Economic Impact of the Texas Forest Sector, 2007

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HIGHLIGHTS 2007

- The Texas forest sector directly contributed $19.4 billion of industry output to the Texas economy, employing over 78,350 people with a payroll of $4.4 billion.
- Including direct, indirect, and induced impacts, the Texas forest sector had a total economic impact of $33.6 billion in industry output, supporting approximately 166,071 jobs with $8.6 billion in labor income.
- On average, every dollar generated in the Texas forest sector contributed an additional 73 cents to the rest of the Texas economy.
- Every job created in the sector resulted in another 1.1 jobs in the state.
- Texas forest landowners received an estimated stumpage revenue of $496.9 million.
- Secondary forest products manufacturing industries contributed two-thirds of the Texas forest sector's direct industry output and employed 77.2 percent of the forest sector workforce.
- North Central Texas generated 39.8 percent of direct industry output and employed 40.4 percent of the workforce in the Texas forest sector.
- Eighty-four percent of industry output from forestry, logging industries and the primary solid wood products industry were from East Texas.
- The forest sector in East Texas directly produced $7.3 billion worth of goods and services, supporting 26,431 jobs with $1.6 billion in labor income.
- Nine of the top 10 counties in Texas with local economies that rely heavily on the forest sector are in East Texas.
- The Texas forest sector's direct industry output increased at an average annual growth rate of 4.2 percent from 1999 to 2007.

INTRODUCTION

Texas has more than 60 million acres of forestland — 12.1 million acres in East Texas and 48.1 million acres across the rest of the state (USDA Forest Service, 2008). Of the 60 million acres, timberland accounts for 24.3 percent, or about 14.6 million acres, and the majority of it — around 82 percent — is located in East Texas. Figure 1 shows the forest coverage ratio across the state.

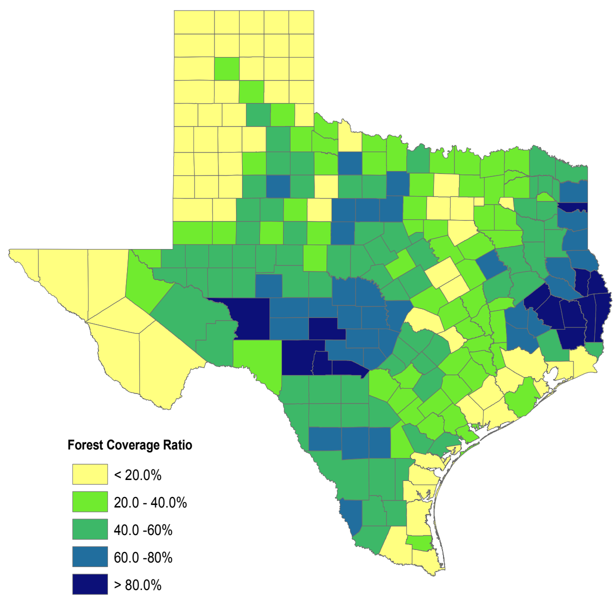


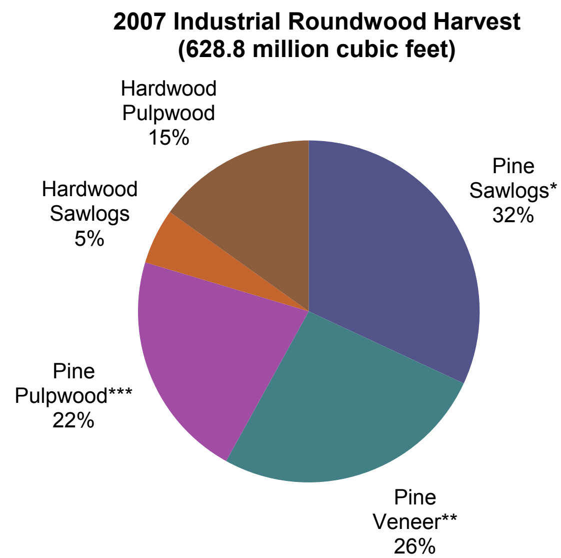
Figure 1. Forest coverage ratio in Texas

Individuals and family forest owners control the largest share — 7.9 million acres, or 66 percent — of timberland in East Texas. Corporate landowners and investors (Timberland Investment Management Organizations and Real Estate Investment Trusts) own 3.0 million acres, or 25 percent of timberland in East Texas. The remaining 8 percent is owned by federal, state or local governments.

