



Economic Impact of the Texas Forest Sector

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INTRODUCTION

The forest sector is important to the Texas economy, especially in East Texas where most of the state's commercial forests are located. In 1999, Texas produced 699 million cubic feet of timber. Timber stumpage value was \$606 million and the delivered value was \$1.06 billion. In 1999, Texas produced 1.51 billion board feet of lumber, 3.26 billion square feet of structural panel, and 3.22 billion tons of pulp and paper products. The Texas forest sector also produces many value-added forest products such as millwork, wood kitchen cabinets, prefabricated wood buildings, wood furniture, and various paper products.

This study evaluates the forest sector's direct and total impacts in 1999 to the overall Texas economy in terms of total industry output, value-added, employment, and labor income. **Total industry output** is the total value of production by industry for a given time period. **Value-added** 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. The economic activities in one sector have three kinds of effects to the over all economy: direct effects, indirect effects, and induced effects. The *direct effects* refer to the sector's own production, value-added, employment and labor incomes. The *indirect effects* refer to the economic activities in other sectors impacted by the forest sector's purchase of goods and services. The *induced effects* are economic activities from consumption of goods and services using incomes generated from the direct and indirect effects. While **direct economic impact** of a sector includes only direct effects, **total economic impact** of a sector includes all three effects generated by the sector.

Since most of the commercial forestland base and primary wood product manufacturing activities are in East Texas (Figure 1), this study also estimates the impact of the forest sector in this region to the East Texas economy.

METHODS

This study uses the input-output method to estimate the direct and total economic impact of the Texas forest sector in 1999. The input-output method, an empirical tool introduced by Wassily Leontief in the late 1930s, is designed to measure the interdependencies of industries in the economy. The input-output analysis can be used to analyze the impact of changes of economic activities (demand or production) in one sector of the economy to other sectors of the economy.

The IMPLAN system, a computerized input-output modeling system, and associated databases were utilized for estimating the direct and total economic impact of the Texas forest sector. The IMPLAN system was developed by the U.S. Forest Service in the early 1980s in response to the need for economic analyses of national forest management plans. The system was later transferred to the private sector and is now maintained by the Minnesota IMPLAN Group (MIG). For any region, the IMPLAN system creates an input-output model that estimates the impacts of the sector of interest to the regional economy by using the input-output relationships among sectors and deriving multipliers for output, value-added, employment, and labor income of the sector. The multipliers used in this study are type SAM multipliers¹. The type SAM multipliers capture the total economic impact of economic sectors including direct, indirect and induced effects. The databases used by the IMPLAN system were compiled by the MIG based on data from various US governmental agencies such as Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, Department of Agriculture, and Geological Survey. The IMPLAN databases consist of the following components: employment, industry output, value added, final demands, national structural matrices, and inter-institutional transfers (MIG, Inc. 2002). The data set used in this study is for 1999. All values estimated here are in 1999 dollars.

The Texas forest sector is divided into six sub-industries, including forestry, logging, primary solid wood products, secondary solid wood products, primary paper & paperboard products, and secondary paper & paperboard products. Each sub-industry

¹ 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.

includes several IMPLAN sectors as defined by the MIG in Table 1. Most of the IMPLAN sectors are self-explanatory, with the exception of sector 22, forest products, and sector 24, forestry products. The two sectors have the same economic activities, such as producing seeds, seedlings, planting trees, growing stumpage, hunting leases and other by-products of forestry. However, sector 24 reports these activities from firms that are principally engaged in stumpage production, while sector 22 includes activities from farms, where stumpage production is not their primary economic function.

The direct and total economic impacts for industry output, value added, employment and labor income are estimated for East Texas and Texas for 1999. The estimated economic impacts from the input-output models were analyzed for consistency with data from other sources, such as data from *Harvest Trends* and *Texas Timber Price Trends* published by the Texas Forest Service. Economic activities in sector 24 are underestimated in the IMPLAN databases due to difficulties in collecting data from small landowners. The output of sector 24 in East Texas was therefore adjusted based on the stumpage values of timber harvested in East Texas from *Harvest Trends, 1999*. Proprietary income, other property income, and indirect business tax of the sector were adjusted proportionally to output. Employee compensation and employment of sector 24 remained unchanged. Since there is little commercial forest outside of East Texas, the direct economic impact of sector 24 for Texas was adjusted to be the same as that in East Texas. Some non-forest based economic activities such as hunting leases on non-forestland outside of East Texas that was originally a part of sector 24 were excluded.

RESULTS

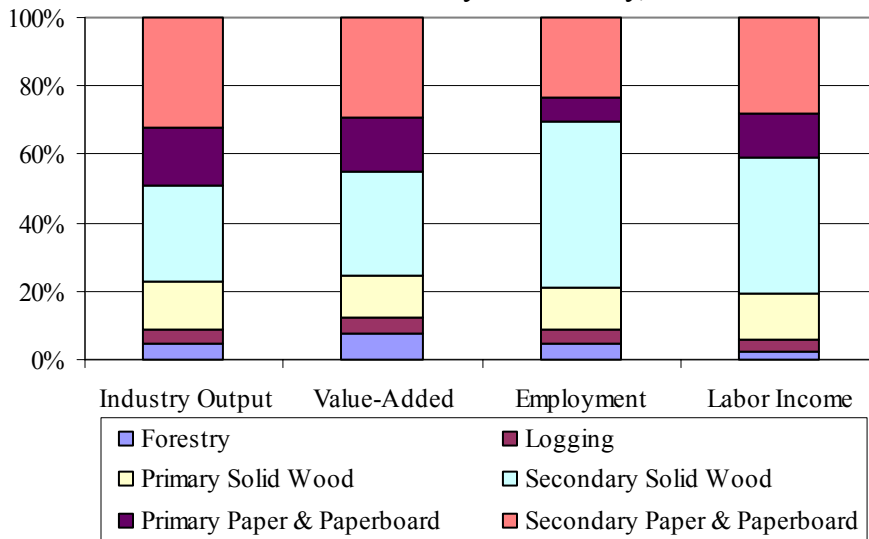
Direct Economic Impact of the Texas Forest Sector

The direct economic impact of the Texas forest sector in 1999 is reported in Table 2. The Texas forest sector produced \$12.9 billion of industry outputs, \$4.6 billion of which were value-added. It employed 79,500 workers and paid \$2.9 billion wages, salaries and benefits in the same year.

