

What role do forests play in employment and local economies in the South?

Chapter 10: Local Economic Impacts of Forests

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Key Findings

■ The overall southern economy has grown since 1969, with total jobs increasing by an average of 2.6 percent per year since 1969. Manufacturing jobs increased by only 0.8 percent per year and agricultural jobs by only 0.1 percent per year. Poverty and unemployment have decreased in the South, but are still higher than in the United States as a whole.

■ In 1997, timber and agriculture, along with subsequent processing, directly contributed approximately 6 percent of jobs and gross regional product (GRP) in the South. Wood products sectors contributed 1.93 percent of jobs, and agriculture sectors contributed 4.27 percent of jobs. Wood products accounted for 2.31 percent of GRP, and agriculture 3.54 percent.

■ The U.S. wood products industry continues to concentrate in the South, which has 39.3 percent of U.S. wood products jobs. Both lumber/wood products and pulp/paper concentration increased, while the furniture sector concentration decreased. The percentages of State-level jobs and income in wood products have generally declined since 1969. Actual numbers of jobs have remained fairly constant.

■ Tourism-related industries are increasing in the South, but are not becoming more concentrated in the South. The percentage of State-level jobs and income in the tourism-related sectors is increasing in all 13 States, as are the actual numbers of jobs and amount of income.

■ In 1997, wood products sectors contributed 5.5 percent of southern jobs and 6 percent of GRP. Public lands represented 8.5 percent of this contribution.

■ In 1997, outdoor recreation-based tourism contributed between 0.64 and 2.88 percent of southern jobs and between 0.51 and 2.51 percent of GRP. Public lands represented approximately 56 percent of this contribution.

■ National forests contributed 1.7 percent of the value of timber harvested and an estimated 17 percent of outdoor recreation-based tourism in 1997. The USDA Forest Service contributed more than \$330 million to the southern economy for management of the national forests, research and development, State and private forestry, and payments to States.

■ National forests in the Southern Region are the second most heavily used of the nine USDA Forest Service regions with visits of 1.9 per acre, reflecting the scarcity of public land for outdoor recreation in this region.

■ Fourteen southern counties have high concentrations of wood products employment and high percentages of land managed by the USDA Forest Service.

in the national economy. From a primarily agrarian economy in 1850, the South became a center for U.S. manufacturing. More recent growth has focused on the service and technology sectors, increasing the diversity of the southern economy. Through all these developments, the South's forests have provided raw materials for wood products industries as well as beauty and recreational opportunities for an increasingly wealthy population.

The South remains largely rural, with higher poverty and lower income than more urbanized regions (Cook and Mizer 1994, Ghelfi 2001, Gibbs 2001). Some areas are still highly dependent on a single industry, including timber, lumber, furniture, and pulp and paper. According to Gale and McGranahan (2001) and Gibbs (2001), many rural areas are still part of the old economy based on manufacturing and resource extraction. Recent growth in southern rural areas was led by industrial machinery and equipment manufacturing, followed by food and then wood processing (Gale and McGranahan 2001). This contrasts with urban areas, where consumer and producer services led recent growth.

Recent forest assessments in the South include two subregional assessments completed for the two mountain regions, the Southern Appalachians (Southern Appalachian Man and the Biosphere 1996) and the Ozark-Ouachita Highlands (U.S. Department of Agriculture, Forest Service 1999). The most recent Southwide assessment was "The South's Fourth Forest" (U.S. Department of Agriculture, Forest Service 1988), which covered essentially the same region as the current Assessment but

Introduction

Economic Growth, Diversity, and Dependency

The economy of the South has grown in proportion to the growth in population and in concert with changes

focused nearly exclusively on the wood products sectors. The two subregional assessments concluded that wood products were important but not dominant and that populations and income were increasing, leading to increased demand for recreational services. Manufacturing and farming were still significant aspects of local economies, but were declining in importance. “The South’s Fourth Forest” noted that “timber is usually considered the most important [sector] in economic terms” (U.S. Department of Agriculture, Forest Service 1988, p. 10). The national forests were reported to have contributed over \$124 million to the local economy but accounted for only 6 percent of regional forest land.

Recreation and timber are the primary forest-based economic sectors today, and this chapter focuses on the roles of these two sectors in the southern economy. Other important contributions of forests to the quality of life are addressed in chapter 12. Wood products industries include timber production on both public and private land and the subsequent harvesting and processing into wood, furniture, or paper products. Recreation and tourism in forests includes camping, hiking, sightseeing, hunting, fishing, biking, and other activities. The economic impacts of these activities are measured in terms of the expenditure by each person for each day of activity.

Conceptual Model

A study of the sustainability of southern forests requires an understanding of the interactions between local communities and the forests around them. Forests influence the economy of a community, State, or region both directly and indirectly. Direct influences of forests include providing raw materials for use in production (timber and forage), as well as providing locations for numerous outdoor activities such as recreation, fishing, and hunting.

Indirect influences include contributions to environmental services such as carbon storage, shading, water filtration, and erosion control. Indirect effects may also include the amenity value of the forested landscape to nonusers, thereby encouraging migration and development (Cromartie 2001, Nord and Cromartie 1997).

Several recent studies have shown the importance of amenities, and the recreation/tourism that derives from them, as drivers of the economy, leading to economic growth (Beale and Johnson 1998, Deller and others 2001, English and others 2000, Marcouiller 1998).

The ownership of forest land provides income to landowners as a return to capital through harvesting, or through selling the land, or possibly through hunting leases. In this chapter, we primarily address the effects on jobs and income from direct influences. To capture some of the indirect influences, we address the overall economy, including size, make-up, poverty, migration, and unemployment. Chapter 11 (recreation) and chapter 12 (quality of life) address other aspects of the relationship between communities and forests.

Methods

The Assessment region consists of the 13 Southern States, covering 583 million acres with a 2000 population of 91,776,331. The region represents 24 percent of the U.S. area and nearly 33 percent of the U.S. population. Division of the region into subregions is important for understanding and displaying the data. States were chosen and are used in the remainder of this chapter, because State laws and policies influence overall and sector-specific economic growth. Methods include time trends, means, correlation coefficients, average annual percent change, and an input-output model, IMPLAN. With the exception of the IMPLAN model, techniques can be found in any basic statistics textbook.

IMPLAN was developed to analyze impacts of forest plan alternatives on the national forests. It is currently maintained by the Minnesota Implan Group, Inc., in Stillwater, MN (1997). The model evaluates the effects of a change in demand for a good or service, taking into account imports to and exports from a region, local production efficiency, and spending by households. IMPLAN also includes transfer payments to and from governments and households, including pensions, welfare, and taxes. Thus, the model includes spending by retirees,

the unemployed, and the reduction in local income due to taxation.

For this analysis, supply and demand were pooled to estimate trade. This method assumes that local purchases of a commodity are purchased from local suppliers, to the extent possible, with excess purchases imported from outside the region. Supply/demand pooling results in larger multipliers than the alternative method (regional purchase coefficients). In our opinion, however, this method is more representative of actual southern trade flows for the forest-based sectors. Because we are modeling the entire South, larger multipliers are of less concern than if we were modeling only a small subregion.

For the IMPLAN analysis, the nonforested portions of Texas and Oklahoma were excluded, and the remainder of the South was treated as one region. Analysis of one large region resulted in larger multipliers, and, thus, larger economic impacts, than would result if smaller regions were used. Multipliers for the wood products sectors were previously developed for each State by Aruna and others (1997), also using IMPLAN.

Input-output models are based on a description of the economy as an interrelated system of equations, where output of each commodity or service is the sum of demands from households (final demand) plus demands from all industries or services that use the commodity for further processing (intermediate demand). Inputs into production include labor (jobs and income), capital (inventories, property, and proprietor income), and cost of materials. The values of inputs of labor and capital sum to value added, and value added minus indirect business taxes is the value of gross industry production. When summed for a State, region, or Nation, this value is gross State, regional, or national product, our most commonly used measure of general economic welfare.

Input-output models do not provide a complete evaluation of the links between the economy and well-being. However, they do provide insights into one important dimension of this relationship—the link between forests and jobs and income. Other aspects of well-being are addressed in chapters 11 and 12. Many of the limitations of input-output modeling, including fixed

production technology, fixed factor prices, and no supply constraints, are not at issue in this analysis because we did not use IMPLAN to predict the effects of changes in final demand on the economy. We used the model to describe the state of the economy in 1997, using production relationships, prices, quantities, and incomes from 1997.

Analyses of the contribution of forests to local economies, particularly comparisons between wood products and recreation/tourism, are complicated by the determination of the actual user of the forest or forest product. The user of timber would be a logging contractor, who is the first, though not the last, user of the timber produced in the South. The user of forest-based recreation is the consumer, who is the end user of such services. Thus, the impact of timber includes the effect of growing and logging timber, and may also include subsequent processing by sawmills, pulpmills, other mills, and furniture manufacturers. The analyses presented below allow the reader to assess the impacts through mill processing, or to stop at any earlier processing stage. Recreation impacts were developed for both resident and nonresident users, where residents were defined as those recreating within 50 miles of home.

Data Sources

The primary sources of data included county- and State-level estimates of jobs and income developed by the Regional

Economic Information System (REIS) of the Bureau of Economic Analysis, U.S. Department of Commerce (1999), and data from the Economic Census of 1997 (U.S. Department of Commerce, Bureau of the Census 2000b). This information was also used in the IMPLAN database for 1997, from which economic impacts were developed for this chapter. Also used in the IMPLAN database were data from the Economic Census, the Bureau of Labor Statistics, and County Business Patterns (see Minnesota IMPLAN Group 1997 for further information on this database). The Bureau of Labor Statistics provided the unemployment and wage data (U.S. Department of Labor, Bureau of Labor Statistics 2000), and the Census Bureau was the source of the poverty information (U.S. Department of Commerce, Bureau of the Census 2000a, 2001, 2002).

Sectors examined included wood products and recreation/tourism. The wood products sector includes Standard Industrial Codes (SIC) 24 (lumber and wood products), 25 (furniture), and 26 (pulp and paper). Data from the Economic Census and IMPLAN for SIC 24 were adjusted to exclude mobile homes, while data from REIS were not adjusted as this information was not available. Also included in the IMPLAN analyses were the timber producing sectors which were not included in the Economic Census or REIS data.

For the time-series examination of the recreation/tourism sector (which we will subsequently refer to as the tourism-related sectors) we included

SIC 58 (eating and drinking places) and SIC 70 (hotels and lodging). In the impact analysis for 1997, we used three different methods to define the extent of the outdoor recreation or forest-based tourism sectors. These data derived from the National Survey on Recreation and the Environment (NSRE) (Personal communication, 2001. Ken Cordell, Project Leader, Forestry Sciences Laboratory, Southern Research Station, 320 Green Street, Athens, GA 30602-2044), the Travel Industry Association of America (TIA) (1999), and the Tourism and Travel Satellite Accounts (TTSA) (Kass and Okuba 2000).

Results

The Southern Economy

Growth and change—As in the United States as a whole, the economy in the South has grown nearly continuously since World War II. Growth in jobs and income exceeded growth in population (2.6 percent per year versus 1.6 percent per year between 1969 and 1997). Manufacturing industries were a major driver of the southern economy during this period, with the proportion of U.S. manufacturing jobs in the South increasing from 23 percent in 1969 to 29 percent in 1998 (fig. 10.1).

Manufacturing wages and salaries rose from 19 to 27 percent of the national total in 30 years (fig. 10.1). Having 29 percent of the jobs, but only 27 percent of the salaries supports the notion that the South has a large, inexpensive labor force. Nevertheless, average hourly

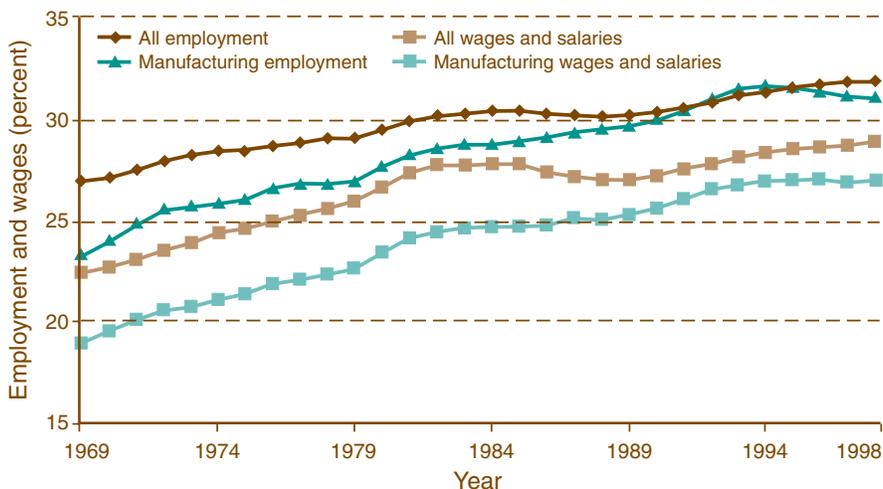


Figure 10.1—Percent of U.S. employment and wages in the South, 1969 to 1998.

manufacturing wages have increased in all Southern States since the mid-1970s. In 1999, Louisiana had the highest average hourly wage (\$15.19), followed by Kentucky (\$14.26) and Oklahoma (\$12.69). The lowest average hourly wages were in South Carolina (\$10.67), Mississippi (\$11.18), and Arkansas (\$11.55).

