Communities and Human Influences in Southern Appalachian Ecosystems:

The Human Dimensions

In all but the most remote and forbidding of the earth's terrestrial ecosystems, human influences range from slight to pervasive. Indeed, it is concern over the pervasiveness of human influences in the Southern Appalachian natural ecosystems that led to this assessment. But even as humans are influencing the ecosystems in which they live, they are in turn being influenced by and are closely tied to those ecosystems. In fact, it is more useful and accurate to define ecosystems to include human settlements and cultures as integral components.

This chapter examines the human dimensions of Southern Appalachian ecosystems. Topics range from overall social trends since 1970 to projected changes in population into the 21st century. At all times, the concern is both with the way people are affected by the area's natural resources and with the way people are influencing the ecosystem.

While other portions of this assessment also address various aspects of human dimensions, it is the intention of this chapter to treat human beings as parts of Southern Appalachian ecosystems. The interactions between humans and the ecosystems around them are too complex to be examined exhaustively in an assessment like the one described here. Instead, the Human Dimensions Subteam, which authored this chapter, designed its analyses around seven questions. The first four of these questions resulted from concerns expressed at three public meetings held across the region in the summer of 1994. The other three questions emerged from needs and concerns expressed by the assessment collaborators in the Southern Appalachian Man and the Biosphere Program, which is the overall sponsor of this effort.

The seven questions addressed in the analysis are:

1. **How has the social pattern of Southern Appalachian communities changed over the past two decades?**

2. **How has the changing social pattern of the Southern Appalachians affected management of natural resources in the region, and what future effects of social trends can we predict?**

3. **How might management of natural resources impact the economic and social status of local communities in the region, particularly communities near major tracts of public land?**

4. **To what extent have interests or publics outside of the Southern Appalachians affected the status and management of the region's ecosystems and public land?**

5. **What are the important attitudes and values that Southern Appalachian residents hold toward natural resources and ecosystem management?**

6. **With particular emphasis on tourism and extractive and other resource-dependent industries, what are the important economic trends in the Southern Appalachians?**

7. What are the status of and the priorities for management of land by nonindustrial private landowners in the region?

To set the context for addressing these questions, the people and development of the Southern Appalachians are broadly described. Then each of the seven questions is addressed.

Most of the data used in this assessment are secondary data obtained from previous work of other organizations. One of the major limitations faced in attempting to address the questions was that none of the available data and information was specifically gathered for the needed analysis. Data describing the human population came from the Bureau of the Census' Census of Population and Housing for 1970, 1980, and 1990-91 and from that agency's TIGER (Topologically Integrated Geographic Encoding and Referencing) system files, which provide geographic resolution down to block group and census tract levels. Economic data came mostly from the U.S. Department of Commerce's County Business Patterns, from the U.S. Department of Labor, and from the U.S. Department of Agriculture's Economic Research Service. Several local sources were used to describe schools, highways, and other social characteristics. Specific sources of data are cited where the information is presented.

In two instances, major questions could not be answered with existing data and original data had to be developed. To adequately estimate the impacts of natural resource management on local populations, focus groups were assembled and studied in five communities near public land in the region. To ascertain the overall knowledge and values that Southern Appalachian residents have about ecosystem issues, a special phone survey was conducted. These special efforts provided essential insights into the importance of natural resources as sources of raw materials, as aesthetic backdrops, and as a way of life for Southern Appalachian people.

The professionals who developed this chapter represent a cross section of sciences ranging from sociology, social psychology, and resource economics to computer and forest sciences. This diversity of background and expertise is a strength of this chapter as the diversity of the people and settings in the Southern Appalachians is a strength of the region.

An Overview of the Southern Appalachian People

This overview is based on a variety of data sources, especially on U.S. census data for 1970, 1980, and 1990-91. Most of the information presented is 1990-91 summary data describing the current situation in the Southern Appalachians. Journal articles and technical reports written by various authors are also used to provide general information about the region.

Trends and Spatial Patterns

Largest Cities In or Near the Southern Appalachian Region

There are 22 cities with populations greater than 25,000 in or within 50 miles of the region (fig. 2.1). The largest city, Atlanta, GA, is located just south of the region. Other large cities in the area include Chattanooga and Knoxville, TN; Greenville, SC; and Roanoke, VA. Each of these cities has a population greater than 200,000. Of the 22 cities in the vicinity, 10 actually fall inside the regional boundary.

Interstates and Other Transportation Corridors

Some 15 interstate highways cross the Southern Appalachian region (fig. 2.2). Each is a major transportation corridor. Interstate 81 is the aorta for the system. It stretches from the most northern Appalachian areas in New York through the center of the Appalachians into Tennessee, where it merges with Interstate 75. Interstate 75 stretches on southward into Georgia while Interstate 59 feeds into Alabama. Other interstate highways cross this central transportation aorta. Most of these crossing interstates connect with major metropolitan areas. For example, Interstate 75 feeds into the Appalachian region from Atlanta, GA; Interstate 59 comes from Birmingham, AL; and Interstates 24 and 40 come from Nashville, TN. Interstate 64 comes from Charleston, WV, to the west and Richmond, VA, to the east; Interstate 70 provides access from the Washington, DC area; and Interstates 77 and 40 provide entry into the mountains from Winston-Salem and Charlotte, NC. All of these major interstates provide access