Timberland in East Texas is dominated by two forest type groups: mixed hardwoods (43.9%) and yellow pine (42.7%). East Texas had an estimated 16.0 billion cubic feet of timber growing stock in 2007, 60.3 percent in softwoods and 39.7 percent in hardwoods.

Outside of East Texas mesquite is predominant (42.4%) on forestland. However, oak forest types are the predominant group (55.9%) on timberland. Timber growing stock outside of East Texas was estimated to be 2.3 billion cubic feet in 2007, predominantly in hardwoods which made up 87.7 percent of the total. Only 12.3 percent came from softwoods.

The industrial roundwood harvest in Texas totaled 628.8 million cubic feet in 2007 — 79.7 percent from softwoods and 20.3 percent from hardwoods (Xu, 2008). Thirty-seven percent of the harvest was sawlogs for lumber production. Roundwood harvest for veneer/panel accounted for 26.1 percent. Round wood harvest for posts, pole, pilings and paper products production accounted for 36.7 percent (Figure 2).



* includes chip-n-saw
** includes panel roundwood
*** includes posts, pole and pilings

Figure 2. Industrial roundwood harvest by product, 2007

In 2007, Texas mills produced 1.7 billion board feet of lumber, 2.8 million tons of paperboard, 2.5 billion square feet (3/8-inch basis) of structural panels and treated 45.6 million cubic feet of wood products. Primary mills generated 5.9 million tons (green) of mill residue, including chips, sawdust, shavings and bark while logging operations generated 3.4 million tons (green) of residue. There was no market pulp or paper production in Texas in 2007.

The forest sector generates major contributions to local and regional economies. In 2007, the wood-based industry continued to be one of the top 10 manufacturing sectors in the state. Texas forest landowners received an estimated stumpage revenue of $496.9 million in 2007. In 25 of the 43 East Texas counties, wood-based industries were one of the top two largest manufacturing employers. Texas was the second largest of the thirteen southern states in terms of direct employment in the forest sector and the third largest in industry output from the forest sector in 2001 (Tilley and Munn, 2007). Nationally, Texas ranked fifth in terms of total output impacts (including direct, indirect and induced impacts) from the forest sector in 2001 (Hodges et al., 2005).

This study evaluates the forest sector's direct and total economic impact on both the state and local economies in 2007, as well as the trends in the past decade. The impacts are further divided to capture variations across industries and regions. The multipliers published in this study can be used to assess the economic impact of individual projects in the forest sector on regional economy.

DATA AND METHODS

The IMPLAN system, a computerized input-output modeling system, and associated 2007 databases from the Minnesota IMPLAN Group (MIG), were used in this study to estimate direct and total economic impacts of the Texas forest sector in 2007. The multipliers used in this study are type SAM (Social Accounting Matrix) multipliers, which capture the total economic impact of economic sectors including direct, indirect and induced effects. The databases used by the IMPLAN system were compiled by MIG based on data from various U.S. federal agencies such as Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, Department of Agriculture and Geological Survey (MIG, Inc. 2000). All values estimated here unless stated otherwise are in **2007 constant** dollars.

The Texas forest sector is divided into six industries: forestry, logging, primary solid wood products, secondary solid wood products, primary paper and paperboard products, and secondary paper and paperboard products. Each industry includes several IMPLAN sectors as defined by MIG in the Appendix. Consistent with previous studies, IMPLAN sector 101 "Manufactured home (mobile home)" is excluded from the secondary solid wood products.

