwin	278	$5,671,447	1.4%	1.1%
Banks	46	$1,247,916	1.2%	1.3%
Barrow	170	$7,365,542	1.2%	1.7%
Bartow	346	$9,359,073	1.0%	0.9%
Ben Hill	403	$12,555,241	4.8%	5.6%
Berrien	107	$2,661,331	2.1%	2.0%
Bibb	1742	$85,904,294	2.0%	3.0%
Bleckley	40	$1,060,215	1.1%	1.0%
Brantley	201	$6,015,882	9.5%	12.1%
Brooks	248	$8,945,288	8.1%	12.6%
Bryan	98	$3,369,298	1.8%	2.4%
Bulloch	343	$11,223,584	1.5%	1.9%
Burke	37	$900,393	0.6%	0.4%
Butts	535	$14,714,496	8.1%	8.0%
Calhoun	16	$705,952	1.0%	2.1%
Camden	281	$9,216,135	1.8%	2.1%
Candler	27	$652,699	0.8%	0.9%
Carroll	985	$41,644,952	2.8%	3.9%
Catoosa	371	$9,248,922	2.4%	2.2%
Charlton	459	$13,962,323	18.4%	22.4%
Chatham	1718	$100,267,339	1.3%	2.2%
Chattahoochee	1	$21,840	0.1%	0.1%
Chattooga	174	$5,351,873	2.5%	2.9%
Cherokee	666	$19,308,841	1.5%	1.4%
Clarke	557	$21,288,777	0.9%	1.0%
Clay	22	$440,503	2.9%	2.5%
Clayton	489	$24,621,106	0.4%	0.6%
Clinch	217	$6,896,662	8.9%	11.3%
Cobb	2765	$113,979,035	0.9%	0.8%
Coffee	821	$20,831,310	4.1%	4.3%
Colquitt	875	$19,514,900	5.8%	5.4%
Columbia	404	$13,630,369	1.5%	1.7%
Cook	226	$6,600,557	4.5%	6.2%
Coweta	213	$6,232,573	0.7%	0.7%
Crawford	35	$1,165,699	2.4%	3.5%
Crisp	181	$5,366,221	2.0%	2.5%

Dade	19	$633,934	0.5%	0.7%
Dawson	39	$1,190,292	0.6%	0.8%
Decatur	412	$10,378,503	3.8%	3.9%
DeKalb	2377	$100,945,862	0.8%	0.8%
Dodge	119	$2,980,399	1.8%	1.9%
Dooly	139	$6,069,883	3.8%	6.9%
Dougherty	1594	$90,412,747	3.0%	5.3%
Douglas	100	$3,315,040	0.3%	0.3%
Early	844	$59,087,931	17.3%	35.6%
Echols	14	$506,572	1.7%	3.5%
Effingham	1662	$94,746,550	19.4%	35.0%
Elbert	47	$1,285,564	0.7%	0.7%
Emanuel	178	$6,653,011	2.3%	3.5%
Evans	175	$6,899,248	3.6%	5.6%
Fannin	55	$1,053,944	1.0%	0.8%
Fayette	466	$22,771,422	1.2%	1.7%
Floyd	1932	$86,368,781	4.5%	6.1%
Forsyth	686	$25,664,832	1.5%	1.5%
Franklin	210	$4,984,972	2.6%	2.3%
Fulton	3325	$154,189,272	0.4%	0.4%
Gilmer	261	$6,675,467	3.0%	3.1%
Glascock	38	$926,438	6.9%	5.9%
Glynn	1095	$70,090,006	2.8%	5.7%
Gordon	125	$3,113,793	0.5%	0.5%
Grady	246	$5,505,239	3.9%	3.6%
Greene	155	$4,204,616	3.0%	3.1%
Gwinnett	3408	$118,510,770	1.0%	0.9%
Habersham	299	$6,910,753	1.9%	1.6%
Hall	991	$35,631,487	1.4%	1.6%
Hancock	15	$313,217	1.0%	1.0%
Haralson	17	$359,657	0.2%	0.2%
Harris	117	$3,389,886	2.4%	3.3%
Hart	340	$14,185,768	4.7%	7.3%
Heard	29	$997,589	1.2%	1.1%
Henry	418	$14,744,686	1.0%	1.1%
Houston	355	$12,965,194	0.7%	0.7%
Irwin	181	$4,651,296	7.1%	7.8%
Jackson	446	$22,614,702	2.4%	4.2%
Jasper	723	$25,513,292	26.5%	34.3%
Jeff Davis	592	$16,298,733	12.3%	13.6%
Jefferson	638	$22,477,081	11.4%	14.9%
Jenkins	472	$12,495,394	17.9%	19.3%
Johnson	242	$6,252,281	11.7%	11.8%
Jones	60	$1,478,263	1.8%	1.8%
Lamar	173	$6,794,902	5.2%	7.1%
Lanier	80	$1,779,821	6.2%	6.0%
Laurens	1242	$57,068,240	6.0%	9.6%
Lee	120	$3,666,368	2.5%	3.0%
Liberty	442	$22,276,530	2.5%	4.7%
Lincoln	163	$5,015,300	10.2%	14.4%