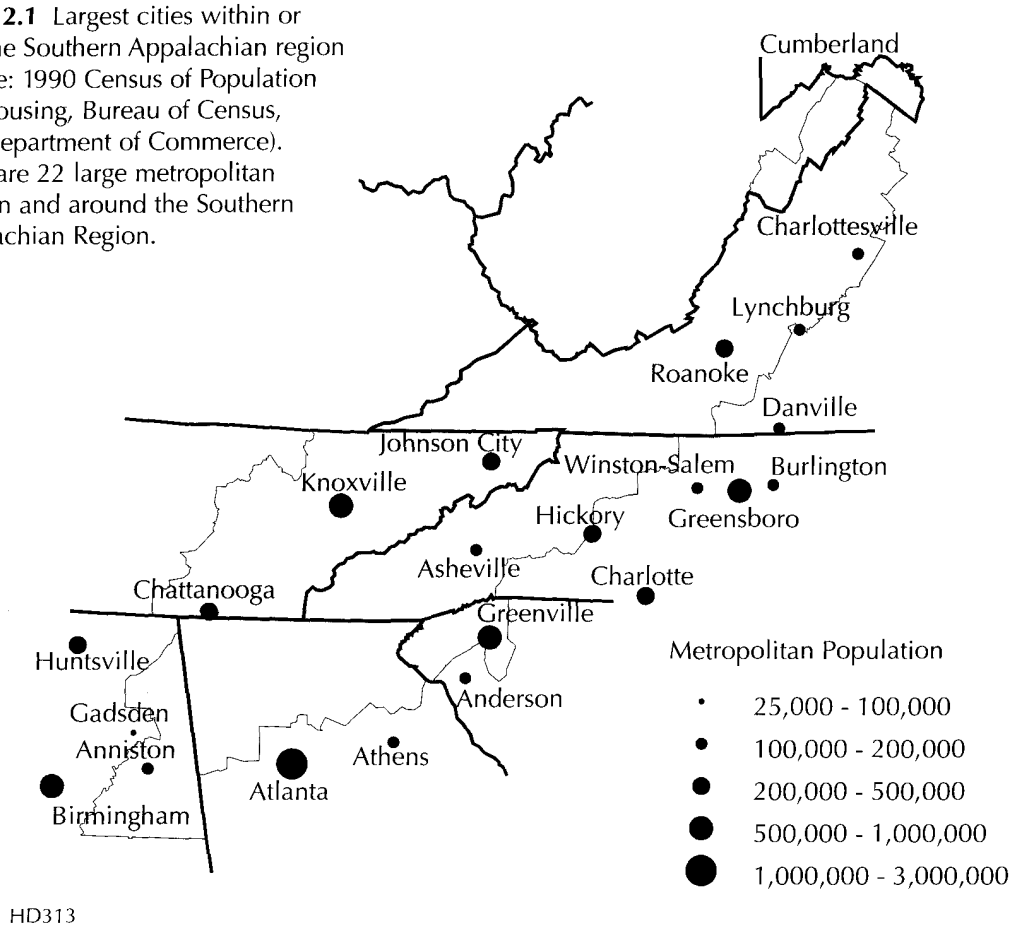

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Figure 2.1 Largest cities within or near the Southern Appalachian region (Source: 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce). There are 22 large metropolitan areas in and around the Southern Appalachian Region.

not only for distant urban residents, but also for people living in the Appalachian region.

Although their importance has declined, railroads also are vital to the transportation system. Many of the railroads follow the same general routes as the interstate system, but they also provide additional access to some rural areas in the region. As can be noted from figure 2.3, most rail systems are on the western side of the mountains. Rail lines also run north and south through the center and the western side of the Appalachian region. The rail lines on the eastern side of the Southern Appalachians connect metropolitan areas there with lines that run the length of the mountain chain.

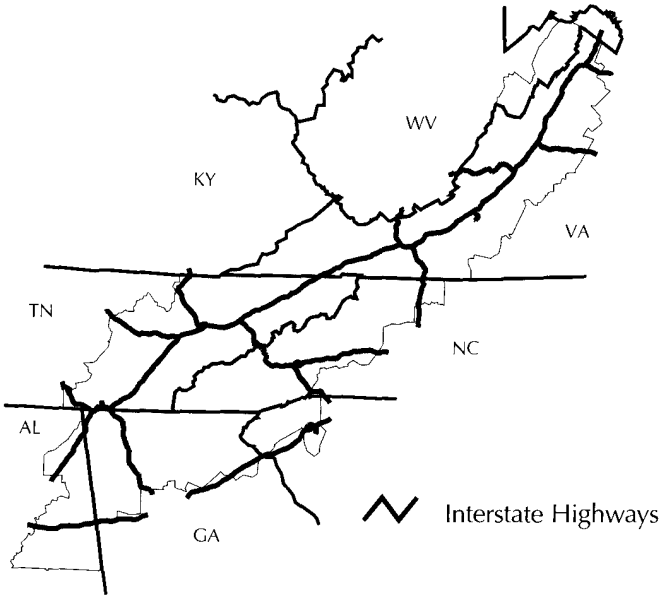

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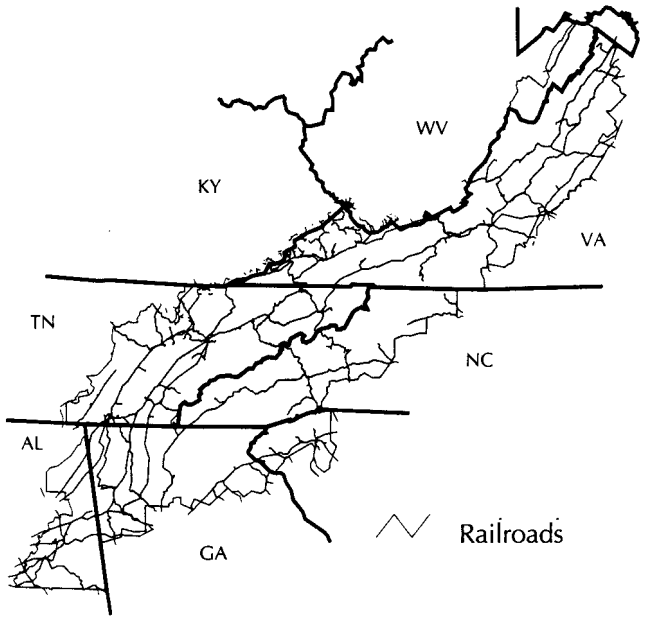
Figure 2.2 Interstates in the Southern Appalachians (Source: U.S. Geological Survey). There are some 15 interstate systems in the Southern Appalachians. Each of these systems serves as a major transportation corridor through the region from larger metropolitan areas that are not within the region.