Figure 10.2 shows the average annual rate of job growth for the 10 major economic sectors in the South and United States between 1969 and 1998. In all sectors except agriculture, southern growth outpaced the national averages. Manufacturing jobs declined in the United States while they were increasing in the South, and agricultural jobs increased faster in the United States than in the South. These changes reflect the continuing shift away from agriculture to manufacturing in the early years of this period. While manufacturing increased in the South, all other sectors except agriculture increased at a higher rate. The largest increases were in the financial, insurance, real estate (FIRE); retail; and service sectors, with the service sector increasing at over 4 percent per year. This reflects the more recent shift from manufacturing to the service sector in the southern economy, a trend that is expected to continue.

Between 1969 and 1998, wages increased faster than jobs for all States (fig. 10.3); the largest increases occurred in Florida, Texas, Georgia, and North Carolina. The smallest increases occurred in Alabama, Kentucky, Oklahoma, and Louisiana. Mississippi and Arkansas have the smallest State economies; Florida and Texas have the largest.

Poverty and unemployment—

The nearly continuous growth in the southern economy has not benefited everyone equally. Some segments of the population still suffer from high unemployment rates, even while the overall rate is quite low. Similarly, there are groups and places with higher-than-average poverty rates in a region with poverty rates historically higher than the United States average.

Poverty rates in the South have declined by one-third over the past 30 years (U.S. Department of Commerce, Bureau of the Census 2000a, 2001). The gap between the South and the country as a whole has narrowed, but the South still

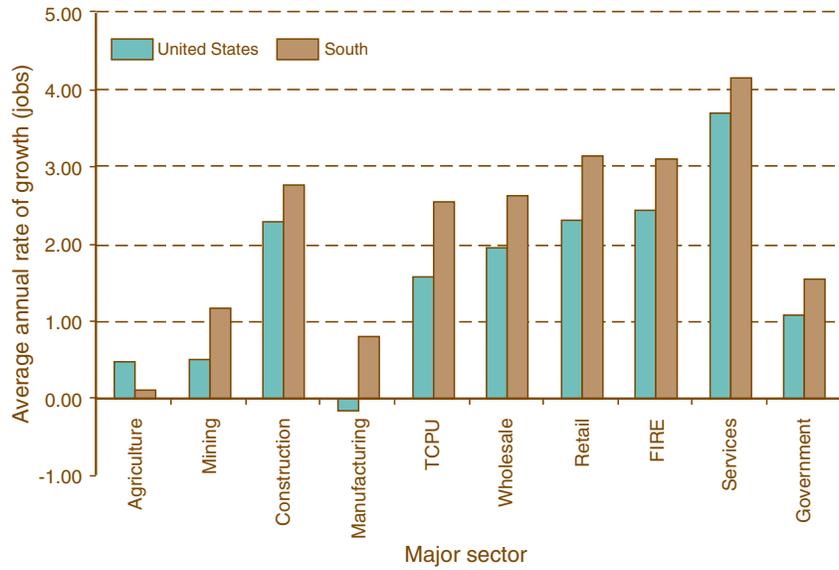


Figure 10.2—Average annual rate of growth in jobs in the South and United States, 1969 to 1998.



Figure 10.3—Average annual rate of growth in jobs and wages by Southern State, 1969 to 1998.

experiences a slightly higher rate (fig. 10.4). Between 1969 and 1999, the sharpest declines in poverty rates occurred in Mississippi (19.3 percent), Arkansas (13.1 percent), and South Carolina (12.2 percent). Texas had the lowest reduction (3.8 percent).

Data on poverty broken down by State, race, and gender are available from the Current Population Survey (U.S. Department of Commerce, Bureau of the Census 2001) conducted jointly

by the Bureau of the Census and the Bureau of Labor Statistics. Note, however, that because of survey design, reliable estimates of poverty by gender and race are available only for the Census South Region, which includes West Virginia. Poverty rates in the South differ substantially by sex and race (fig. 10.5). Females have higher rates of poverty than males, and both black and Hispanic rates are more than twice the rate for white

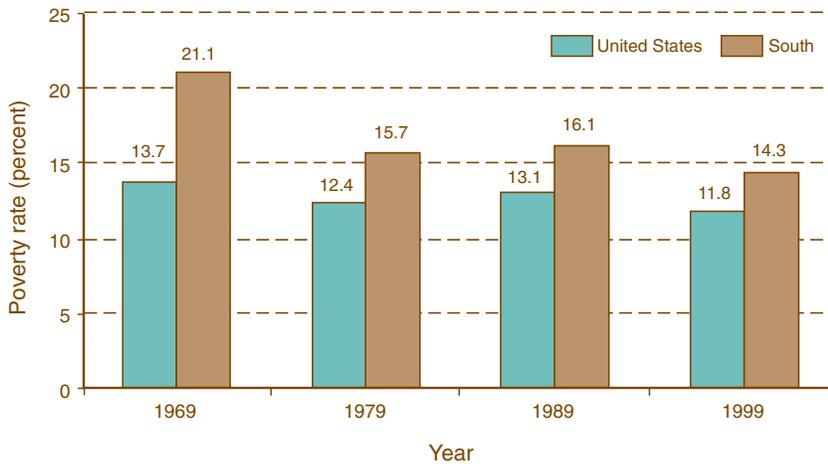


Figure 10.4—Poverty rates in the United States and in the South, 1969 to 1999.

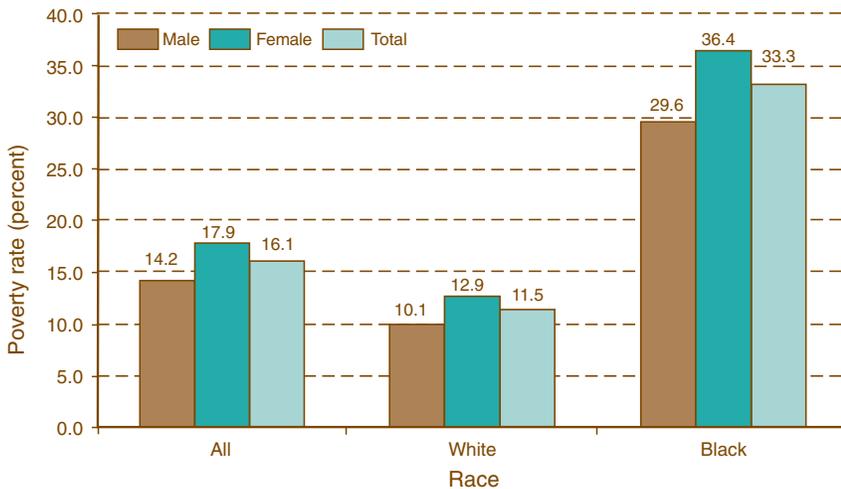


Figure 10.5—Poverty rates in the South by race and gender, 1995.

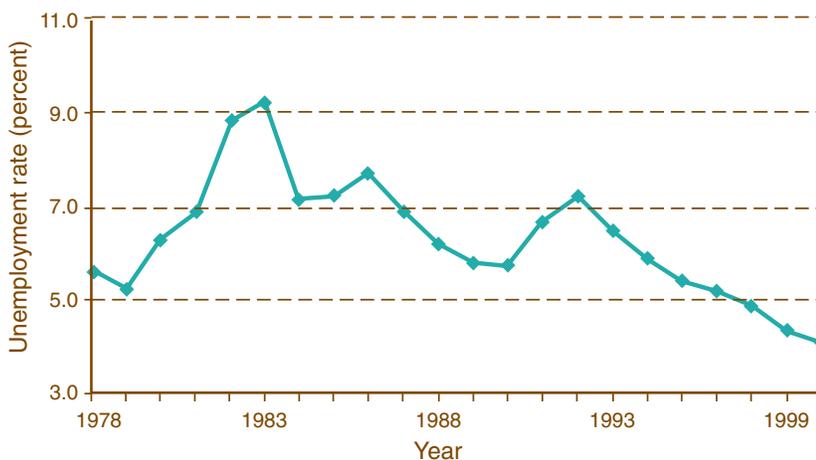


Figure 10.6—Unemployment rate in the South, 1978 to 1999.

southerners. As a group, black females have the highest poverty rates.

The average unemployment rate for the South during the period 1978 to 1999 was 6.2 percent. Like poverty rates, unemployment rates differ across races. The average unemployment rate among black southerners between 1981 and 1998 was 12.1 percent, while that for whites was 5.2 percent. The South’s annual unemployment rate of 4.1 percent in 1999 represents a 1.5 percent decrease from 1978. Florida and Virginia led this decline with decreases of 2.8 percent and 2.6 percent, respectively, but improvement occurred throughout the South. Three Southern States had unemployment rates of 5 percent or lower in 1978, compared to 11 States in 1999.

The sharp spikes in the unemployment rate in the early eighties and early nineties (fig. 10.6) roughly correspond to declines in growth of U.S. Gross Domestic Product. Alabama’s unemployment rate was 14.4 percent in 1982, while Tennessee’s reached 11.8 percent. During the period from 1978 to 1999, unemployment for the South peaked at 9.2 percent in 1983.

Forest-Based Sectors of the Southern Economy

Measuring contributions to the local economy—Forest-based sectors of the economy include timber production, wood-processing industries, recreation and tourism deriving from forest land, and the contribution of the management of the national forests to the local economy. Jobs and income are the quantity and price measures, respectively, of a single input, labor, to the production or provision of a good or service. The production of lumber, for example, requires other inputs including timber, machinery and buildings, and energy. The provision of recreation requires inputs of labor, buildings, goods, and services. Because the outputs are assumed to be produced efficiently, labor may be substituted for, or may substitute for, other inputs in the production process. Thus, examining jobs and income alone will not provide a complete picture of the contribution of forest-based sectors to the regional economy.

In addition, lack of data and modeling ability prevent us from examining the nonmonetary transactions between

industries and households. Thus we cannot isolate the impacts of one industry on another, or the impacts of industries on communities and individuals, except through transactions. These types of nonmonetary impacts are addressed qualitatively in chapter 12.

This analysis includes an evaluation of sector contributions to value added, total industry output, and GRP. Value added is the total income for a sector and includes wages and salaries, property income, and proprietor income. Wages and salaries are the largest component of income, and represent the total price of labor used in production. Southwide, wage and salary income comprise 58 percent of value added. Value added, less indirect business taxes, is referred to as gross industrial product, which when summed over a region represents GRP. GRP is at present the best overall measure of the size and state of the regional economy. GRP is comparable to gross domestic product at the national level. GRP is acknowledged, however, to have significant limitations when measuring effects on natural capital, such as forests, water, and air. Both data and modeling limitations must be overcome before a more adequate measure, often referred to as natural resource accounting, is available for use in this type of assessment.

Extensive data are available on manufacturing industries and on certain components of the service and retail trade sectors. These data allow us to formulate a picture of the contribution of forests to the economy over time. However, while the manufacturing data may pertain directly to timber production and processing, the recreation portion of the service and retail sectors is not clearly identified. In the time-series analysis below, we use hotels and lodging plus eating and drinking places to proxy for the tourism industry, referred to as tourism-related sectors. While this may be a suitable proxy for the size and concentration of the tourism sector, it is clearly different than the size and concentration of outdoor recreation or forest-based recreation. Much forest-based recreation involves camping, backpacking, hunting, or hiking, which may require neither local lodging nor restaurants. In addition, purchases of other goods and services, including

transportation, are not included in these time-series data. Therefore, these should not be viewed as total contributions but as a proxy for the trend in the recreation sector. Further detail is developed in the following assessment of direct and total impacts of outdoor or forest-based tourism for 1997.

We used input-output methods for the analysis of economic linkages and the total contribution of the forest-based sectors to the economy for 1997. These methods capture the indirect and induced effects of forest-based economic activities, as well as both the backward and forward linkages in the economy. Direct impacts are jobs, wages, and value added to a sector or lost from a sector in response to changes in final demand for that sector. Indirect impacts result when a producer buys inputs from other sectors within the region. Induced impacts are generated when an employee of a directly or indirectly impacted sector spends disposable income in the local economy. Backward linkages are impacts traced from any point in the production process back to the initial producer. For example, 2 by 4s purchased at a hardware store can be traced back to the tree farmer. Forward linkages, often referred to as downstream processing, represent subsequent processors of the commodity in question. For example,

for timber, a forward linkage is the milling of logs into lumber.

Wood Products Sectors

Changes in wood products sectors over time—Between 1987 and 1997, the South's share of U.S. manufacturing jobs increased from 30.8 to 31.4 percent. At the same time, the South's share of wood products sector jobs increased from 36.5 to 39.3 percent (fig. 10.7). Southern jobs in both the lumber and wood products (SIC 24) and pulp and paper (SIC 26) sectors have increased faster than for all manufacturing, while the percentage of all furniture jobs in the South decreased between 1992 and 1997. This increase in the percentage of the industry located in the South is in contrast to the percentage of southern jobs in the wood products industry. More of U.S. production of wood products is occurring in the South, but wood products are a smaller percentage of southern jobs. The same is true of income and value added. The percentages of southern income and value added deriving from wood products have declined, while the percentages of U. S. wood products income and value added that are in the South have increased.