As illustrated in Figure 2, the six sub-industries showed somewhat consistent patterns relative to their shares of industry output, value-added, employment and labor income.

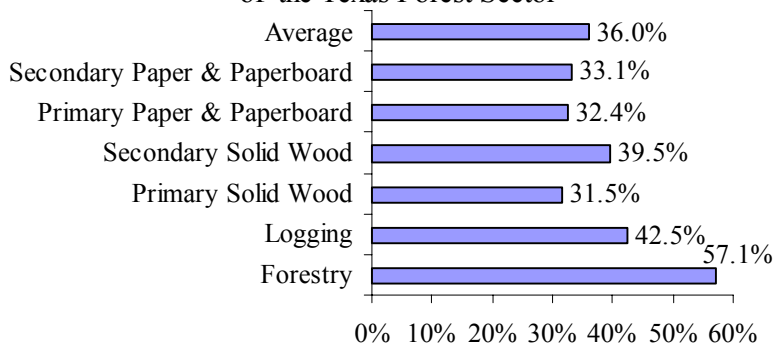
The largest industry output came from the secondary paper & paperboard products industry. In terms of value-added, employment and labor income, the secondary paper & paperboard products industry ranked second. The secondary solid wood products industry ranked second in industry output. Yet, it produced the largest value-added, employed the most labor force, and generated the highest labor income in the forest sector. Primary paper & paperboard products and primary solid wood products industries took the third and fourth places by industry output, value-added, employment and labor income. The smallest industries were forestry and logging with forestry having higher economic impact than logging in all economic indicators except labor income.

Figure 2. Shares of Direct Economic Impact of Texas Forest Sector by Sub-industry, 1999



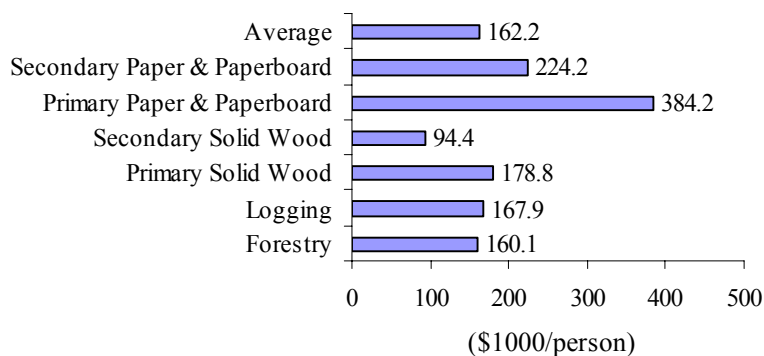
Value-added to output ratio was calculated to measure the percentage of returns to capital and labor in a sector (Figure 3). The difference between value-added and output is the intermediate inputs, such as raw materials and energy. Forestry had the highest ratio of value-added to output (57.1%), followed by logging (42.5%) and secondary solid wood (38.0%). The ratios in the other three sub-industries were slightly lower.

Figure 3. Value-added to Output Ratio
of the Texas Forest Sector



The output to employment ratio in Figure 4, a labor productivity index, measures annual output per employee. Primary paper & paperboard products industry boasted the highest labor productivity at \$384,200 output per employee per year in 1999. The second highest labor productivity was from secondary paper & paperboard products industry at \$224,200 output per employee per year. Logging and forestry ranked third and fourth at \$167,900 and \$160,100 output per employee per year, respectively. Secondary solid wood products and primary solid wood products industries had the lowest labor productivity in the Texas forest sector with \$112,600 and \$111,300 output per employee, respectively.

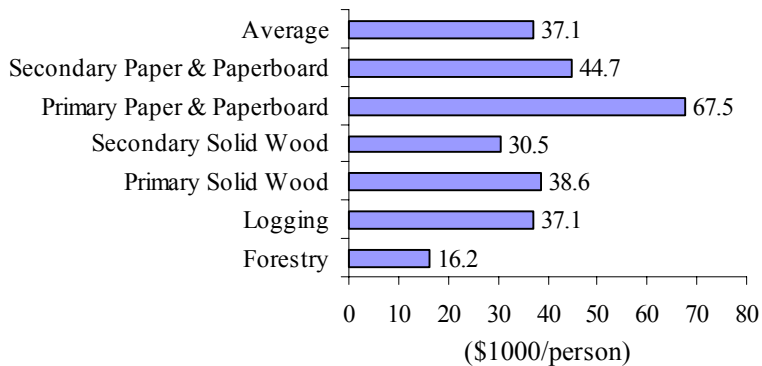
Figure 4. Output to Employment Ratio
of the Texas Forest Sector



Labor income to employment ratio represents average salary/wages and benefits per employee per year (Figure 5). The ratio is indicative of the skill level and experience required by jobs, job intensity, safety, and work environment. Employees in primary paper & paperboard products industry were paid the highest in the Texas forest sector, at

\$67,500/person/year. Secondary paper & paperboard products industry was the second in average employee compensation, at \$44,700/person/year. Average employee compensations in logging, secondary solid wood products and primary solid wood products industries were fairly close, at \$37,100, \$32,600 and \$31,600 per person per year, respectively. The lowest payroll was in forestry --- average pay was only \$16,200/person/year, possibly reflecting the seasonal and low-skill nature of forestry jobs.