HD308 **Figure 2.3** Railroads in the Southern Appalachians (Source: U.S. Geological Survey). The railroad systems in the Southern Appalachians tend to congregate toward the western part of the region in the southern and central areas, while they are more to the eastern part of the region in the northern areas. These railroads serve more for the purpose of freight distribution than personal transportation.

Population

The population of the Southern Appalachians increased by over 1.2 million between 1970 and 1990 (table 2.1). Two-thirds of this growth took place between 1970 and 1980. Prior to the 1970s, the region's population had been decreasing due to a lack of employment opportunities for young people and a lack of accommodations for the elderly. Since the 1970s, however, all of the counties in this region have had high population growth percentages, except those containing metropolitan areas, which had high population bases in 1970.

Population Distribution

The population of the Southern Appalachians is unevenly distributed. The most rugged portions of the mountains, where much of the public land is, are sparsely settled. The more level areas have more dense populations than the national average. Although the number and size of urban areas have grown, almost 57 percent of the Southern Appalachian population still resides in rural areas.

Population densities of Southern Appalachian counties vary from 6.3 people per square mile (ppsm) to 4,034 ppsm (fig. 2.4). The average for the region is 262 ppsm. There are only two counties in Tennessee that have densities of over 500 ppsm, Hamilton and Knox. Hamilton County is just north of the Georgia-Tennessee border and includes Chattanooga. Knox County includes Knoxville. Other counties with

Table 2.1 Population of the Southern Appalachian region, by state, 1970, 1980, 1990.

	1970	1980	1990	Percent Change 1970–1990
Alabama	267,922	312,378	310,198	15.7
Georgia	610,361	755,293	923,174	51.2
North Carolina	677,090	796,134	846,356	25.0
South Carolina	340,230	415,816	471,555	38.6
Tennessee	1,474,707	1,757,565	1,822,643	23.6
Virginia	1,195,536	1,404,127	1,459,239	22.1
West Virginia	27,596	32,807	35,529	28.7
Regional Total	4,593,442	5,471,120	5,868,694	27.8

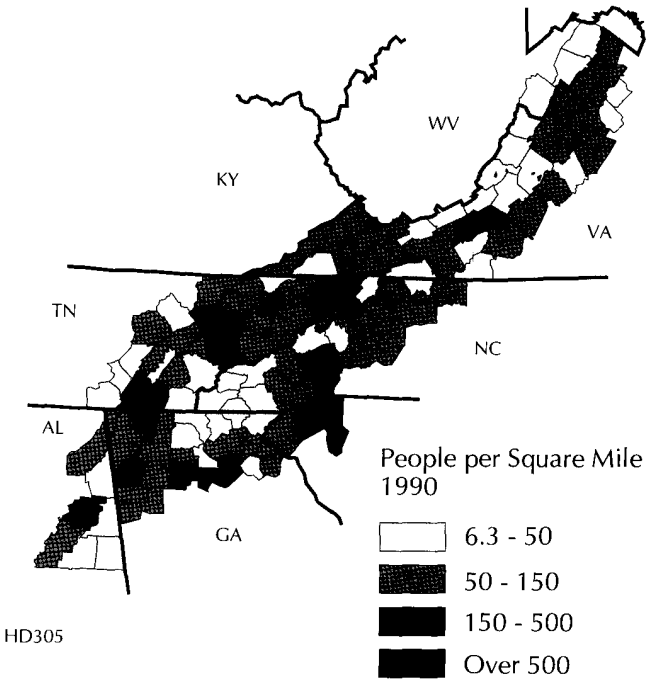
(Source: 1970, 1980, and 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce)

population densities over 500 ppsm are those that include cities in Virginia. Two counties in the Southern Appalachians have fewer than 10 ppsm, Bath and Highland Counties in Virginia.

Employment

In the early 1970s, manufacturing accounted for approximately half of total employment in Southern Appalachia. By 1990, this proportion had decreased to approximately 27 percent. Employment in retail and wholesale trade and in professional and related services each comprised approximately 20 percent of total employment in Southern Appalachia in 1990 (fig. 2.5). Together, manufacturing, retail and wholesale trade, and professional and related services comprise over 67 percent of all employment in Southern Appalachia. Agriculture (mainly farming), forestry, fishing, mining, and the entertainment and recreation industries together comprise less than 8 percent of total employment in this region. Although there are currently only three major economic sectors in the Southern Appalachian region – retail, manufacturing, and professional – the economy is much more diversified than it was 20 years ago.

Figure 2.4 Population density of the Southern Appalachians, 1990 (Source: 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce). The population densities of counties in the Southern Appalachians vary from 6.3 to over 500 people per square mile. Densities in most of the region range between 50 and 150 people per square mile.