The 13 Southern States vary widely in the percentage of jobs that are in wood products sectors (fig. 10.8). Wood products sectors here include all of SIC 24, 25, and 26 (mobile homes were not excluded). For 1998,

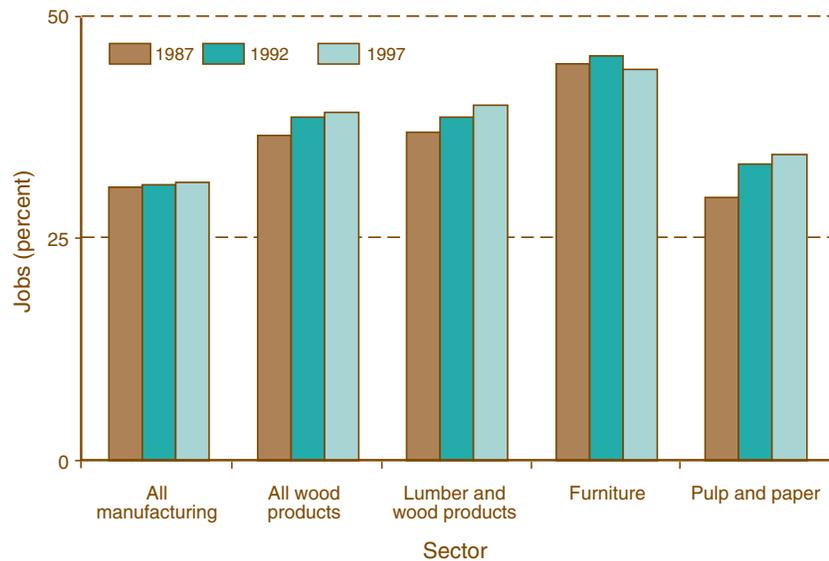


Figure 10.7—Percent of U.S. manufacturing and wood products jobs in the South, 1987 to 1997.

proportions ranged from 0.5 percent in Oklahoma to more than 5 percent in Mississippi. Trends for all States were generally downward, though the lowest point was in 1982, coincident with a low point for wood products output in the United States. These peaks and valleys are consistent with trends for the general U.S. economy.

The trends in percentage of income from wood products sectors are very similar to the trends in percentage of jobs (fig. 10.9). They are generally

downward, but with wide variation among States. Note, however, that the percentage of income from wood products was nearly double the percentage of jobs. For example, in 1998, 8 percent of Mississippi income derived from wood products, while only 5 percent of jobs derived from wood products. Note that the 1982 percentage drop is more dramatic for income than for jobs, most likely representing a decline in hours of work per job.

The percentages of all southern jobs and income coming from wood products are declining. This decline does not necessarily imply that the industry is shrinking. In fact, output from the industry is rising, but the amount of labor used (and thus wages paid) per unit of output is smaller. This substitution between inputs in the production of lumber has been examined specifically for sawmills (Abt and others 1994). This study found that increases in labor productivity (3 to 4 percent per year) were higher than for

Figure 10.8—Percent of all jobs in wood products sectors in Southern States, 1969 to 1999.

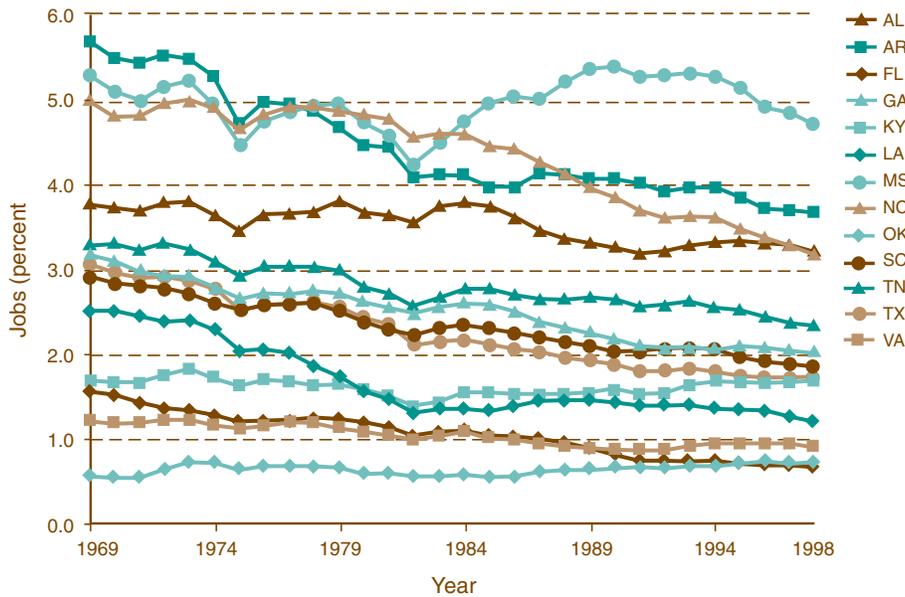


Figure 10.9—Percent of all wages in wood products sectors in Southern States, 1969 to 1998.

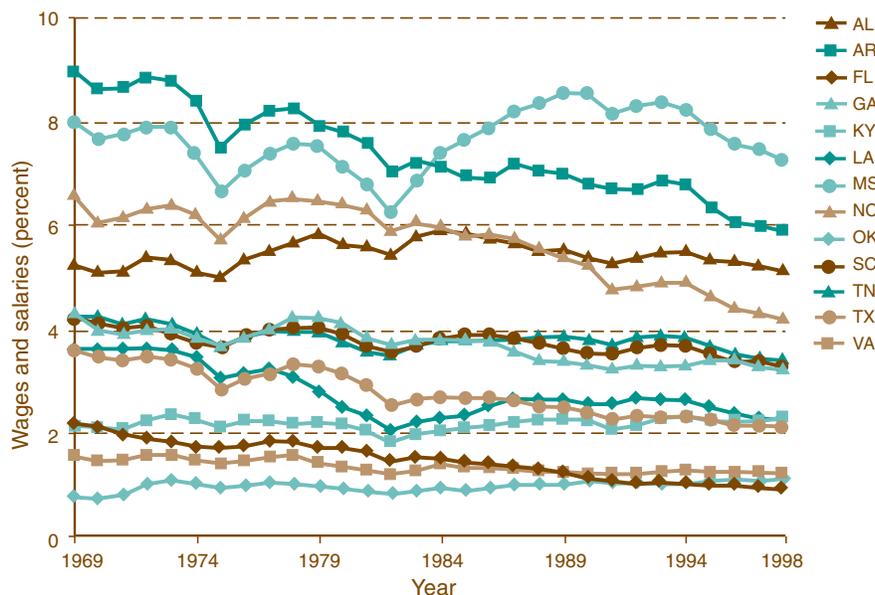


Table 10.1—Direct employment, employee compensation, value added, gross regional product, and total industry output for wood products related sectors, 1997

IMPLAN sector		Direct impacts by IMPLAN wood products sector						
Number	Name	Aggregate sector name	All wood products	Employment	Employee compensation	Value added	Total industry output	Gross regional product
22	Forest products	Timber	1.2	25,991	38	1,151	1,460	1,116
24	Forestry products	Timber	3.1	13,485	147	1,618	3,678	1,240
133	Logging camps and logging contractors	Logging	6.4	47,331	1,133	2,824	7,583	2,780
134	Sawmills and planning mills, general	Sawmills	9.5	71,531	1,993	3,202	11,232	3,138
135	Hardwood dimension and flooring mills	Sawmills	1.5	25,931	591	862	1,739	852
136	Special Product Sawmills, N.E.C.	Sawmills	0	509	15	22	37	22
137	Millwork	Sawmills	2.2	29,582	776	1,003	2,569	988
138	Wood kitchen cabinets	Sawmills	1.3	21,858	518	755	1,521	746
139	Veneer and plywood	Sawmills	4.2	36,149	1,305	1,903	4,967	1,872
140	Structural Wood Members, N.E.C.	Sawmills	1.4	15,246	411	584	1,663	574
141	Wood containers	Sawmills	.3	5,146	103	147	355	145
142	Wood pallets and skids	Sawmills	.9	16,714	341	475	1,071	469
144	Prefabricated wood buildings	Sawmills	.4	4,948	126	176	524	173
145	Wood preserving	Sawmills	1.8	7,846	221	431	2,146	420
146	Reconstituted wood products	Sawmills	2.0	10,981	390	876	2,405	862
147	Wood Products, N.E.C.	Sawmills	1.1	17,492	416	634	1,340	626
148	Wood household furniture	Wood furniture	5.2	73,696	1,830	2,370	6,123	2,335
149	Upholstered household furniture	Wood furniture	5.1	65,463	1,769	2,143	6,085	2,107
150	Metal household furniture	Wood furniture	.9	9,908	262	341	1,029	336
151	Mattresses and bedsprings	Wood furniture	1.1	11,057	347	459	1,263	454
152	Wood tv and radio cabinets	Wood furniture	.2	1,822	49	58	184	56
153	Household Furniture, N.E.C.	Wood furniture	.2	3,853	98	111	254	110
154	Wood office furniture	Wood furniture	.5	7,932	241	279	611	275
155	Metal office furniture	Wood furniture	1.1	6,143	198	276	1,266	270
156	Public building furniture	Wood furniture	1.8	12,444	395	583	2,134	571
157	Wood partitions and fixtures	Wood furniture	.6	9,466	272	327	682	324
158	Metal partitions and fixtures	Wood furniture	.9	8,674	285	375	1,039	369

continued

Table 10.1—Direct employment, employee compensation, value added, gross regional product, and total industry output for wood products related sectors, 1997 (continued)

IMPLAN sector		Direct impacts by IMPLAN wood products sector						
Number	Name	Aggregate sector name	All wood products	Employment	Employee compensation	Value added	Total industry output	Gross regional product
			Percent	Jobs	----- Dollars (millions) -----			
159	Blinds, shades, and drapery hardware	Wood furniture	.4	4,401	114	182	444	180
160	Furniture and Fixtures, N.E.C.	Wood furniture	.7	4,205	124	206	823	203
161	Pulp mills	Pulp and paper	3.3	8,315	546	1,205	3,852	1,160
162	Paper mills, except building paper	Pulp and paper	11.0	53,130	3,371	5,064	13,040	4,922
163	Paperboard mills	Pulp and paper	9.9	29,712	1,910	3,306	11,767	3,188
164	Paperboard containers and boxes	Pulp and paper	9.2	60,867	2,567	3,188	10,880	3,072
165	Paper coated and laminated packaging	Pulp and paper	1.0	5,428	265	404	1,159	392
166	Paper Coated & Laminated N.E.C.	Pulp and paper	.9	5,485	272	426	1,089	414
168	Bags, paper	Pulp and paper	1.3	8,733	298	469	1,482	453
169	Die-cut paper and board	Pulp and paper	.3	2,939	92	125	361	120
170	Sanitary paper products	Pulp and paper	4.9	10,382	536	1,859	5,828	1,800
171	Envelopes	Pulp and paper	.4	3,722	139	168	500	163
172	Stationery products	Pulp and paper	.3	1,581	62	116	340	112
173	Converted Paper Products, N.E.C.	Pulp and paper	1.6	11,295	427	655	1,914	635
Total all wood products			100.0	771,392	25,439	42,022	120,543	40,688

Source: Minnesota IMPLAN Group, Inc. 1997.

other inputs, which may result from increased use of capital in production. Thus, less labor could be used to produce the same amount of lumber. In Georgia, for example, while wood products wages represented 15.7 percent of the value of wood products shipments in 1982, wages were only 13.2 percent of the value of shipments in 1997.

Impact analysis for 1997—In 1997 the wood products sectors contributed over 770,000 direct jobs to the southern economy, \$120 billion in total industry output, and over \$40 billion in GRP (table 10.1). Table 10.1 also shows the aggregated sector subset we used to simplify the discussion below. The direct impacts are shown for private timber production, logging, sawmills, wood furniture, and pulp and paper. This table also includes the proportion of wood processing accounted for by each individual sector, as well as the direct employment, income, value added, total industry output, and GRP for each individual sector.

To calculate the indirect (what producers buy) and induced (what consumers buy) effects of the wood products industry, we used the IMPLAN input-output model to develop response coefficients, such as the number of jobs per million dollars of final demand. Response coefficients were also developed for public timber harvests by using the expenditures made by the national forests in the South to proxy for the production relationships of public timber producers. Public timber production coefficients were determined from the National Forest System (NFS) accounting as reported for each forest at the USDA National Finance Center. Expenditures by the national forests were classified into a program area, and all of the timber classifications were bridged to IMPLAN sectors. This procedure results in expenditures in each sector for the production of national forest timber.