Figure 5. Labor Income to Employment Ratio of the Texas Forest Sector



Total Economic Impact of the Texas Forest Sector

The annual total economic impact of the Texas forest sector was \$22.1 billion in 1999, \$9.9 billion of which were value-added. In the same year, the Texas forest sector generated 169,200 jobs and created \$6.0 billion in labor income (Table 3). These impacts were estimated based on type SAM multipliers for output, value-added, employment and labor income in Table 4.

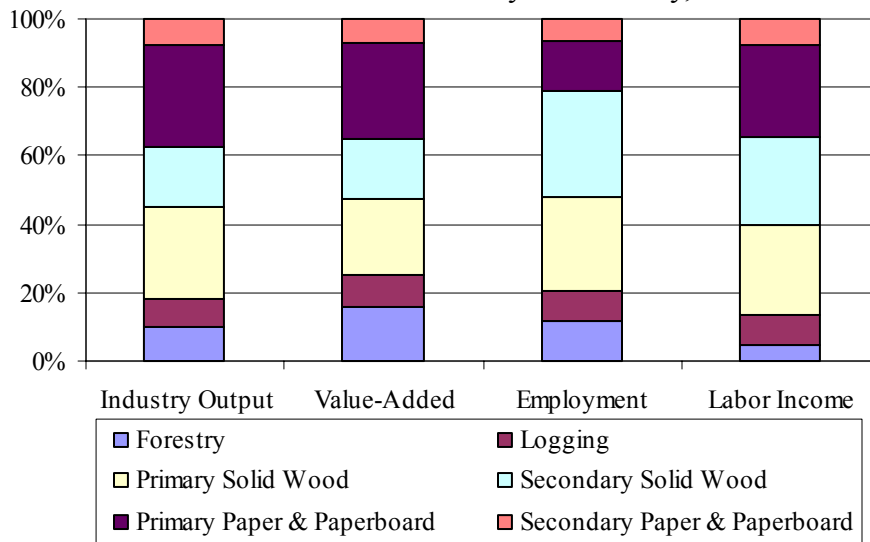
Direct Economic Impact of the Forest Sector in East Texas

The forest sector in East Texas produced \$6.1 billion of goods and services in 1999. It generated \$2.2 billion in value-added, 32,600 jobs and \$1.2 billion in labor income (Table 5). The characteristics of the forest sector in East Texas in terms of value-added to output ratio, output to employment ratio, and labor income to employment ratio in each sub-industry were similar to Texas as a whole.

East Texas produced 47% of the total industry output from the Texas forest sector in 1999. Virtually all forestry and logging industries and the great majority of the primary forest product manufacturing industries in Texas are located in East Texas. The output from primary solid wood products industry in East Texas accounted for 88.7% of all primary solid wood manufacturing in Texas. The output from the primary paper & paperboard products in East Texas accounted for 81.5% of the total primary paper & paperboard industry output in Texas. On the other hand, most of the secondary forest product manufacturing facilities in Texas are located outside of East Texas. In 1999, only 29.2% of the state's total output for secondary solid wood products industry was from East Texas. East Texas' share dropped to 11.4% for secondary paper & paperboard products industry (Table 8).

Since only a small portion of secondary forest product industries and majority of the primary forest product industries are located in East Texas, the relative significance of the six sub-industries in East Texas is very different from that of Texas as a whole (Figure 6). While the secondary forest product industries are the largest statewide, the primary forest product industries are the largest in East Texas.

Figure 6. Shares of Direct Economic Impact of Forest Sector in East Texas by Sub-industry, 1999



Of all forest industries in East Texas in 1999, primary paper & paperboard products industry was the number one producer with the largest output, value-added and labor

income. It was the third largest employer in the sector. Primary solid wood products industry was the second largest industry in the same year by all four economic indicators. Secondary solid wood products industry was the largest employer in the sector and ranked third based on output, value-added and labor income. Forestry, logging and secondary paper & paperboard products ranked fourth, fifth and sixth, respectively, based on all economic indicators but labor income. In terms of payroll size, logging ranked fourth, secondary paper & paperboard products ranked fifth and forestry ranked sixth.

Total Economic Impact of the Forest Sector in East Texas

The total estimated output impact of the East Texas forest sector was \$10.9 billion of output in 1999, \$4.9 billion of which was value-added impact. The total employment impact of the East Texas forest sector was 77,300 jobs. The East Texas forest sector provided \$2.9 billion in payroll in 1999 for the region (Table 6). The total economic impact of the forest sector in East Texas was estimated based on type SAM multipliers in Table 7.

CONCLUSION

This study analyzed the importance of the Texas forest sector to the Texas economy and to the economy of East Texas in particular. It estimated the direct and total economic impacts of the forest sector in thirty-three IMPLAN sectors and six sub-industries for both Texas and East Texas. It assessed the structure of the sector by the IMPLAN sectors and sub-industry, and by industry locations inside and outside of East Texas. The multipliers published in this study can be used for assessing the economic impact of individual projects in the Texas forest sector.