RESULTS

STATEWIDE IMPACTS

The Texas forest sector directly produced $19.4 billion of industry output (Table 1) in 2007. Value-added accounted for 33.0 percent, or $6.4 billion, of the industry output. Note that value-added is the contribution of industries to the state's output, also known as Gross State Product (GSP). It equals industrial output minus intermediate inputs.

Compared to 2004 (Xu, 2006), the 2007 industry output of the Texas forest sector increased 4.3 percent with most boost coming from solid wood products manufacturing industries. The Texas forest sector employed 78,358 workers and paid $4.4 billion in wages, salaries, and benefits in the same year. The sector's average labor compensation was $55,682 in 2007, which is $7,216 higher than the state average across all sectors[1]. Compared to 2004, the total employment of the Texas forest sector in 2007 increased 3.3 percent.

The impacts of the forest sector are transferred to other sectors of the economy through purchasing inputs from other sectors in the state as well as household income and institutions spending with subsequent rounds of additional spending. Including direct, indirect and induced effects, the Texas forest sector contributed $33.6 billion in industry output to the state economy in 2007. Value-added was $14.1 billion, or 42.0 percent of the total industry output. The Texas forest sector generated 166,071 jobs and created $8.6 billion in labor income. These impacts were estimated based on type SAM multipliers for output, value-added, employment and labor income in Table 1[2].

Compared to 2004, the total economic impact of the Texas forest sector in 2007 increased 3.0 percent in industry output. On average, every dollar generated in the Texas forest sector contributed an additional 73 cents to the rest of the Texas economy. Every job created in the Texas forest sector resulted in another 1.1 jobs in the state economy.

Table 1. Direct and total economic impacts of the Forest Sector, 2007

	Sub-industry	Industry Output (million $)	Value-Added (million $)	Employment (jobs)	Labor Income (million $)
Direct Impact					
	Forestry	839.52	552.45	1,650	111.73
	Logging	1,083.47	613.48	4,486	187.34
	Primary Solid Wood Products	2,369.95	800.94	8,421	468.94
	Secondary Solid Wood Products	6,254.28	2,072.31	44,184	1,712.84
	Primary Paper & Paperboard Products	2,612.44	743.93	3,335	501.17
	Secondary Paper & Paperboard Products	6,273.76	1,636.70	16,282	1,381.16
	Grand total	**19,433.42**	**6,419.82**	**78,358**	**4,363.18**
Total Impact					
	Forestry	1,194.98	780.34	6,277	266.30
	Logging	1,558.12	882.56	7,608	319.54
	Primary Solid Wood Products	4,264.43	1,834.06	19,072	965.62
	Secondary Solid Wood Products	11,641.82	4,913.25	78,053	3,345.60
	Primary Paper & Paperboard Products	5,025.48	2,026.71	16,088	1,182.19
	Secondary Paper & Paperboard Products	9,934.41	3,628.47	38,973	2,547.71
	Grand total	**33,619.24**	**14,065.39**	**166,071**	**8,626.96**
SAM Multiplier					
	Forestry	1.42	1.41	3.80	2.38
	Logging	1.44	1.44	1.70	1.71
	Primary Solid Wood Products	1.80	2.29	2.26	2.06
	Secondary Solid Wood Products	1.86	2.37	1.77	1.95
	Primary Paper & Paperboard Products	1.92	2.72	4.82	2.36
	Secondary Paper & Paperboard Products	1.58	2.22	2.39	1.84
	Grand total	**1.73**	**2.19**	**2.12**	**1.98**

IMPACTS BY INDUSTRY

Economic contribution varied across industries in the Texas forest sector. The secondary solid wood products manufacturing industry generally had the greatest impacts in terms of industrial output, value-added, employment, and labor income.

