Economic Impacts of the Forest Industry in Florida, 2003

Final Report to the Florida Forestry Association

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Economic Impacts of the Forest Industry in Florida, 2003
Executive Summary

Florida has over 16 million acres or 25 thousand square miles of forests, representing nearly half of the state's land area. Forests in Florida are managed to produce a variety of wood and fiber products, with about 650 million cubic feet of roundwood harvested annually. These forests also support outdoor recreational opportunities for residents and millions of visitors to the state, and provide important non-market environmental services such as biodiversity, hydrologic function, and mitigation of global climate change through sequestering atmospheric carbon.

A study was conducted to assess the economic impacts of the forest products industry in the state of Florida, in order to better understand its role and contribution to the regional economy. A mail survey was used to collect information on product sales, employment, regional trade, and types of products and services offered by forest industry firms. Major sectors of the industry surveyed were landowners, forest product manufacturing mills, and forestry service businesses such as loggers, management consultants, trucking, and forest tree nurseries. Mail surveys were supplemented by personal interviews with mill managers, and other secondary statistics. A total of 615 usable questionnaires were received, representing an overall response rate of 19 percent. Survey respondents reported total sales of $2.54 billion (Bn) in 2003 and employment of 8,436 fulltime and part-time or seasonal employees (Table ES-1). Assuming the survey data were a representative sample of the industry, these results were extrapolated to estimate a total value of industry sales at $7.78Bn, including $6.37Bn by manufacturers, $1.02Bn by service firms, and $382 million (Mn) by landowners. Total employment in the industry was estimated at around 30 thousand jobs.

Table ES-1. Florida forest industry groups surveyed, response rates, and reported and estimated sales and employment in 2003

Survey Group	Number Firms Targeted	Number Respondents	Response Rate	Reported Sales (Million$)	Reported Employment (full & part-time jobs)	Expanded Sales (Million$)	Expanded Employment (jobs)
Landowners	2,460	474	19.3%	73.7	729	382.4	3,781
Manufacturers	175	65	37.1%	2,366.3	6,807	6,370.9	18,327
Forestry Services	680	76	11.2%	114.4	901	1,023.8	8,057
Total	3,315	615	18.6%	2,554.4	8,436	7,777.0	30,164

Values were estimated for specific forest products and services. Among manufactured products, values in excess of $100 million were obtained for pulp ($2.18 Bn), paper/paperboard ($1.78 Bn), preservative-treated wood ($859 Mn), dimension lumber ($388 Mn), plywood ($365 Mn), wood chemicals ($245Mn), chipped wood ($185 Mn), and mulch/shavings ($123 Mn). Revenues for forestry services included timber harvesting ($615 Mn), timber trucking ($113 Mn), forest thinning ($107 Mn), tree trimming and removal ($61 Mn), and site preparation ($48 Mn). Values for forest products sold by landowners included pulpwood ($80 Mn), pine straw ($79 Mn), chip-and-saw logs ($62 Mn), and sawtimber logs ($37 Mn).

The forest products industry also produces a significant amount of electric power and heat energy to meet its energy needs for manufacturing processes, through utilization of residuals and byproducts, contributing to energy sustainability through reliance on locally renewable resources. The industry increasingly utilizes post-consumer recycled fiber sources for paper manufacturing, which reduces the dependence upon forests for virgin wood fiber.

Regionally in Florida, the value of all forest products and services produced was $3.8Bn (49%) in the northeast, $2.01Bn (26%) in the central, $1.21Bn (16%) in the northwest, and $695Mn (9%) in the south (Figure ES-1). Exports of forest products outside the state to domestic and international markets represented 50 percent of total industry sales, and within Florida, 23 percent of total sales were to the central region, 15 percent to the northeast, 8 percent to the south, and 4 percent to the northwest.

Total economic impacts of the forest products industry were evaluated using a regional input-output model developed with the *Implan* software system and associated databases for Florida counties (MIG, Inc). These models represent the structure of an economy in terms of linkages between industry sectors, households and governments institutions. The model accounts for commodity production, employment, final demand, transfer payments, taxes, capital investment, and regional trade (imports and exports). Multipliers from the model enable estimation of the change in total regional economic activity resulting from output or employment of a particular sector that is

attributable to business activity by input supplier industries (indirect effects) and employee household spending (induced effects). Values of total sales estimated for specific products and services were entered into *Implan* for 12 separate forest products industry sectors to calculate total impacts.

Total economic impacts of the Florida forest industry are indicated in Table ES-3. Total output or sales impacts of the forest products industry in Florida in 2003 were estimated at $16.63 Bn, including $8.84 Bn in the forestry and forest product sector and an additional $7.70 Bn in other industry sectors. This was comprised of $7.78 Bn in direct sales, plus $3.09 Bn in indirect impacts associated with activity in supplier businesses, and $5.67 Bn in induced activity due to spending by industry employees. Within the forest industry, output impacts were $1.65 Bn in forestry and natural resources and $7.19 Bn in forest product manufacturing. Total employment impacts were 133,475 jobs, with 48,930 in the forest sector and 84,545 in other industry sectors. Total value added impacts were $7.52 Bn, including labor income of $4.92 Bn, other property-related income of $2.02 Bn, and indirect business taxes paid to local, state and federal governments of $581 Mn. Fiscal impacts on total tax collections by governments were estimated at $1.75 Bn, including sales taxes, property taxes, payroll taxes and personal and business income taxes. The value added impact indicates the net contribution of personal and business income to the regional economy, and this value for the forest industry represents approximately 1.53 percent of the gross regional product of the Florida economy ($490 Bn).

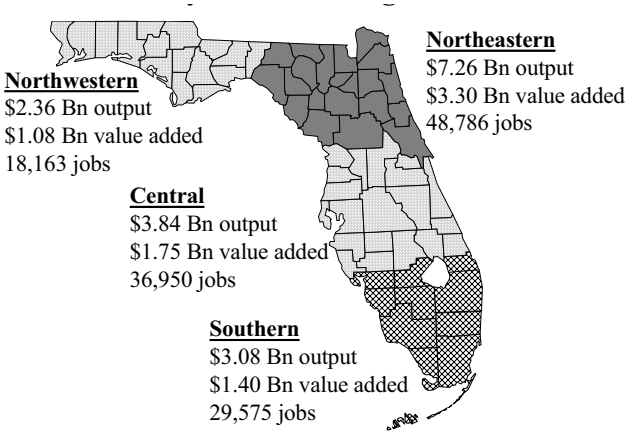


Figure ES-1. Economic impacts of the forest industry in Florida regions.

Table ES-2. Total economic impacts of the forest industry in Florida, by industry group and sector, 2003

Industry Sector	Output Impact (Million $)	Employment Impact (Jobs)	Value Added Impact (Million $)
Forestry & Forest Products	8,835	48,930	2,709
Forestry & Natural Resources	1,646	24,834	835
Logging	722	5,082	364
Forest nurseries and timber tracts	406	1,165	185
Agriculture and forestry support activities	449	17,534	244
Forest Products Manufacturing	7,189	24,096	1,875
Pulp mills	2,181	4,916	502
Paper and paperboard mills	1,781	4,197	594
Wood preservation	931	2,816	131
Sawmills	955	5,271	229
Veneer and plywood manufacturing	388	2,394	117
Other miscellaneous chemical product manuf.	255	828	65
Miscellaneous wood product manufacturing	86	706	28
Millwork- including flooring	10	125	5
Reconstituted wood product manufacturing	6	23	2
Other Industry Sectors	7,699	84,545	4,814
Total	16,534	133,475	7,523

Economic impacts were estimated for Florida counties and regions based on their share of total state economic activity in the forest products sector. Total economic impacts are indicated for four regions of the state in Figure ES-1. The top ten Florida counties in terms of output impacts were Taylor ($1.94 Bn), Miami-Dade ($1.89 Bn), Duval ($1.71 Bn), Putnam ($1.08 Bn), Escambia ($1.05 Bn), Hillsborough ($1.00 Bn), Nassau ($973 Mn), Polk ($684 Mn), Orange ($595 Mn), and Bay ($502 Mn).

Recreation and tourism values associated with Florida forests were also evaluated in this report from secondary information sources. According to US Fish & Wildlife Service surveys, wildlife-related recreational activity, including hunting, fishing and wildlife viewing, accounted for an estimated $6.05 Bn total expenditures in Florida in 2001, including $2.89 Bn for trip costs for fuel, lodging, meals, etc., and $3.17 Bn for recreational equipment purchased (e.g. boats, guns), with $1.20 Bn spent by Florida visitors. Of course, not all wildlife-related recreational activity is directly attributable to the forest resource, however, most of the hunting and wildlife watching takes place in forested ecosystems.

Tourism is the largest and most well known sector of the Florida economy, and forested landscapes provide environmental amenities that support this industry, particularly for the growing eco-tourism market. Visitor spending of around $47 Bn in Florida in 2000 had an estimated output impact of $117 Bn. Surveys indicate that over half of Florida visitors engage in some type of nature-based activity during their visit, and a study by the USDA-Forest Service indicated that 19 to 33 percent of total travel and tourism activity in the southern U.S. is attributable to outdoor recreation. Using the lower bound (19%) together with data on the total value of Florida tourism, it is estimated that outdoor recreation in the state had a total economic impact of $22.3 Bn in output, $14.72 Bn in value added, and 332 thousand jobs. Again, some share of this may be appropriately attributed specifically to forest ecosystems.

In addition to these commercial commodity and recreational use values associated with forests in Florida, there is also an array of non-marketed environmental services that are important to recognize, although they may not be readily quantified. Some of the environmental services of forests include surface and ground water storage, purification of air and water, mitigation of droughts and floods, stabilization of climate and moderation of extreme weather events, generation and preservation of soils, detoxification and decomposition of wastes, cycling and movement of nutrients, control of agricultural pests, provision of wildlife habitat, and maintenance of biodiversity. An estimated 5.8 million tons of carbon are sequestered annually by Florida forests. Markets for this service for trading of pollution emission credits are being established (e.g. Chicago Climate Exchange). The avoided costs for pollution abatement may be conservatively estimated at a price of $5 per ton carbon, which would indicate a total value of $29 million annually for this environmental service.

Forests in Florida also provide numerous amenities or quality of life values. Published studies have shown that properties landscaped with trees and other attractive vegetation may add approximately 6 to 10 percent to the value of homes purchased. Thus, forests contribute to the large market in Florida for real estate development. Some additional non-market benefits to human communities from forests include support of rural life values, provision of character building opportunities, support of national identity/ideals, heritage, research and educational values. Finally, forests provide personal, psychic and aesthetic benefits such as scenic views, therapeutic and physical health values, intrinsic existence values, religious and spiritual values.

1. Introduction: Florida Forest Resources and Economic Values

Florida has over 16 million acres of forest land, representing 47 percent of the state's land area, including 12.4 million acres privately owned and 3.9 million acres of public forests (Table 1). The total area of commercial timberland in Florida, around 14 million acres, has remained rather stable since the mid-1980's, in spite of the loss of forests to rapid urban development. Losses of forest land in the non-industrial private sector have been offset somewhat by public (state) land purchases (Figure 1.1).

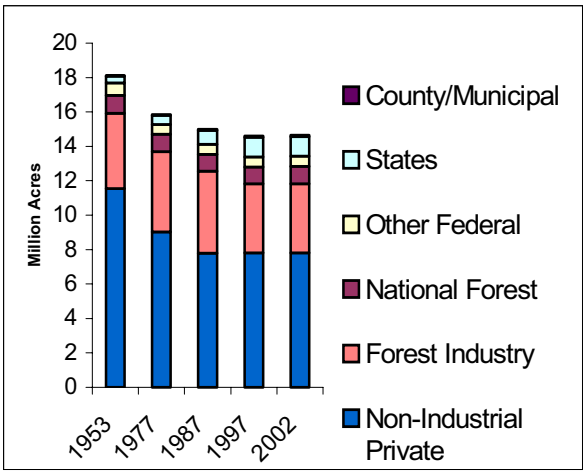


Figure 1.1. Florida timberland area, 1953-2002.

Forests are concentrated in the northern part of Florida, with nearly all counties in this area having at least 50 percent forest cover, and some counties having over 75 percent forest area (Fig. 1.2). The timberlands in this region represent one of the world's largest concentration of intensively managed plantations of southern pines. The subtropical environment of Florida supports a rich forest biodiversity of softwood and hardwood tree species that are commercially utilized, including pine, cypress, cedar, oak, poplar, maple, hickory, tupelo and gum (Figure 1.3). The state had an estimated 15.3 billion cubic feet of timber growing stock in 2002, with about 61 percent in softwoods, notably slash and longleaf pine and cypress. Net annual growth of timber in Florida is around 717 million cubic feet (Brown, 1999).

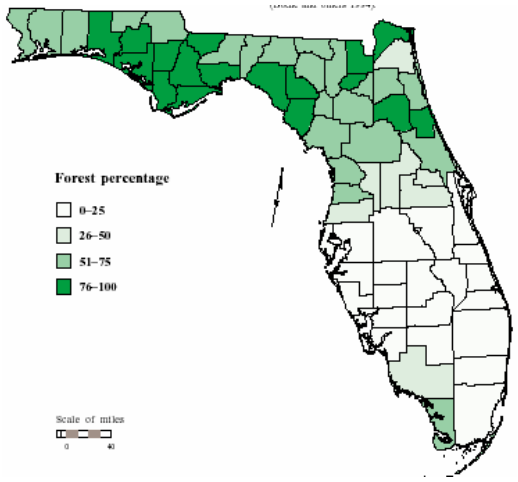


Figure 1.2. Forest area coverage in the counties of Florida (1995).

Florida forests are managed to produce a variety of wood and fiber products such as lumber, poles/pilings, veneer and plywood, reconstituted wood products, preservative-treated wood products, pulp, paper and paperboard, converted paper products, and wood chemicals. An estimated 650 million cubic feet (MCF) of roundwood timber products were produced from Florida forests in 1999, including 167 MCF of saw logs and 261 MCF of pulpwood (Bentley, 2002). Mills in Florida produced 888 million board feet of lumber in 2002, an increase of about 3 percent from the previous year (USDOC, Current Industrial Reports).

The forest products industry generates a significant amount of electric power and heat energy to meet its energy needs for manufacturing processes, through utilization of residuals and byproducts, thereby contributing to energy sustainability through reliance on locally renewable resources. The industry increasingly utilizes post-consumer recycled fiber sources for paper manufacturing, which reduces the dependence upon forests for virgin wood fiber.

The forest industry in Florida had some 1,300 businesses in 2002 that reported employment of nearly 34,000 persons, and paid about $1.2 billion in wages (Table 1.1). This included 2,728 jobs in forestry and logging, 18,039 jobs in wood product manufacturing, 11,167 jobs in paper manufacturing, and 1,862 jobs in supporting activities and allied product firms (Fla. Dept. Labor, 2004). Annual earnings in the industry averaged around $35,000 per worker. According to the 1997 Economic Census, the forest products manufacturing sector in Florida contributed value added of $2.8 billion on shipments valued at $6.6 billion, and made capital expenditures of $256 million (Table 1.2). The total value of shipments remained steady

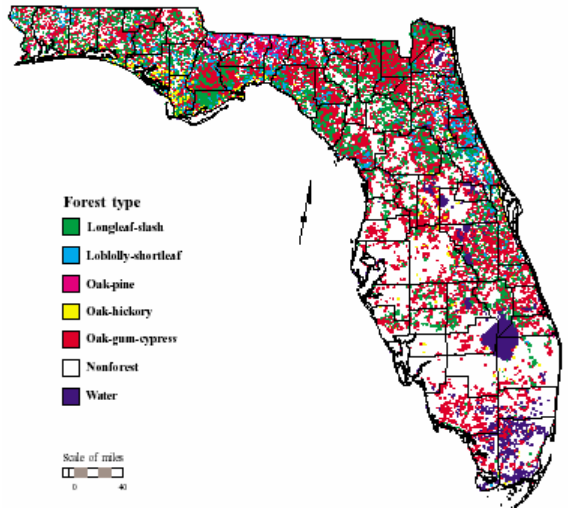


Figure 1.3. Forest types in Florida.

during the period of 1997 through 2001, in spite of the recession in the U.S. economy (Figures 1.4). Industry employment declined slightly during this period, particularly for pulp and paperboard mills, although not to the degree that it has recently in many other manufacturing sectors due to foreign outsourcing (Figure 1.5).