LITERATURE

MIG, Inc. 2002. User's Guide, Analysis Guide, Data Guide for IMPLAN Professional Version 2.0

Weihuan Xu, 1999, Harvest Trends, Texas Forest Service, Publication 158

Texas Forest Service, 1999, Timber Price Trends

Figure 1. East Texas Counties

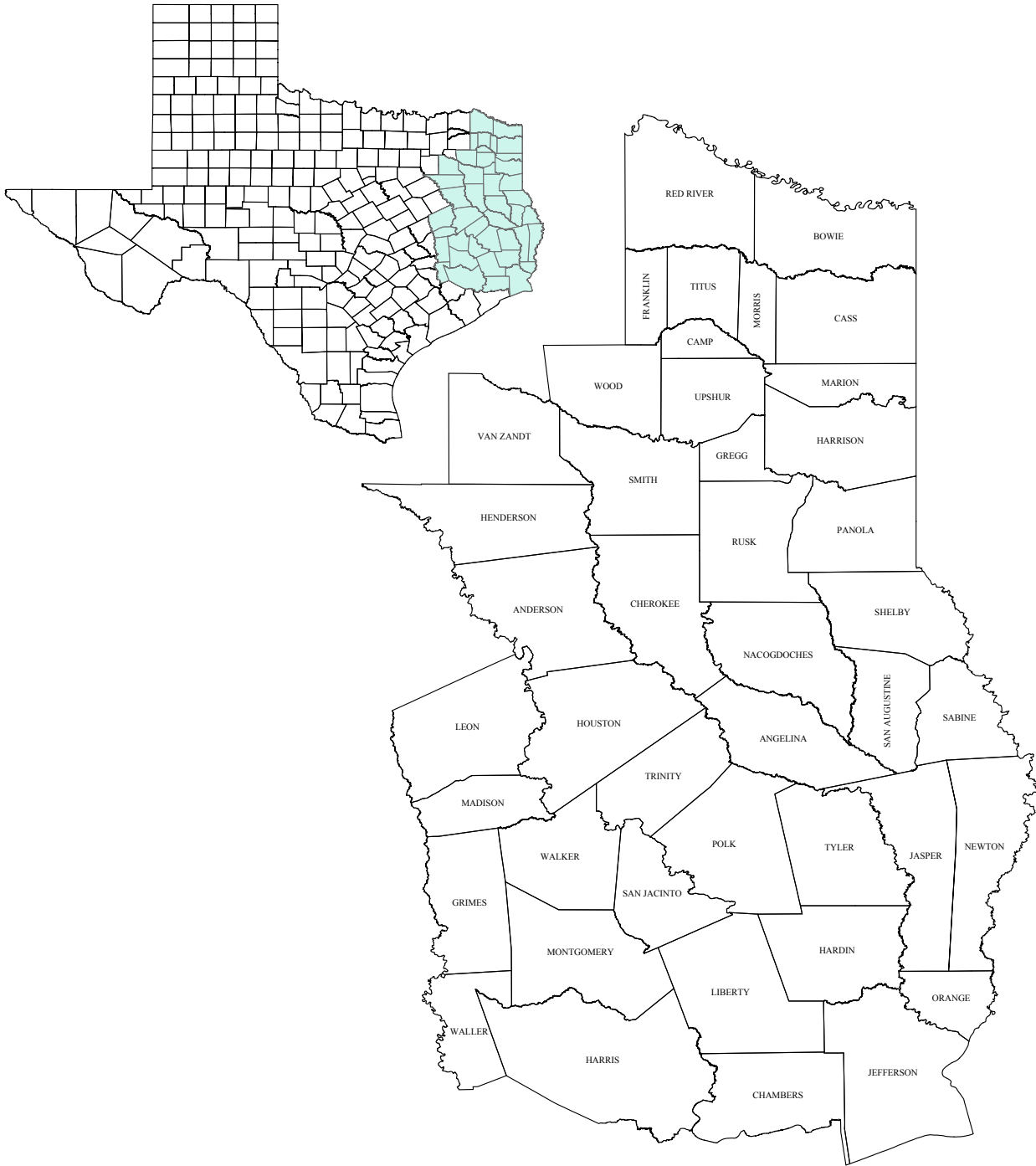


Table 1. Definitions of the Texas Forest Sector, 1999

Sub-industry	IMPLAN Sector	IMPLAN Sector ID	82 BEA Commodity	1987 Standard Industrial Classification
Forestry	Forest Products	22	2.0701	
	Forestry Products	24	3.0001	0810, 0830, 0970
Logging	Logging Camps and Logging Contractors	133	20.0100	2410
Primary Solid Wood Products	Sawmills and Planing Mills, General	134	20.0200	2421
	Hardwood Dimension and Flooring Mills	135	20.0300	2426
	Special Product Sawmills, N.E.C*	136	20.0400	2429
	Veneer and Plywood	139	20.0600	2435, 2436
	Reconstituted Wood Products	146	20.0902	2493
Secondary Solid Wood Products	Millwork	137	20.0501	2431
	Wood Kitchen Cabinets	138	20.0502	2434
	Structural Wood Members, N.E.C	140	20.0701	2439
	Wood Containers	141	21.0000	2441, 2449
	Wood Pallets and Skids	142	20.0901	2448
	Prefabricated Wood Buildings	144	20.0702	2452
	Wood Preserving	145	20.0800	2491
	Wood Products, N.E.C	147	20.0903	2499
	Wood Household Furniture	148	22.0101	2511
	Upholstered Household Furniture	149	22.0200	2512
	Wood TV and Radio Cabinets	152	22.0103	2517
	Wood Office Furniture	154	23.0100	2521
	Wood Partitions and Fixtures	157	23.0400	2541
Primary Paper & Paperboard Products	Pulp Mills	161	24.0100	2610
	Paper Mills, Except Building Paper	162	24.0200	2620
	Paperboard Mills	163	24.0300, 24.0602	2630
Secondary Paper & Paperboard Products	Paperboard Containers and Boxes	164	25.0000	2650
	Paper Coated & Laminated Packaging	165	pt 24.0701	2671
	Paper Coated & Laminated N.E.C.	166	pt 24.0701	2672
	Bags, Paper	168	pt 24.0702	2674
	Die-cut Paper and Board	169	24.0703	2675
	Sanitary Paper Products	170	24.0500	2676
	Envelopes	171	24.0400	2677
	Stationery Products	172	24.0705	2678
	Converted Paper Products, N.E.C	173	24.0704, 24.0706	2679