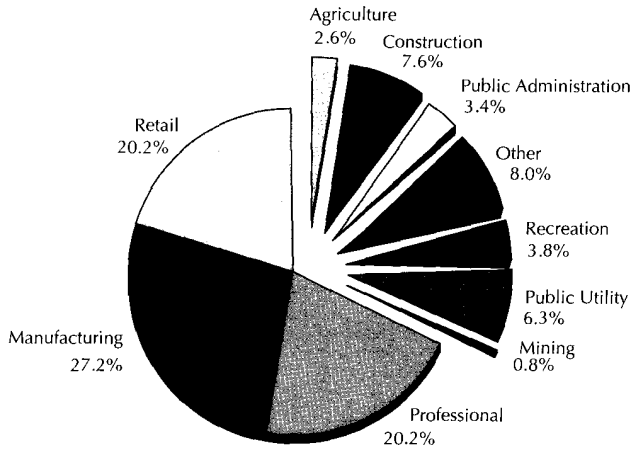


Figure 2.5 Southern Appalachian region employment, 1990. (Source: USA Counties 1994, Bureau of Census, U.S. Department of Commerce)

Race

In 1990, almost 92 percent of the 5.87 million people in the Southern Appalachians were white. A little over 7 percent were black, and 1.1 percent were of some other race. Since 1970, the percentage of the Southern Appalachian population that is black has increased and the place of residence of blacks has changed somewhat. Increasingly, blacks live in urban areas, and while most were once in Alabama and Tennessee, many now live further north and east in the Appalachian portions of North Carolina and Virginia.

Urban/Rural Mix

Although a majority still lives in rural areas, the population of the region, as in all regions of the U.S., is becoming more urban. Currently, 43 percent of the region's residents are urban. Urban areas in the Southern Appalachians provide more jobs for the young and better health care for the elderly. Some of the region's smaller cities are considered outstanding retirement communities.

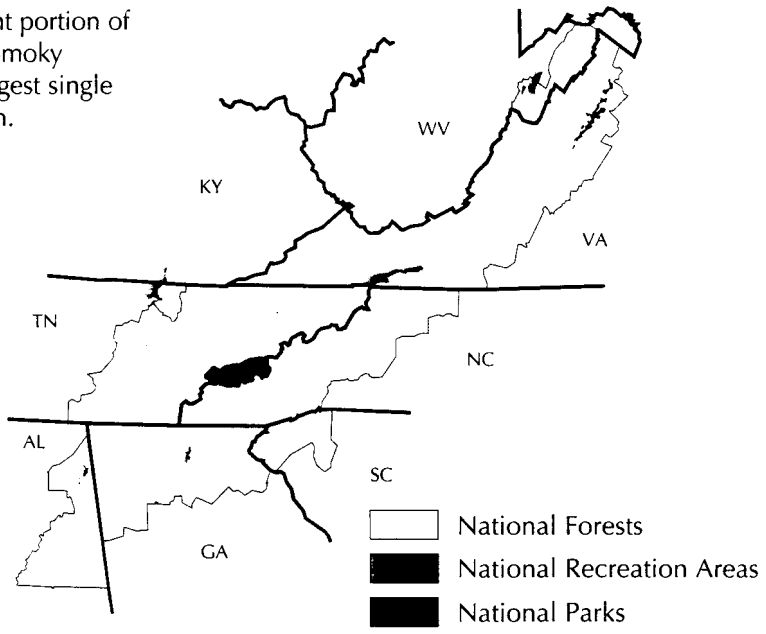
Location of Public Land

Tracts of public land are prominent components of the landscape. The region has 10 national forests, 2 national parks, and 5 national recreation areas (fig. 2.6). The largest concentration of federal land is in northern Georgia, southeastern Tennessee, and western North Carolina. In this area are the Chattahoochee, Nantahala, and Cherokee national forests, as well as the southern portion of the Blue Ridge Parkway and the Great Smoky Mountains National Park, the largest national park in the eastern United States. Another large concentration of federal land is in Virginia and West Virginia. This area contains the George Washington and Monongahela national forests as well as the Shenandoah National Park and the northern portion of the Blue Ridge Parkway.

Priorities of the Appalachian Regional Commission

The Appalachian Regional Commission (ARC), established in 1965, has a mission of promoting Appalachia's future economic and

Figure 2.6 Public Land in the Southern Appalachians, 1990 (Source: U.S. Geological Survey). The majority of public land in the Southern Appalachians is in national forest land. A significant portion of the public land is in the Great Smoky Mountain National Park, the largest single tract of public land in the region.



social development through a phased series of public investments to improve education, health, transportation, housing, community development, and conservation of natural resources (Appalachian Regional Commission 1970). The main priorities through 1970 were highway development, establishment of new health facilities, vocational technical centers, and assistance for construction of new housing. In 1975, the ARC was still concentrating on highway development, education, health, and housing, but child development and environmental and natural resource conservation were added. In 1980, funding priority for the ARC was concentrated in four areas: infant mortality, basic education skills, energy, and housing (Appalachian Regional Commission 1980). By 1985, the ARC had completed or nearly completed many of its initial projects. It turned its attention to new economic development needs, retraining and education of workers, reducing the high school dropout rate, and establishing new markets for the region's wood and coal industries. Since 1990, the ARC has focused on completing the Appalachian Development Highway System, creating jobs and retraining workers, supporting growth of small- to mid-sized businesses, and providing special help to the region's poorest counties (Appalachian Regional Commission 1991).

In the sections that follow, the seven questions listed earlier are addressed. Each question is addressed by first presenting key findings and observations from the analysis. Next, data and methods of analysis are briefly described. Finally, the more detailed results of the analysis are presented with accompanying maps, graphics, and tables.

The Seven Assessment Questions and Key Findings

Question 1:

How has the social pattern (demographics, occupations, lifestyles, cultures, backgrounds, etc.) of Southern Appalachian communities changed over the past two decades?