The secondary solid wood products and secondary paper and paperboard products manufacturing sectors were the largest two industries in the Texas forest sector during 2007. Each accounted for about 32 percent of the total direct industrial output, or \$6.3 billion each. Primary wood products manufacturing sectors (solid wood products and paper and paperboard products) fell in the second tier, each contributing about 13 percent — \$2.5 billion — to the total industrial output. The forestry and logging sectors each accounted for about 5 percent — \$0.9 billion — in terms of industrial output.

The majority of the forest sector workforce — 44,184 workers — was employed in the secondary solid wood products manufacturing sector. The secondary paper and paperboard products manufacturing sector employed about 16,282 workers, accounting for 20.8 percent of the total direct employment of the forest sector. Figure 3 shows the direct economic impact of the forest sector by industry. The size of the bubbles represents the magnitude of industry output.

Overall, the primary paper and paperboard manufacturing, and the primary and secondary solid wood products manufacturing industries had slightly to moderately higher SAM multipliers than other industries, indicating local economies benefited slightly more from these industries than other industries in the forest sector. The primary paper and paperboard products manufacturing industry had the highest multiplier in employment. Every job in the primary paperboard industry created an additional 3.8 jobs in Texas.

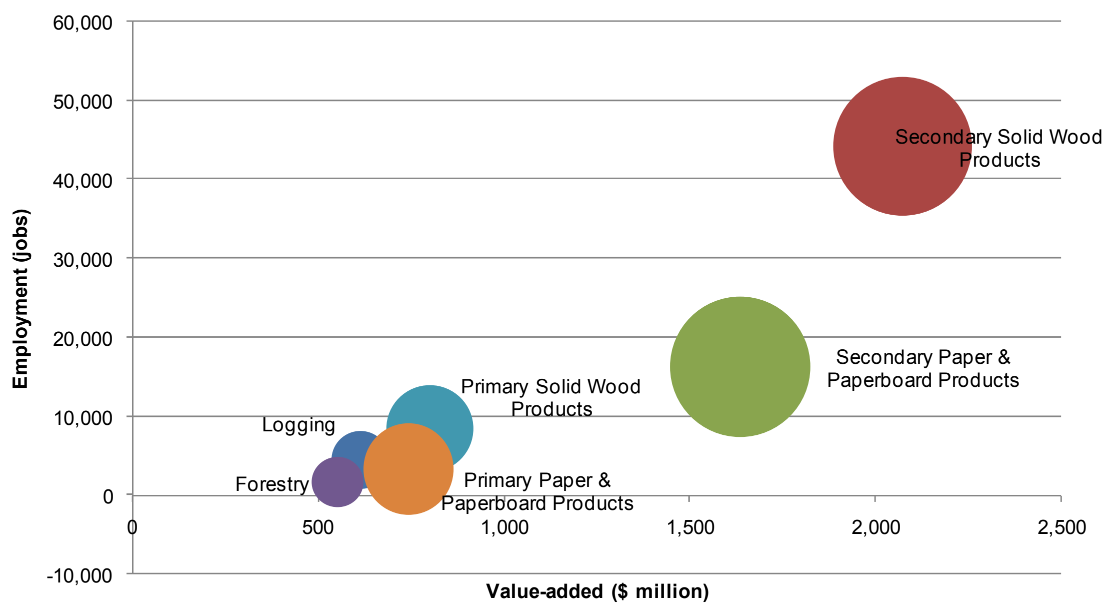


Figure 3. Direct economic impacts of the Texas forest sector by industry, 2007

IMPACTS BY REGIONS

The economic impact of the forest sector varied substantially across the state's seven regions: Northeast, Southeast, North Central, Northwest, South, West and West Central (Figure 4).