Source: Minnesota IMPLAN Group, 2002.

* N.E.C. refers to "Not Elsewhere Classified."

Table 2. Direct Economic Impacts of the Forest Sector in Texas, 1999

Sub-industry	IMPLAN Sector	Industry Output (million \$)	Value-Added (million \$)	Employment (jobs)	Labor Income (million \$)
Forestry	Forest Products	78.94	45.35	2,144.00	21.31
	Forestry Products	527.41	301.12	1,643.00	39.91
	Sub-total	606.34	346.47	3,787.00	61.22
Logging	Logging Camps and Logging Contractors	504.46	214.31	3,004.03	111.60
	Sub-total	504.46	214.31	3,004.03	111.60
Primary Solid Wood Products	Sawmills and Planing Mills, General	819.36	207.18	4,560.06	145.54
	Hardwood Dimension and Flooring Mills	99.77	58.02	843.02	45.59
	Special Product Sawmills, N.E.C	0.53	0.36	6.00	0.26
	Veneer and Plywood	439.73	163.40	3,038.05	129.21
	Reconstituted Wood Products	456.95	142.70	1,714.00	72.09
	Sub-total	1,816.34	571.66	10,161.13	392.70
Secondary Solid Wood Products	Millwork	802.56	311.51	8,835.94	275.92
	Wood Kitchen Cabinets	821.62	397.38	10,320.09	319.03
	Structural Wood Members, N.E.C	297.01	110.77	2,445.95	90.29
	Wood Containers	48.64	22.07	734.11	18.65
	Wood Pallets and Skids	261.13	114.55	3,576.86	95.33
	Prefabricated Wood Buildings	67.97	20.32	562.04	16.71
	Wood Preserving	261.99	42.52	772.16	24.77
	Wood Products, N.E.C	356.80	143.93	3,744.94	107.49
	Wood Household Furniture	143.14	53.75	1,661.02	41.50
	Upholstered Household Furniture	191.51	71.42	2,160.00	60.87
	Wood TV and Radio Cabinets	16.77	6.84	227.17	6.30
	Wood Office Furniture	117.78	50.92	1,093.94	44.67
	Wood Partitions and Fixtures	238.15	86.36	2,248.04	70.39
	Sub-total	3,625.07	1,432.34	38,382.27	1,171.92
Primary Paper & Paperboard Products	Pulp Mills	15.95	4.44	90.01	2.64
	Paper Mills, Except Building Paper	646.98	234.88	2,258.98	143.42
	Paperboard Mills	1,561.89	482.06	3,441.14	245.01
	Sub-total	2,224.82	721.38	5,790.13	391.07
Secondary Paper & Paperboard Products	Paperboard Containers and Boxes	2,169.08	589.86	11,007.10	461.58
	Paper Coated & Laminated Packaging	73.16	22.97	321.07	13.25
	Paper Coated & Laminated N.E.C.	251.24	93.63	1,235.03	61.47
	Bags, Paper	58.39	18.97	344.96	11.77
	Die-cut Paper and Board	139.71	41.53	1,040.90	30.96
	Sanitary Paper Products	893.52	416.76	1,664.05	130.51
	Envelopes	167.31	55.09	1,110.91	45.78
	Stationery Products	133.89	44.54	464.06	19.20
	Converted Paper Products, N.E.C	235.64	79.29	1,200.96	46.72
	Sub-total	4,121.94	1,362.64	18,389.03	821.23
Grand total		12,898.96	4,648.80	79,513.59	2,949.73

Source: Minnesota IMPLAN Group, 2002.