Key Findings

The population of the Southern Appalachians increased by almost 28 percent between 1970 and 1990. This increase was about the same as the almost 29 percent increase for the seven states in which the region is located. Population density in the study area remains below the average for the seven-state area. The greatest increases in population density occurred in areas near major metropolitan centers. These included northern Georgia, northwestern South Carolina, and portions of Tennessee, North Carolina, and Virginia.

The Southern Appalachian economy has improved greatly over the last 20 years. It has become less dependent on manufacturing and more dependent on the wholesale/retail and service industries. Growth of sales and service industries and maintenance of a manufacturing base have helped stabilize the economy.

Employment in manufacturing in the 1990s is a smaller share of total employment than it was in 1970. The trade and service industries have larger shares than in 1970. The trade sector employs 22 percent of Southern Appalachian workers, and the service sector employs 27 percent.

Poverty has declined significantly over the past 20 years. Twenty percent of families were below the poverty level in 1970; less than 11 percent were below it in 1990. The poverty rate in 1990 was slightly lower in the study region than that in the contiguous seven-state area. A lower poverty rate is the result of increasing real wages (inflation adjusted), particularly during the 1970s. Smaller increases in the 1980s were consistent with the national trend in real wages. Average real wage in 1990 was $10,100 in the region, about $2,500 per person below the average in the surrounding states.

Unemployment rates in the study area were relatively low in 1970, but they turned upward in the 1980s and 1990s in response to overall national recessions. The 6.5 percent unemployment rate for the region in 1990 was about the same as for the surrounding seven-state area.

Farming, a long-standing means of livelihood in the region, decreased 31 percent between 1969 and 1987. The percentage of the region's area in farms also decreased during this period, from 34 percent in 1969 to 25 percent in 1987. Perhaps helping to push the decrease in farmland, average inflation-adjusted market

value of farms rose over 100 percent throughout the region during the 1970s. Following a national trend, real farm values decreased 12 percent between 1978 and 1987 in the study region, but this decline was much less than the 33 percent decrease in the contiguous seven states.

A high percentage of households in the region own their homes. The average age of houses is about the same in the study area as in the surrounding states. The median year of construction is 1969. Market values for these homes average about $10,000 less in the Southern Appalachians than in the surrounding seven-state area. However, housing quality has improved greatly since 1970. Housing with incomplete plumbing has been almost eliminated. The number of people per household decreased between 1970 and 1990; the average in 1990 was about 2.5 per household.

Overall, the social changes that have occurred in the Southern Appalachians have been growth oriented. Rural character is starting to give way to a more trade- and service-oriented urban character.

Observations

Rapid population growth, economic growth and diversification, better employment and wages, declining farming, and better housing translate into rising pressures on the natural resources of the Southern Appalachian region for the foreseeable future. For resource managers and planners the message is clear. Human communities, particularly those that are fastest growing, will be an increasingly dominating force in the balance between the biological, physical, and human dimensions of the region's ecosystems.

Rural lifestyles with close attachments to the land and water of the region are fast giving way to trade and employment attachments to industries and interests that have little direct contact with the natural systems of the southern highlands. Emerging social changes in the region will strongly influence planning and management of national forests, operation and maintenance of national and state parks, and the use of private land.

New highways connecting highland communities with major metropolitan centers, such as Atlanta, GA, Greenville, SC, and Knoxville, TN, are forever changing the commuting patterns and makeup of the people who live in the region. Some towns and cities in the Southern Appalachians are now almost unrecognizable to people who have not seen them for 20 years.

As ecoregional assessments, such as this one, are developed for other regions, the process will be improved. The list of social factors analyzed needs to be expanded to include additional dimensions such as health, commuting patterns, leisure patterns associated with natural resources, cultural shifts, and political influences. Time and resources limited the coverage of this assessment to existing and easily obtainable data sources.

Data and Methods of Analysis

To address changes in population and housing in the region, census data from 1970, 1980, and 1990-91 were geographically analyzed. Other data sources included the Census of Agriculture for the last three decades and USDA Economic Research Service data.

To place changes in the study area in perspective, they were compared with changes across the seven entire states in which the Southern Appalachians are located: North Carolina, Virginia, West Virginia, Tennessee, Georgia, South Carolina, and Alabama.

Maps were developed with ARCVIEW Version 2.1, a Geographical Information System (GIS) mapping system to display data geographically. For most maps, the averages for the counties in the study area were compared to averages for the seven states in which the Southern Appalachian counties reside. Only a few of the key maps are presented here. Others from the assessment database can be obtained separately in the Internet and can be accessed through SAMAB's Home Page and through the Forest Service Home Page.

When dollars were a unit of measure, real dollars were used. Real dollars reflect adjustments for inflation over periods across which trends were analyzed.

Economic and Social Trends Detailed Results of the Analysis

Many factors contribute to the social status of an area. We analyzed population, housing,