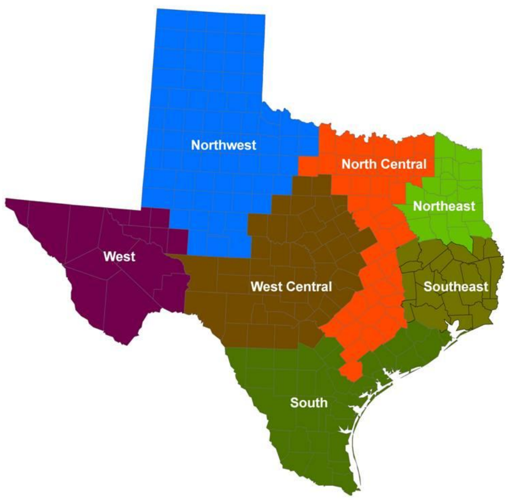


Figure 4. Regions in Texas

Table 2 shows how the Texas forest sector impacted each region. The impact also is presented by industry for Northeast and Southeast Texas due to the potentially great interest in this area.

In absolute terms, North Central Texas had the greatest direct economic impact in 2007. The forest sector in North Central Texas contributed 39.8 percent — or \$7.7 billion — of the industry output and employed 40.4 percent of total workers — or 31,653 people — in the Texas forest sector. This is mainly due to the concentration of secondary products and primary paperboard products manufacturing firms in this region. Including direct, indirect and induced impacts, the forest sector in this region had a total effect of approximately \$13.3 billion in industry output, \$5.2 billion in value-added and employed 67,092 people.

Table 2. Direct impact of the Texas forest sector by region, 2007

Texas Region	Industry Output (million $)	Value-Added (million $)	Employment (jobs)	Labor Income (million $)
Northeast	2,109.53	750.51	9,072	387.73
Forestry	151.67	99.09	332	18.48
Logging	430.66	243.85	1,725	74.48
Primary Solid Wood Products	554.34	140.93	2,064	78.50
Secondary Solid Wood Products	521.79	169.25	3,655	129.84
Primary Paper & Paperboard Products	58.66	15.47	77	10.49
Secondary Paper & Paperboard Products	392.40	81.92	1,220	75.94
Southeast	5,227.75	2,010.19	17,359	1,171.45
Forestry	328.91	214.22	547	39.27
Logging	635.42	359.79	2,698	109.82
Primary Solid Wood Products	1,507.29	558.84	5,143	329.77
Secondary Solid Wood Products	885.49	333.73	5,809	256.89
Primary Paper & Paperboard Products	1,255.08	300.73	1,720	202.53
Secondary Paper & Paperboard Products	615.56	242.89	1,442	233.18
North Central	7,731.36	2,365.66	31,653	1,847.35
Northwest	558.05	152.78	2,037	88.86
South	683.90	207.17	3,215	136.50
West	437.51	103.44	1,933	93.80
West Central	2,685.33	830.08	13,089	637.50
Total	19,433.42	6,419.81	78,358	4,363.18

East Texas — the second largest region — had about 37.8 percent of direct industrial outputs ($7.3 billion) and employed 33.8 percent of total workers (26,431) in the sector, mainly from the primary solid wood products manufacturing firms and logging industries in the region. Over two-thirds of all forestry and logging industries and the great majority of the primary forest product manufacturing industries in Texas are in East Texas. The output from the primary solid wood products industry in East Texas accounted for 87.0 percent of all primary solid wood manufacturing in Texas. The forest sector in East Texas had a total economic impact of $12.7 billion in total industry output, $6.1 billion in value-added, and 56,031 jobs to the state economy.

West Central Texas produced 13.8 percent of the total industry output (around $2.7 billion) from the Texas forest sector in 2007. The region's shares of the total Texas forest sector's employment, value-added and labor income were all around 15 percent. Most of the outputs in this region were from the secondary forest products industries. The remaining three regions (Northwest, South and West) played minor roles in the Texas forest sector.

Nine of the top 10 counties with local economies that relied heavily on forest industries were from the East Texas area. Jasper County in Southeast Texas was No.1. In 2007, 43.5 percent of the county's direct industry output and 28.0 percent of labor income were from the forest sector with 12.1 percent of the workforce employed in the sector. Lamar county (North Central) was the only county outside of the region on the top 10 list. Figure 5 shows the dependence of local economies on the forest sector by looking at the ratio of employment in the forest sector to total employment by county in Texas.