Table 3. Total Economic Impacts of the Forest Sector in Texas, 1999*

Sub-industry	IMPLAN Sector	Industry Output (million \$)	Value-Added (million \$)	Employment (jobs)	Labor Income (million \$)
Forestry	Forest Products	128.27	75.14	2,703.20	38.25
	Forestry Products	771.53	447.43	6,872.01	142.08
	Sub-total	899.79	522.58	9,575.21	180.33
Logging	Logging Camps and Logging Contractors	748.21	354.24	5,580.07	196.64
	Sub-total	748.21	354.24	5,580.07	196.64
Primary Solid Wood Products	Sawmills and Planing Mills, General	1,571.93	620.92	11,438.14	390.80
	Hardwood Dimension and Flooring Mills	173.70	100.86	1,591.63	70.90
	Special Product Sawmills, N.E.C	0.91	0.58	9.72	0.39
	Veneer and Plywood	823.76	376.20	6,579.62	255.13
	Reconstituted Wood Products	860.28	361.95	5,093.02	200.12
	Sub-total	3,430.58	1,460.50	24,712.13	917.33
Secondary Solid Wood Products	Millwork	1,473.80	695.13	15,339.26	508.85
	Wood Kitchen Cabinets	1,456.09	760.87	16,559.22	536.45
	Structural Wood Members, N.E.C	537.71	245.73	4,735.10	171.66
	Wood Containers	89.38	45.17	1,129.25	32.40
	Wood Pallets and Skids	476.63	237.38	5,738.18	169.76
	Prefabricated Wood Buildings	121.44	50.45	1,084.62	35.26
	Wood Preserving	515.07	178.15	2,960.15	107.47
	Wood Products, N.E.C	645.72	308.11	6,555.64	207.15
	Wood Household Furniture	259.90	120.82	2,815.61	82.42
	Upholstered Household Furniture	314.06	144.35	3,431.29	105.45
	Wood TV and Radio Cabinets	30.51	14.39	350.74	10.73
	Wood Office Furniture	214.56	108.49	2,072.02	79.76
	Wood Partitions and Fixtures	419.06	191.68	4,056.07	133.78
	Sub-total	6,553.91	3,100.72	66,827.15	2,181.14
Primary Paper & Paperboard Products	Pulp Mills	31.16	12.70	218.81	7.60
	Paper Mills, Except Building Paper	1,178.58	538.19	7,020.83	323.50
	Paperboard Mills	2,870.44	1,223.55	14,903.05	686.68
	Sub-total	4,080.18	1,774.44	22,142.70	1,017.78
Secondary Paper & Paperboard Products	Paperboard Containers and Boxes	3,364.86	1,302.73	22,890.10	894.36
	Paper Coated & Laminated Packaging	119.90	49.16	742.68	29.21
	Paper Coated & Laminated N.E.C.	410.82	183.96	2,713.28	116.17
	Bags, Paper	104.33	43.42	724.52	26.51
	Die-cut Paper and Board	216.34	87.22	1,815.96	58.86
	Sanitary Paper Products	1,294.41	649.00	5,607.52	274.31
	Envelopes	271.28	116.26	2,151.72	82.75
	Stationery Products	198.36	82.50	1,112.78	42.51
	Converted Paper Products, N.E.C	381.37	165.08	2,603.71	98.41
	Sub-total	6,361.68	2,679.32	40,362.27	1,623.07
Grand total		22,074.36	9,891.80	169,199.52	6,116.29

Source: Minnesota IMPLAN Group, 2002.

*Sub-total economic impacts are estimated using type SAM economic multipliers that include direct, indirect, and induced effects.

Table 4. Type SAM Multipliers of the Forest Sector in Texas, 1999

Sub-industry	IMPLAN Sector	Industry Output	Value-Added	Employment	Labor Income
Forestry	Forest Products	1.62	1.66	1.26	1.80
	Forestry Products	1.46	1.49	4.18	3.56
	Sub-total	1.48	1.51	2.53	2.95
Logging	Logging Camps and Logging Contractors	1.48	1.65	1.86	1.76
	Sub-total	1.48	1.65	1.86	1.76
Primary Solid Wood Products	Sawmills and Planing Mills, General	1.92	3.00	2.51	2.69
	Hardwood Dimension and Flooring Mills	1.74	1.74	1.89	1.56
	Special Product Sawmills, N.E.C	1.71	1.60	1.62	1.47
	Veneer and Plywood	1.87	2.30	2.17	1.97
	Reconstituted Wood Products	1.88	2.54	2.97	2.78
	Sub-total	1.89	2.55	2.43	2.34
Secondary Solid Wood Products	Millwork	1.84	2.23	1.74	1.84
	Wood Kitchen Cabinets	1.77	1.91	1.60	1.68
	Structural Wood Members, N.E.C	1.81	2.22	1.94	1.90
	Wood Containers	1.84	2.05	1.54	1.74
	Wood Pallets and Skids	1.83	2.07	1.60	1.78
	Prefabricated Wood Buildings	1.79	2.48	1.93	2.11
	Wood Preserving	1.97	4.19	3.83	4.34
	Wood Products, N.E.C	1.81	2.14	1.75	1.93
	Wood Household Furniture	1.82	2.25	1.70	1.99
	Upholstered Household Furniture	1.64	2.02	1.59	1.73
	Wood TV and Radio Cabinets	1.82	2.10	1.54	1.70
	Wood Office Furniture	1.82	2.13	1.89	1.79
	Wood Partitions and Fixtures	1.76	2.22	1.80	1.90
	Sub-total	1.81	2.16	1.74	1.86
Primary Paper & Paperboard Products	Pulp Mills				
	Paper Mills, Except Building Paper	1.82	2.29	3.11	2.26
	Paperboard Mills	1.84	2.54	4.33	2.80
	Sub-total	1.83	2.46	3.82	2.60
Secondary Paper & Paperboard Products	Paperboard Containers and Boxes	1.55	2.21	2.08	1.94
	Paper Coated & Laminated Packaging	1.64	2.14	2.31	2.20
	Paper Coated & Laminated N.E.C.	1.64	1.96	2.20	1.89
	Bags, Paper	1.79	2.29	2.10	2.25
	Die-cut Paper and Board	1.55	2.10	1.74	1.90
	Sanitary Paper Products	1.45	1.56	3.37	2.10
	Envelopes	1.62	2.11	1.94	1.81
	Stationery Products	1.48	1.85	2.40	2.21
	Converted Paper Products, N.E.C	1.62	2.08	2.17	2.11
	Sub-total	1.54	1.97	2.19	1.98
Grand total		1.71	2.13	2.13	2.07