The response coefficients show the total impacts on the economy from each \$1 million increase in final demand for that industry's output. Special care was taken to eliminate double counting by eliminating local purchases between modeled sectors. A different set of response coefficients would be needed to measure the effect of, for example, adding a mill to a local

Table 10.2—Direct effects of aggregate wood products sectors compared to agriculture sectors, 1997

Sector	Employment	Employee compensation	Value added	Total industry output	Gross regional product
	<i>Jobs</i>	<i>Dollars (millions)</i>			
Timber	39,475	185	2,769	5,138	2,355
Logging	47,331	1,133	2,824	7,583	2,780
Sawmills	263,933	7,207	11,070	31,569	10,886
Wood furniture	219,064	5,860	7,503	21,114	7,387
Pulp and paper	201,589	10,610	17,191	53,035	16,635
All wood products	771,392	24,995	41,357	118,438	40,043
Total, South	39,988,010	1,094,474	1,885,326	3,353,628	1,735,953
	<i>Percent</i>				
Southern economy in					
Timber production	0.22	0.12	0.30	0.38	0.30
Wood processing	1.71	2.16	1.90	3.15	2.01
Farming	3.00	.60	1.50	1.70	1.60
Food processing	1.27	1.61	2.22	4.19	1.94

Source: Minnesota IMPLAN Group, Inc. 1997.

Table 10.3—Total impacts for 1997 wood products output levels

Sector	Total impact values (direct+indirect+induced) for 1997 output levels				
	Employment	Employee compensation	Value added	Total industry output	Gross regional product
	<i>Jobs</i>	<i>Dollars (millions)</i>			
Public timber	8,854	223	422	777	422
Timber	110,527	1,679	4,905	10,081	4,181
Logging	99,750	2,462	5,246	11,967	4,982
Sawmills	688,768	18,614	32,035	70,909	29,924
Wood furniture	530,916	14,509	23,096	50,557	21,545
Pulp and paper	771,430	26,355	47,041	107,283	43,584
Total	2,210,246	63,842	112,745	251,574	104,639
Southern production (%)	5.53	5.83	5.98	7.50	6.03

Source: Minnesota IMPLAN Group, Inc. 1997.

economy and counting all backward linkages from the mill to logging to timber production.

Table 10.2 shows the direct impacts of the five aggregated wood products sectors (not including the public timber sector, whose jobs and income are included in the government sectors of

the input-output database). Also included in this table is the percentage of the southern economy in timber production and wood processing as well as the percentage in agriculture, including both farming and food processing. Thus, timber production and subsequent wood processing (most

of SIC 24, 25, and 26) directly constitute about 2 percent of the southern economy. More of total industry output (3.53 percent) than jobs (1.93 percent) derives from wood processing, implying that returns to capital are higher than average. Farming, the counterpart to timber

Table 10.4—Selected counties with high wood products concentration and high national forest land ownership

County name	State	National forest harvest receipts		Harvest receipts from national forests		Wood products jobs		Wood products jobs		Jobs in wood products 1996		Per capita income	Removals		Forest in planted pine
		Dollars (millions)	Percent	No.	Percent	No.	Percent	Cubic feet per acre	Percent						
Montgomery	AR	4.72	0.81	129	0.04	225	0.07	8,343	0.025	0.105	0.131				
Newton	AR	.1	.09	157	.07	104	.04	7,114	.017	.038	.000				
Polk	AR	.76	.33	560	.06	559	.06	8,884	.029	.059	.127				
Scott	AR	6.99	.99	346	.07	472	.09	8,360	.034	.150	.099				
Liberty	FL	.42	.37	323	.16	279	.13	11,500	.024	.053	.321				
Grant	LA	4.47	.91	497	.10	472	.10	8,330	.077	.134	.147				
Franklin	MS	3.11	.82	464	.16	444	.17	7,426	.117	.165	.052				
Perry	MS	3.08	.12	928	.28	1,025	.27	7,418	.043	.078	.246				
Cherokee	NC	.1	.05	408	.04	500	.04	9,258	.020	.032	.024				
Graham	NC	.17	.10	793	.24	752	.21	8,877	.010	.033	.000				
Transylvania	NC	.09	.05	1,389	.11	1,729	.13	12,737	.010	.017	.000				
Monroe	TN	.37	.13	1,012	.07	1,458	.10	9,080	.027	.059	.000				
Sabine	TX	2.27	.34	719	.22	747	.20	10,539	.100	.156	.187				
Smyth	VA	.11	.05	2,466	.14	2,527	.11	9,613	.026	.046	.000				
14-county average				728	.13	807	.12	9,106	.040057	.080484	0				
Southwide average				615	.04	616	.04	10,494	.05	0	.1613				

production, is 3 percent of employment but only 1.7 percent of total industrial output. The contributions of farming are greater than those of the other major rural land use, timber, which constituted only 0.22 percent of jobs and 0.38 percent of total industrial output. The wood-processing sectors are similar to the food-processing sectors (SICs 20 and 21), which constitute a slightly larger percentage of the southern economy.

In 1997, public timber harvests had a value of \$478 million, \$96 million of which was from national forests, while private harvests had a value of \$5,138 million. These numbers do not include harvests from Federal lands other than national forests. Tracking the forward-linkage (downstream processing) effects of both public and private harvests through the economy resulted in 2.2 million jobs and \$104.6 billion of GRP (table 10.3), amounting to approximately 5.5 percent of jobs and 6.0 percent of GRP in the South. Public timber harvests constituted 8.5 percent of the value of all timber harvests, with only 1.7 percent from national forests.

Although the national forests contribute only a small amount to the total harvest value in the South, in some communities and counties the national forests play a large role in the wood-processing sector and in the local economy. The national forests spend more than \$76 million on the timber program in the South, approximately one-third of the southern regional budget for 1996. This program is small, however, relative to the private harvests in the region. Table 10.4 shows 14 southern counties where the national forests manage more than 25 percent of the forest land and where the proportion of employment in wood products sectors is greater than 4 percent, approximately twice the Southwide average. Also included in this table are the county level per capita income, removal rate on all land, and removal rate on private land.

Future impacts of the wood-processing sectors on the southern economy are expected to continue at about the same level. The total wood products workforce has stayed fairly constant over the last 30 years, indicating that increases in production have been offset by increases in labor productivity. Using the increased harvest numbers from chapter 13 in the

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IMPLAN input-output model requires an assumption that technology does not change, which is unrealistic over the 40-year projection period. Thus, we conclude that wood products will continue to be important contributors to the economy, and that labor use might not change. Given the projected shifts in harvest location from chapter 13, we would expect jobs to shift to areas of increasing harvest intensity and away from areas of decreasing harvest intensity. The degree of this shift will depend on the relative costs of industrial relocation versus raw materials transportation.

Recreation/Tourism Sectors

As in our analysis of wood products, we first examined the direct tourism-related jobs over time and by State. We then estimated the direct, indirect, and induced effects of forest-based recreation in 1997. The analysis of the role of forests in recreation- and tourism-based employment and income is hampered by the lack of information on exactly how much of the local economy derives from recreation and tourism (Kass and Okuba 2000). Unlike the wood products sectors, where data are collected in categories that relate closely to forests and forestry, expenditures by visitors to forests are lumped together with expenditures by residents and other travelers for such items as eating and lodging.

As noted earlier in the State-level analysis, we used lodging and eating places to proxy for tourism-related industries. For 1996, we developed a measure of outdoor recreation-based tourism at the county level and compared this to the totals from the lodging and eating places. The correlation was quite high (greater than 0.98) and significant, and the rankings were similar. Thus, we concluded that the time-series of overall tourism was an adequate proxy for the actual but unobtainable time-series of outdoor recreation-based tourism.

In contrast, the indirect effects were more precisely modeled using three different techniques (a complete discussion of these methods follows). Thus, the discussion of the time-series direct jobs and income in tourism-related sectors is not directly comparable to the estimates of direct, indirect, and induced effects of

forest-based and outdoor recreation-based tourism.

Few forest-based recreation activities generate direct income for landowners although the Fee Demonstration Program for the national forests and hunting leases on private land do bring some income. The major economic impact is the money spent in local communities by recreationists. This includes the costs of transportation, purchases of equipment and supplies, and purchases of lodging and restaurant services. As a result, the recreation analysis is very different from the timber analysis. Rather than tracking a physical commodity through several processing steps, we trace the impact of a nonmaterial forest output—the opportunity to recreate—to the final consumer. There are no forward linkages, in the market sense, from the forest to the final consumer. There are only backward linkages from the recreation consumer to the producers of the supplies the consumer buys.

Recreation output from the forest is nonmaterial; it is the setting that is provided. As this output is not being processed in any way, we have no sales value for secondary processing industries as we did for timber. Therefore, to measure the economic impact of recreation activities, we estimated what recreationists purchased in local economies.

Changes in recreation/tourism sectors over time—The percentages of all southern jobs that are in the hotel and lodging and the eating and drinking place sectors have increased in all 13 Southern States (fig. 10.10). Percentages for Mississippi and Louisiana reflect significant increases in the early 1990s, likely due to changes in State gambling laws. Similar increases occurred in wages and salaries (fig. 10.11) between 1969 and 1998. Florida had the largest concentration of tourism-related jobs and income, exceeding 7 percent in 1998. There is much less variation by State in tourism-related jobs and income than in wood products jobs and income. Tourism-related jobs are 5 to 6 percent of all jobs, and 3 to 6 percent of income is in tourism-related sectors. Unlike in the wood products sector, these sectors represent a larger share of jobs than of income. Because actual wage rates are not available, and the jobs in this dataset do not represent full-time equivalents (40-hour weeks), the lower income per job may reflect part-time jobs, and in any case reflects only the average, not individual wage rates.

Impact analysis for 1997—We used three different methods to estimate total outdoor or forest-based recreation impacts in the South. These methods give us a range of impacts, with a low of 317 million forest visitor days and a high of 1,268 million visitor days. The first method is based on the

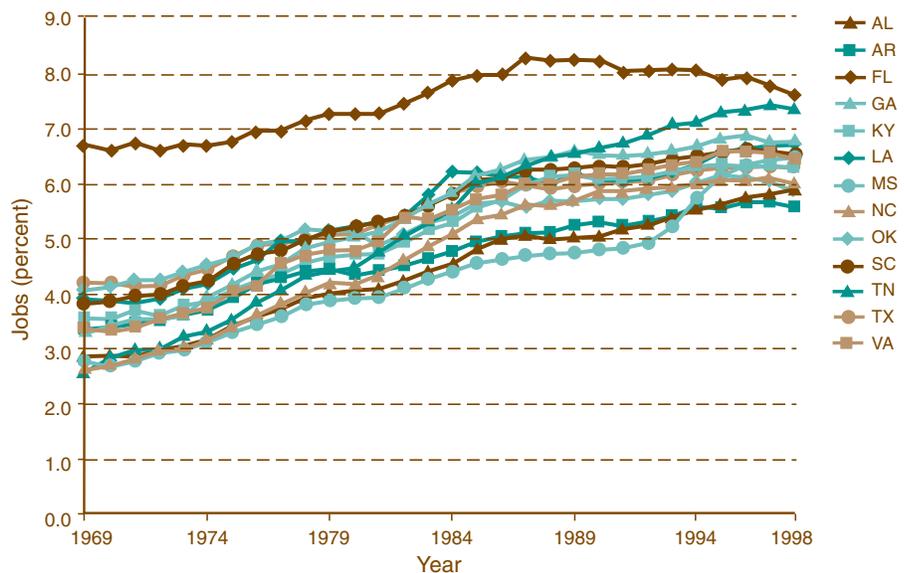


Figure 10.10—Percent of all jobs in recreation/tourism sectors in Southern States, 1969 to 1999.

most recent NFS estimates of visits to Region 8 in 2000 (U.S. Department of Agriculture, Forest Service 2001). This method includes expenditures made for durables, nondurables, and services within 50 miles of the recreation site. We allocated NFS recreation visits using two different methods: (1) participation from NSRE (NFS-P) and (2) land area in national forests (NFS-L). The second method uses the national TTSA (Kass and Okuba 2000) to attribute output to travel and tourism, then estimates forest-based proportions using recent study results that outdoor recreation comprises 19 percent of all leisure tourism visits and 33 percent of all leisure tourism expenditures (Pennsylvania Department of Conservation and Natural Resources 1999). This method does not include durables expenditures, but includes all other expenditures for outdoor recreation-related tourism. The third method also uses the 19 and 33 percentages, but applies them to State-level estimates of total travel and tourism outputs from the Travel Industry Association of America (1999). Similar to the TTSA method, this method does not include durables purchases, accounts for all other purchases regardless of where made, and includes expenditures from all outdoor recreation, not just forest-based outdoor recreation.

NFS-methods—National forest visits in the Southern Region were estimated

at 24,869,000 for 2000 (Personal communication. 2001. Don English, Research Social Scientist, Forestry Sciences Laboratory, Southern Research Station, 320 Green Street, Athens, GA 30602-2044). The NFS-P method assumed that the proportion of visits to public land was equal to the proportion of activity days occurring on public land in the NSRE (56 percent). Further, the percent of visits to national forest land was equal to the proportion of public land managed by the national forests (30 percent). This approach resulted in an estimated 17 percent of the recreation visits occurring on NFS land, and thus the remaining 83 percent occurred on private and other public lands (148,115,474 visits) (table 10.5). For the NFS-L method we assumed that all forests were visited in proportion to their acreage in the South, so we divided the NFS visits by the percent of all forest land in national forests (6 percent), resulting in 410,043,596 total forest visits.