In a previous study, the forest products industry in thirteen states of the southeast and southcentral U.S. in 1997 were estimated to provide nearly 652,000 jobs. This represented 1.3 percent of all employment in the region, and 38 percent of total forest-based employment in the U.S (Murthy and Cubbage). Direct forest-based employment in Florida was estimated at 38,664 jobs The forest industry exports its products to customers throughout the US and to many foreign countries, which brings about secondary economic impacts due to the multiplier effect of other linked industries and consumer spending by industry employees.

Table 1.1. Florida forest industry employment and wages paid, 2002

Industry Sector	Number Business Units	Total Wages ($Mn)	Average Employment (jobs)	Average Annual Wage ($)
Forestry and logging	346	74.8	2,728	27,404
Timber tract operations	35	11.8	400	29,465
Forest nursery and gathering forest products	29	7.8	417	18,754
Logging	282	55.2	1,912	28,858
Support activities for forestry	146	61.1	1,862	32,798
Wood product manufacturing	596	542.2	18,039	30,060
Sawmills and wood preservation	74	71.1	2,367	30,032
Plywood and engineered wood product mfg	126	187.7	6,256	29,998
Other wood product manufacturing	396	283.5	9,416	30,108
Paper manufacturing	212	510.0	11,167	45,672
Pulp, paper, and paperboard mills	27	184.7	3,080	59,984
Converted paper product manufacturing	185	325.3	8,087	40,222
All Forest Products Sectors	1,300	1,188.1	33,796	35,154

Source: Florida Department of Labor, Labor Market Information System, statistics for covered employment of firms with 10 or more employees.

Table 1.2. Economic characteristics of the forest products manufacturing sector in Florida, 1997

Sector	Number Establish-ments	Employees	Payroll ($Mn)	Value Added ($Mn)	Value of Shipments ($Mn)	Capital Expenditures ($Mn)
Logging	337	2,696	64.2	403.0	548.4	21.0
Sawmills	52	1,814	44.4	136.9	403.2	19.2
Wood Preservation	18	610	14.6	49.4	292.8	2.0
Veneer, Plywood & Engineered Wood	120	5,055	119.7	243.4	588.9	14.2
Other Wood Product Manufacturing	333	7,867	181,6	395.2	982.2	17.6
Pulp Mills	3	1,701	85.7	413.1	768.0	50.9
Paper, Exc. Newsprint	3	2,486	135.3	357.4	895.1	56.7
Paperboard Mills	4	1,637	89.2	318.0	751.5	19.1
Converted Paper Products	156	6,778	211.4	526.9	1,409.0	56.0
Total	1,026	30,644	946.0	2,843.4	6,639.0	256.6

Source: U.S. Census Bureau, Economic Census, Manufacturing Industry Series

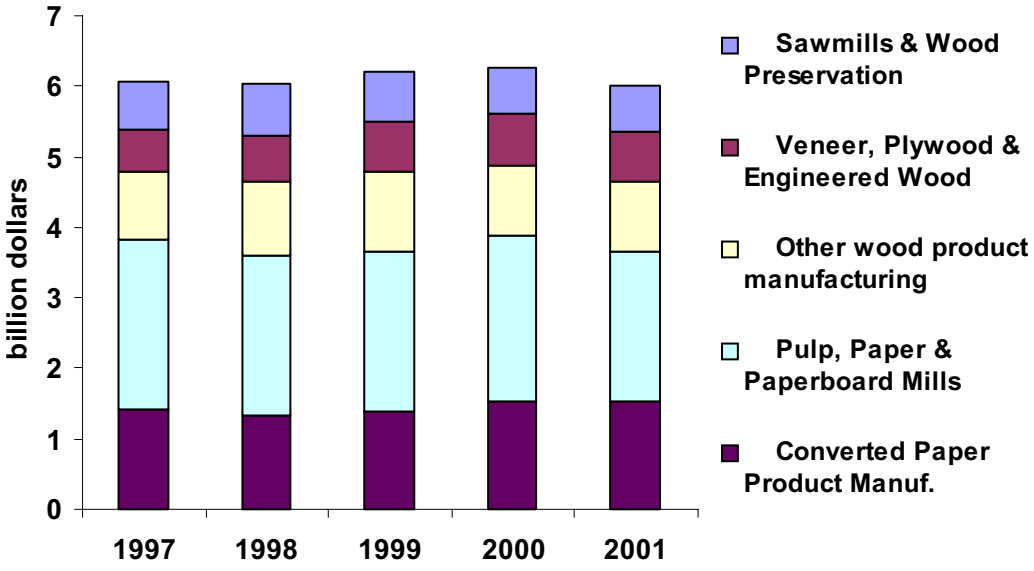


Figure 1.4. Value of shipments by Florida forest product manufacturers, 1997-2001

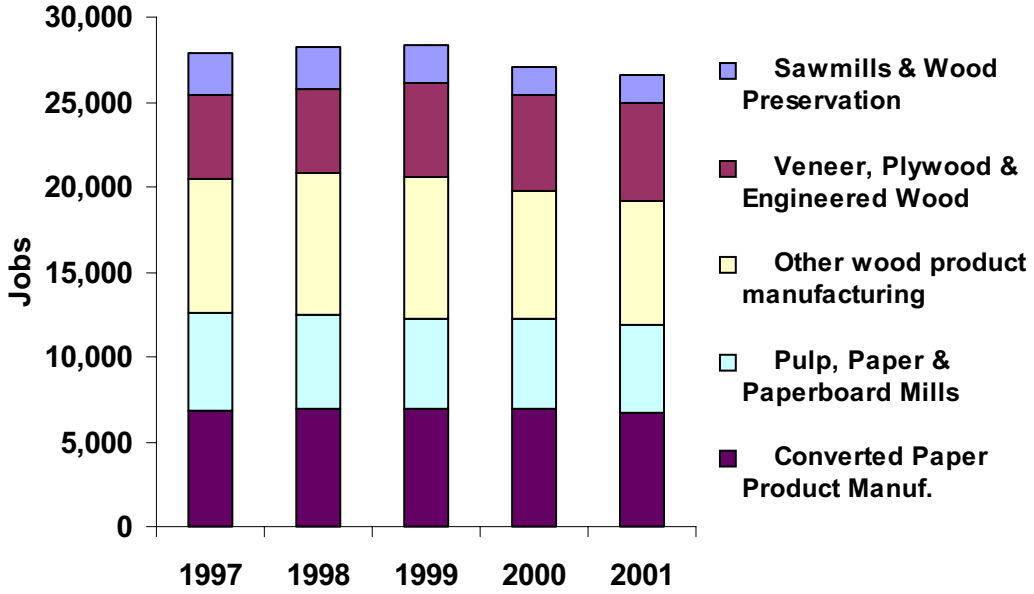


Figure 1.5. Employment by Florida forest product manufacturers, 1997-2001

Industry output and employment in Florida counties in 2001 is presented in Table 1.3. for paper and wood product manufacturing, logging, and forest nurseries/timber tracts. The top counties with output in excess of $100 million were Taylor ($647 Mn), Miami-Dade ($629 Mn), Duval ($569 Mn), Putnam ($362 Mn), Escambia ($351 Mn), Hillsborough ($335 Mn), Nassau ($325 Mn), Polk ($228 Mn), Orange ($199 Mn), Bay ($167 Mn), Broward ($123 Mn), and Pinellas ($117 Mn). The top ten counties in terms of reported employment were Miami-Dade (3,836), Duval (3,419), Hillsborough (1,880), Taylor (1,700), Polk (1,506), Putnam (1,343), Escambia (1,306), Orange (1,027), Palm Beach (1,004) and Nassau (910). These figures are conservative since they represent only firms with 10 or more employees that are required to report quarterly employment and payroll.

Table 1.3. Output and employment in the forest industry in Florida counties, 2001

Region	Industry Output ($Mn)					Employment (Jobs)				
	Paper Product Manufac-turing	Wood Product Manufac-turing	Logging	Forest nurseries and Timber Tracts	Total	Paper Product Manufac-turing	Wood Product Manufac-turing	Logging	Forest nurseries and Timber Tracts	Total
Alachua	17.4	45.1	1.4	5.4	69.2	111	309	11	14	445
Baker	0.0	0.0	0.5	1.8	2.3	0	0	6	8	15
Bay	132.7	16.8	15.5	2.4	167.4	352	198	155	10	715
Bradford	0.0	6.8	4.3	0.0	11.1	0	41	23	0	64
Brevard	0.5	47.9	0.0	3.6	52.0	1	410	0	17	428
Broward	51.6	62.3	1.3	7.6	122.8	257	549	11	22	839
Calhoun	0.0	5.9	8.1	0.7	14.7	0	34	59	2	95
Charlotte	0.0	11.7	0.0	0.0	11.7	0	105	0	0	105
Citrus	0.0	3.4	0.0	14.7	18.1	0	34	0	52	86
Clay	0.5	0.4	9.6	1.3	11.7	2	6	75	4	87
Collier	0.0	10.8	0.0	0.0	10.8	0	119	0	0	119
Columbia	0.0	59.7	8.2	0.0	67.9	0	245	74	0	320
Desoto	0.0	0.0	7.6	0.0	7.6	0	0	74	0	74
Dixie	0.0	50.1	14.4	0.0	64.5	0	307	75	0	381
Duval	373.9	138.0	15.4	41.8	569.1	1,765	1,278	196	180	3,419
Escambia	313.1	11.9	5.3	21.0	351.3	1,095	108	46	58	1,306
Flagler	0.0	14.4	4.0	0.0	18.4	0	139	23	0	162
Franklin	0.0	0.0	2.9	0.0	2.9	0	0	35	0	35
Gadsden	0.0	62.9	0.9	3.5	67.4	0	564	8	11	583
Gilchrist	0.0	5.0	5.5	11.8	22.2	0	37	43	38	118
Glades	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
Gulf	0.0	0.1	23.5	0.0	23.6	0	1	147	0	148
Hamilton	0.0	0.0	0.7	1.2	1.9	0	0	4	3	6
Hardee	0.0	7.7	0.4	0.0	8.1	0	38	2	0	40
Hendry	0.0	0.0	5.6	0.0	5.6	0	0	30	0	30
Hernando	0.0	16.3	4.2	22.5	43.0	0	161	55	102	318
Highlands	59.3	1.7	6.7	26.8	94.6	288	26	38	49	401
Hillsborough	195.0	138.3	0.0	1.8	335.1	916	959	0	5	1,880
Holmes	0.0	2.9	7.3	0.0	10.2	0	19	71	0	89
Indian River	0.0	4.7	1.5	0.0	6.2	0	59	10	0	69
Jackson	0.0	29.4	9.2	0.0	38.6	0	182	100	0	281
Jefferson	0.0	0.0	13.9	1.5	15.3	0	0	87	4	91
Lafayette	0.0	0.8	2.7	0.5	4.0	0	9	18	1	29
Lake	0.0	15.7	7.6	1.5	24.8	0	185	69	6	260
Lee	48.9	37.4	1.7	5.0	92.9	210	259	11	14	494
Leon	0.0	0.0	1.7	0.3	2.1	0	1	23	1	26
Levy	0.0	3.5	5.0	0.2	8.7	0	21	27	1	49
Liberty	0.0	9.8	29.4	3.6	42.7	0	30	190	10	230

Table 1.3. Output and employment in the forest industry in Florida counties, 2001

Region	Industry Output ($Mn)					Employment (Jobs)				
	Paper Product Manufac-turing	Wood Product Manufac-turing	Logging	Forest nurseries and Timber Tracts	Total	Paper Product Manufac-turing	Wood Product Manufac-turing	Logging	Forest nurseries and Timber Tracts	Total
Madison	0.0	69.6	10.2	1.7	81.5	0	489	58	4	550
Manatee	12.9	12.5	0.0	0.0	25.4	59	164	0	0	223
Marion	26.3	47.4	12.0	1.1	86.7	126	496	88	4	713
Martin	0.0	13.6	3.3	0.0	16.9	0	62	32	0	94
Miami-Dade	470.5	130.8	3.2	24.7	629.2	2,384	1,351	29	72	3,836
Monroe	0.0	0.7	0.0	0.0	0.7	0	7	0	0	7
Nassau	248.0	3.8	28.7	44.1	324.6	699	21	128	61	910
Okaloosa	0.0	7.1	7.5	0.0	14.6	0	48	94	0	142
Okeechobee	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
Orange	140.2	53.3	0.6	4.4	198.5	542	468	5	13	1,027
Osceola	0.0	2.9	24.1	0.0	27.0	0	19	267	0	285
Palm Beach	3.4	130.2	0.0	2.2	135.8	14	985	0	6	1,004
Pasco	2.4	12.7	2.7	0.5	18.4	12	100	27	2	141
Pinellas	78.8	37.9	0.0	0.0	116.7	374	365	0	0	739
Polk	96.1	128.8	3.5	0.0	228.4	429	1,050	27	0	1,506
Putnam	257.0	88.0	16.8	0.0	361.7	669	542	133	0	1,343
Santa Rosa	0.5	6.0	4.7	3.8	15.0	1	64	33	10	109
Sarsota	7.5	13.6	0.0	0.0	21.1	34	151	0	0	186
Seminole	2.8	13.2	0.2	0.0	16.1	12	148	2	0	162
St. Johns	0.0	4.2	0.4	0.9	5.5	0	35	3	3	42
St. Lucie	0.0	26.4	0.0	0.0	26.4	0	251	0	0	251
Sumter	0.0	11.8	0.7	0.0	12.6	0	76	4	0	80
Suwanee	0.0	0.0	10.9	12.1	23.0	0	0	59	35	94
Taylor	573.3	44.7	22.2	6.5	646.7	1,338	265	86	10	1,700
Union	0.0	15.9	4.1	0.0	20.0	0	96	22	0	118
Volusia	1.3	12.1	6.2	0.0	19.6	5	129	70	0	204
Wakulla	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
Walton	1.0	7.1	1.1	1.6	10.9	3	79	8	5	94
Washington	0.0	1.7	9.0	0.7	11.4	0	10	53	2	64
Total	3,114.7	1,717.4	398.2	284.9	5,515.2	11,696	13,909	3,022	838	29,465

Source: *Implan* data for Florida counties (MIG, Inc, 2004)

2. Research Methods and Procedures

Industry Surveys

Primary information on economic values of the forest products industry in Florida was gathered through mailed survey questionnaires from March through June 2004. Questionnaires were developed for three industry groups: landowners, manufacturers (mills), and forestry service businesses. Manufacturing operations included sawmills, planers, plywood/panels, poles/posts, chippers, pulp/paper, wood preserving, mulching/shavings, and other secondary wood products. Forestry service firms comprised the activities of logging, site preparation, tree planting, forest nurseries, arborists, management consulting, trucking, equipment sales and repair. Lists of firms in each sector were developed from Florida Forestry Association membership rolls, Florida Department of Agriculture and Consumer Service-Division of Forestry, USDA-Forest Service, Dunn & Bradstreet, and Yellow Pages. In addition, a sample of landowners was randomly selected from the property tax rolls for commercial timberland in North Florida, from a database compiled by the Florida Department of Revenue. These sources provided a total of 175 manufacturing firms, 387 service firms and 2460 landowners. The number of firms surveyed in each group and region is summarized in Table 2.1. Among manufacturers and forestry services, the largest sectors surveyed were lumber and pulp/paper manufacturers, loggers and miscellaneous other types of forestry services. The largest numbers of firms were located in the northeast and northwest Florida regions (Fig. 2.1).