Table 5. Direct Economic Impacts of the Forest Sector in East Texas, 1999

Sub-industry	IMPLAN Sector	Industry Output (million \$)	Value-Added (million \$)	Employment (jobs)	Labor Income (million \$)
Forestry	Forest Products	78.94	45.35	2,144.42	21.31
	Forestry Products	527.41	301.12	1,643.39	39.91
	Sub-total	606.34	346.47	3,787.81	61.22
Logging	Logging Camps and Logging Contractors	504.46	200.03	2,934.83	104.16
	Sub-total	504.46	200.03	2,934.83	104.16
Primary Solid Wood Products	Sawmills and Planing Mills, General	744.04	184.74	4,169.85	129.78
	Hardwood Dimension and Flooring Mills	11.08	5.16	139.22	4.05
	Special Product Sawmills, N.E.C	0.53	0.36	6.00	0.26
	Veneer and Plywood	438.21	163.01	3,025.25	128.91
	Reconstituted Wood Products	417.26	132.09	1,552.01	66.74
	Sub-total	1,611.13	485.36	8,892.33	329.73
Secondary Solid Wood Products	Millwork	242.70	94.49	2,665.81	83.70
	Wood Kitchen Cabinets	108.34	53.06	1,338.33	42.60
	Structural Wood Members, N.E.C	127.62	54.43	942.91	44.37
	Wood Containers	21.24	9.29	333.06	7.85
	Wood Pallets and Skids	112.48	49.75	1,528.10	41.40
	Prefabricated Wood Buildings	33.56	9.29	287.47	7.64
	Wood Preserving	171.87	28.31	504.94	16.49
	Wood Products, N.E.C	73.23	29.93	759.54	22.36
	Wood Household Furniture	31.86	12.59	355.49	9.72
	Upholstered Household Furniture	42.73	14.42	513.52	12.29
	Wood TV and Radio Cabinets	14.08	5.76	190.36	5.30
	Wood Office Furniture	13.39	7.87	83.88	6.90
	Wood Partitions and Fixtures	66.08	24.43	615.77	19.91
	Sub-total	1,059.17	393.62	10,119.17	320.53
Primary Paper & Paperboard Products	Pulp Mills	0.00	0.00	0.00	0.00
	Paper Mills, Except Building Paper	619.94	228.22	2,141.78	139.36
	Paperboard Mills	1,194.19	385.01	2,563.08	195.69
	Sub-total	1,814.13	613.23	4,704.86	335.05
Secondary Paper & Paperboard Products	Paperboard Containers and Boxes	261.09	71.94	1,317.71	56.29
	Paper Coated & Laminated Packaging	2.39	0.52	12.40	0.30
	Paper Coated & Laminated N.E.C.	16.46	5.56	86.70	3.65
	Bags, Paper	21.65	6.81	130.28	4.23
	Die-cut Paper and Board	6.77	2.03	50.29	1.51
	Sanitary Paper Products	76.11	33.63	158.40	10.53
	Envelopes	6.81	2.00	47.80	1.66
	Stationery Products	4.83	1.49	17.60	0.64
	Converted Paper Products, N.E.C	74.83	27.20	361.59	16.02
	Sub-total	470.94	151.18	2,182.77	94.84
Grand total		6,066.16	2,189.89	32,621.78	1,245.54

Source: Minnesota IMPLAN Group, 2002.

Table 6. Total Economic Impacts of the Forest Sector in East Texas, 1999*

Sub-industry	IMPLAN Sector	Industry Output (million \$)	Value-Added (million \$)	Employment (jobs)	Labor Income (million \$)
Forestry	Forest Products	124.94	73.49	2,620.74	37.28
	Forestry Products	703.40	408.80	4,578.44	115.14
	Sub-total	828.33	482.29	7,199.18	152.42
Logging	Logging Camps and Logging Contractors	748.21	339.49	5,446.07	189.44
	Sub-total	748.21	339.49	5,446.07	189.44
Primary Solid Wood Products	Sawmills and Planing Mills, General	1,512.36	592.06	10,893.13	372.62
	Hardwood Dimension and Flooring Mills	21.86	10.96	238.43	7.55
	Special Product Sawmills, N.E.C	0.91	0.58	9.62	0.38
	Veneer and Plywood	844.90	384.62	6,645.83	260.87
	Reconstituted Wood Products	809.91	342.67	4,743.48	190.13
	Sub-total	3,189.94	1,330.88	22,530.48	831.56
Secondary Solid Wood Products	Millwork	483.78	224.43	4,871.11	163.16
	Wood Kitchen Cabinets	201.08	104.25	2,208.34	73.38
	Structural Wood Members, N.E.C	255.59	121.87	2,093.64	85.37
	Wood Containers	42.62	20.81	528.65	14.80
	Wood Pallets and Skids	227.73	111.32	2,604.04	79.06
	Prefabricated Wood Buildings	65.99	26.47	583.10	18.29
	Wood Preserving	388.41	137.12	2,282.01	83.40
	Wood Products, N.E.C	142.17	67.22	1,395.63	45.12
	Wood Household Furniture	57.87	27.36	607.57	18.72
	Upholstered Household Furniture	67.34	29.36	769.38	21.42
	Wood TV and Radio Cabinets	25.18	11.85	288.76	8.86
	Wood Office Furniture	23.11	13.75	184.30	10.44
	Wood Partitions and Fixtures	116.57	53.66	1,108.29	37.56
	Sub-total	2,097.44	949.48	19,524.83	659.58
Primary Paper & Paperboard Products	Pulp Mills	0.00	0.00	0.00	0.00
	Paper Mills, Except Building Paper	1,139.86	525.11	6,690.31	316.53
	Paperboard Mills	2,213.95	963.27	11,308.05	541.82
	Sub-total	3,353.81	1,488.38	17,998.36	858.35
Secondary Paper & Paperboard Products	Paperboard Containers and Boxes	400.71	155.99	2,684.29	107.50
	Paper Coated & Laminated Packaging	3.96	1.40	25.92	0.84
	Paper Coated & Laminated N.E.C.	26.69	11.39	178.75	7.20
	Bags, Paper	37.94	15.61	261.98	9.53
	Die-cut Paper and Board	10.22	4.14	85.19	2.80
	Sanitary Paper Products	107.85	52.54	470.92	22.26
	Envelopes	10.73	4.37	86.80	3.10
	Stationery Products	7.01	2.81	39.49	1.45
	Converted Paper Products, N.E.C	118.13	53.17	776.77	31.65
	Sub-total	723.24	301.40	4,610.11	186.33
Grand total		10,940.98	4,891.92	77,309.04	2,877.67