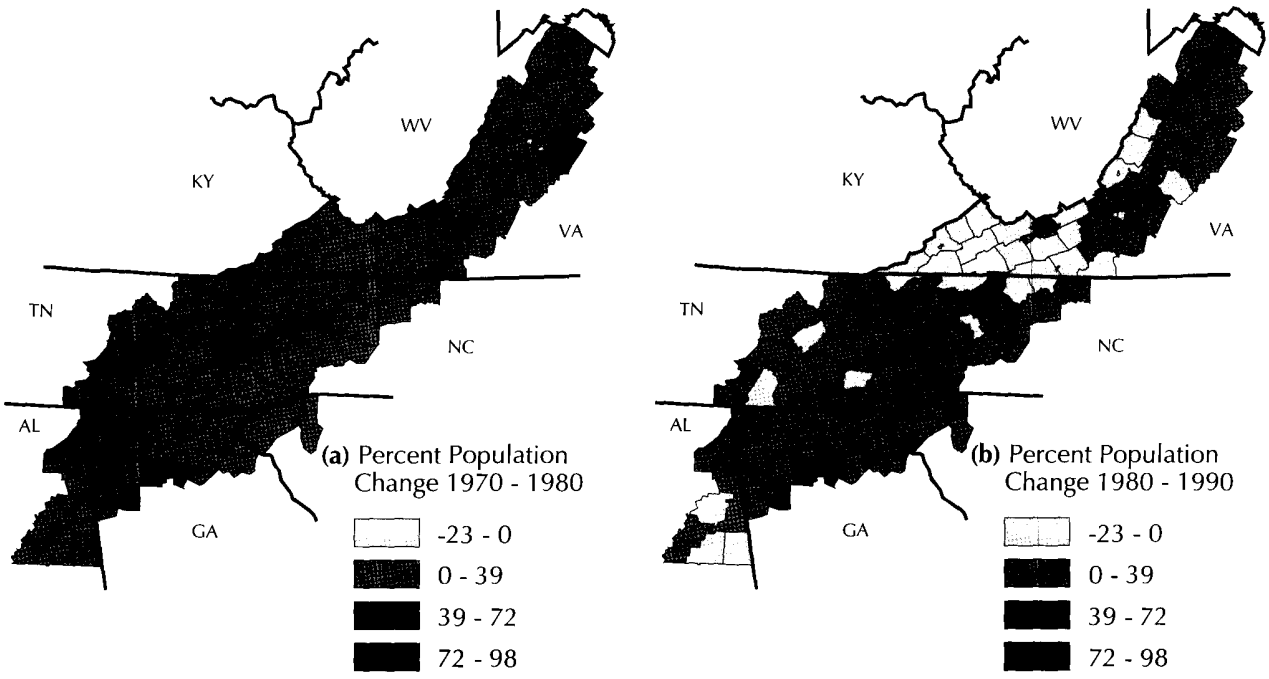


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Figure 2.7 Percent population change in Southern Appalachia, by county, 1970-1990; (a) 1970-1980; (b) 1980-1990; (Source: U.S. Census). **(a)** In the 1970s, population increases were high in counties of northern Georgia, eastern Tennessee, and western Virginia. The average population increase for the region in the 1970s was 19.1 percent compared with the average total increase for the seven-states area of 16.2 percent. **(b)** In the 1980s there was substantial growth in northern Georgia and Virginia even though the average population increase was lower than that of the 1970s at 7.3 percent.

income, employment, and farming as key indicators of social change in the Southern Appalachian region.

Population

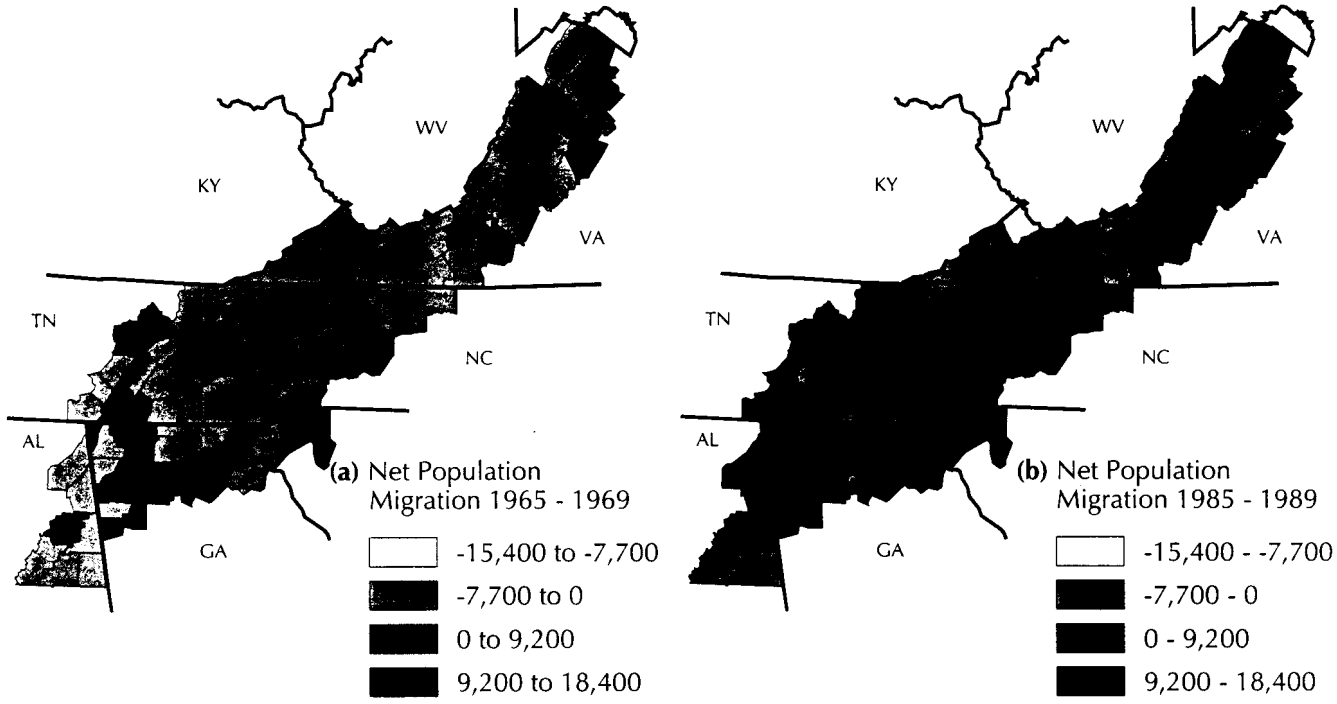
The population of the Southern Appalachian region increased by 19 percent between 1970 and 1980 (fig. 2.7). The population of the seven states encompassing the assessment area increased by 16 percent during this same decade. The population of all of the counties in the study area increased in the 1970s. Increases were particularly large in northern Georgia, eastern Tennessee, and western Virginia.