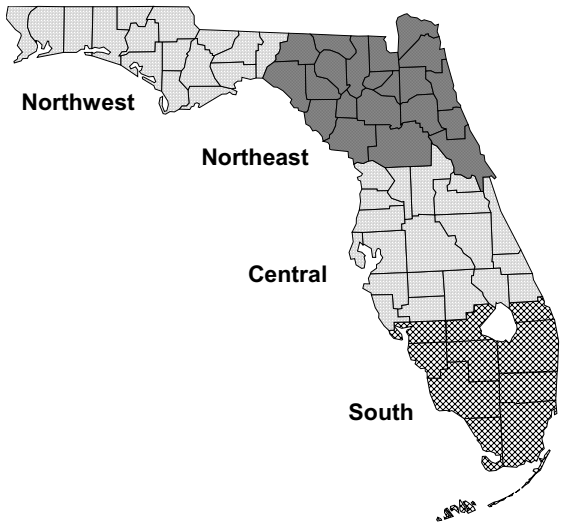


Figure 2.1. Forest regions of Florida surveyed

Table 2.1. Sampled population of forest industry firms in Florida, by region and principal business

Group/Principal Business	Central	Northeast	Northwest	South	Total
Manufacturers	47	76	33	19	175
Chemicals		2	2		4
Lumber	11	34	18	2	65
Mulch/Chips	4	10	1	3	18
Other Manufacturing	12	8	1	3	24
Plywood/Reconstituted Products	2	5	1		8
Posts/Poles	4	3	5		12
Pulp/Paper	9	14	4	11	38
Wood Preserving	5		1		6
Forestry Services	162	291	138	89	680
Logging	20	153	90	1	264
Management	1	15	5		21
Silviculture		12	8		20
Nursery	1	7	0	0	8
Other Forestry Services (transport, equip, etc.)	140	104	35	88	367
Landowners					2,460
Total	209	366	172	108	3,315

Types of information collected in the survey were as follows:

- Respondent (company) name, location, and contact information
- Total annual sales in 2003 (actual value or range: <$100 thousand (k), $100-249k, $250-499k, $500-$999k, $1.0-1.9 million (M), $2-2.9M, $3-3.9M, $4-4.9M, $5-5.9M, $6-6.9M, $7-7.9M, $8-8.9M, $9-9.9M, $10M+)
- Specific types of forest products and services provided (percentage of total sales)
- Employment (fulltime, part-time or seasonal)
- Regional sales: within four Florida regions, neighboring states (GA, AL), rest of US, and international (percentage of total sales)
- Operating expenses and net income (percentage of total)
- Business organization: sole proprietorship, partnership, corporation
- Memberships and certifications
- Area managed and harvested by forest type (landowners, services)
- Mill capacity and energy systems used (manufacturers only)
- Product volumes handled (manufacturers, services)
- Conservation easements (landowners only)

The identity of each firm and contact information were collected for purposes of tracking and possible follow-up. The questionnaires were approved by the University of Florida Institutional Review Board for compliance with standards for human subjects research, and an informed consent statement was provided in the survey forms. This statement also indicated that confidentiality of survey responses would be protected to the fullest extent of the law. Copies of the survey questionnaires and informed consent statement are shown in the Appendix.

Surveys were begun on March 1, 2004 with an introductory letter mailed to all selected firms and landowners informing them that they would be receiving a survey form in a few days. The letter briefly explained the purpose and benefits of the survey, and asked for their cooperation. The letters were signed by representatives of UF/IFAS, the Florida Department of Agriculture & Consumer Services-Division of Forestry and the Florida Forestry Association. Survey forms were mailed the first week of March with a cover letter and postage-paid business reply envelope. A second copy of the survey letter and return envelope was mailed around April 15, as a reminder to any firms or landowners who had not yet responded.

This economic survey was conducted jointly with the USDA-Forest Service's Timber Removals and Product Output Survey, in order to minimize the burden on survey respondents. For this purpose, the manufacturers group also received a copy of the Timber Removals Survey form. Firms in this group were contacted personally at least twice by a contractor to encourage owners/managers to respond, and to assist with completing and returning the forms. For a few survey respondents, follow-up calls were made to clarify responses and to fill-in missing values.

Survey data were entered into spreadsheets for analysis. The principal business of each manufacturer or forestry services respondent was determined based on the type of product or service that represented the largest share of total sales. Total sales for each respondent were estimated at the midpoint of the range of values indicated, or as the actual value provided in some cases. Sales for various product or service categories and regional markets were estimated by multiplying the percentage share reported against the total sales for each firm. Survey results for sampled firms were extrapolated to estimate values for the entire industry state industry population using an expansion factor, expressed as the ratio of the population to the number of respondents within each major industry group. This procedure assumes that the sampled firms are representative of the industry population.

Regional Economic Modeling of the Forest Industry

In order to evaluate the broad regional economic impacts of the forest products industry in Florida, an economic model was developed for the state using the *Implan* software system and associated Florida datasets (MIG, Inc.). Input-output models represent the structure of a regional economy in terms of transactions between industries, employees, households, and government institutions (Miller & Blair, 1985). The *Implan* system includes some 27 distinct industry sectors related to forestry and forest products. The information for these models is derived from the U.S. National Income and Product Accounts, together with regional economic data collected by the US Department of Commerce, Bureau of Economic Analysis. The information used for this analysis was based on fiscal year 2001. Economic multipliers derived from the models can be used to estimate the total economic activity generated in each region by sales to final demand or exports. This includes the effects of intermediate purchases by the forest industry

from other economic sectors (indirect effects), and the effects of industry employee household consumer spending (induced effects), as well as direct sales by forest industry firms. Separate multipliers are provided for output (sales), employment, value added, labor income, and business taxes. The regional *Implan* model was constructed as a fully closed model with all household, government and capital accounts treated as endogenous, to derive Social Accounting Matrix (SAM) type multipliers. The only modifications made to the original model information were to set the regional purchase coefficients to zero for the sectors of timber tracts (landowner), logging, and agricultural and forestry support services, in order to avoid double-counting of backward-linked impacts from the manufacturing sectors. The multipliers for selected sectors used in this study are shown in Table 2.2. Differences in values of the multipliers reflect the structure of industry sectors and regional mix of supplier industries. The multipliers were applied to estimated industry sales from the survey data in order to estimate total economic impacts. Impact estimates were allocated to counties and regions of Florida in proportion to their direct output and employment reported by secondary sources (Florida Dept. of Labor; and US Department of Commerce, County Business Patterns).

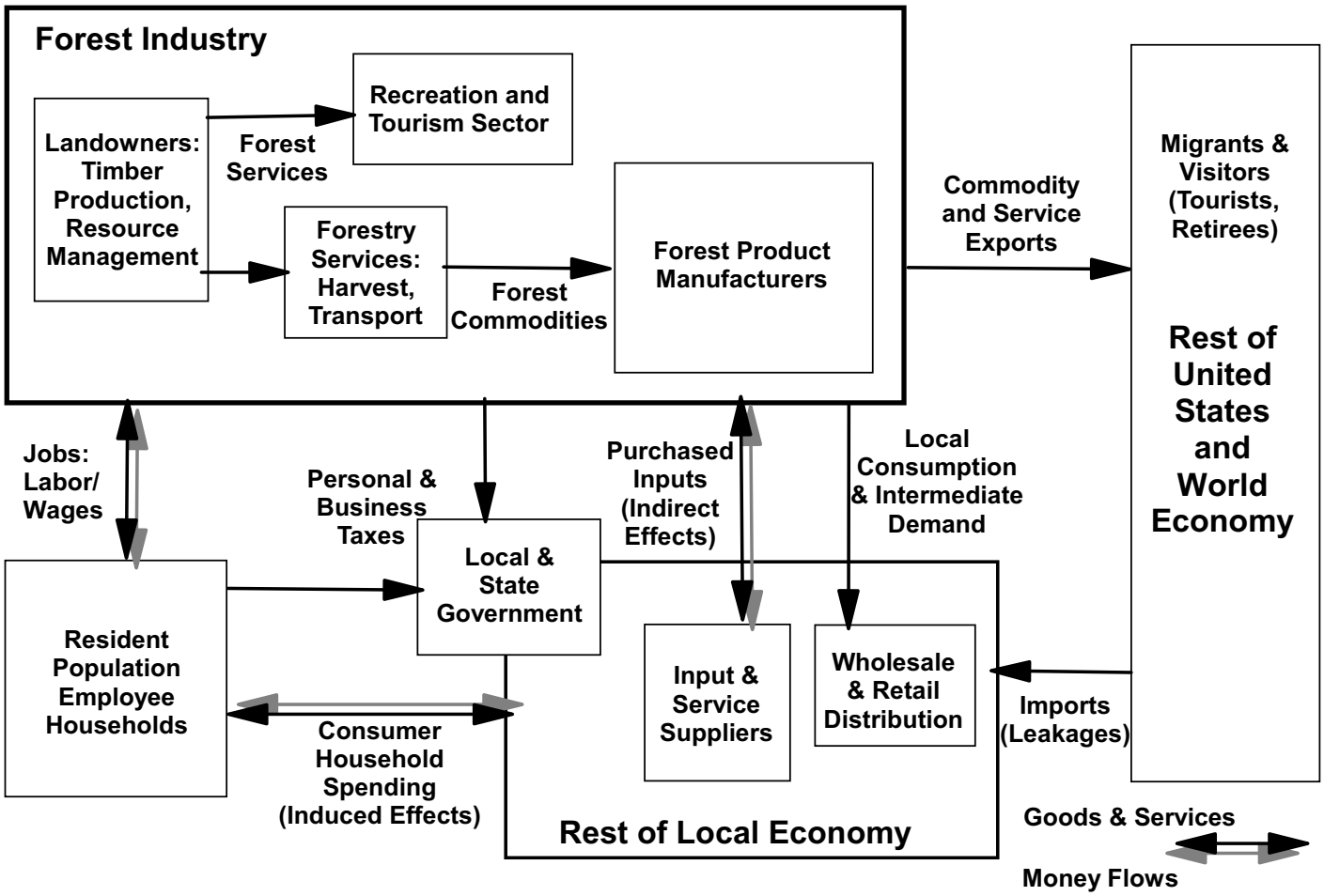
Table 2.2. Economic multipliers for forest industry sectors in Florida

Implan Industry Sector	Output Indirect Effects	Output Induced Effects	Output Total Effects	Value Added Total	Labor Income	Other Property Type Income	Indirect Business Taxes	Employ -ment
Logging	0.156	0.797	1.953	1.083	0.642	0.374	0.067	20.0
Forest nurseries, forest products, and timber tracts	0.544	1.048	2.592	1.413	0.820	0.457	0.136	32.0
Agriculture and forestry support activities	0.350	1.105	2.455	1.443	1.204	0.147	0.091	58.2
Sawmills	0.278	0.550	1.828	0.735	0.506	0.172	0.057	15.0
Wood preservation	0.502	0.571	2.073	0.759	0.520	0.160	0.079	14.3
Reconstituted wood product manufacturing	0.300	0.703	2.003	0.953	0.584	0.304	0.066	14.9
Veneer and plywood manufacturing	0.310	0.671	1.981	0.892	0.647	0.177	0.069	17.4
Engineered wood member and truss manufacturing	0.366	0.801	2.167	1.074	0.733	0.263	0.078	21.5
Cut stock, resawing lumber, and planning	0.514	0.552	2.066	0.737	0.488	0.175	0.073	15.1
Other millwork, including flooring	0.317	0.918	2.235	1.212	0.941	0.189	0.081	27.8
Miscellaneous wood product manufacturing	0.432	0.789	2.221	1.054	0.722	0.247	0.085	22.0
Pulp mills	0.464	0.692	2.156	0.912	0.614	0.225	0.073	14.6
Paper and paperboard mills	0.389	0.774	2.163	1.024	0.622	0.332	0.070	15.0
Paperboard container manufacturing	0.256	0.580	1.836	0.773	0.551	0.168	0.055	14.0
Surface-coated paperboard manufacturing	0.431	0.551	1.983	0.732	0.514	0.149	0.068	13.7
Coated and laminated paper and packaging materials	0.344	0.760	2.103	1.028	0.644	0.313	0.071	16.6
Other miscellaneous chemical product manufacturing	0.484	0.727	2.211	0.977	0.631	0.266	0.079	16.2

All multiplier units are in dollars per dollar of output, except employment, in jobs per million dollars output.
Source: Implan data for Florida (MIG, Inc., 2004).

The structure of the forest industry represented by this model, and the linkages that generate economic impacts are depicted in Figure 2.2. Timber growers own and manage the forest resource that produces the raw commodities, then loggers and trucking firms harvest and deliver wood to forest product manufacturers who in turn produce and market finished wood, paper and chemical products. Some portion of the output is exported to the rest of the United States and world economy, bringing new money into the region, while some output is distributed through wholesale and retail market channels for consumption and intermediate demand within the region. Also, forest resource managers provide environmental services and amenities to the forest-based recreation and tourism sector, which caters to local residents, visitors and migrants to the state. Forest industry sectors purchase inputs and supporting services from other local businesses, which in turn purchase inputs from the broader economy and employ workers to meet this demand, thereby generating economic impacts referred to as indirect effects. Wages paid to employees are spent in the local economy for household personal consumption (e.g. food, clothing, shelter, transportation), and these expenditures create additional economic activity, known as induced effects. Some goods and services required for production activities may not be available from local sources and must be imported from outside the region, which represents a loss to the local economy, often referred to as a "leakage".

Figure 2.2. Structure of the forest industry market chain and economic impact generation.



3. Survey Results and Analysis

Survey Respondent Characteristics

Responses to the industry survey are summarized in Table 3.1. A total of 615 completed questionnaires were received, including 474 from landowners, 65 from manufacturers, and 76 from forestry service firms. The overall response rate was 18.6 percent, which is typical for contemporary mail surveys, while the response rate was higher for the manufacturer group (37%) due to the personal contacts made by a survey interviewer. Most of the respondents were located in the northeast (295) and northwest (220) Florida regions.

Information on the business organization of forest product industry firms surveyed is shown in Table 3.2. Most manufacturers (85%) and service businesses (78%) were corporations, while a majority of landowners (57%) were sole proprietors. A significant number of responding forest landowners (13%) was non-profit organizations.

Information on industry memberships and certifications of surveyed firms is shown in Table 3.3. The Florida Forestry Association was the most common organizational membership, reported by 56 percent of manufacturers, 42 percent of landowners, and 75 percent of services firms. Also, 55 percent of services respondents indicated that they participated in the FFA Master Logger Program. Smaller numbers of respondents indicated participation in other organizations such as the Forest Stewardship Council (7% of landowners) and Sustainable Forestry Initiative (26% of manufacturers). The Farm Bureau and USDA Tree Farm program were affiliations reported by 24 and 22 percent of landowners, respectively. A small number of manufacturers were registered under the International Standards Organization for quality assurance (ISO9000, 8%) and environmental protection (ISO14000, 18%).