Long	36	$592,127	3.8%	3.3%
Lowndes	1586	$63,076,492	3.1%	5.0%
Lumpkin	118	$2,231,988	1.9%	1.3%
McDuffie	279	$13,644,220	3.4%	6.4%
McIntosh	5	$83,636	0.2%	0.2%
Macon	417	$23,827,888	10.3%	21.0%
Madison	286	$10,827,065	7.4%	11.0%
Marion	271	$7,461,019	15.9%	18.7%
Meriwether	405	$15,822,632	7.5%	10.9%
Miller	4	$78,880	0.2%	0.2%
Mitchell	84	$1,548,353	0.7%	0.7%
Monroe	207	$6,977,845	3.7%	4.4%
Montgomery	143	$4,485,873	7.8%	10.0%
Morgan	505	$20,650,241	7.8%	11.7%
Murray	124	$3,184,209	1.0%	0.9%
Muscogee	578	$19,106,309	0.6%	0.6%
Newton	364	$14,924,026	1.8%	2.2%
Oconee	155	$5,552,671	1.9%	2.4%
Oglethorpe	25	$464,251	1.5%	1.2%
Paulding	162	$5,903,599	0.9%	1.2%
Peach	8	$244,256	0.1%	0.1%
Pickens	309	$12,540,062	4.6%	6.4%
Pierce	444	$13,685,755	10.4%	13.1%
Pike	68	$1,463,064	2.8%	2.4%
Polk	332	$12,033,938	2.8%	3.7%
Pulaski	82	$4,285,802	2.7%	5.1%
Putnam	987	$32,037,130	13.6%	16.5%
Quitman	46	$1,726,680	9.3%	14.3%
Rabun	46	$1,062,745	0.7%	0.6%
Randolph	219	$6,451,274	9.5%	11.4%
Richmond	2190	$113,411,606	1.9%	3.2%
Rockdale	1231	$53,162,832	3.6%	4.8%
Schley	178	$5,274,821	13.2%	13.8%
Screven	221	$5,757,480	5.5%	5.7%
Seminole	4	$110,641	0.2%	0.2%
Spalding	250	$8,606,555	1.0%	1.3%
Stephens	741	$22,094,027	7.6%	8.2%
Stewart	35	$1,201,981	3.4%	5.5%
Sumter	620	$14,269,903	4.8%	4.2%
Talbot	63	$1,430,512	7.4%	6.3%
Taliaferro	12	$379,176	4.9%	7.5%
Tattnall	169	$4,398,422	2.9%	3.3%
Taylor	44	$671,178	2.3%	1.3%
Telfair	60	$1,047,843	1.4%	1.2%
Terrell	29	$643,992	1.2%	1.1%
Thomas	1310	$34,681,008	5.4%	5.0%
Tift	305	$9,199,719	1.3%	1.6%
Toombs	265	$7,673,163	2.3%	2.8%
Towns	7	$167,376	0.4%	0.4%
Treutlen	9	$265,733	0.3%	0.4%

Troup	362	$10,798,517	1.1%	1.1%
Turner	215	$5,856,936	8.1%	10.2%
Twiggs	39	$1,014,901	2.9%	2.2%
Union	23	$484,779	0.4%	0.3%
Upson	354	$11,760,010	4.3%	5.5%
Walker	28	$657,012	0.2%	0.2%
Walton	353	$12,598,343	1.9%	2.2%
Ware	867	$24,131,560	5.6%	6.1%
Warren	313	$9,687,095	21.6%	25.4%
Washington	84	$2,774,885	1.0%	1.1%
Wayne	1192	$72,248,949	12.9%	26.6%
Webster	227	$6,784,505	42.3%	50.5%
Wheeler	190	$5,234,055	16.0%	17.7%
White	178	$3,475,290	2.7%	2.1%
Whitfield	793	$23,573,288	1.2%	1.1%
Wilcox	60	$928,237	4.6%	3.1%
Wilkes	434	$10,873,465	12.1%	12.5%
Wilkinson	215	$5,306,146	7.0%	5.2%

Source: Georgia Department of Labor (ES202) and Georgia Tech's Enterprise Innovation Institute

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