In the study area as a whole, population increases were far lower in the 1980s than in the 1970s. During the 1980s, the rate of increase was 7 percent in the Southern Appalachian region, whereas it was almost 11 percent for the seven-state area. Some notable exceptions to this lower growth rate were rapid increases in northern Georgia and portions of Virginia.

The population density of the study area increased markedly from 1970 to 1990. In 1970, the area had an average of almost 80 ppsm, while the seven surrounding states averaged about 90 ppsm. In 1990, the region had increased to a density of 102 ppsm while the seven-state area had increased to 115 ppsm (fig. 2.4). The most dramatic changes in population density occurred in northern Georgia, northeastern South Carolina, and in isolated sections of Tennessee, North Carolina, and Virginia. These increases in population density occurred primarily in areas near major metropolitan centers.

Total net migration into the Southern Appalachian region has increased tremendously over the past 25 years. The area experienced population losses through out-migration in most of its counties from 1965 to 1969

Figure 2.8 Net population migration into Southern Appalachian counties, (a) 1965-1969 and (b) 1985-1989 (Source: U.S. Census). **(a)** Between 1965 and 1969, the total net migration into the region was 14,816, compared with the seven-states total of 264,627. The higher rates of net migration occurred in and around larger metropolitan centers. **(b)** The total net migration between 1985 and 1989 was 250,694 for the region and 1,014,368 for the seven-states area. During this time period, the population of the region increased as a result of net migration.



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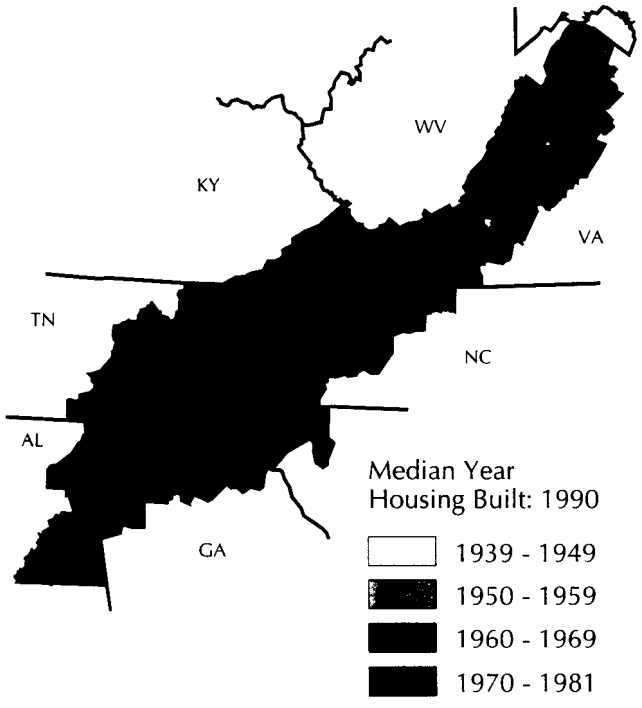

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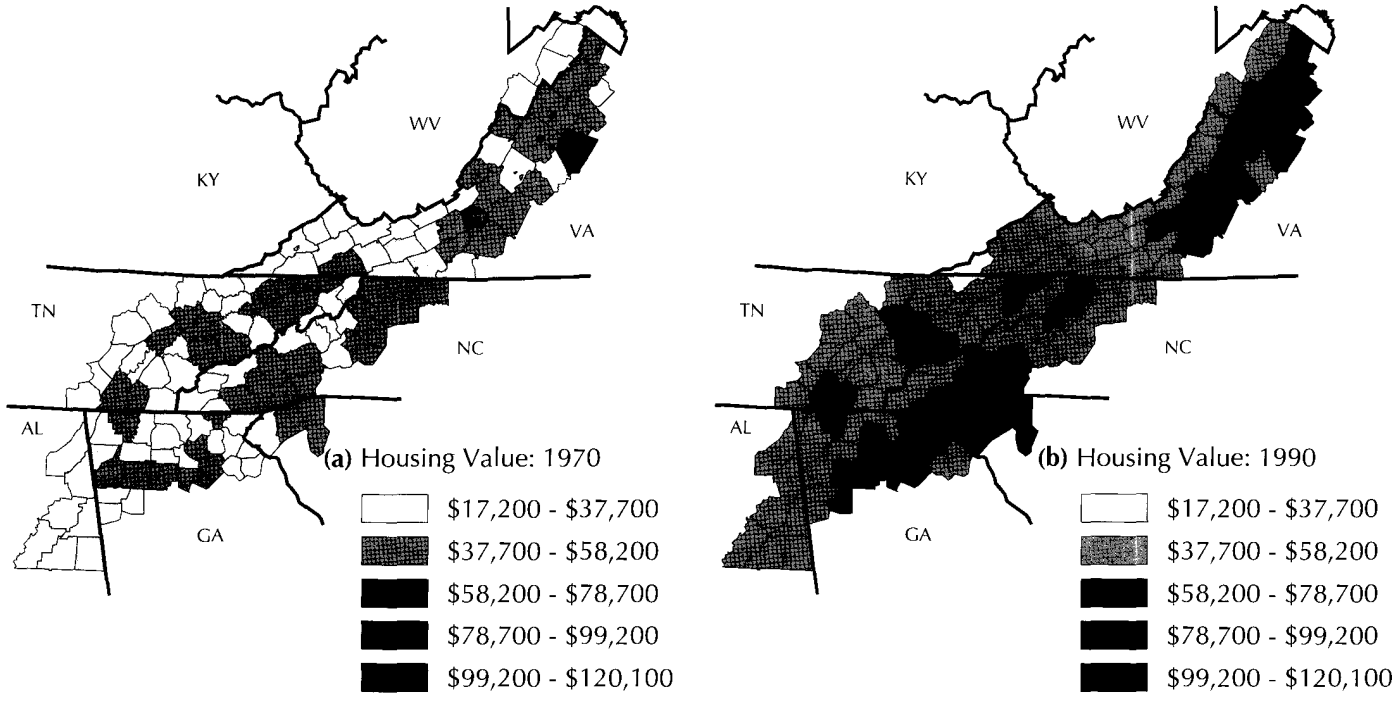
Figure 2.9 Median year of home construction in Southern Appalachian counties (Source: U.S. Census). The median age of houses in the region was 21 years as of 1990. Thus, the median year that houses were built was 1969. This can be compared with the seven-states median year for construction of 1970.