Table 3.1. Florida forest industry survey responses and response rates

Survey Group	Number Firms Sampled	Number Respondents					Response Rate
		Total	Northeast Region	Northwest Region	Central Region	South Region	
Landowners	2,460	474	222	189	15	2	19.3%
Manufacturers	175	65	39	14	10	1	37.1%
Forestry Services	680	76	34	17	14	3	11.2%
Total	3,315	615	295	220	39	6	18.6%

Table 3.2. Business organization of surveyed forest industry firms in Florida, 2003

Business Type	Manufacturers		Services		Landowners	
	Number	Percent	Number	Percent	Number	Percent
Sole Proprietorship	7	11%	11	14%	268	57%
Partnership	3	5%	5	7%	62	13%
Corporation	56	85%	59	78%	55	12%
Government	1	2%	1	1%	0	0%
Private Non Profit			0	0%	62	13%

Table 3.3. Association memberships and certifications of surveyed forest industry firms in Florida, 2003

Association	Manufacturers		Services		Landowners	
	Number	Percent	Number	Percent	Number	Percent
Florida Forestry Association	37	56%	57	75%	198	42%
Smartwood	0	0%	0	0%	0	0%
Forest Stewardship Council	0	0%	3	4%	34	7%
Sustainable Forestry Initiative	17	26%	3	4%	7	1%
ISO 9000	5	8%	0	0%	1	0%
ISO 14000	12	18%	0	0%	1	0%
Master Logger, FFA			42	55%		
Farm Bureau					115	24%
Tree Farm					105	22%

Sales and Employment by Principal Forest-Related Business Types

Survey results for sales and employment are summarized by principal type of business in Table 3.4. There were at least ten respondents from each of the following types of businesses: lumber (17), paper/paperboard (12), logging/sitework (39) and other forestry services (18). Some other principal types surveyed were wood preserving (7), plywood and reconstituted wood products (6), wood chemicals (2), mulch/chips (6), posts/poles (5), pulp mills (2), management services (7), and forest nurseries (4).

Table 3.4. Florida forest industry survey results for sales and employment, by principal business, 2003

Industry Group / Primary Business	Number Respondents	Sales Reported ($Mn)	Employment Reported (jobs)	Expanded Total Sales ($Mn)	Expanded Total Employment (jobs)
Landowners	474	73.7	729	382.46	3,781
Manufacturers	64	2,366.3	6,798	6,362.3	18,313
Pulp	2	840.0	1,737	2,520.0	5,211
Paper/Paperboard	10	661.5	1,901	2,116.8	6,083
Lumber	17	220.7	842	844.0	3,219
Wood Preserving	7	351.6	678	351.6	678
Plywood/Reconstituted Prod.	6	165.5	908	220.7	1,211
Wood Chemicals	2	61.5	123	123.0	246
Mulch/Chips	6	38.5	186	115.5	558
Other Manufacturing	9	22.3	345	59.3	920
Posts/Poles	5	4.8	78	11.5	187
Forestry Services	74	113.9	869	1,009.9	8,408
Logging	37	85.2	367	607.9	2,619
Other Service	18	18.5	256	376.7	5,209
Silviculture	9	5.3	134	11.7	298
Management	6	2.5	39	8.6	137
Nursery	4	2.5	73	5.0	146
Total All Sectors	612	2,553.9	8,395	7,754.5	30,503

Sales of forest products and services in 2003 reported by all groups of survey respondents totaled $2.55 billion (Bn), including $2.37 Bn by manufacturers, $114 million (Mn) by forestry services, and $74 Mn by landowners (Table 3.4). An extrapolation of the survey sample results to represent the entire population of firm yielded an estimate of total industry sales of $7.75 Bn, including $6.36 Bn by manufacturers, $1.01 Bn by forestry service firms, and $382 Mn by landowners. Principal businesses with estimated sales exceeding $100 million included pulp ($2.52 Bn), paper/paperboard ($2.12 Bn), lumber ($844 Mn), landowners ($382 Mn), wood preserving ($352 Mn), plywood/reconstituted wood products ($221 Mn), wood chemicals ($123 Mn), mulch and chips ($116 Mn), logging ($608 Mn), and other forestry services such as transportation and equipment services ($376 Mn).

Total employment reported by survey respondents was 8,395 fulltime, part-time or seasonal jobs. Again, based on extrapolation of the sample data, total direct employment in the Florida forest products industry in 2003 was estimated at 30,503 jobs, including 18,313 for manufacturers, 8,408 for forestry services, and 3,781 for landowners. Among principal types of businesses, the largest employers were for paper/paperboard (6,083), pulp mills (5,211), other forestry services (5,209), lumber (3,219), landowners (3,781), logging (2,619), and plywood/reconstituted products (1,211).

These overall results for sales and employment are consistent with official statistics reported by US Department of Commerce and Department of Labor (Tables 1.1, 1.2, Figures 1.4, 1.5). The estimated sales of forest products by landowners is also consistent with values derived from data on volumes of roundwood products harvested, together with statewide average prices reported by Timber Mart South (Univ. Georgia).

Value of Forest Products and Services

Survey results and extrapolated values for specific types of forest products and services are summarized in Table 3.5. The number and percentage of respondents within each major survey group that reported selling the specified product or service is indicated. Total sales of each product or service item were estimated by computing the share of total sales reported within each industry group, then multiplying this percentage by the extrapolated total sales estimate for the industry group, in order to maintain a controlled total value. Because many firms reported multiple types of products, this approach is more accurate and provides a more detailed breakout than the analysis by principal business type shown above.

Within the manufacturers group, a large percentage of respondents reported selling dimension lumber (42%), mulch/shavings (29%), and chipped wood (20%). In addition, 34 percent of manufacturers reported selling other miscellaneous products that were not specifically itemized. By far, the largest type of manufactured forest product in Florida was pulp and paper, with sales of $1.47 Bn reported by survey respondents, and estimated total sales of $3.96 Bn. This represented 62 percent of total manufactured product sales. Other important manufactured forest products representing at least $100 million in extrapolated sales included preservative treated wood ($859 Mn), dimension lumber ($388 Mn), plywood ($365 Mn), wood chemicals ($245 Mn), chipped wood ($186 Mn), and mulch/shavings ($123 Mn). In addition, some notable minor manufactured forest products that represented one percent or less of total sales included residuals/by-products ($81 Mn), posts/fencing ($43 Mn), poles/pilings ($22 Mn), milled wood ($7 Mn), reconstituted wood products ($6 Mn), and fuelwood ($4 Mn).

Within the forestry services sector, the most commonly reported activities by survey respondents were timber harvesting (57%), timber trucking (29%), forest thinning (25%) and mensuration/management (21%). In terms of estimated value, the largest service activity was timber harvesting, at $615 Mn, or 60 percent of all forestry services. Timber trucking had an estimated valued of $113 Mn, representing about 11 percent of all services. The large value for forest thinning ($107 Mn) is notable as a growing area of forestry services, to meet the need for both precommercial thinning of pine plantations to improve stand conditions for higher value products. Other significant services reported included tree trimming and removal ($61 Mn), forest site preparation ($48 Mn), tree seedling production by nurseries ($23 Mn), and forest mensuration/management ($22 Mn). Some minor forestry services, valued at less than $10 Mn were tree planting, controlled burning, equipment sales and repair, and forest fertilization.

Among forest landowners in Florida, the most commonly reported products sold in 2003 were pulpwood (22%), pine straw (12%), chip & saw logs (17%) and sawtimber logs (15%). In terms of estimated value, the largest product categories were pulpwood ($81 Mn), pine straw ($80 Mn), other miscellanous products ($76 Mn), chip & saw logs ($63 Mn), and sawtimber logs ($37 Mn). Some minor forest products reported by less than 10 percent of landowners included hunting and fishing leases, valued at $13 Mn, plywood veneer logs ($11 Mn), livestock grazing ($9 Mn), pole and post logs ($8 Mn), logs for chips and mulch ($2 Mn), logs for composite wood products such as oriented strandboard ($1 Mn), ornamental, food and medicinal products such as saw palmetto berries, and fuelwood. The large value for pine straw is notable because this is a relatively new forest product that has grown rapidly to become one of the most important sources of income to forest landowners, rivaling pulpwood in value.

Table 3.5. Products and services sold by the forest industry in Florida, 2003

Industry Group / Products and Services	Respondents		Reported Sales (Mn$)	Share Total Sales	Expanded Sales (Mn$)
	Number	Percent			
Manufacturers					
Pulp & Paper	13	20%	1,470.4	62%	3,958.4
Pulp	2	3%	808.9	34%	2,177.5
Paper/Paperboard	11	17%	661.5	28%	1,780.9
Preservative Treated Wood	12	18%	319.1	13%	859.1
Dimension Lumber	27	42%	144.1	6%	387.8
Plywood	6	9%	135.6	6%	365.1
Wood Chemicals	4	6%	91.2	4%	245.4
Chipped Wood	13	20%	69.0	3%	185.8
Mulch & Shavings	19	29%	45.6	2%	122.8
Other Products	14	22%	31.0	1%	83.4
Residuals & By-Products	18	28%	30.0	1%	80.7
Posts & Fencing	11	17%	15.9	1%	42.9
Poles & Pilings	6	9%	8.1	<1%	21.9
Milled Wood Products	5	8%	2.8	<1%	7.4
Reconstituted Wood Products	1	2%	2.3	<1%	6.2
Fuelwood	4	6%	1.5	<1%	3.9
Total All Manufactured Products			2,366.5	100%	6,370.9
Forestry Services					
Timber Harvesting	43	57%	66.2	60%	615.0
Timber Trucking	22	29%	12.1	11%	112.6
Forest Thinning	19	25%	11.5	10%	106.9
Tree Trimming & Removal	6	8%	6.5	6%	60.8
Site Preparation	14	18%	5.2	5%	48.4
Forest Nursery	5	7%	2.5	2%	23.2
Mensuration & Management	16	21%	2.4	2%	22.4
Other Operations	10	13%	1.3	1%	12.5
Tree Planting	11	14%	1.0	1%	9.3
Controlled Burning	12	16%	1.0	1%	9.0
Equipment Sales & Repair	3	4%	0.2	<1%	2.2
Forest Fertilization	3	4%	0.2	<1%	1.6
Total All Services			110.2	100%	1,023.8
Landowners					
Pulpwood	135	22%	10.7	21%	80.9
Pine Straw	74	12%	10.5	21%	79.8
Other Products	25	4%	9.9	20%	75.6
Chip & Saw Logs	104	17%	8.3	16%	62.9
Sawtimber Logs	90	15%	4.9	10%	37.0
Hunting & Fishing Leases	49	8%	1.8	4%	13.4
Plywood Veneer Logs	52	8%	1.5	3%	11.4
Livestock Grazing	38	6%	1.1	2%	8.6
Poles & Posts	50	8%	1.1	2%	8.1
Chips & Mulch Wood	25	4%	0.3	1%	2.0
Logs for Composites	19	3%	0.2	<1%	1.3
Ornamentals Foods, & Medicinals	19	3%	0.1	<1%	0.8
Fuelwood	22	4%	0.1	<1%	0.6
Total All Landowner Products			50.3	100%	382.4

Regional Sales, Employment and Markets

Estimated sales of the Florida forest products industry are summarized in Table 3.6 by the four Florida regions in which survey respondents were located (see Figure 2.1). The northeast Florida region had 49 percent of sales ($3.81 Bn) and 43 percent of employment (13,620), due mainly due to the concentration of pulp/paper manufacturing firms in this area. Industry sales from the central Florida region totaled $2.01 Bn, and employment was 5,594 jobs. Firms in the northwest Florida region had total sales of $1.21 Bn and employment of 6,806, while south Florida had total sales of $696 Mn and employment of 5,020.

Table 3.6. Forest industry production value and employment by Florida regions, 2003

Industry Group	Value ($Mn)					Employment (jobs)				
	Central	North-east	North-west	South	All Regions	Central	North-east	North-west	South	All Regions
Manufacturers	1,804.2	2,949.2	1,009.9	627.0	6,390	3,995	8,190	3,891	1,653	17,729
Services	203.1	566.2	124.8	68.2	962	1,470	3,043	2,176	2,848	9,536
Landowners	6.2	298.5	74.5	0.3	380	130	2,387	740	519	3,776
Total	2,013.5	3,813.9	1,209.2	695.5	7,732	5,594	13,620	6,806	5,020	31,040
Region Share (Percent)	26.0%	49.3%	15.6%	9.0%	100.0%	18.0%	43.9%	21.9%	16.2%	100.0%

Information on the sales of forest products and services by Florida-based firms to various regional markets is summarized in Table 3.7. Survey respondents reported sales to four regions in Florida (northwest, northeast, central, south), the neighboring states of Georgia and Alabama, the rest of the United States, and to other countries (international). For all sectors, sales within Florida were $3.91 Bn, or 50 percent of total sales, including 23 percent in the central region, 15 percent in the northeast, 4 percent in the northwest, and 8 percent in the south. Total sales to Georgia and Alabama were $745 Mn (10%), while total sales to the rest of the United States were $2.49 Bn (32%), and sales to international markets were $636 Mn (8%). Total sales outside Florida were $3.87 Bn (50%). Manufacturers had the highest share of sales to domestic markets outside the state (44%) and internationally (9%). For forestry services, virtually all sales (97%) were within the state, with the largest share to the northeast (55%), and northwest regions (26%). Landowners also sold most products to customers within Florida (80%), but had significant sales to domestic markets in other states (20%). Export sales are important from the standpoint of regional economic development, because the new money coming into the region recirculates in the local economy, thereby stimulating further activity.

Table 3.7. Regional market area sales by the Florida forest industry, 2003

Market Region	Manufacturers		Services		Landowners		All Sectors	
	Million $	Percent	Million $	Percent	Million $	Percent	Million $	Percent
In Florida	2,968.6	47%	989.9	97%	305.7	80%	3,908.3	50%
Northwest	161.3	3%	229.7	22%	98.6	26%	329.7	4%
Northeast	749.3	12%	561.8	55%	203.9	53%	1,184.9	15%
Central	1,522.2	24%	155.2	15%	3.2	1%	1,774.5	23%
South	535.8	8%	43.3	4%	0.0	0%	619.2	8%
Outside Florida	3,402.3	53%	33.9	3%	76.7	20%	3,868.8	50%
Other States	2,834.8	44%	33.9	3%	76.7	20%	3,232.4	42%
Georgia & Alabama	650.1	10%	33.9	3%	3.9	1%	745.3	10%
Rest of U.S.	2,184.7	34%	0.0	0%	72.8	19%	2,487.1	32%
International	567.6	9%	0.0	0%	0.0	0%	636.4	8%
Total	6,370.9	100%	1,023.8	100%	382.4	100%	7,777.0	100%

Operating Expenses of Forest Industry Firms

Information on operating expenses in 2003 reported by each industry group is presented in Table 3.8.