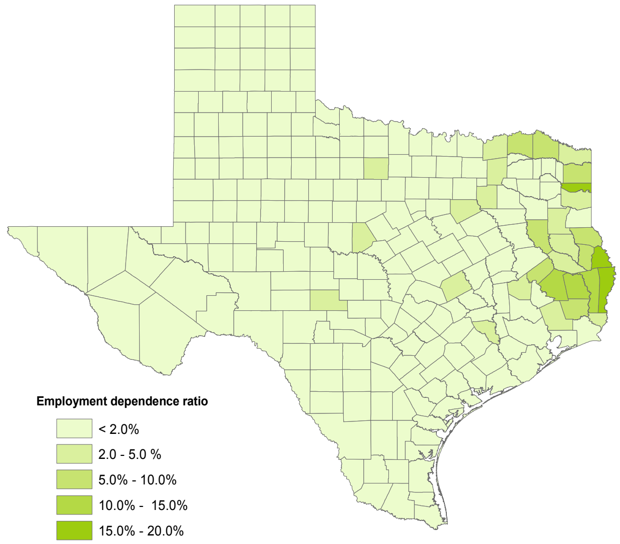


Figure 5. Employment dependence ratio by county in Texas, 2007

TRENDS OF IMPACTS

Compared to 1999 (Xu, 2002), the Texas forest sector increased $5.4 billion in direct industry output and $1.4 billion in value-added (Figure 6). This represents an average annual growth rate between 1999 and 2007 of 4.2 percent in industry output and 3.1 percent in value-added. Although employment decreased slightly, the sector payroll grew consistently between 1999 and 2007. Total economic impacts of the forest sector to the state economy increased $9.7 billion in industry output, $4.0 billion in value-added, and $2.1 billion in payroll.

During the nine-year period, most industries in the sector saw increases in direct industry output except the primary paper and paperboard manufacturing, which saw a slight decrease.

Although the total direct employment of the Texas forest sector remained at roughly the same level during the period, changes in employment varied by industry. Employment in the secondary solid wood products manufacturing and logging sectors consistently grew over the nine-year period while the workforce shrank in the others (Figure 7). These adjustments were made mainly because of changes in market demand and competition. Firms have to improve their productivity to keep competitive in the market. The output to employment ratio, a measure of labor productivity, has been improving for all industries over the same time period.

There also have been some significant changes in the East Texas forest sector. Compared to 2004, the 2007 direct industry output of the East Texas forest sector increased 2.1 percent, lower than the state's average growth rate in the forest sector. Meanwhile, direct employment in the East Texas forest sector decreased 2.2 percent, mostly in the primary paper and paperboard manufacturing industry. East Texas' share of output from the primary paper and paperboard products manufacturing dropped to 50.0 percent from 74.3 percent in 2004. In 2007, 22 percent of the state's total direct industry output for the secondary solid wood products industry was from East Texas, down from 25.4 percent in 2004. The region's share of output from secondary paper and paperboard products industry increased slightly.