Visits are multi-day trips, so we adjusted the visit estimates using trip lengths from the CUSTOMER survey (available from Ken Cordell, Project Leader, Forestry Sciences Laboratory, Southern Research Station, 320 Green Street, Athens, GA 30602-2044) and activity allocation from NSRE to get total days of forest visits. To get days, we used a weighted average length of trip for nonresidents and assumed a single-day visit for residents. The

weights were based on the proportion of total trips that were a single type, such as camping, using the NSRE data on participation. The average of 2.14 days per trip resulted in an estimate of the total number of forest-based recreation days of 317,123,332 for the NFS-P method and 878,448,994 for the NFS-L method.

These activity estimates were multiplied by the response coefficients for direct and total impacts derived from IMPLAN. We used expenditure profiles detailing what people spent on various activities from two previously developed surveys, the Public Area Recreation Visitor Survey (PARVS) (available from Ken Cordell, Project Leader, Forestry Sciences Laboratory, Southern Research Station, 320 Green Street, Athens, GA 30602-2044) for recreation, and the U.S. Fish and Wildlife Service (FWS) surveys for hunting and fishing, both in dollars of expenditures per person per day (U.S. Fish and Wildlife Service 1999). The response coefficients for the recreational activities (developed camping, mechanized travel, other recreation, trail use, and winter activities) were developed using PARVS expenditures bridged to IMPLAN sectors. Hunting and fishing response coefficients were developed by bridging FWS survey data to IMPLAN sectors. These profiles include expenditures within 50 miles for PARVS and within the State for FWS, for both residents and nonresidents. Separate coefficients were estimated for residents and nonresidents. Impacts for residents are substantially lower than for nonresidents.

For both scenarios, allocations to individual forest-related activities were based on the percentages from NSRE. Table 10.6 shows the number of forest visitor days for both NFS-L and NFS-P. Mechanical travel (resident and nonresident), other (resident), trail use (resident and nonresident), freshwater fishing (nonresident), and other (nonresident), are the largest in number of visitor days.

The direct and total impacts by activity are shown in table 10.7 for NFS-P and table 10.8 for NFS-L. Direct jobs range from 136,944 to 379,116 and total jobs (direct plus indirect plus induced) range from 254,591 to 704,812 jobs. Direct

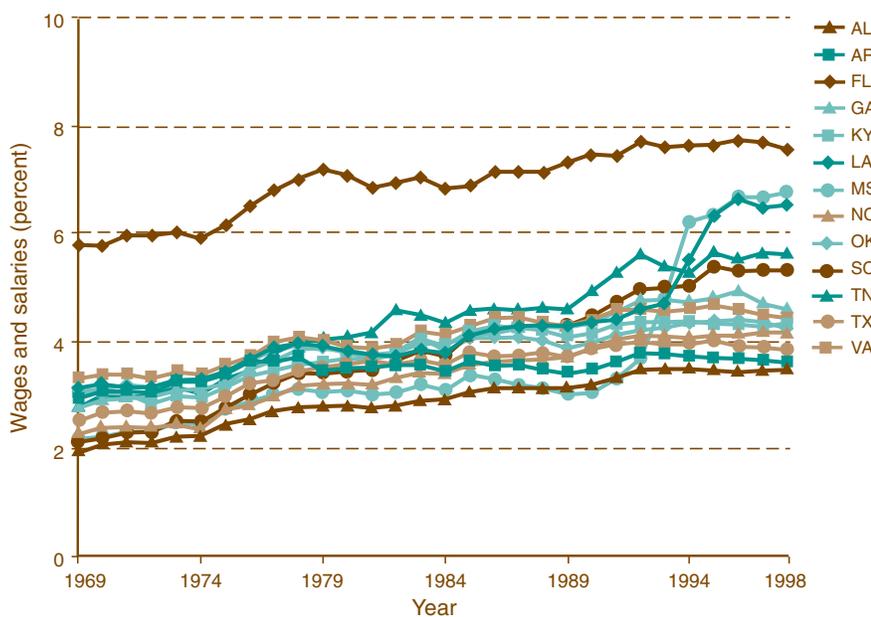


Figure 10.11—Percent of all wages and salaries in recreation/tourism sectors in Southern States, 1969 to 1998.

Table 10.5—Development of NFS land and NFS participation recreation impacts analysis, 1997

Visits to national forests in the Southern Region (NVUM)	24,869,000
Weighted average trip length (CUSTOMER)	2.14
NFS land	
Forest land (FIA) (acres)	214,850
National forest (CRS) (acres)	13,031
Forest land in national forest (percent)	6
Visits to all forests in the Southern Region	410,043,596
Total forest visitor days	878,448,994
NFS participation	
Total forest-based recreation participation days (NSRE)	5,044,205,000
Forest-based recreation participation days on public lands (56 percent of participation on all lands)	2,823,120,150
Participation on national forest lands (percent) (approx. 30 percent of all public lands are national forests)	17
Visits to all forests in the Southern Region (28 percent of total forest visits)	1,481,155
Total forest visitor days (2.14 days per trip)	317,312,332

contribution to GRP ranges from \$3,805 to \$10,533 million, while total GRP from recreation ranges from \$9,350 to \$25,886 million for this method.

T TSA methods—The second method relies on the T TSA for most data (Kass and Okuba 2000) supplemented with IMPLAN data. IMPLAN response coefficients for each of the affected sectors were used. The T TSA uses national-level data on consumer expenditures and the national input-output tables to attribute demand to tourism. Only travel farther than 50 miles from home is represented, so the data were adjusted using the percentages of resident and nonresident travel from the NSRE. The T TSAs estimate foreign and domestic nonresident leisure tourism, as well as business tourism. Table 10.9 lists the sectors that are assumed to be influenced by tourism. We used the percentage of each sector that was attributed to leisure tourism and applied that percentage to total southern output (from IMPLAN) from those sectors to estimate southern leisure tourism. Leisure tourism is determined from the proportion of industry output that is purchased by tourists more than 50 miles from home.

We then used two different levels to represent the proportion of outdoor

recreation expenditures, 19 and 33 percent. These percentages were derived from a study of outdoor recreation tourism in Pennsylvania (Pennsylvania Department of Conservation and Natural Resources 1999). If the primary purpose of the vacation was outdoor recreation and involved overnight travel or travel farther than 50 miles from home, then the vacation was considered an outdoor recreation vacation. The study estimated that 59 percent of all travel included some form of outdoor recreation, but that only 19 percent had outdoor recreation as the primary purpose. The study also found that outdoor recreation travel is increasing faster than other forms of travel, and that outdoor recreation travelers spend more per person per trip than the average leisure traveler. While this study was conducted for a different ecoregion and a single State, other similar research was not found. We therefore used two of the numbers from this study: 19 percent of all travelers are outdoor recreation travelers, and 33 percent of all expenditures are made by outdoor recreation travelers. Those numbers represent the high and low bounds of the T TSA and T IA methods.

Tables 10.10 and 10.11 show the direct and total effects by sector assuming either the 19 or 33 percent in

outdoor recreation. Direct employment ranges from 212,193 jobs to 427,317 jobs, and direct GRP ranges from \$6,145 to \$11,555 million. Total employment (direct plus indirect plus induced) ranges from 379,373 to 748,094 and total GRP from \$13,492 to \$25,624 million dollars. The largest impacts are from the airline, eating and drinking, hotel and lodging, and recreation and entertainment sectors.

T IA method—The third method used the T IA report for 1997 in combination with inputs from the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the T TSAs for 1997. The T IA developed impacts for travel by State for 1997 (Travel Industry Association of America 1999) using an input-output model. The results include total impacts for expenditures, payroll, and employment. T IA travel includes only travel farther than 50 miles from home, so the data were adjusted using the percentages of resident and nonresident recreators from the NSRE. We applied the percentage of tourism that is leisure tourism (from the T TSA) and the percentage attributable to outdoor recreation (19 and 33 percent, from the Pennsylvania DCNR study). These percentages were also adjusted by the proportion of the State in forest to account for the differences in largely unforested States such as Texas and Oklahoma. These latter two States had the lowest percent of tourism in outdoor recreation-related tourism (table 10.12), while Alabama, Georgia, and Mississippi had the highest rates. Table 10.12 also has the T IA data for all tourism direct expenditures, payroll, and employment.

Table 10.13 shows the direct and total effects from applying both the 19 and 33 percent of tourism as outdoor recreation related. Direct effects jobs range from 276,000 to 480,000 and expenditures from \$16 to \$28 billion. Total jobs range from 579,000 to 1,006,000, and total expenditures range from \$38.5 to \$66.9 billion. Total values were derived by using the multipliers developed at the national level for the T IA report.

Summary—table 10.14 compares the six estimates and also estimates the number of visitor days associated with the T TSA and T IA methods. The relationship between jobs and visitor

Table 10.6—Allocation of tourism from NFS methods to activities, 1997

Activity	Tourism allocation to activities			Forest visitors	
	Participation (NSRE)	Proportion on public lands (NSRE)	Proportion by activity (NSRE)	By participation on public lands and activity length	By public land area and activity length
	<i>Days (millions)</i>			<i>----- Days (millions) -----</i>	
Resident					
Developed camping	35.67	0.68	0.01	2.24	6.21
Mechanized travel	664.70	.56	.13	41.81	115.76
Other	549.65	.66	.11	34.58	95.72
Trail use	448.60	.54	.09	28.22	78.12
Winter activities	13.68	.06	.00	.86	2.38
Big game hunting	64.50	.27	.01	4.06	11.23
Small game hunting	43.94	.33	.01	2.76	7.65
Other game hunting	4.65	.26	0	.29	.81
Fresh water fishing	146.00	.30	.03	9.18	25.43
Nonconsumptive wildlife	348.79	.72	.07	21.94	60.74
Nonresident					
Developed camping	96.43	.68	.02	6.07	16.79
Mechanized travel	1,084.50	.56	.21	68.22	188.87
Other	283.15	.66	.06	17.81	49.31
Trail use	431.00	.54	.09	27.11	75.06
Winter activities	54.72	.06	.01	3.44	9.53
Big game hunting	43.00	.27	.01	2.70	7.49
Small game hunting	39.72	.33	.01	2.50	6.92
Other game hunting	10.20	.26	0	.64	1.78
Fresh water fishing	288.00	.30	.06	18.12	50.16
Nonconsumptive wildlife	393.31	.72	.08	24.74	68.50
Total	5,044.21			317.31	878.45

days in the NFS methods was used to calculate the visitor days associated with the TTSA and TIA methods. Estimated visitor days, and the other economic measures of jobs, income, etc., are ordered similarly, with the NFS-P method generating the lowest economic contributions, followed by the TTSA-19 and TIA-19 methods, and NFS-L, TTSA-33, and TIA-33 generating the highest contributions. Direct effects are 0.2 to 1.2 percent of total southern employment and 0.13 to 0.61 percent of total southern GRP. Total effects range from 0.38 to 2.62 percent of employment and 0.32 to 1.35 percent of GRP.

The USDA Forest Service recently released revised estimates of national forest visits based on a survey (U.S. Department of Agriculture, Forest Service 2001). These estimates will be prepared each year for all national forests. Estimates for the Southern Region, which were used in the NFS methods above, were 24.9 million visits in 2000. Table 10.15 shows the estimated visits and land area

for each of the regions and for the United States as well as the visits per acre. This rate of visitation is highest in the Eastern Region, followed by the Southern Region at 1.89 visits per acre. These numbers are an indication of relative resource scarcity of national forest land for recreation. At this time, the bulk of the national forest land is located distant from most of the population, thus limiting its usefulness in alleviating this scarcity.

Participation in recreational activities has been projected to increase in the South (see chapter 11). It is likely that this recreation will be concentrated on Federal and State parks, forests, and coastlines. As such, these increases in participation will likely lead to increased jobs in areas with public recreation lands. Increases in labor productivity will occur in the leisure service sectors, but they are likely to be small relative to total output. Thus, labor will continue to be a major input into production of these services.

One aspect of recreational services that could change in the South is a potential increase in manufacturers of recreation products, leading to an increase in retention of backward linkages within the region, involving both returns to capital and to labor. We expect the proportion of the southern economy in outdoor recreation enterprises to continue to increase, comparable to increases in the national economy.