Table 3.8. Operating expenses reported by surveyed forest industry firms in Florida, 2003

Industry Group / Operating Expense Item	Expenses Reported ($1000)	Share of Total Expenses (percent)
Forest Product Manufacturers		
Raw Materials	890,231	41%
Employee Wages & Benefits	312,608	14%
Supplies & fuel	191,352	9%
Repair & Maintenance	152,188	7%
Capital Interest & Depreciation	113,694	5%
Transportation & Freight	94,508	4%
Utilities	75,376	3%
Administrative Overhead	59,192	3%
Management Salaries	59,433	3%
Other Expense	57,183	3%
Rent	33,752	2%
Contractual Services	51,191	2%
Marketing	42,850	2%
Insurance	14,823	1%
Taxes (Fed, State, Local)	24,758	1%
Total Manufacturer Expenses	2,173,139	100%
Forestry Services		
Raw Materials	21,743	24%
Contractual Services	16,603	19%
Employee Compensation & Benefits	16,040	18%
Transportation & Freight	7,016	8%
Fuel	5,205	6%
Machinery Repair & Maintenance	4,411	5%
Insurance	4,699	5%
Capital Interest & Depreciation	3,337	4%
Supplies	2,533	3%
Taxes (Fed, State, Local)	2,858	3%
Management Salaries	1,658	2%
Utilities	1,187	1%
Administrative Overhead	486	1%
Other Expense(s)	1,111	1%
Total Forestry Services Expenses	88,887	100%
Landowners		
Timber Harvesting Services	4,480	15%
Fuel & Supplies	4,388	15%
Employee Compensation &Benefits	3,982	14%
Taxes (Fed, State, Local)	3,679	13%
Other Expense(s)	2,810	10%
Management Services	2,624	9%
Tree Planting Supply & Services	2,667	9%
Machinery Repair & Maintenance	2,519	9%
Bank Interest & Insurance	1,154	4%
Transportation & Freight	611	2%
Rent	279	1%
Total Landowner Expenses	29,192	100%

Expenses reported by survey respondents totaled $2.17 Bn for manufacturers, $88.9 Mn for forestry services, and $29.2 Mn for landowners. As a share of total annual operating expenses, the largest expense items for manufacturers were raw materials purchased (41%), employee wages and benefits (14%), supplies and fuel (9%), repairs and maintenance (7%), and interest and depreciation on capital investments (5%). Major expenses for forestry services businesses were raw materials (24%), contractual services (19%), employee compensation and benefits (18%), transportation and freight (8%), fuel (6%), equipment repairs and maintenance (5%), and insurance (5%). The largest expenses for landowners were for timber harvesting services (15%), fuel and supplies (15%), employee compensation and benefits (14%), taxes (13%), management services (9%), tree planting (9%), and machinery repair and maintenance (9%).

Forest Land Owned and Harvested

Forest land owned and harvested in 2003 reported by landowner respondents is shown in Table 3.9. Florida landowners reported ownership of 1.96 million acres of forest lands, including 1.2 million acres in pine plantation, 592 thousand acres in wetlands, 117 thousand acres in natural pine stands, and 30 thousand acres in upland hardwoods. Some 78 percent of respondents reported having pine plantations. Landowners reported a total of 67 thousand acres were harvested in 2003, or 3.4 percent of the area owned, with the majority of harvested area from pine plantations (54,032 acres). The overall harvest rate, calculated as the ratio of harvested area to total land area owned, was 3.4 percent, which implies an average turnover rate of 29.2 years.

Conservation easements have become a popular mechanism for protecting land from development, while continuing commercial use for timber production and recreation. Conservation easements reported by Florida landowners totaled 37 thousand acres, and were valued at nearly $30 million.

Table 3.9. Area of timberland owned and harvested reported by surveyed Florida landowners, 2003

Land Type	Number Respondents	Percent Respondents	Land Owned (acres)	Area Harvested in 2003 (acres)
Pine Plantation	369	78%	1,216,232	54,032
Natural Pine	203	43%	117,290	2,946
Upland Hardwood	118	25%	30,473	459
Wetlands	164	35%	591,868	9,349
Total Area	280	59%	1,959,650	67,094

Mill Capacity and Product Volumes Handled

Manufacturers reported total annual mill capacity of 8.6 million tons of pulpwood, and 86.9 billion board feet of sawtimber. Forestry service businesses surveyed reported managing a total forest land area of 840 thousand acres. A total volume of 18.6 million tons of products was reported handled by forestry services firms in 2003 (Table 3.10).

Table 3.10. Volumes of forest products handled by forestry services firms surveyed, 2003

Product	Number Respondents	Amount (tons)
Logs	35	1,350,609
Poles & Posts	22	104,777
Pulpwood	36	2,261,309
Chipped Wood	8	81,056
Tree Trimmings, Waste, & Fuel Wood	3	86,507
Finished Products Hauled	1	400
Other Products	2	14,688,020
Total Volume		18,572,679

4. Economic Impacts of the Florida Forest Industry

Statewide Impacts by Sector

Results of the economic impact analysis are summarized in Table 4.1 Total output impacts were estimated at $16.63 Bn, comprised of $7.78 Bn in direct sales within the forestry and forest products sectors, plus $3.09 Bn associated with activity in supplier businesses (indirect effects), and $5.67 Bn in activity due to spending by industry employees (induced effects). Total employment impacts were 133,475 jobs, with 37,193 directly, 30,023 indirectly, and 66,250 induced. Total value added impacts were $7.52 Bn, including $2.32 Bn direct, $1.70 Bn indirect, and $3.51 Bn induced. Value added included labor income impacts of $4.92Bn, other property-related income impacts of $2.02 Bn, and indirect business taxes paid to local, state and federal governments of $581Mn. The value added impact indicates the net contribution of personal and business income to the regional economy. The value added impact for the forest product industry represented approximately 1.53 percent of the $490 Bn gross regional product of Florida.

Table 4.1. Direct, indirect, and induced economic impacts of the forest industry in Florida, 2003

Impact Measure	Direct	Indirect	Induced	Total
Output ($Mn)	7,777	3,087	5,670	16,534
Value Added ($Mn)	2,320	1,696	3,508	7,523
Labor Income ($Mn)	1,452	1,066	2,403	4,921
Other Property Type Income ($Mn)	742	440	840	2,022
Indirect Business Taxes ($Mn)	126	190	265	581
Employment (Jobs)	37,193	30,032	66,250	133,475

Note all values expressed in year 2003 dollars

Total economic impacts of the forest industry in Florida are summarized for major industry groups in Table 4.2. Output impacts in the forestry and forest products sectors totaled $8.24 Bn, including $1.65 Bn in agriculture, forestry and natural resources, and $6.59 Bn in forest product manufacturing. Total output impacts were $8.29 Bn in other sectors of the Florida economy. Employment impacts were 46,109 jobs in forestry and forest products and 87,366 in all other sectors. Value added impacts were $2.51 Bn in forestry and forest products and $5.01 Bn in all other sectors. Value added impacts within the forest industry were $594 Mn for paper and paperboard mills, $502 Mn for pulp mills, $364 Mn for logging, $244 Mn for agriculture and forestry support activities, $229 Mn for sawmills, $185 Mn for forest nurseries and timber tracts, and $117 Mn for veneer and plywood manufacturing. Large value added impacts were also felt in the other economic sectors of government ($903 Mn), wholesale trade ($570 Mn), professional-scientific & technical services ($379 Mn), health & social services ($361 Mn), real estate ($340 Mn), retail trade ($339 Mn), finance-insurance ($320 Mn).

Table 4.2. Economic impacts of the forest industry on major sectors of the Florida economy, 2003

Industry Group / Sector	Output Impact ($Mn)	Employment Impact (Jobs)	Value Added Impact ($Mn)
Forestry & Forest Products	8,240	46,109	2,509
Agriculture & Forestry & Natural Resources	1,646	24,834	835
Logging	722	5,082	364
Forest nurseries and timber tracts	406	1,165	185
Agriculture and forestry support activities	449	17,534	244
Forest Products Manufacturing	6,593	21,276	1,674
Pulp mills	2,181	4,916	502
Paper and paperboard mills	1,781	4,197	594
Wood preservation	931	2,816	131
Sawmills	955	5,271	229
Veneer and plywood manufacturing	388	2,394	117
Other miscellaneous chemical product manuf.	255	828	65
Miscellaneous wood product manufacturing	86	706	28
Other millwork- including flooring	10	125	5
Reconstituted wood product manufacturing	6	23	2
Other Industry Sectors	8,294	87,366	5,015
Mining	71	356	26
Utilities	270	544	159
Construction	577	6,127	224
Non-Forest Products Manufacturing	596	2,820	201
Wholesale Trade	852	6,222	570
Transportation & Warehousing	505	4,491	238
Retail trade	550	10,352	339
Information	233	1,293	127
Finance & insurance	557	3,800	320
Real estate & rental	466	2,715	340
Professional- scientific & tech services	493	5,821	379
Management of companies	133	1,170	95
Administrative & waste services	237	4,808	165
Educational svcs	48	1,004	32
Health & social services	669	8,107	361
Arts- entertainment & recreation	78	1,412	51
Accomodation & food services	293	6,164	157
Other services	645	8,040	329
Government & non NAICs	1,021	12,119	903
Total	16,534	133,475	7,523

Impacts in Florida Counties

Total economic impacts allocated to Florida counties are shown in Table 4.3 for output, value added, labor income, other property income, indirect business taxes, and employment. These results were estimated by allocating the total impact values to each county based on its share of total output or employment reported by secondary sources (USDOC, County Business Patterns). The counties are rank-ordered by output impact. The top ten counties, all with output impacts of at least $500 Mn, were Taylor ($1.94 Bn), Miami-Dade ($1.89 Bn), Duval ($1.71 Bn), Putnam ($1.08 Bn), Escambia ($1.05 Bn), Hillsborough ($1.00 Bn), Nassau ($973 Mn), Polk ($684 Mn), Orange ($595 Mn), and Bay ($502 Mn). In addition, 10 counties had estimated output impacts between $200 and $500 Mn. In terms of employment, the largest counties were Miami-Dade (17,379) and Duval (15,487). Twenty nine other

counties had employment impacts of at least 1000 jobs. Although many of the counties in Central and South Florida do not have significant forest resources, they do have substantial manufacturing activity and employment. Only three counties did not have any appreciable impacts. The large impact in Miami-Dade and other highly urbanized counties reflects the significant forest-based manufacturing activity, although there may not be large forest resources locally.

Table 4.3. Economic impacts of the forest industry in Florida counties, 2003

County	Output ($Mn)	Total Value Added ($Mn)	Labor Income ($Mn)	Other Property Type Income ($Mn)	Indirect Business Taxes ($Mn)	Employment (Jobs)
Taylor	1,938.7	882.2	577.0	237.1	68.1	7,700
Miami-Dade	1,886.4	858.4	561.4	230.7	66.3	17,379
Duval	1,706.1	776.3	507.8	208.6	59.9	15,487
Putnam	1,084.5	493.5	322.8	132.6	38.1	6,085
Escambia	1,053.3	479.3	313.5	128.8	37.0	5,917
Hillsborough	1,004.5	457.1	299.0	122.8	35.3	8,518
Nassau	973.1	442.8	289.6	119.0	34.2	4,121
Polk	684.7	311.6	203.8	83.7	24.1	6,821
Orange	595.0	270.7	177.1	72.8	20.9	4,654
Bay	501.8	228.3	149.3	61.4	17.6	3,238
Palm Beach	407.2	185.3	121.2	49.8	14.3	4,549
Broward	368.2	167.5	109.6	45.0	12.9	3,800
Pinellas	349.9	159.2	104.1	42.8	12.3	3,346
Highlands	283.6	129.0	84.4	34.7	10.0	1,817
Lee	278.5	126.7	82.9	34.1	9.8	2,236
Marion	260.1	118.3	77.4	31.8	9.1	3,228
Madison	244.2	111.1	72.7	29.9	8.6	2,493
Alachua	207.6	94.4	61.8	25.4	7.3	2,014
Columbia	203.5	92.6	60.6	24.9	7.1	1,449
Gadsden	202.0	91.9	60.1	24.7	7.1	2,643
Dixie	193.2	87.9	57.5	23.6	6.8	1,728
Brevard	155.9	71.0	46.4	19.1	5.5	1,939
Hernando	128.9	58.7	38.4	15.8	4.5	1,443
Liberty	128.0	58.3	38.1	15.7	4.5	1,044
Jackson	115.7	52.7	34.4	14.2	4.1	1,274
Osceola	80.8	36.8	24.1	9.9	2.8	1,291
St. Lucie	79.1	36.0	23.5	9.7	2.8	1,137
Manatee	76.2	34.7	22.7	9.3	2.7	1,011
Lake	74.4	33.9	22.2	9.1	2.6	1,178
Gulf	70.9	32.2	21.1	8.7	2.5	670
Suwanee	68.9	31.4	20.5	8.4	2.4	426
Gilchrist	66.6	30.3	19.8	8.1	2.3	535
Sarsota	63.3	28.8	18.8	7.7	2.2	842
Union	59.9	27.2	17.8	7.3	2.1	536
Volusia	58.9	26.8	17.5	7.2	2.1	925
Flagler	55.2	25.1	16.4	6.8	1.9	735
Pasco	55.2	25.1	16.4	6.8	1.9	637
Citrus	54.3	24.7	16.2	6.6	1.9	390
Martin	50.7	23.1	15.1	6.2	1.8	427
Seminole	48.4	22.0	14.4	5.9	1.7	734
Jefferson	46.0	20.9	13.7	5.6	1.6	411
Santa Rosa	44.9	20.4	13.4	5.5	1.6	492
Calhoun	44.2	20.1	13.1	5.4	1.6	432

Table 4.3. Economic impacts of the forest industry in Florida counties, 2003

County	Output ($Mn)	Total Value Added ($Mn)	Labor Income ($Mn)	Other Property Type Income ($Mn)	Indirect Business Taxes ($Mn)	Employment (Jobs)
Okaloosa	43.8	19.9	13.0	5.4	1.5	642
Sumter	37.7	17.1	11.2	4.6	1.3	364
Clay	35.2	16.0	10.5	4.3	1.2	394
Charlotte	35.0	15.9	10.4	4.3	1.2	474
Washington	34.1	15.5	10.1	4.2	1.2	292
Bradford	33.3	15.2	9.9	4.1	1.2	290
Walton	32.7	14.9	9.7	4.0	1.1	428
Collier	32.4	14.8	9.7	4.0	1.1	540
Holmes	30.6	13.9	9.1	3.7	1.1	405
Levy	26.1	11.9	7.8	3.2	0.9	223
Hardee	24.3	11.0	7.2	3.0	0.9	181
Desoto	22.7	10.3	6.8	2.8	0.8	336
Indian River	18.5	8.4	5.5	2.3	0.6	311
Hendry	16.9	7.7	5.0	2.1	0.6	136
St. Johns	16.4	7.4	4.9	2.0	0.6	191
Lafayette	12.1	5.5	3.6	1.5	0.4	131
Franklin	8.7	3.9	2.6	1.1	0.3	157
Baker	6.9	3.1	2.1	0.8	0.2	66
Leon	6.3	2.9	1.9	0.8	0.2	117
Hamilton	5.8	2.6	1.7	0.7	0.2	28
Monroe	2.0	0.9	0.6	0.2	0.1	33
Glades	0.0	0.0	0.0	0.0	0.0	0
Okeechobee	0.0	0.0	0.0	0.0	0.0	0
Wakulla	0.0	0.0	0.0	0.0	0.0	0

Fiscal Impacts of the Forest Industry

Fiscal impacts of the Florida forest industry on tax revenues to local, state and federal governments are summarized in Table 4.4. This information was provided by a special report available in the *Implan* software, that accounts for prevailing rates of all forms of local taxes. The total tax impact of $1.75 Bn included $1.20 Bn to the federal government and $544 Mn to state and local governments. Some of the largest tax impact items were personal income tax ($516 Mn), federal social insurance payments by employees ($265 Mn) and employers ($254 Mn), sales tax ($255 Mn), and personal/business property taxes ($179 Mn).