Figure 6. Direct economic impacts of the Texas forest sector, 1999-2007

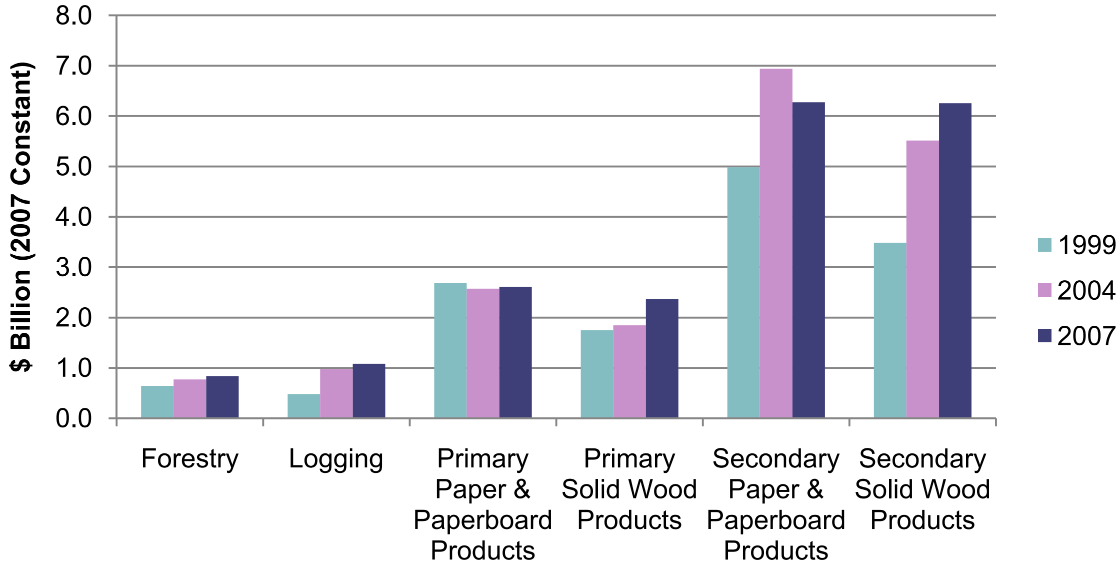


Figure 7. Direct industry output of the Texas forest sector, 1999–2007

CONCLUSION

The Texas forest sector plays an important role in the state economy. During the past decade, the wood-based industry has remained one of the top 10 manufacturing sectors in the state. In 25 of the 43 East Texas counties, the forest sector served as one of the top two largest manufacturing employers. In 2007, the Texas forest sector (forestry, logging, primary and secondary solid wood products manufacturing, and primary and secondary paper and paperboard manufacturing) directly contributed $19.4 billion in industry output and $6.4 billion in value-added to the state economy and supported more than 78,350 jobs with a payroll of $4.4 billion. Compared to 2004, the 2007 Texas forest sector direct industry output, value-added, employment, and labor income increased 4.3 percent, 9.9 percent, 3.3 percent and 11.2 percent, respectively.

Impacts of the forest sector are transferred to other sectors of the economy through input purchases and spending. Including direct, indirect, and induced impacts, the total economic impact of the Texas forest sector in 2007 was $33.6 billion in industry output, $14.1 billion in value-added, $8.6 billion in labor income and 166,071 jobs. On average, every job in the Texas forest sector created another 1.1 jobs in the state economy. Compared to 2004, the 2007 total economic impact of the Texas forest sector increased 3.0 percent in industry output, 6.6 percent in value-added, and 6.9 percent in labor income. There was a 4.2 percent decrease in employment.

The largest industry outputs were from secondary forest products manufacturing (wood windows/doors and mill work, wood container, wood buildings, other wood products, furniture, paperboard container, coated and treated paper and packaging materials, etc.). The primary paper and paperboard products manufacturing industry had the highest multiplier in employment. Every job in the primary paperboard industry created an additional 3.8 jobs in the Texas economy.

Over two-thirds of the forestry and logging industries and the great majority of the primary forest product manufacturing industries in Texas are in East Texas. Most of the secondary forest product manufacturing facilities in Texas are located outside of East Texas, mostly in North Central Texas.

The forest sector in East Texas produced $7.3 billion worth of goods and services in 2007. It generated $2.8 billion in value-added, 26,431 jobs, and $1.6 billion in labor income. Between 2004 and 2007, East Texas experienced significant shrinkage in the primary paper and paperboard industry, which resulted in an annual regional growth that was lower than the state average. It also led to a decrease in employment.