Relationship between recreation and wood products sectors in the economy—Discussions of the forest-based economy often center around the relationship between the wood products and the recreation and tourism sectors because both depend on the existence of forests (Morton 1994, Schallau 1994). While the relationship between the two uses may be obvious at an individual site, the landscape-level effects of these activities on the economy are not clear. The substitution of one site for another in both recreation and wood products

Table 10.7—Direct and total impacts by activity from NFS-P recreation impacts analysis, 1997

Activity	1997 activity level	Jobs	Employee compensation	Value added	Total industry output	Gross regional product
	<i>Days (millions)</i>	<i>No.</i>	<i>----- Dollars (millions) -----</i>			
Direct impacts for 1997 output levels						
Resident						
Developed camping	2	367	7	12	24	10
Mechanized travel	42	11,666	216	402	816	334
Other	35	8,263	156	293	586	244
Trail use	28	3,594	64	122	238	99
Winter activities	1	419	6	10	20	9
Big game hunting	4	420	10	19	41	16
Small game hunting	3	198	5	9	19	8
Other game hunting	0	34	1	2	3	1
Fresh water fishing	9	921	21	41	83	34
Nonconsumptive wildlife	22	1,638	37	75	159	63
Nonresident						
Developed camping	6	2,616	48	86	175	73
Mechanized travel	68	64,374	1,110	1,940	3,875	1,670
Other	18	10,910	196	351	704	299
Trail use	27	19,415	350	609	1,203	522
Winter activities	3	2,817	44	75	141	66
Big game hunting	3	642	15	29	63	25
Small game hunting	2	408	9	19	40	16
Other game hunting	1	170	4	8	16	7
Fresh water fishing	18	3,396	78	149	307	126
Nonconsumptive wildlife	25	4,675	108	216	461	183
Total	317	136,944	2,485	4,467	8,973	3,805
Total impacts (direct+indirect+induced) for 1997 output levels						
Resident						
Developed camping	2	697	15	28	53	25
Mechanized travel	42	22,283	488	961	1,821	842
Other	35	15,946	353	693	1,305	607
Trail use	28	6,652	142	280	524	242
Winter activities	1	698	13	24	45	21
Big game hunting	4	908	23	46	90	40
Small game hunting	3	428	11	22	43	19
Other game hunting	0	73	2	4	7	3
Fresh water fishing	9	1,833	46	92	178	81
Nonconsumptive wildlife	22	3,472	86	175	348	154
Nonresident						
Developed camping	6	4,946	108	207	392	183
Mechanized travel	68	116,623	2,439	4,621	8,629	4,103
Other	18	20,313	436	837	1,571	740
Trail use	27	35,544	763	1,436	2,677	1,273
Winter activities	3	4,804	93	170	307	153
Big game hunting	3	1,360	34	69	137	61
Small game hunting	2	865	21	44	86	38
Other game hunting	1	360	9	18	36	16
Fresh water fishing	18	6,887	171	342	665	300
Nonconsumptive wildlife	25	9,902	248	507	1,005	447
Total	317	254,591	5,501	10,577	19,919	9,350

Table 10.8—Direct and total impacts by activity from NFS-L recreation impacts analysis, 1997

Activity	1997 activity level	Jobs	Employee compensation	Value added	Total industry output	Gross regional product
	<i>Days (millions)</i>	<i>No.</i>	<i>----- Dollars (millions) -----</i>			
Direct impacts for 1997 output levels						
Resident						
Developed camping	6	1,017	18	33	65	28
Mechanized travel	116	32,296	597	1,114	2,260	925
Other	96	22,877	433	812	1,622	675
Trail use	78	9,951	177	338	659	273
Winter activities	2	1,161	17	28	56	24
Big game hunting	11	1,163	26	53	112	44
Small game hunting	8	548	13	25	54	21
Other game hunting	1	95	2	4	9	4
Fresh water fishing	25	2,551	59	113	228	95
Nonconsumptive wildlife	61	4,533	104	207	441	175
Nonresident						
Developed camping	17	7,243	134	239	484	203
Mechanized travel	189	178,213	3,072	5,372	10,727	4,623
Other	49	30,202	543	972	1,949	829
Trail use	75	53,747	970	1,685	3,330	1,446
Winter activities	10	7,797	122	207	389	183
Big game hunting	7	1,777	41	81	174	69
Small game hunting	7	1,129	26	51	110	43
Other game hunting	2	470	11	21	46	18
Fresh water fishing	50	9,403	215	414	851	348
Nonconsumptive wildlife	68	12,943	299	597	1,275	506
Total	878	379,116	6,879	12,366	24,840	10,533
Total impacts (direct+indirect+induced) for 1997 output levels						
Resident						
Developed camping	4	1,929	41	78	147	69
Mechanized travel	75	61,688	1,352	2,661	5,042	2,330
Other	62	44,144	978	1,919	3,612	1,681
Trail use	51	18,414	394	776	1,451	670
Winter activities	2	1,932	36	66	124	58
Big game hunting	7	2,515	62	127	249	112
Small game hunting	5	1,185	30	61	119	53
Other game hunting	1	201	5	10	20	9
Fresh water fishing	17	5,074	127	256	492	224
Nonconsumptive wildlife	39	9,611	239	486	963	427
Nonresident						
Developed camping	11	13,692	299	574	1,085	508
Mechanized travel	123	322,859	6,751	12,792	23,888	11,360
Other	32	56,234	1,207	2,316	4,350	2,049
Trail use	49	98,399	2,111	3,976	7,411	3,525
Winter activities	6	13,299	258	471	851	423
Big game hunting	5	3,766	94	191	379	168
Small game hunting	4	2,395	59	121	239	106
Other game hunting	1	996	25	50	100	44
Fresh water fishing	33	19,067	472	946	1,841	830
Nonconsumptive wildlife	45	27,414	688	1,405	2,782	1,238
Total	571	704,812	15,230	29,280	55,144	25,886

Table 10.9—Allocation of tourism from TTSA methods to sectors, 1997

IMPLAN sector Name	Direct sector 1997 values from IMPLAN					Tourism allocation by sector			
	Number	Employment	Employee compensation	Value added	Industry output	Total regional product	Leisure tourism	Gross outdoor recreation ^a	Outdoor recreation ^b
		Jobs		Dollars (millions)					Percent
Hotel and lodging	463	492,002	9,047	15,309	25,595	13,698	34.1	6.5	11.2
Eating and drinking places	454	2,144,731	24,807	37,248	73,953	32,195	9.7	1.9	3.2
Taxi	434	82,788	1,576	2,071	535	2,029	19.0	3.6	6.3
Bus	510	11,183	495	-540	3,190	-540	20.0	3.8	6.6
Domestic airlines	437	309,060	14,096	20,504	35,958	18,646	34.0	6.5	11.2
Automobile rental	477	84,679	1,699	4,625	7,512	4,108	13.0	2.5	4.3
Tours and arrangements	439	66,092	1,618	2,958	4,488	2,853	20.0	3.8	6.6
Recreation and entertainment	487	27,274	484	1,159	2,227	842	20.0	3.8	6.6
Participant sports	488	329,106	4,543	8,664	13,802	8,063	20.0	3.8	6.6
Movie and theater	485	20,046	190	319	589	281	22.0	4.2	7.3
Sports events	489	141,076	1,933	2,354	5,383	2,252	22.0	4.2	7.3
Gas and oil	483	119,323	1,713	2,384	9,785	2,310	15.0	2.9	5.0
Automobile repair and parking	484	42,399	900	1,429	3,919	1,340	15.0	2.9	5.0
Other personal consumption expenditures (nondurables)	486	22,745	1,170	1,519	1,588	1,449	7.0	1.3	2.3
Total	451	713,175	18,514	32,254	41,060	25,601	6.0	1.1	2.0
	479	274,830	5,023	10,827	23,012	9,956	1.5	.3	.5
	448	292	6,285	10,492	12,556	8,458	3.0	.6	1.0
	449	804,896	11,842	19,964	27,065	15,578	3.0	.6	1.0
	450	1,066,937	15,484	26,351	31,119	21,308	3.0	.6	1.0
	452	324,263	4,218	7,951	11,582	6,074	3.0	.6	1.0
	453	310,144	6,203	10,571	13,942	8,312	3.0	.6	1.0
	455	1,224,501	14,810	28,453	34,862	22,799	3.0	.6	1.0
	456	478,356	18,094	53,027	72,319	51,393	3.0	.6	1.0
Total		9,089,898	164,743	299,893	456,042	259,005			

^a Assumes 19 percent.^b Assumes 33 percent.

Table 10.10—Direct effects by sector from TTSA methods recreation impact analysis, 1997

Sector	Employment	Employee compensation	Value added	Total industry output	Gross regional product
----- Dollars (millions) -----					
Assuming 19 percent of leisure tourism is outdoor recreation					
Hotel and lodging	31,853	586	991	1,657	887
Eating and drinking places	39,723	459	690	1,370	596
Bus and taxi	6,321	140	100	260	98
Airlines	19,965	911	1,325	2,323	1,205
Automobile rental	2,092	42	114	186	101
Tours and arrangements	4,651	114	208	316	201
Recreation and entertainment	25,079	354	691	1,128	627
Participant sports	12,474	164	207	462	196
Movie and theater	8,535	138	201	723	193
Sports events	560	29	37	39	36
Gas and oil	15,056	391	681	867	540
Automobile repair and parking	1,450	27	57	121	53
Other PCE	44,432	812	1,655	2,147	1,414
Total	212,193	4,166	6,958	11,600	6,145
Assuming 33 percent of leisure tourism is outdoor recreation					
Hotel and lodging	55,324	1,017	1,721	2,878	1,540
Eating and drinking places	127,765	1,478	2,219	4,405	1,918
Bus and taxi	10,979	244	174	452	170
Airlines	34,677	1,582	2,301	4,034	2,092
Automobile rental	3,633	73	198	322	176
Tours and arrangements	8,078	198	362	549	349
Recreation and entertainment	43,558	614	1,201	1,959	1,088
Participant sports	21,665	285	359	803	341
Movie and theater	14,825	240	349	1,256	335
Sports events	973	50	65	68	62
Gas and oil	26,150	679	1,183	1,506	939
Automobile repair and parking	2,519	46	99	211	91
Other PCE	77,172	1,411	2,875	3,730	2,455
Total	427,317	7,916	13,106	22,174	11,555

average, which is higher than the average of the three recreation methods used. Average income per job (not a wage rate) ranges from less than \$5,000 per year for timber to over \$52,000 per year for pulp and paper. GRP per job, also shown in table 10.16, is highest for pulp and paper (over \$82,000 per year) and lowest for wood furniture and recreation (about \$33,000 per year).

Recreation and wood products contribute to the local community by providing jobs and income. However, both recreation and wood products development, on either public or private forest land, have the potential for negative effects on the local community. Murdy and others (2000) list some of the negative effects from recreation as host-tourist conflicts, crime, overcrowding, migration, and loss of family traditions. Negative impacts of wood products development could include resource ownership concentration (Bliss and others 1998a, 1998b; Joshi and others 2000; Swanson 1988) and externalities such as pollution, traffic, and resource alteration.

Distributional Consequences of Forest-Based Economic Activity

This section summarizes previous research on the distributional impacts of policies, industrial changes, and situations. In assessing situations, we can only examine correlations or associations, because causality between forests, forest-based industries, and distribution has not been determined.

Impact of a project or situation can be assessed by assuming individuals maximize utility consisting of physical, amenity, financial/economic, and institutional/social factors (Xu 1994). Impacts on groups divided by age, generation, income, geography, place in the production chain (producers or consumers), and race can all be assessed. In this discussion, we focus on financial and economic impacts on groups divided by geography (urban/rural), race, and income class, largely because these are what previous studies have addressed.

Previous analyses of distributional impacts in forestry have focused on the (1) public land harvests and (2) tree planting programs (Berck and others 1992, Boyd and Hyde 1989, Wear

will lead to geographic shifts in economic costs and benefits, but may or may not represent an economic loss. For some sites, such as Great Smoky Mountains National Park, there may be no acceptable substitutes, in which case the loss of this location would clearly represent a loss in welfare, even if there were no loss in expenditures. To our knowledge, no systematic study of the joint production aspects of the forest landscape in supporting both the wood products and recreation/tourism industries has been conducted.

While much of the past controversy centers around public land, the management of private forests is

becoming more controversial. Land-owners and recreationists have similar perceptions about general forest management, but differing perceptions about harvesting activities (Marcouiller and Mace 1999, Theodori and others 2000). These differences also occur when comparing second homeowners with local residents (Marcouiller and others 1999).

Another source of discussion regarding the two forest uses is the disparity between the average annual incomes from the two sectors (table 10.16). The wood products average is higher than the Southwide economy

Table 10.11—Total impacts (direct+indirect+induced) by sector from TTSA methods recreation impact analysis, 1997

Sector	Employment	Employee compensation	Value added	Total industry output	Gross regional product
----- Dollars (millions) -----					
Assuming 19 percent of leisure tourism is outdoor recreation					
Hotel and lodging	58,733	1,229	2,207	3,695	1,993
Eating and drinking places	60,277	967	1,674	3,170	1,481
Bus and taxi	11,773	285	383	775	354
Airlines	49,899	1,713	2,859	5,040	2,602
Automobile rental	4,521	104	230	388	206
Tours and arrangements	8,994	234	425	676	399
Recreation and entertainment	41,866	753	1,454	2,432	1,320
Participant sports	21,360	375	628	1,169	578
Movie and theater	21,313	431	757	1,760	703
Sports events	1,083	42	62	81	58
Gas and oil	25,297	642	1,170	1,702	983
Automobile repair and parking	3,223	73	143	275	130
Other PCE	71,033	1,407	2,918	4,038	2,684
Total	379,373	8,254	14,909	25,199	13,492
Assuming 33 percent of leisure tourism is outdoor recreation					
Hotel and lodging	102,011	2,134	3,832	6,417	3,461
Eating and drinking places	193,875	3,109	5,386	10,195	4,762
Bus and taxi	20,448	495	665	1,346	615
Airlines	86,667	2,975	4,965	8,753	4,519
Automobile rental	7,853	180	399	674	359
Tours and arrangements	15,621	406	737	1,174	694
Recreation and entertainment	72,714	1,309	2,525	4,223	2,293
Participant sports	37,098	652	1,091	2,030	1,004
Movie and theater	37,017	748	1,315	3,057	1,222
Sports events	1,881	72	108	140	101
Gas and oil	43,937	1,115	2,033	2,957	1,708
Automobile repair and parking	5,598	126	248	478	226
Other PCE	123,374	2,444	5,068	7,013	4,663
Total	748,094	15,765	28,372	48,456	25,624

and Hyde 1992). In addition, several analyses of the impacts of changes in the industry (products of technology) have been conducted (Alavalapati and others 1999, Marcouiller and others 1995, Xu 1994). Other studies have assessed the association between forests, rural communities, and the economic benefits derived from forests, including tourism and wood products (Bliss, J.C.; Bailey, C.; Howze, G.R.; Teeter, L.J. [n.d.] Timber dependency in the American South. SCFER Work. Pap. 74. 18 p. Unpublished manuscript. On file with: USDA Forest Service, Southern Research Station, Southeastern Center for Forest

Economics Research, P.O. Box 12254, Research Triangle Park, NC 27709.) (Bliss and others 1994, 1998b; English and others 2000; Lee and Cabbage 1994; Overdeest and Green 1994).