Table 4.4. Tax impacts of the Florida forest industry, 2003

Government Level / Tax Type	Tax Amount ($1000)
Federal Government	**1,204,334**
Corporate Profits Tax	99,361
Custom Duties	12,113
Indirect Business Excise Taxes	38,984
Indirect Business Federal Non Taxes	13,759
Personal Income Tax	515,645
Personal Fines, Fees	5,438
Social Ins, Employee Contribution	264,924
Social Ins., Employer Contribution	254,110
State/Local Government	**544,329**
Corporate Profits Tax	15,286
Dividends	233
Business Motor Vehicle Licenses	3,917
Business Other Taxes	29,078
Business Property Tax	176,047
State & Local Non Taxes	28,818
Sales Tax	255,252
Severance Tax	527
Motor Vehicle Licenses	7,291
Personal Fines, Fees	19,370
Other Taxes: Fishing, Hunting permits	315
Personal Property Taxes	2,744
Social Ins, Employee Contribution	1,185
Social Ins., Employer Contribution	4,266
Total All Governments	**1,748,667**

Comparisons to the Forest Industry in Other States

The importance of the forest industry in Florida may be put in context by comparison with equivalent economic impact values and the share of gross regional product in other states of the U.S. Total economic impacts of the forest industry in each state in 2001 are shown in Table 4.5. Note that these estimates are based on secondary information on industry output, employment and value added, together with mulipliers derived from *Implan* models for each state. Therefore, the values for Florida differ somewhat from the estimates presented above due to differences in the source of data, the year (2001 vs. 2003), and the exact method of impact calculation. For the forest industry in the U.S., total industry output in 2001 was $258 Bn, total output impacts were $452 Bn, total value added impacts were $203 Bn, and total employment impacts were 3.4 million jobs. States with the largest output impacts were Wisconsin ($35.9 Bn), Georgia ($26.2 Bn), California ($25.2 Bn), Oregon ($21.7 Bn), Texas ($19.7 Bn), Washington ($19.4 Bn), Alabama ($19.1 Bn), and North Carolina ($18.0 Bn). Florida was ranked 22nd in terms of total output impacts ($10.6 Bn), 18th in employment impacts (87,906 jobs), and 20th in value added impacts ($4.8 Bn). The forest industry accounted for 2.0 percent of total employment and total economic activity (GDP) in the U.S., as compared with 1.3 percent for Florida. Other states with a rather higher share of regional economic activity in the forest industry were Maine (13.8%), Oregon (9.2%), Wisconsin (9.0%), Arkansas (7.6%), Mississippi (7.2%), and Alabama (7.0%).

Table 4.5. Economic impacts of the forest industry in the United States, by state, 2001

State	Industry Output ($Mn)	Output Impacts ($Mn)	Employment Impacts (jobs)	Total Value Added Impacts ($Mn)	Share of Total Employment	Share of Gross State Product
Alabama	10,467.8	19,147.8	139,734	8,369.0	5.8%	7.0%
Alaska	313.7	554.6	3,943	269.2	1.0%	1.2%
Arizona	1,302.0	2,004.6	17,108	848.2	0.6%	0.5%
Arkansas	6,913.8	12,154.2	100,010	5,056.4	6.6%	7.6%
California	14,787.8	25,239.6	185,624	11,355.2	0.9%	0.8%
Colorado	1,411.6	2,230.6	17,279	956.5	0.6%	0.5%
Connecticut	2,186.8	3,893.1	24,002	1,844.8	1.1%	1.1%
Delaware	466.4	726.3	5,099	317.1	1.0%	1.0%
Florida	5,957.8	10,594.3	87,906	4,834.6	1.0%	1.0%
Georgia	13,201.5	26,193.5	195,046	12,404.9	3.9%	4.0%
Hawaii	109.5	158.5	1,310	74.0	0.2%	0.2%
Idaho	2,365.6	4,231.1	36,791	1,975.1	4.5%	5.4%
Illinois	7,853.2	14,862.9	105,397	6,676.3	1.4%	1.4%
Indiana	4,935.8	7,693.3	59,772	2,970.3	1.6%	1.6%
Iowa	2,842.8	4,694.1	39,541	2,009.6	2.0%	2.3%
Kansas	995.1	1,620.4	12,653	653.3	0.7%	0.8%
Kentucky	4,529.4	7,317.6	58,886	2,875.1	2.5%	2.5%
Louisiana	5,868.1	10,618.6	81,340	4,652.8	3.3%	3.8%
Maine	6,259.6	11,245.8	87,710	4,948.8	10.9%	13.8%
Maryland	2,306.1	3,841.9	27,991	1,682.5	0.9%	0.9%
Massachusetts	5,032.0	9,377.0	61,669	4,329.0	1.5%	1.5%
Michigan	7,515.4	12,774.8	85,705	5,564.1	1.5%	1.7%
Minnesota	6,902.0	13,909.4	105,744	6,530.8	3.1%	3.4%
Mississippi	6,150.4	10,842.5	88,879	4,576.2	6.0%	7.2%
Missouri	3,875.6	6,706.2	57,255	2,721.3	1.6%	1.5%
Montana	1,491.7	2,555.1	21,937	1,064.3	3.8%	4.6%
Nebraska	611.4	961.5	8,367	384.3	0.7%	0.7%
Nevada	349.3	506.0	4,146	240.6	0.3%	0.3%
New Hampshire	1,791.2	3,077.0	22,402	1,349.5	2.8%	3.1%
New Jersey	5,423.3	9,706.8	62,614	4,587.6	1.3%	1.3%
New Mexico	409.0	715.3	7,990	285.0	0.8%	0.6%
New York	8,788.2	15,181.2	95,558	6,926.8	0.9%	0.8%
North Carolina	10,576.5	17,962.5	135,766	7,468.3	2.8%	2.8%
North Dakota	269.8	410.7	3,821	159.9	0.8%	0.9%
Ohio	10,237.2	16,516.3	120,324	6,755.3	1.8%	1.9%
Oklahoma	1,626.9	2,050.8	22,960	1,170.2	1.1%	1.2%
Oregon	11,088.9	21,731.3	171,487	10,381.0	8.1%	9.2%
Pennsylvania	11,992.0	15,643.5	158,103	9,538.6	2.3%	2.3%
Rhode Island	526.9	755.6	5,354	296.9	0.9%	0.9%
South Carolina	6,666.0	11,405.3	84,396	4,986.6	3.7%	4.5%
South Dakota	560.2	870.0	6,992	338.9	1.3%	1.5%
Tennessee	8,356.7	15,363.2	114,667	6,621.4	3.3%	3.6%
Texas	10,913.9	19,664.8	146,995	8,855.8	1.2%	1.1%
Utah	836.8	1,397.3	13,005	589.6	0.9%	0.9%
Vermont	1,155.9	1,908.2	16,336	785.8	4.0%	4.0%
Virginia	7,299.9	12,451.7	88,967	5,386.2	2.0%	2.0%
Washington	10,535.1	19,403.9	137,427	9,175.2	3.8%	4.2%
West Virginia	1,825.6	3,029.6	26,231	1,140.1	2.9%	2.7%
Wisconsin	19,624.3	35,911.7	259,327	15,474.3	7.6%	9.0%
Wyoming	215.9	324.7	2,827	123.4	0.8%	0.8%
Total	257,722.6	452,136.5	3,424,391	202,580.7	2.0%	2.0%

Source: *Implan* data for the United States (MIG, Inc, 2004)

5. Recreation, Tourism and Amenity Values of Forests

(Adapted from Kiker and Hodges, 2002)

Recreation Values

Forests in Florida are used extensively for recreational activities such as hunting, fishing, wildlife viewing, hiking, and camping. About 8 percent of landowners surveyed in this study reported that their forest land is used for hunting or fishing, and the estimated total value of such leases in 2003 was $13.4 million. However, this estimate does not capture the full value of recreational use of forests.

Information from a national survey of wildlife-related recreational activity in 2001 is summarized for Florida in Table 5.1. There were an estimated 6.6 million participants, and 75 million activity days for wildlife-related recreation in 2001, including 9.9 million by non-resident visitors. Over 3 million persons engaged in fishing and wildlife watching activities in Florida, and over 200,000 participated in hunting. Total expenditures by recreational participants amounted to $6.05 Bn, including $2.89 Bn for trip costs (fuel, lodging, meals, etc.), and $3.17 Bn for recreational equipment purchased (e.g. boats, guns). A total of $1.20 Bn was spent by visitors to Florida. For comparison, total expenditures in the U.S. were in excess of $96 Bn. Expenditures averaged $39 per activity day. Of course, not all of this recreational activity is directly attributable to the forest resource, however, much of the hunting and wildlife watching probably does take place in forests.

Table 5.1. Wildlife-related recreational economic activity in Florida, 2001

	Fishing	Hunting	Wildlife Watching	All Activities
Participants (1000)	3,104	226	3,240	6,570
Total Activity Days (1000)	48,417	4,693	21,388	74,498
Non-Resident Activity Days (1000)	6,002	190	3,663	9,855
Total Expenditures (mil.$)	$4,083	$394	$1,575	$6,053
Trip-Related Expenditures (mil.$)	$2,091	$120	$675	$2,887
Equipment & other Expenditures (mil.$)	$1,992	$274	$900	$3,167
Total Expenditures by Nonresidents (mil.$)	$771	$24	$401	$1,196
Average Expenditure per Participant	$1,341	$1,273	$486	$921
Average Trip Expenditure Per Day	$43	$26	$32	$39

Source: U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.
Data represents activities in Florida by U.S. residents 16 years and older

In addition to the actual expenditures made for outdoor recreation, many recreationists have the willingness-to-pay for such recreation that exceeds their expenditure. This benefit net of the cost is termed the consumer surplus. Outdoor recreation such as hunting, fishing, boating, hiking, biking, wildlife observation and general outdoor experiences are tied to the positive perceptions of the landscape and ecological processes. The number of participants willing to pay for the outdoor activity is a reflection of their value for the ecosystems and services. Much of the early work on valuation of natural environments and their services focused on various forms of outdoor recreation. Reviews by Walsh et al. (1992) and Rosenberger and Loomis (2001) summarized 163 individual studies in the U.S. spanning from 1967 to 1998 on consumer surplus values for 21 recreational activities. Net economic values per recreation day for various types of outdoor recreation are shown in Table 5.2. The overall average for all outdoor activities was $51 per day, with values ranging from less than $30 per day for camping and picnicking, to over $100 per day for salt water fishing.

Table 5.2. Average net economic values per recreation day for various outdoor activities in the United States.

Activity	Mean or Range ($/day)
Total All Activities	51.46
Camping	29.56 -- 33.33
Picnicking	26.27 -- 38.72
Swimming	23.15 -- 34.82
Sightseeing	30.76 -- 39.40
Off-Road Driving	19.14 -- 30.76
Boating, Motorized	38.16 -- 47.89
Boating, Non-Motorized	67.60 -- 73.80
Hiking	40.22 -- 44.09
Bicycling	49.57
Winter Sports	43.21
Big game hunting	47.40 -- 68.93
Small game hunting	39.20 -- 46.72
Migratory waterfowl hunting	34.71 -- 54.03
Cold water fishing	46.42
Anadromous fishing	81.88
Warm water fishing	35.70
Salt water fishing	109.89
Fishing (all)	39.41
Non-consumptive fish and wildlife	33.66
Wilderness	37.26
Other recreational activities	28.53 – 44.56

Sources: Walsh et al. (1992); Rosenberger and Loomis (2001). All values expressed in year 2000 dollars using the consumer price index (U.S. Department of Labor, 2001).

Hunting has a long history in U.S. culture and continues to be one of the highest valued outdoor recreational activities. For example, a 1971 survey conducted in Georgia found an average consumer surplus of $303 per occasion per household for hunting of big game (such as deer) and $142 for small game (Ziemer and Musser, 1978). In another study, the loss of forestland in Georgia during the period 1973 –76 was estimated to result in a $6 per acre loss in consumer surplus (Musser and Ziemer, 1979). It should be pointed out that this value is for the hunting circumstances that occurred in Georgia during this time and that it would not necessarily apply to other areas where there are proportionally more or less forested areas open to hunting or a different demand for hunting.

It is reasonable to expect that anglers, both local and tourists, fishing the rivers and lakes of Florida have similar values for their activities. Considering that 121,000 anglers are fishing these waters on multiple days, the aggregate passive-use value (i.e., consumer surplus or net benefits) could be in the magnitude of $70 million per year. Similarly, with 19,000 hunters, their aggregate passive-use value could be $26 million per year.

Wildlife observing and hiking are also important outdoor recreational pursuits. It was estimated that over 66 million people participate in these activates in the U.S., and expenditures on this activity in 2001 were nearly $40 Bn (USFWS, 2002). It has been estimated that a day of these activities has a consumer surplus value of $34 and $44, respectively (Walsh et al. 1992). Canoeing and kayaking are a rapidly growing similar form of recreation. Consumer surplus values are estimated to be in the range of $74 per day of this activity (Walsh et al. 1992). Additionally, as bicycles have been redesigned for riding on rough trails, biking through natural areas has become a recreational past-time for many people. Fix and Loomis appraised the willingness-to-pay (WTP) value of a trip to Moab, Utah, one of the most popular mountain trail areas, at between $225 for the revealed preference method and $258 for the stated preference method. These numbers translate into values of $58 and $69 per day of biking. Although Moab is quite different than many other sites, it is evident that bikers receive considerable consumer surplus (net value) from this activity.

In Florida, hunting, fishing, hiking, wildlife observation, canoeing, kayaking, bicycling and other outdoor activities are participated in by both local people and tourists. Climatic conditions allow activities all year, and

during winter months, people are drawn to Florida from other states to participate in these activities and have willingness to pay to participate in the activities. The activities will only be of value as long as the natural ecologic and hydrologic processes of the landscape remain viable. Whereas much of the lands that are privately held and provide benefits exclusively to the owners, these lands also provide nonexclusive benefits as part of the ecologic and hydrologic processes of the broader landscape. If natural processes on private property are unduly disrupted, the cumulative impact on broader landscape process can be disrupted thereby potentially diminishing recreation benefits. Florida's recreational economy is inextricably intertwined with natural process at many scales.

Tourism Values

Tourism is one of the largest industries in Florida, due to the state's moderate climate, beaches, forests and other natural amenities as well as many entertainment attractions that draw visitors from across the United States and many foreign countries. Surveys by *Visit Florida USA* indicate that over 71 million people visited Florida in year 2000, and visitors stayed an average of 5.3 days, representing a total of 379 million visitor-days (Table 5.3). Visitor expenditures averaged $125 per day in 2000, giving estimated total expenditures of $47.37 billion. Visitor expenditures were distributed across transportation (28%), food (20%), lodging (21%), shopping (13%), entertainment (14%), and miscellaneous other expenses (5%), according to 1998 surveys. Note that these values do not include the tourism spending by Florida residents traveling within the state.