Between 1999 and 2007, the Texas forest sector as a whole experienced an average annual growth rate of 4.2 percent in industry output and 3.1 percent in value-added. Employment in the secondary solid wood products manufacturing and logging sectors consistently grew over the nine-year period while the workforce shrank in the other industries in the forest sector.

Note that the scope of this study is focused on the economic impacts of the forest sector. The environmental benefits of forests were not included. The economic downturn that started in late 2007 heavily affected the forest sector. This impact was not addressed in this report, but may be captured in later studies. Meanwhile, there are some emerging, non-traditional markets for forestry and forest products such as biofuel production using woody biomass, carbon credits, and other ecosystem benefits trading from sustainable forest management. These markets may provide opportunities for the Texas forest sector in the future.

ENDNOTES

1. Direct economic impacts of sub-industries are available from the Texas Forest Service upon request.
2. SAM multipliers for sub-industries are available from the Texas Forest Service upon request.

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GLOSSARY

Total industry output is the total value of production or service by industry for a given time period.

Value-added is the difference between an industry's total output and the cost of its intermediate. It consists of four components: employee compensation, proprietor income, other property income, and indirect business tax.

Employment includes full-time and part-time employees, and self-employed.

Labor income includes wages, salary and benefits of employees as well as income for self-employed individuals.

Direct effects refer to the sector's own production, value-added, employment and labor incomes.

Indirect effects refer to the economic activities in other sectors impacted by the forest sector's purchase of goods and services.

Induced effects are economic activities from consumption of goods and services using incomes generated from the direct and indirect effects.

SAM is the acronym for Social Accounting Matrices, a macro accounting system widely used by many countries for analyzing relationships of economic activities such as production, consumption and trade between various economic entities.

Direct economic impact of a sector includes only direct effects.

Total economic impact of a sector includes all three effects generated by the sector.

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APPENDIX

Definition of the Texas forest sector, 2007

Industry	IMPLAN Sector	IMPLAN Sector ID	1997 BEA Commodity	NAICS 2007
Forestry				
	Forestry- forest products- and timber tracts	15	113A00	1131-2
	Hunting and trapping on forestlands	18 (partial)	114200 (partial)	1142 (partial)
	Forestry support activities	19 (partial)	115000 (partial)	115 (partial)
Logging				
	Commercial logging	16	113300	1133
Primary Solid Wood Products				
	Sawmills and wood preservation	95	321113-4	321113-4
	Reconstituted wood product manufacturing	98	321219	321219
	Veneer and plywood manufacturing	96	32121A	321211-2
Secondary Solid Wood Products				
	Engineered wood member and truss manufacturing	97	32121B	321213-4
	Wood windows and doors and millwork	99	321911	32191
	Wood container and pallet manufacturing	100	321920	32192
	Prefabricated wood building manufacturing	102	321992	321992
	Miscellaneous wood product manufacturing	103	321999	321999
	Wood kitchen cabinet and countertop manufacturing	295	337110	33711
	Upholstered household furniture manufacturing	296	337121	337121
	Nonupholstered wood household furniture manufacturing	297	337122	337122
	Wood television/radio/sewing machine cabinet manufacturing	300	337129	337129
	Institutional furniture manufacturing	299	337124-5,7,9	337127
	Office furniture and custom architectural woodwork	301	337211-2	337211-2, 337214
	Showcases, partitions, shelving, and lockers	302	337215	337215
Primary Paper & Paperboard Products				
	Pulp mills	104	322110	32211
	Paper mills	105	3221A0	32212
	Paperboard mills	106	3221A0	32213
Secondary Paper & Paperboard Products				
	Paperboard container manufacturing	107	322210	32221
	Coated and laminated paper and packaging materials	108	32222A	322221-2
	All other paper bag and coated and treated paper	109	32222B	322223-6
	Stationery product manufacturing	110	322232-3	32223
	Sanitary paper product manufacturing	111	322291	322291
	All other converted paper product manufacturing	112	322299	322299

Source: Minnesota IMPLAN Group, 2008.