Rural communities are found to be worse off than more urban communities, with lower per capita incomes, lower educational attainment, and higher unemployment (Beaulieu and others 2001, Gale and McGranahan 2001, Ghelfi 2001, Gibbs 2001, McGranahan 2001, Rowley and Freshwater 1999). This disparity is attributed, in part, to a lack of both human capital (education) and

human-made capital (buildings and machinery), even in the presence of a wealth of natural capital (Beaulieu and others 2001). Social capital and other community attributes can also influence well-being in rural communities (Bliss, J.C.; Bailey, C.; Howze, G.R.; Teeter, L.J. [n.d.] Timber dependency in the American South. SCFER Work. Pap. 74. 18 p. Unpublished manuscript. On file with: USDA Forest Service, Southern Research Station, Southeastern Center for Forest Economics Research, P.O. Box 12254, Research Triangle Park, NC 27709.) (Force and others 2000).

Forests in the South are a major component of the region's natural capital, but forests are often associated with the absence of human and human-made capital (Joshi and others 2000). Forests are unlikely causes for lower economic well-being, but the negative associations and correlations between well-being and forests have been well documented (Bliss, J.C.; Bailey, C.; Howze, G.R.; Teeter, L.J. [n.d.] Timber dependency in the American South. SCFER Work. Pap. 74. 18 p. Unpublished manuscript. On file with: USDA Forest Service, Southern Research Station, Southeastern Center for Forest Economics Research, P.O. Box 12254, Research Triangle Park, NC 27709.) (Bliss and others 1994, Lee and Cabbage 1994, Overdeest and Green 1994). Berck and others (1992) found that problems in rural communities resulted more from remote locations and transportation costs than from specific forest products industries. Using simulation, they found that maximizing the diversity of the rural community or replacing wood products with other manufacturing sectors did not improve the economic well-being of the community.

Use of private forests for timber and recreation production could also have potentially undesirable distributional consequences. According to Marcouiller and others (1995), because forest land is owned by middle and upper income households, revenue from uses will go to these households. Alavalapati and others (1999), in a study in Canada, found that subsequent wood processing, however, leads to benefits for lower income households through increases in well-paid job opportunities (Alavalapati and others 1999). In contrast, increasing recreation

Table 10.12—Allocation of tourism from TIA methods to States, 1997

State	Tourism allocation by State					Totals for 1997 tourism from TIA		
	Leisure tourism	Forest	Leisure tourism-forest adjusted	Tourism in outdoor recreation—19%	Tourism in outdoor recreation—33%	Employment	Payroll	Travel expenditures
	----- Percent -----					Jobs	Dollars (millions)	
AL	43.0	67.2	49.0	9.3	16.2	72,000	976	4,180
AR	43.0	56.3	41.0	7.8	13.5	55,700	714	3,337
FL	43.0	46.7	34.0	6.5	11.2	794,000	14,235	52,135
GA	43.0	65.5	47.7	9.1	15.7	231,900	5,419	12,637
KY	43.0	49.8	36.3	6.9	12.0	99,700	1,967	4,734
LA	43.0	47.8	34.8	6.6	11.5	113,200	1,689	7,328
MS	43.0	61.5	44.8	8.5	14.8	74,000	1,177	3,806
NC	43.0	61.4	44.7	8.5	14.8	192,400	3,424	10,731
OK	43.0	17.4	12.7	2.4	4.2	68,100	1,313	3,505
SC	43.0	65.3	47.6	9.0	15.7	112,900	1,571	6,546
TN	43.0	53.9	39.3	7.5	13.0	167,400	3,621	8,985
TX	43.0	10.9	8.0	1.5	2.6	514,100	10,578	29,247
VA	43.0	62.9	45.8	8.7	15.1	201,800	3,528	11,627

production is likely to produce lower paying jobs locally, with the returns to capital accumulating to higher income households elsewhere. Adding race into the mix (rural, forested, and large minority populations) makes it harder to correct problems of lower human and human-made capital and often exacerbates the regressive distributional effects of rural, forested locations (Bliss and others 1994). Changes in the nature of the wood products sectors can also have distributional impacts. In modeling an expansion of the pulp and paper sector, Alavalapati and others (1999) found that higher income households benefited, while a decline in the lumber sector hurt higher income households more than lower income households.

Revenues and Expenditures by State and Federal Governments for Forest-Based Activities

State governments—State and local governments derive revenues from and make expenditures for both wood products and forest-based recreation and tourism. Expenditures include State budgets for forestry and park agencies and for visitor and tourism agencies, as well as grants or subsidies to specific industries or businesses designed to bolster economic

development. Subsidies can include property tax or development fee waivers, infrastructure improvements or other incentives. These subsidies and grants are not usually focused on the forest-based sectors. In addition, the Federal Government may also provide subsidies through infrastructure improvements or development assistance.

Tables 10.17 and 10.18 show the revenues and expenditures of the 13 State forestry agencies for 1998 obtained from the National Association of State Foresters. Florida, Georgia, and North Carolina have the largest State forestry agencies. Over 54 percent of the expenditures for all States are for fire management. About 7 percent of revenues are from the Federal Government, and the remainder are from State budgets and sales or permits.

State-level expenditures in support of and revenue from forest-based recreation occur through both State park agencies and State travel and tourism agencies. Travel and tourism agencies, however, also deal with significant nonforest-recreation opportunities. Table 10.19 shows State park acres, expenditures, and revenues for the State parks in the 13 Southern States (Thoreau Institute 1995). Florida has the largest percentage of land in State parks, while

Kentucky and Tennessee have the largest numbers of visitors.

Federal Government—The Federal Government contributes to the forest-based economy of the South, and hence to the general economy, through the management of Federal land used for recreation, hunting, and product removal. The harvest from national forests is discussed in more detail in the section on “Relationship between recreation and wood products sectors in the economy.”

Land managed by the four major Federal land management agencies constitutes 4.7 percent of southern land area (tables 10.20 and 10.21). Most of this land is managed by the USDA Forest Service (Vincent and others 2001). This compares to the nearly 29 percent of total U.S. land area that is managed by these agencies. Arkansas, Virginia, and North Carolina have the largest percentage of Federal land among Southern States, while Texas, Oklahoma, and Alabama have the smallest. Table 10.19 also shows acres of wilderness by agency and miles of wild, scenic, and recreational rivers by agency. Wilderness represents over 10 percent of Federal land in the South, with most of the wilderness occurring in Florida, Virginia, North Carolina, and Arkansas.

Timber is produced on forest land managed by the USDA Forest Service,

Table 10.13—Direct and total impacts from TIA methods of recreation impact analysis, 1997

State	Percent of tourism in outdoor recreation					
	19 percent			33 percent		
	Employment	Payroll	Expenditures	Employment	Payroll	Expenditures
	<i>Jobs</i>	<i>Dollars (millions)</i>		<i>Jobs</i>	<i>Dollars (millions)</i>	
	Direct					
Alabama	12,410	168	720	21,555	292	1,251
Arkansas	8,036	103	481	13,957	179	836
Florida	95,121	1,705	6,246	165,211	2,962	10,848
Georgia	38,926	910	2,121	67,609	1,580	3,684
Kentucky	12,726	251	604	22,103	436	1,049
Louisiana	13,869	207	898	24,088	359	1,559
Mississippi	11,675	186	600	20,278	323	1,043
North Carolina	30,288	539	1,689	52,606	936	2,934
Oklahoma	3,036	59	156	5,273	102	271
South Carolina	18,897	263	1,096	32,822	457	1,903
Tennessee	23,136	501	1,242	40,183	869	2,157
Texas	14,384	296	818	24,983	514	1,421
Virginia	32,529	569	1,874	56,498	988	3,255
South	315,034	5,755	18,547	547,165	9,996	32,213
	Total (direct+indirect+included)					
Alabama	25,791	511	1,715	44,795	888	2,978
Arkansas	17,236	342	1,146	29,937	594	1,990
Florida	223,601	4,435	14,865	388,360	7,702	25,818
Georgia	75,942	1,506	5,049	131,899	2,616	8,769
Kentucky	21,632	429	1,438	37,571	745	2,498
Louisiana	32,141	637	2,137	55,824	1,107	3,711
Mississippi	21,498	426	1,429	37,338	741	2,482
North Carolina	60,476	1,199	4,020	105,037	2,083	6,983
Oklahoma	5,595	111	372	9,717	193	646
South Carolina	39,225	778	2,608	68,128	1,351	4,529
Tennessee	44,456	882	2,955	77,213	1,531	5,133
Texas	29,295	581	1,948	50,882	1,009	3,383
Virginia	67,097	1,331	4,461	116,537	2,311	7,747
South	663,984	13,168	44,142	1,153,236	22,871	76,668

the Bureau of Land Management, the FWS, and the National Park Service. All four agencies contribute substantial recreation opportunities. Mining and oil and gas production occur on some Federal lands in these States. Some of the land included in table 10.20 is not forested, such as coastal marshlands and grasslands managed by the agencies. Note also that these values are for Texas and Oklahoma, in their entirety.

Management of public land also contributes to local economies through expenditures made by the agencies and through payroll for employees. For example, the USDA Forest Service contributed over \$330 million to the Southern Region for management of the national forests, for research and development, for State and Private Forestry, and for payments to States. Revenues generated from activities on Federal lands are shared with local governments through various

regulations, including the 25 Percent Fund Act (Public Law 60-136) and Payments in Lieu of Taxes (PILT) (Public Law 94-565, Public Law 97-258). In 1996, the USDA Forest Service, through the 25 percent fund, paid \$22,709,317 to Southern States. This total does not include PILT payments or payments made through the Minerals Management Service, Department of the Interior.

Recently, these laws were amended by the Secure Rural Schools and

Table 10.14—Comparison of NFS, TTSA, and TIA recreation impacts, 1997

Method	Visitor days	Employment	Employee compensation	Value added	Total industry output	Gross regional product
	<i>Million</i>	<i>Jobs</i>	----- <i>Dollars (millions)</i> -----			
Direct impacts						
NFS-participation	317	136,944	2,485	4,467	8,973	3,805
NFS-land	878	379,116	6,879	12,366	24,840	10,533
TTSA-19	492	212,193	4,166	6,958	11,600	6,145
TTSA-33	990	427,317	7,916	13,106	22,174	11,555
TIA-19 ^a	730	315,034	5,755	6,890	18,547	20,360
TIA-33 ^a	1,268	547,165	9,996	11,968	32,213	35,361
	<i>Million</i>		----- <i>Percent</i> -----			
Southern economy						
NFS-participation	317	.34	.23	.24	.27	.22
NFS-land	878	.95	.63	.66	.74	.61
TTSA-19	492	.53	.38	.37	.35	.35
TTSA-33	990	1.07	.72	.70	.66	.67
TIA-19 ^a	730	.79	.53	.63	.55	.61
TIA-33 ^a	1,268	1.37	.91	1.09	.96	1.05
	<i>Million</i>	<i>Jobs</i>	----- <i>Dollars (millions)</i> -----			
Total impacts (direct+indirect +induced)						
NFS-participation	317	254,591	5,501	10,577	19,919	9,350
NFS-land	878	704,812	15,230	29,280	55,144	25,886
TTSA-19	492	379,373	8,254	14,909	25,199	13,492
TTSA-33	990	748,094	15,765	28,372	48,456	25,624
TIA-19 ^a	730	663,984	13,168	15,765	44,142	48,456
TIA-33 ^a	1,268	1,153,236	22,871	27,382	76,668	84,160
	<i>Million</i>		----- <i>Percent</i> -----			
Southern economy						
NFS-participation	317	.64	.50	.56	.59	.54
NFS-land	878	1.76	1.39	1.55	1.64	1.49
TTSA-19	492	.95	.75	.79	.75	.78
TTSA-33	990	1.87	1.44	1.50	1.44	1.48
TIA-19 ^a	730	1.66	1.20	1.44	1.32	1.44
TIA-33 ^a	1,268	2.88	2.09	2.50	2.29	2.51

^a Estimates were made for value added and gross regional product for the TIA methods using the relationship between TTSA employee compensation and value added and between total industry output and gross regional product.