Table 5.3. Characteristics of Florida visitors, 2000

Characteristic	Amount
Number of visitors (millions)	71.5
Average length of stay (days)	5.3
Total number of visitor-days (millions)	379.0
Average expenditure per person-day	$125.00
Total annual expenditures (billion$)	$47.37

Source: Visit Florida USA, *Florida Visitor Study*, 1998, 2000, Tallahassee

The total economic impact of Florida visitor expenditures was evaluated with the *Implan Professional* software and associated database for Florida (MIG, Inc.). Florida visitor expenditures were assigned to various industry sectors in the *Implan* system. The estimated total economic impacts of visitor spending in Florida in 2000 are summarized in Table 5.4. Total output (sales) impacts amounted to $117.2 Bn, including $48.4 Bn in direct effects in the tourism and travel industries, $13.3 Bn in indirect effects in other linked industries, and $55.4 Bn in induced effects of consumer expenditures by industry employees. Total employment impacts were estimated at 1.75 million jobs, and total value added impacts amounted to $77.5 Bn, including $50.6 Bn in labor income, and $7.8 Bn in indirect business taxes. The largest industry groups impacted were services and trade sectors such as retail stores and wholesale distributors. A recent analysis indicated that outdoor-based recreation represents 19 to 33 percent share of total tourism activity in the southern United States (Abt, Winter and Huggett, 2002). Using the lower bound figure (19%) together with data on the value of tourism, it can be estimated that outdoor recreation in Florida had a total impact of about $22.3 Bn in output, $14.72 Bn in value added, and 332 thousand jobs in 2000 (Table 5.4). Note that these values are independent of the recreation impacts estimated above.

Table 5.4. Economic impacts of Florida visitors and outdoor tourism, 2000

Impact Measure	Direct Impact	Total Impact	Outdoor-Based Total Impact
Output ($Bn)	48.44	117.17	22.26
Total Value Added ($Bn)	32.33	77.48	14.72
Labor Income ($Bn)	21.04	50.59	9.61
Indirect Business Taxes ($Bn)	4.38	7.77	1.48
Employment (jobs)	882,447	1,748,716	332,256

* Values in 2001 dollars

Amenity and Quality of Life Values

As real incomes rose in the second half of the twentieth century, the patterns of individual and household expenditures changed. A smaller proportion of income was required for the necessities of American life, leaving more discretionary income for other activities and purposes, and amenities or the "finer things in life" became possible to a much larger part of the population. An aggregate effect of this change has been a movement of households to places with a higher quality of life and amenities. Economists have attempted to identify amenities that make up the desired quality of life and to measure household willingness to pay for these amenities. As with the study of other non-market goods and services, economists use revealed preference and stated preference methods, primarily hedonic pricing methods and contingent valuation methods, respectively, to estimate these values.

The term "quality of life" is used in many contexts and for many reasons, and in this usage has many dimensions. In the broadest use it includes such elements as potential for personal growth and continued education, participation in the arts, security from crime, access to recreational facilities, healthy environment, and a pleasant climate in addition to other natural amenities. Many studies have been done on the broad aspects of quality of life elements (Dissart and Deller, 2000). The interest here is primarily on environmental and natural amenities and the role they play in people's perceptions of quality of life.

In urban areas the overall quality of the neighborhood would be thought to be an important factor in quality of life and to affect housing values. As one would also expect, landscaping with trees and attractive vegetation adds to the value of houses (Des Rosiers et al. 2002). In a similar way, open space around a house adds monetary value. In a recent study of the monetary impact of nearby high voltage power lines, the visual impact had a negative value, but the right-of-way space associated with the power line translated into a positive economic value for the houses abutting the open area (Des Rosiers 2002). The study suggests that open space is perceived as a premium factor by many people. Considering quality-of-life attributes at a broader level, Blomquist et al. (1988) used a hedonic methodology that included 16 climate, environmental and urban amenities and implicit prices to calculate quality of life indices expressed in dollar values for 253 urban areas. Florida ranked high in quality of life, with six urban areas in the top 50, and was tied for first place (with California and Colorado), and had no urban areas in the bottom 50. The quality of life index puts the top Florida urban areas at $5,500 to $7,000 per household above the lowest ranked urban area. The implication is that the majority of Florida's urban areas are perceived as having a very high environmental quality of life. On the other hand, Nord and Cromartie (1997), examined natural amenities in rural areas to develop a summary index of natural amenities in each U.S. county. Every county in Florida was in the highest quartile. When the amenity index is associated with net migration in the period 1992-94, many counties in Florida are in the highest quartile of net migration. One can conclude that Florida is perceived as an area of high quality natural amenities and a desirable place to live.

Economists' views are that positive perceptions of high quality of life and high quality natural amenities translate into higher willingness to pay by both property owners and the broader public. The result is that locations with high quality of life and high quality natural amenities will have higher property values. Recent studies give insight into this economic phenomenon. Bastian et al. (2002) were interested in the environmental amenity values associated with agricultural lands. Using transacted land sales data in Wyoming for the period 1989 through 1995, a hedonic price model was used to estimate the impact of environmental amenity and agricultural production land characteristics on price per acre. Their findings were that land prices were explained by the level of environmental amenities, as well as by production attributes. Land transaction prices indicate purchasers had a higher willingness to pay for lands with wildlife habitats, productive sports fishing, and overall scenic attractiveness.

Shrestha and Alavalapati (2004) conducted a study of the northern part of the Lake Okeechobee watershed using a choice-based stated preference methodology to determine the benefits that residents of the Lake Okeechobee watershed receive from landscape attributes. Their specific goal was to estimate residents' willingness-to-pay values for silvopasture practices. Results indicate a representative household is willing to pay $138 for a moderate level of landscape improvement. With 1.34 million households in the watershed, the total willingness to pay for environmental improvement would be $185 million. If these values are any indication of the values Floridians have for their landscape amenities, it is clear that these amenities are important parts of the Florida economy. The above studies support the premise that residents receive benefits from natural landscape amenities and have a willingness to pay to assure the continued service flow from these landscapes.

Landscape attributes also play a role in the decisions of migrants and retirees to relocate to areas of high environmental amenities. Mueser and Graves (1995) examined the role of economic opportunity and amenities in explaining population redistribution in the United States from 1950 to 1980. Migration trends over this time period

appear to have been tied to household preference for amenities in conjunction with changes in income. Although the shifts occurred slowly in any single decade, the same locations appear to have grown in attraction over extended periods. Their conclusion was that while "employment opportunities may have played an important role in migration patterns, amenities were no less important and may have played a greater role" (p. 192). Deller et al. (2001) used data from 2,243 U.S. counties to evaluate a range of factors related to population and economic growth in rural areas. Of the five environmental amenity attribute measures, "all five appear to play a significant role in regional economic growth" (p. 361). Additionally, they found that "counties with higher levels of water amenities . . . tend to be associated with higher levels of population and income growth" (p. 361), and "developed recreational infrastructure is strongly associated with population, employment, and income growth rates" (p. 362).

In a complementary study, Beale and Johnson (1998) found that what they classified as "recreational counties" in non-metropolitan areas of the United States had population growth rates that exceeded those of any other counties. The growth was largely due to net migration into these recreational counties, particularly by those households not bound to specific locations by employment or economic necessity (i.e., retirees) that are drawn by scenic and recreational amenities. Beale and Johnson noted "the flow of tourists and recreational spending produces additional employment and opportunities for existing residents, thereby reducing out-migration" (p. 38). Haigood and Compton (1998) studied specifically the role that recreational amenities played in retirees' relocation decisions. In a survey of five Texas communities, they found that, of 26 items, the two that dealt with recreation (i.e., desire to live in a more recreationally enjoyable area and desire to live in a place where recreational opportunities are plentiful) were ranked second and third, respectively, behind desire to get away from cold weather. This is likely to be true for non-retirees as well. To further echo the point of the importance of natural amenities in selecting places to which to relocate, Nord and Cromartie (1997) state: "In studies that estimate the effects of economics and location factors on migration while controlling for effects of other factors, natural amenities emerges as the strongest single factor associated with net immigration to rural counties".

6. Environmental Services of Forests

In addition to the commercial commodities, recreational uses and amenity values associated with forests in Florida, there is a wide array of non-marketed environmental services that are important to recognize, although they may not be readily quantified. Some of the environmental services of forests include surface and ground water storage, purification of air and water, mitigation of droughts and floods, stabilization of climate and moderation of extreme weather events, generation and preservation of soils, detoxification and decomposition of wastes, cycling and movement of nutrients, control of agricultural pests, provision of wildlife habitat, and maintenance of biodiversity.

The increase in man-made releases of greenhouse gases, notably carbon dioxide ($CO_{2)}$, into the atmosphere has caused concern over human induced climate change. Since the early 1990s, governmental and nongovernmental organizations across the globe have been discussing strategies to mitigate atmospheric concentrations of greenhouse gases. It is widely recognized that forests play an important role in the global carbon cycle by sequestering and storing carbon, enabling the switch from more energy-intensive materials such as steel to forest products, and facilitating the substitution of biomass fuels for fossil fuels (Brand 1998). This potential influenced participants in the Kyoto protocol to allow countries to count carbon sequestered in forests towards obligations under the protocol. The U.S. has been a strong proponent of this idea. Thus, even though the U.S. has pulled out of Kyoto, President Bush's budget request for 2003 included over 3 billion dollars for carbon sequestration activities (Bush 2002).

In the absence of markets for forest carbon, private timber producers consider carbon external to their production decisions, and as a result, forest biomass production and associated carbon sequestration may be lower than is socially desirable. In the presence of markets for carbon, landowners would consider carbon sequestration benefits in their production decisions (Alavalapati 1998). Several authors have investigated the impact of various forms of carbon payments on the optimal rotation age, supply of sequestered carbon on a stand level, and profitability (Stainback and Alavalapati 2004, van Kooten et al. 1995). Adams et al. (1999) included various management intensities in their investigation of least cost strategies to meet given carbon reduction targets in the U.S. These studies have used a variety of methodologies to estimate volumes and values associated with carbon sequestration by forests.

For productive forests in Florida, Stainback and Alavalapati (2002) estimated that an acre of slash pine would sequester about 106 metric tons. Using the information on net annual timber growth volume of 716.9 million cubic feet (SFRA 2002), and an average of 0.0081 tons of carbon are sequestered per cubic foot, it can be estimated that Florida forests would sequester 5.81 million tons of carbon annually. Markets for this service are now being developed (e.g. Chicago Climate Exchange). In such a market, the avoided costs for pollution abatement may be conservatively estimated at a price of $5 per ton carbon, which would indicate a total value of $29 million annually for this environmental service.

7. Conclusions

This report presents the results of an economic impact assessment of the forest resource and the forest products industry in Florida. An industry survey of landowners, manufacturers and forestry services businesses was conducted to document values for principal products and services in 2003, and a regional economic model was constructed to estimate the total economic impacts on the Florida economy. The principal findings of this investigation are summarized as follows:

- The area of forest land in Florida, 16 million acres, represents 49 percent of the state's total land area, and the area of commercial timberland, 14 million acres, has remained rather stable since the mid-1980's, due to vigorous reforestation efforts, offsetting losses to rapid urban development; loss of forest land in the non-industrial private sector has been offset by public land purchases for conservation programs, indicating strong public support for maintenance of intact forests.
- The forest products industry is very diverse, with many different types of interlinked businesses: private and industrial landowners; manufacturing operations for pulp/paper, lumber, plywood, other milled wood products, wood preservative treating and wood chemical products; forestry service businesses such as loggers, silviculture contractors, management consultants, trucking firms, tree trimming/removal services, and forest tree nurseries.
- Overall forest product manufacturing activity in Florida has been steady since 1997, thus serving as a stable source of regional income and jobs, in spite of general economic recession and a cyclical downturn in the U.S. forest products industry.
- Industry sales in 2003 were estimated at $7.78 billion (Bn), including $6.37 Bn by manufacturers, $1.02 Bn by service firms, and $382 million (Mn) by landowners.
- Total economic impacts of the forest products sector in the broader Florida economy were estimated at $16.63Bn in output or sales. This was comprised of $7.78 Bn in direct sales, plus $3.09 Bn in indirect impacts associated with activity in supplier businesses, and $5.67 Bn in activity due to spending by industry employees.
- Employment in the industry was estimated at about 30,000 jobs, and total employment impacts across the regional economy were 133,475 jobs.
- Total value added impacts of $7.52 Bn included labor income of $4.92 Bn, and other property-related income of $2.02 Bn
- Fiscal impacts of the Florida forest industry on tax collections by local, state and federal governments were estimated at $1.75 Bn.
- The value added impacts of the forest industry in Florida accounted for 1.5 percent of total economic activity (gross regional product), compared to 2.5 percent nationally.
- Pulp and paper/paperboard manufacturing remains a dominant segment of the industry, with annual sales approaching $4 Bn, and directly providing over 11,000 high-paying jobs.
- The forest products industry is concentrated in the northeast region of Florida, which accounted for 49 percent of the total value of forest products and services; however, the industry is distributed throughout the state, with employment reported in 64 of the state's 67 counties, and is relatively more important in many rural counties; significant value-added manufacturing activity occurs in urban areas of central and south Florida; the top ten Florida counties in terms of output impacts were Taylor ($1.94Bn), Miami-Dade ($1.89Bn), Duval ($1.71Bn), Putnam ($1.08Bn), Escambia ($1.05Bn), Nassau ($973Mn), Polk ($684Mn), Orange ($595Mn), and Bay ($502Mn).

- Shipments of forest products outside the state to domestic and international markets represented 50 percent of total industry sales, thereby contributing export earnings to the regional economic base, and stimulating regional economic development.
- The forest industry in Florida ranks 22nd in output and 18th in employment impacts compared to other states in the United States.
- The importance of non-timber uses of forests, such as pine straw and recreation, was noted by many landowner respondents as growing market.
- Forests support numerous wildlife-related recreational opportunities for residents and millions of visitors; the value of all spending in Florida in 2001 for hunting, fishing and wildlife viewing was estimated at $6.05Bn.
- Forested landscapes provide environmental amenities that support the large tourism industry in Florida generally, and particularly the growing eco-tourism market; visitor spending for outdoor recreation in Florida was estimated to account for 19 percent of the tourism market.
- Many published studies have shown that properties landscaped with trees and other attractive vegetation command a higher value, contributing to the large market in Florida for real estate development.
- Forests provide important non-market environmental services such as mitigating global climate change by sequestering an estimated 5.8 million tons of carbon annually in Florida; the value of this service for avoided costs of pollution abatement were conservatively estimated at $29 million annually, based on a price of $5 per ton carbon.

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Appendix A
Informed Consent Statement for Economic Survey of the Forest Products Industry in Florida

This survey is being conducted by the University of Florida Institute of Food & Agricultural Sciences, as part of a research project to evaluate the economic impacts of the forest products industry in Florida, sponsored jointly by the Florida Forestry Association and the Florida Division of Forestry.

The survey is being sent to all known forest products manufacturers, forestry service/support businesses, and a sample of forest landowners in the state. It is important that you provide information so that your type of business is represented in the study.

All questions pertain to the most recent completed year of operations. Please fill-in the information requested as follows. All information obtained in this survey about your particular business will be kept strictly confidential; only averages or totals for all survey respondents will be disclosed. Your participation is voluntary and you do not have to answer any question that you do not wish to. There is no compensation or anticipated risks for participating in this survey.

If you have any questions about this survey, you may contact the investigator: Alan W. Hodges, PO Box 110240, Gainesville, FL 32611, telephone 352-392-1881 x312, AWHodges@ufl.edu.

For questions about your rights as a research participant, contact the University of Florida Institutional Review Board at PO Box 112250, Gainesville, FL 32611, telephone 352-392-0433.

Thank you for your cooperation!