Source: Minnesota IMPLAN Group, 2002.

*Grand total economic impacts are estimated using type SAM economic multipliers that include direct, indirect, and induced effects.

Table 7. Type SAM Multipliers of the Forest Sector in East Texas, 1999*

Sub-industry	IMPLAN Sector	Industry Output	Value-Added	Employment	Labor Income
Forestry					
	Forest Products	1.58	1.62	1.22	1.75
	Forestry Products	1.33	1.36	2.79	2.88
	Sub-total	1.37	1.39	1.90	2.49
Logging					
	Logging Camps and Logging Contractors	1.48	1.70	1.86	1.82
	Sub-total	1.48	1.70	1.86	1.82
Primary Solid Wood Products					
	Sawmills and Planing Mills, General	2.03	3.20	2.61	2.87
	Hardwood Dimension and Flooring Mills	1.97	2.13	1.71	1.86
	Special Product Sawmills, N.E.C	1.71	1.60	1.60	1.47
	Veneer and Plywood	1.93	2.36	2.20	2.02
	Reconstituted Wood Products	1.94	2.59	3.06	2.85
	Sub-total	1.98	2.74	2.53	2.52
Secondary Solid Wood Products					
	Millwork	1.99	2.38	1.83	1.95
	Wood Kitchen Cabinets	1.86	1.96	1.65	1.72
	Structural Wood Members, N.E.C	2.00	2.24	2.22	1.92
	Wood Containers	2.01	2.24	1.59	1.89
	Wood Pallets and Skids	2.02	2.24	1.70	1.91
	Prefabricated Wood Buildings	1.97	2.85	2.03	2.39
	Wood Preserving	2.26	4.84	4.52	5.06
	Wood Products, N.E.C	1.94	2.25	1.84	2.02
	Wood Household Furniture	1.82	2.17	1.71	1.93
	Upholstered Household Furniture	1.58	2.04	1.50	1.74
	Wood TV and Radio Cabinets	1.79	2.06	1.52	1.67
	Wood Office Furniture	1.73	1.75	2.20	1.51
	Wood Partitions and Fixtures	1.76	2.20	1.80	1.89
	Sub-total	1.98	2.41	1.93	2.06
Primary Paper & Paperboard Products					
	Pulp Mills				
	Paper Mills, Except Building Paper	1.84	2.30	3.12	2.27
	Paperboard Mills	1.85	2.50	4.41	2.77
	Sub-total	1.85	2.43	3.83	2.56
Secondary Paper & Paperboard Products					
	Paperboard Containers and Boxes	1.53	2.17	2.04	1.91
	Paper Coated & Laminated Packaging	1.65	2.70	2.09	2.81
	Paper Coated & Laminated N.E.C.	1.62	2.05	2.06	1.97
	Bags, Paper	1.75	2.29	2.01	2.25
	Die-cut Paper and Board	1.51	2.04	1.69	1.85
	Sanitary Paper Products	1.42	1.56	2.97	2.11
	Envelopes	1.58	2.18	1.82	1.86
	Stationery Products	1.45	1.88	2.24	2.26
	Converted Paper Products, N.E.C	1.58	1.96	2.15	1.98
	Sub-total	1.54	1.99	2.11	1.96
Grand total		1.80	2.23	2.37	2.31

Table 8. Forest Sector Economic Impact: Shares of East Texas in the State's Total, 1999

Type	Sub-industry	Industry			Labor
		Output	Value-Added	Employment	Income
Direct Impact					
	Forestry	100.0%	100.0%	100.0%	100.0%
	Logging	100.0%	93.3%	97.7%	93.3%
	Primary Solid Wood Products	88.7%	84.9%	87.5%	84.0%
	Secondary Solid Wood Products	29.2%	27.5%	26.4%	27.4%
	Primary Paper & Paperboard Products	81.5%	85.0%	81.3%	85.7%
	Secondary Paper & Paperboard Products	11.4%	11.1%	11.9%	11.5%
	Total	47.0%	47.1%	41.0%	42.2%
Total Impact					
	Forestry	92.1%	92.3%	75.2%	84.5%
	Logging	100.0%	95.8%	97.6%	96.3%
	Primary Solid Wood Products	93.0%	91.1%	91.2%	90.6%
	Secondary Solid Wood Products	32.0%	30.6%	29.2%	30.2%
	Primary Paper & Paperboard Products	82.2%	83.9%	81.3%	84.3%
	Secondary Paper & Paperboard Products	11.4%	11.2%	11.4%	11.5%
	Total	49.6%	49.5%	45.7%	47.0%