Community Self Determination Act of 2000 (Public Law 106-393). Counties that have received payments previously are now eligible to collect either the traditional amount (usually 25 percent for USDA Forest Service land) or an amount equal to the average of the three highest years' payments between 1986 and 1999. If the latter amount is requested (referred to as the "full payment"), the counties must use 80

to 85 percent of the total for traditional payments to support roads and schools. The percentage depends on the total amount received. The balance of the payment would be used for public land projects or county-level projects as determined by a resource advisory council in the local area. This new law was to take effect for the fiscal year 2001 payments to States.

Discussion and Conclusions

Forests are important in the local and regional economies of the South, contributing jobs, income, and other less tangible benefits. The overall southern economy has grown since 1969 with increases in numbers of jobs

proportionate to increases in population and in the national economy. This new economy is less dominated by manufacturing and agriculture, with continuing shifts into the retail and service sectors. Timber and agriculture, the two major uses of rural southern land, still account for over 6 percent of the southern economy. Much of the South is still rural and poor, though conditions have improved.

The South has 33 percent of the U.S. population and 24 percent of the U.S. area, but only 4 percent of Federal land and 12 percent of State park and forest land. About 2.6 percent of U.S. wilderness is in the South, and 6.8 percent of miles of wild, scenic, and recreational rivers are in the 13 Southern States. These percentages imply that both recreational and timber producing opportunities may be more constrained on public land in the South than in other regions of the United States. National forests in the Southern Region are the second most heavily used for recreation among the nine USDA Forest Service regions, with visits of 1.9 per acre, reflecting the scarcity of public land for outdoor recreation in this region. National forests contributed 1.7 percent of the value of timber harvested, and an estimated 17 percent of outdoor recreation-based tourism in 1997. Fourteen southern counties have high concentrations of wood products employment and high percentages of land managed by the USDA Forest Service.

The U.S. wood products industry continues to concentrate in the South, which already has 39.3 percent of U.S. wood products jobs. Concentrations of both the lumber and wood products sector and the pulp and paper sector have increased since 1969, while the furniture sector concentration decreased. The percentages of State-level jobs and income in wood products have generally declined since 1969, but actual numbers of jobs have remained fairly constant. Tourism-related industries are increasing in the South, but are not becoming more concentrated in the South. The percentage of State-level jobs and income in the tourism-related sectors is increasing in all 13 States, as are the actual numbers of jobs and amount of income.

Table 10.15—National forest acres, visitation, and visits per acre for all regions, 2000

Region	Acres	Visits	Visits per acre
----- Million -----			
Northern	25.4	12.4	0.49
Rocky Mountain	22.1	38.6	1.75
Southwest	20.8	17.3	.83
Intermountain	32.0	20.5	.64
Pacific Southwest	20.1	20.2	1.00
Pacific Northwest	24.7	34.0	1.38
Southern	13.2	24.9	1.89
Eastern	12.0	34.2	2.85
Alaska	22.0	7.0	.32
United States	192.3	209.1	1.09

Source: National Visitor Use Monitoring Report, USDA Forest Service, 2001; Lands of the USDA Forest Service, 2001.

Table 10.16—Income, value added, total industry output, and gross regional product per job for wood products and recreation sectors and Southwide, 1997

Sector	Direct effects per job			
	Employee comp.	Value added	Total industry output	Gross regional product
----- Dollars (millions) -----				
Aggregate wood products sector				
Timber	4,691	70,137	130,154	59,659
Logging	23,935	59,674	160,203	58,728
Sawmills	27,308	41,942	119,609	41,245
Wood furniture	26,748	34,249	96,385	33,721
Pulp and paper	52,632	85,279	263,083	82,519
Wood products avg.	32,402	53,614	153,538	51,910
Recreation method				
NFS based	21,608	41,543	78,240	36,727
TTSA	19,633	32,793	54,666	28,960
TIA	18,223	NA	58,471	NA
Recreation method avg.	19,821	37,168	63,792	32,844
Southwide average	27,370	47,147	83,866	43,412

NA = not applicable.
Source: IMPLAN 1997.

In 1997, wood products sectors contributed 5.5 percent of southern jobs and 6.0 percent of GRP. Public lands represented 8.5 percent of this contribution. In 1997, outdoor recreation-based tourism contributed between 0.64 and 2.88 percent of

southern jobs and between 0.51 and 2.51 percent of GRP. Public lands represented approximately 56 percent of this contribution.

Both forest-based recreation and wood products rely on the nearby presence of forest land. Thus, these

Table 10.17—Revenue sources by State for forestry activities in 1998

State	Government sources			Revenue				Total
	Federal	State	Other	Sales	Permits	Service charges	Other	
-----Dollars (thousands)-----								
Alabama	2,973	11,968	2,233	1,668	2	229	6,450	25,523
Arkansas	1,195	5,915	5,959	1,657		76	96	14,898
Florida	2,811	46,300	700	4,700	1,500			56,011
Georgia	2,443	34,612	1,366	2,900		664	16	42,001
Kentucky	1,421	8,462		370			482	10,735
Louisiana	1,180	9,225	761	1,962		554		13,682
Mississippi	130	19,800	5,300			350		25,580
North Carolina	3,279	33,027	5,219	1,929		1,246	5,351	50,051
Oklahoma	1,268	9,120	88	709		12	38	11,235
South Carolina	2,377	16,842		2,406	22	161	1,580	23,388
Tennessee	1,548	14,701	160	1,926		30	64	18,428
Texas	2,118	11,373		1,097			1,430	16,018
Virginia	1,993	12,309		2,334	34	353	4,872	21,895
Total	22,743	233,654	21,786	23,659	1,558	3,322	15,507	307,551

sectors are often concentrated in rural areas. Rural areas in the South are generally less well off, have higher minority concentrations, and more forest land. While causality between forests and well-being has not been determined, the associations between forested areas, wood products concentrations, and economic well-being indicate that rural, forested areas are less well off than many, but not all, other rural areas.

Needs for Additional Research

Research is needed to:

- Explore the joint production of recreation/tourism and wood products from forested landscapes and the subsequent economic impacts.
- Explore the relationship between growth in the economy, economic and social well-being, and ecosystem sustainability.
- Continue to work to isolate the forest-based portion of recreation/tourism impacts on the economy.

■ Improve methodologies and gather data to assess the total resource impacts of both wood products and forest-based tourism development through natural resource accounting.

■ Develop comprehensive models and gather data to address distributional aspects of the forest-economy relationship.

■ Explore potential for substitution between public and private lands in providing wood products and recreation/tourism outputs.

Acknowledgments

We thank Carter Betz and Ken Cordell of the Southern Research Station for the NSRE data, and Donald English of the Southern Research Station for assistance with the National Forest System visitation data.

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Table 10.18—Expenditures by State for forestry activities in 1998

State	Cooperative forestry and landowner assistance			Urban and community forestry			Dollars (thousands)						
	State programs	Forest Service	FSA/NRCS	State programs	Federal programs	Fire mgmt.	State forest mgmt.	Marketing	Insect and disease	RC&D (PL-566)	Nursery	Forest recreation	Other
AL	1,570	4,298	977	697	9,581	355	199	1,994	2,420	3,432	25,523		
AR	1,140	3,491	472	262	6,555	329	5	195	1,109	1,606	14,070		
FL	1,140	625	1,000	506	40,446	7,815	1	150	842	1,500	56,011		
GA	2,161	1,242	21	909	31,787	461	506	330	2,059	4,672	42,001		
KY	1,884	318	282	651	5,659	50	307	110	1,132	184	10,380		
LA	10,300	100	300	308	7,540	44	214	200	1,962	840	13,682		
MS	12,589	123	324	300	14,300	2,600	200	2,081	1,500	300	29,900		
NC	42	612	53	428	8,719	456	1	52	1,970	6,660	50,049		
OK	846	46	94	320	13,755	3,648	133	616	28	2,229	23,385		
TN	1,286	120	73	365	10,053	1,949	50	261	1,291	2,795	18,387		
TX	5,117	692	450	589	3,383	685	522	1,139	823	346	10,567		
VA	14,908	106	15	557	177,623	18,442	1,819	7,835	1,269	24,738	327,485		
Total	51,842	11,773	3,737	1,204	6,216	18,442	1,819	7,835	19,296	1,690	24,738	327,485	

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Table 10.19—Revenues and expenditures by State for State park management

State	State park	State area in parks	Total visitors	User fee revenues	Operating budget	Capital budget	Total budget
	Ac (k)	Percent	k	----- Dollars (thousands) -----			
AL	50	0.20	6,198	23,912	28,547	84	28,631
AR	48	.10	7,257	12,661	21,012	2,323	23,335
FL	428	1.20	11,416	19,196	43,858	14,100	57,958
GA	57	.20	15,637	18,475	37,832	4,525	42,357
KY	43	.20	28,396	40,800	57,672	10,906	68,578
LA	39	.10	1,221	2,141	6,511	2,675	9,186
MS	22	.10	3,913	5,196	11,909	1,562	13,471
NC	135	.40	11,830	2,238	11,956	2,839	14,795
OK	72	.20	16,049	17,240	27,664	1,349	29,013
SC	80	.40	8,189	12,034	19,919	3,871	23,790
TN	133	.50	28,701	21,033	36,216	0	36,216
TX	499	.30	25,368	15,178	36,093	10,289	46,382
VA	67	.30	3,779	2,350	11,122	5,767	16,889
Total	11,610		725,500	504,594	1,143,593	332,239	1,475,832
South (percent)	14.41		23.15	38.14	30.63	18.15	27.82

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Table 10.20—Acres managed by Federal agency by State, 1999

State	Federal land		Managed by agency				Federally designated wilderness				
	Total	%	USDA Forest Service	National Park Service	Fish and Wildlife Service	Bureau of Land Management	Total	USDA Forest Service	National Park Service	Fish and Wildlife Service	Bureau of Land Management
AL	32,678,400	3.4	665,026	16,873	57,866	110,963	41,367	41,367	0	0	0
AR	33,399,360	9.8	2,586,074	101,456	345,745	291,126	153,655	116,578	34,993	2,144	0
FL	34,721,280	8.3	1,152,824	2,443,323	976,080	25,277	1,422,247	74,495	1,296,500	51,252	0
GA	37,295,360	5.6	865,078	40,335	479,241	0	485,484	114,537	8,840	362,107	0
KY	25,512,320	4.8	693,746	93,941	7,487	0	16,779	16,779	0	0	0
LA	28,867,840	4.5	604,210	10,731	510,615	309,611	17,025	8,679	0	8,346	0
MS	30,222,720	5.9	1,158,967	107,866	223,634	57,171	10,683	6,046	4,637	0	0
NC	31,402,880	8.0	1,244,295	393,095	421,080	0	111,419	102,634	0	8,785	0
OK	44,087,680	2.9	397,131	10,200	167,682	2,126	23,113	14,543	0	8,570	0
SC	19,374,080	6.1	613,171	27,152	160,490	0	60,681	16,671	15,010	29,000	0
TN	26,727,680	6.1	634,523	355,354	114,517	0	66,349	66,349	0	0	0
TX	168,217,600	1.7	755,104	1,183,095	496,916	0	85,333	38,483	46,850	0	0
VA	25,496,320	9.0	1,660,428	333,422	129,721	0	177,214	97,635	79,579	0	0
South	538,003,520	4.7	13,030,577	5,116,843	4,091,074	796,274	2,671,349	714,796	1,486,409	470,204	0
U.S. total	2,271,343,360	28.8	192,046,672	77,937,494	93,628,302	264,174,745	104,231,201	34,777,793	43,229,874	20,694,502	5,529,032

Source: Congressional Research Service, 2001.

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Table 10.21—Miles of wild, scenic, and recreational rivers by State, 1999

State	Wild	Scenic	Recreational	Total
----- Miles -----				
AL	36.4	25.0	0	61.4
AR	21.5	147.7	40.8	210.0
FL	32.7	7.9	8.6	49.1
GA	39.8	2.5	14.6	56.9
KY	9.1	0	10.3	19.4
LA	0	19.0	0	19.0
MS	0	21.0	0	21.0
NC	44.4	95.5	52.0	191.9
OK	0	0	0	0
SC	39.8	2.5	14.6	56.9
TN	44.3	0	1.0	45.2
TX	95.2	96.0	0	191.2
VA				0
South	363.0	417.0	142.0	922.0
U.S. Total	5,345.0	2,445.7	3,501.4	11,292.1

Source: Congressional Research Service (2001).

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The southern forest resource assessment provides a comprehensive analysis of the history, status, and likely future of forests in the Southern United States. Twenty-three chapters address questions regarding social/economic systems, terrestrial ecosystems, water and aquatic ecosystems, forest health, and timber management; 2 additional chapters provide a background on history and fire. Each chapter surveys pertinent literature and data, assesses conditions, identifies research needs, and examines the implications for southern forests and the benefits that they provide.

Keywords: Conservation, forest sustainability, integrated assessment.

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