Appendix B
Introductory Letter for Economic Survey of Florida Forest Landowners
(Similar letter was used for manufacturers and forestry services firms surveyed)

March 1, 2004

Dear Florida Forest Landowner:

The University of Florida-Institute of Food & Agricultural Sciences (IFAS) is conducting a survey in an effort to better understand the influence of forestry and forest products on Florida's economy, under the sponsorship of the Florida Division of Forestry and Florida Forestry Association.

This letter is being sent as a notice that you will receive a copy of the survey in the mail in the near future. It is our sincere hope that you will take the time to complete the survey form and return it to us. Your participation provides valuable information on the value of forestry to our state and the need to protect, preserve and strengthen this resource and industry. All of the information being collected is voluntary and strictly held as confidential.

Currently, forest based economies are in decline throughout the south. The future of forestry will be shaped by the ability of national, state and local governments and organizations to adapt to changing global markets. This study is designed to obtain the necessary data with which to make these crucial decisions.

If you have questions or desire information, please contact the investigator, Dr. Alan Hodges, telephone (352) 392-1881 x312, e-mail AWHodges@ufl.edu, or the project administrators, Mr. Alan Shelby, Florida Forest Association, (850) 222-5646, alan@forestfla.org, or Mr. Eric Ford, Florida Division of Forestry, (850) 414-9955, forde@doacs.state.fl.us.

We look forward to working with you to improve the future of forestry in Florida.

Sincerely,

Jeff Doran, Exec. Vice President
Forestry Association

Alan Hodges, Ph.D., Associate
University of Florida/IFAS

Michael C. Long, Director Florida
Florida Division of Forestry

Appendix C

Survey of Forest Product Manufacturers in Florida: Sawmills, Planers, Plywood/Panels, Poles/Posts, Chippers, Pulp/Paper, Wood Preserving, Secondary Wood Products

Company and Contact Information

Company Name: _____

Address, Street/PO Box: _____

City, Zip Code: _____

Name of Person Filling-Out Form: _____

Position in Organization: _____

Telephone: _____

Plant Location(s). List locations of all plant operations (nearest city/town): _____

Fiscal Year/Ending Month For Annual Information Reported.

□ Check here if January 1 to December 31, 2003; Otherwise indicate annual period reported: _____

Number Of Days Worked In The Year Reported: _____ Number Of Shifts Worked Daily: _____

Type of Business Organization. Check any that apply:

□ Sole Proprietorship □ Partnership □ Corporation □ Government

Memberships and Certifications. Check any that apply to your business:

□ Florida Forestry Association □ Smartwood □ Forest Stewardship Council

□ Sustainable Forestry Initiative □ ISO 9000 (Quality Management) □ ISO 14000 (Environ. Mgmt.)

Products Sold. For each type of product, indicate the share of total value of sales in the year reported; percentages should sum to 100%:

_____% Dimension Lumber _____% Plywood _____% Poles & Pilings

_____% Posts & Fencing _____% Fuelwood _____% Chipped Wood for Pulp

_____% Pulp & Paper _____% Mulch & Shavings _____% Preservative-Treated Wood

_____% Reconstituted Wood Panel/Board (e.g. OSB) _____% Milled Wood Products (Flooring, Molding,)

_____% Wood Chemical Products _____% Residuals & By-Products (bark, sawdust, etc.)

_____% Other Product(s); Describe: _____

Regional Sales. Indicate the share of total forest product sales to buyers in each region in the year reported; refer to map for Florida; percentages should sum to 100%:

_____% Northwest Florida _____% Northeast Florida

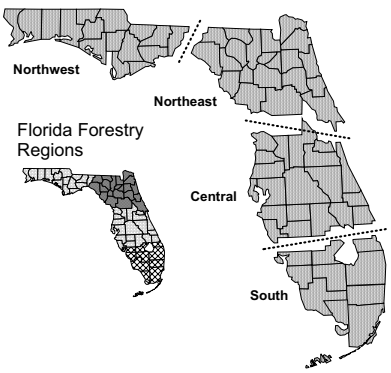
_____% Central Florida _____% South Florida

_____% Neighboring states (Georgia and Alabama)

_____% National (outside Florida, Georgia, Alabama region)

_____% International (outside U.S.)

For international sales, list top five destination countries: _____



Operating Expenses. For each item, indicate the share of total expenses it represented in the year reported; percentages should sum to 100%:

_____% Raw Material (Timber, Rough Stock) _____% Supplies & Fuels

_____% Employee Wages & Benefits _____% Rent (Real Property, Equipment)

_____% Contractual Services _____% Maintenance And Repair

_____% Transportation And Freight _____% Interest And Depreciation On Capital

_____% Insurance _____% Federal, State & Local Taxes

_____% Utilities (Water, Electric, Phone) _____ % Marketing

_____% Other Administrative _____ % Management Salaries

_____% Other Expenses; Describe: _____

Proprietor or Owner Income. Indicate the net profit margin or share of total income received by the business owners, including dividends to stockholders, in the year reported: _____%

Employment. Indicate average number of full time and part time or seasonal employees in the year reported, including management, clerical and sales personnel, but not including contractors, consultants, etc.

_____ Full Time Employees _____ Part Time or Seasonal Employees

Mill Capacity. Indicate current annual capacity of your mill(s) and circle units that apply: _____ (tons, cords, cubic meters, MBF).

Energy Systems. Does your mill use residual materials (bark, sawdust, slabs, etc.) as fuel for plant operations? Check answer: □ Yes □ No

If "Yes", does your mill produce surplus electric power for sale? Check answer: □ Yes □ No

Total Sales of Forest Products. Check appropriate range below to indicate value of total sales of forest products in the year reported:

□ Less than $100,000 □ $100,000 to $249,000 □ $250,000 to $499,000

□ $500,000 to $999,000 □ $1,000,000 to $1,999,999 □ $2,000,000 to $2,999,999

□ $3,000,000 to $3,999,999 □ $4,000,000 to $4,999,999 □ $5,000,000 to $5,999,999

□ $6,000,000 to $6,999,999 □ $7,000,000 to $7,999,999 □ $8,000,000 to $8,999,999

□ $9,000,000 to $9,999,999 □ $10,000,000 or greater

If sales were $10,000,000 or greater, please give approximate amount to nearest million dollars: $_____

Note, as a reminder, this and all other information collected in this survey will be kept strictly confidential!

Appendix D

Survey of Forestry Service Businesses in Florida: Logging, Site Preparation, Tree Planting, Forest Nurseries, Arborists, Management Consulting, Trucking, Equipment Sales and Repair

Company and Contact Information

Company Name: _____

Address, Street/PO Box: _____

City, Zip: _____

Person Filling-Out Form: _____

Position in Organization: _____

Telephone: _____

Fiscal Year/Ending Month For Annual Information Reported.

□ Check here if January 1 to December 31, 2003; Otherwise indicate period reported: _____

Number Of Days Worked In The Year Reported: _____

Type of Business Organization. Check any that apply:

□ Sole Proprietorship □ Partnership □ Corporation

□ Government □ Private, Non-profit

Certifications and Memberships. Check any that apply to your organization:

□ Florida Forestry Association □ Smartwood □ Forest Stewardship Council

□ Sustainable Forestry Initiative □ ISO 9000 (Quality Management) □ Master Logger

□ ISO 14000 (Environmental Management)

Forestry Operations Conducted. For each activity, indicate the share of total sales it represented in the year reported; percentages should sum to 100%:

____% Timber Harvesting ____% Site Preparation ____% Tree Planting

____% Forest Fertilization ____% Forest Thinning ____% Forest Nursery

____% Tree Trimming & Removal ____% Trucking (Logs, Chips, Finished Products)

____% Controlled Burning & Fire Control ____% Harvesting Non-Timber Products (e.g. pine straw)

____% Forest Mensuration/Management/Consulting ____% Forestry Equipment Sales & Service

____% Others; Describe:_____

Regional Sales. Indicate the share of total sales of forestry services to buyers in each region; refer to map for Florida; percentages should sum to 100%:

_____% Northwest Florida _____% Northeast Florida

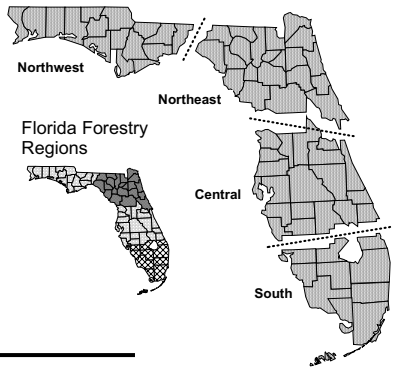
_____% Central Florida _____% South Florida

_____% Neighboring states Georgia and Alabama)

_____% National (outside Florida, Georgia and Alabama)

_____% International (outside U.S.)

For international sales, list top five destination countries:



Operating Expenses. For each expense item, indicate the share of total expenses it represented in the year reported; percentages should sum to 100%:

_____% Raw Materials Purchased (Timber) _____% Supplies

_____% Employee Compensation & Benefits _____% Contractual Services

_____% Transportation & Freight _____% Fuels

_____% Maintenance & Repair _____% Utilities (Water, Electric, Phone)

_____% Insurance _____% Federal, State & Local Taxes

_____% Interest And Depreciation On Capital _____% Other Administrative Expenses

_____ % Management Salaries _____% Other(s); Describe: _____

Proprietor or Owner Income. Indicate the net profit margin or share of total income received by the business owners, including dividends to stockholders, in the year reported: _____%

Employment. Indicate average number of full time and part time or seasonal employees in the year reported, including management, clerical and sales personnel, but not including sub-contractors:

_____ Full time employees _____ Part time or seasonal employees

Area of Forest Land Managed. Indicate total acres of forest land managed in the year reported: _____ (acres)

Volume(s) Of Forest Products Handled. Indicate the volume of each type of product handled in the year reported, and circle units that apply:

_____ Logs for Sawtimber, Veneer, Chip/Saw (tons, cords, MBF)

_____ Logs for Poles or Posts (tons, cords) _____ Pulpwood or Logs for Composite Products (tons, cords)

_____ Chipped or Mulched Wood (tons, cords) _____ Tree Trimmings, Waste Wood or Fuelwood (tons, cords)

_____ Finished Wood Products Hauled (tons, MBF)

_____ Other Products (tons, cords); Describe: _____

Total Annual Sales Of Forest Products And Forestry Services. Check appropriate range below to indicate value of total sales of forestry services in the year reported:

□ Less than $100,000 □ $100,000 to $249,000 □ $250,000 to $499,000

□ $500,000 to $999,000 □ $1,000,000 to $1,999,999 □ $2,000,000 to $2,999,999

□ $3,000,000 to $3,999,999 □ $4,000,000 to $4,999,999 □ $5,000,000 to $5,999,999

□ $6,000,000 to $6,999,999 □ $7,000,000 to $7,999,999 □ $8,000,000 to $8,999,999

□ $9,000,000 to $9,999,999 □ $10,000,000 or greater

If sales were $10,000,000 or greater, please give approximate amount to nearest million dollars: $_____

Note, as a reminder, this and all other information collected in this survey will be kept strictly confidential!

Appendix E
Survey of Forest Landowners in Florida

Company and Contact Information

Company Name: _____

Address, Street/PO Box: _____

City, Zip Code: _____

Person Filling Out Form: _____

Position in Organization: _____

Telephone: _____

Location. List Florida Counties in which landholdings are located: _____

Fiscal Year/Ending Month For Annual Information Reported

□ Check here if information is reported for Jan. 1 to Dec. 31, 2003; Otherwise, indicate annual period reported: ____

Type of Business Organization. Check any that apply to your business.

□ Sole Proprietorship □ Partnership □ Corporation □ Government

□ Private, Non-Profit □ Timberland Investment Management Organization (TIMO)

Certifications and Memberships. Check any that apply to your forest land.

□ Florida Forestry Association □ Smartwood □ Forest Stewardship Council

□ Farm Bureau □ Sustainable Forestry Initiative □ Tree Farm (USDA)

□ ISO 9000 (Quality Management) □ ISO 14000 (Env. Mgmt.)

Forest Products Sold. For each type of forest product below, indicate the percent share of total value of sales from Florida timberlands in the year reported; percentages should sum to 100%:

_____% Sawtimber Logs (Pine, Hardwood) _____% Plywood Veneer Logs

_____% Chip and Saw Logs _____% Pole & Post Logs

_____% Pulpwood (Pine, Hardwood) _____% Fuelwood

_____% Logs for Composites _____% Chipped or Mulched Wood

_____% Livestock Grazing _____% Hunting & Fishing Leases

_____% Pine Straw _____% Ornamental, Food & Medicinal Plants

_____% Other Product(s); Describe: _____

Regional Sales. Indicate the share of total forest product sales to buyers in each region below; refer to map for Florida; percentages should sum to 100%:

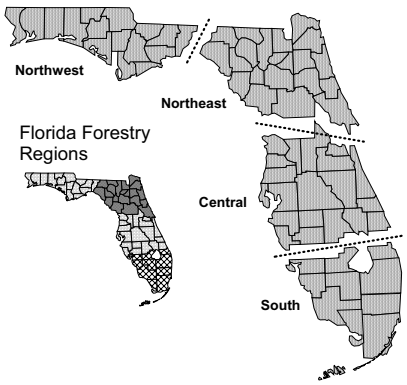
_____% Northwest Florida _____% Northeast Florida

_____% Central Florida _____% South Florida

_____% Neighboring States (Georgia and Alabama)

_____% National (outside Florida, Georgia, Alabama region)

_____% International (outside U.S.)



Operating Expenses. For each item, indicate the share of total expenses it represented in the year reported; percentages should sum to 100%:

_____% Employee Compensation & Benefits _____% Rent (Land & Buildings)

_____% Management Services _____% Timber Harvesting Services

_____% Tree Planting Supplies and Services _____% Transportation and Freight

_____% Fuel & Supplies _____% Federal, State & Local Taxes

_____% Banking, Interest & Insurance _____% Machinery & Equipment Repair and Maintenance

_____% Other Expenses; Describe: _____

Proprietor or Owner Income. Indicate the net profit margin or share of total income received by the business owners, including dividends to stockholders, in the year reported: _____%

Area of Forest Land. For each forest type, indicate the acreage of forest land owned in Florida, and the acreage harvested in the year reported:

	Owned Acres	Harvested Acres
Pine Plantation	_____	_____
Natural Pine/Oak	_____	_____
Upland Hardwood	_____	_____
Cypress/Wetland	_____	_____
Total	_____	_____

Conservation Easements. For any conservation easements on your land(s), indicate the total area (acres) covered and the approximate value of development rights represented: Acres: _____ Value: $_____

Employment. Indicate the average number of full time and part time or seasonal employees in the year reported, including management, clerical and sales personnel, but excluding sub-contractors:

_____ Full time _____ Part time or seasonal

Sales Of Forest Products And Services. Indicate the appropriate range below that represents your total sales of forest products from Florida timberlands in the year reported:

□ Less than $100,000 □ $100,000 to $249,000 □ $250,000 to $499,000

□ $500,000 to $999,000 □ $1,000,000 to $1,999,999 □ $2,000,000 to $2,999,999

□ $3,000,000 to $3,999,999 □ $4,000,000 to $4,999,999 □ $5,000,000 to $5,999,999

□ $6,000,000 to $6,999,999 □ $7,000,000 to $7,999,999 □ $8,000,000 to $8,999,999

□ $9,000,000 to $9,999,999 □ $10,000,000 or greater

If sales were $10,000,000 or greater, please give approximate amount to nearest million dollars: $_____

Note, as a reminder, this and all other information collected in this survey will be kept strictly confidential!