Figure 2.10 Housing values in Southern Appalachian counties (in 1990 Dollars) (a) 1970; (b) 1990; (Source: U.S. Census). **(a)** The average housing value for the region in 1970 was $38,200 compared to the seven-states value of $48,100. The areas with the higher housing values tend to be in western Virginia. **(b)** In 1990, the average housing value for the region was $59,700, which remained approximately $10,000 below the seven-states average. Again the higher values were in western Virginia, but there were also higher values in southwestern North Carolina and northern Georgia.



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(fig. 2.8a). However, this trend was reversed from 1975 to 1979 and from 1985 to 1989, as population gains were fairly evenly distributed throughout the region (fig. 2.8b). There was one exception: a block of counties in southwestern Virginia experienced population losses from 1985 to 1989.

Housing

A high proportion of a region's population owning their homes is an indicator of social and economic stability. In the Southern Appalachians, this proportion has always been around two-thirds and has changed little in recent years. In the seven contiguous states, 61 percent of households owned their homes in 1990.

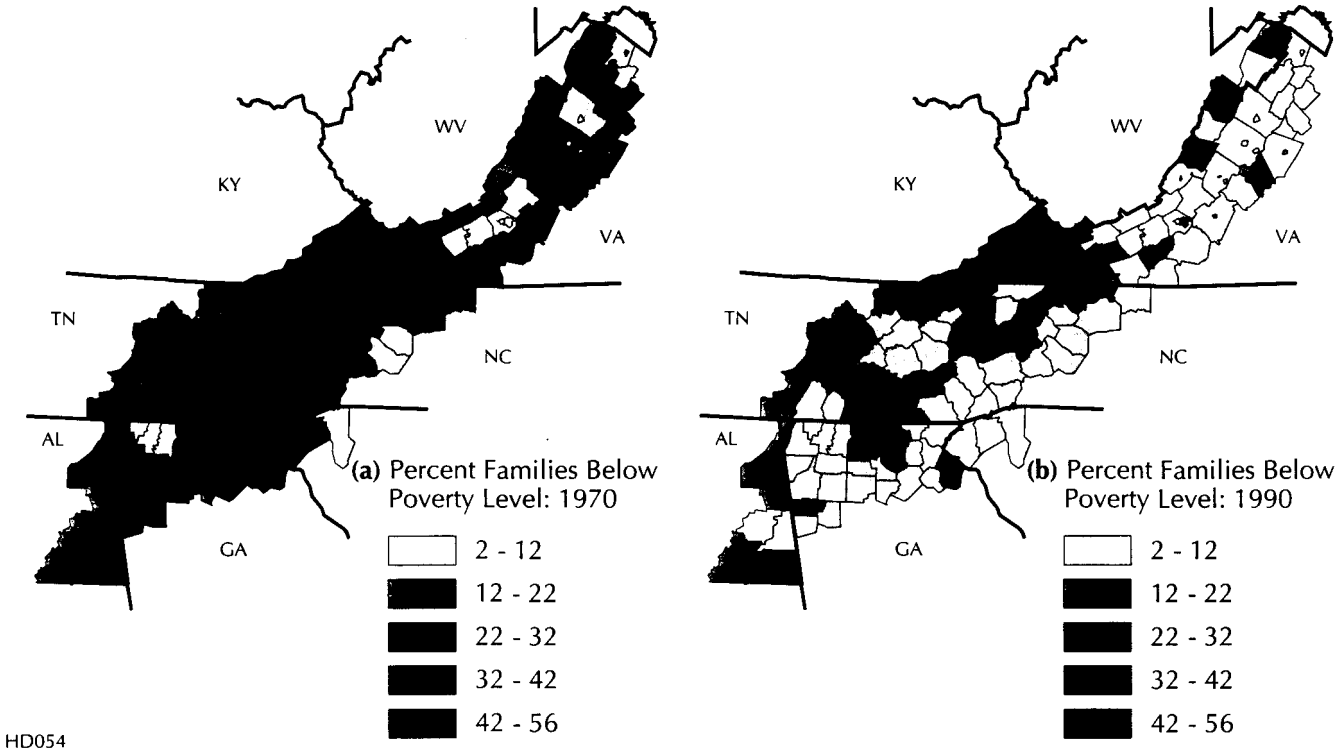
The median year of home construction is also an indicator of social status (fig. 2.9). More modern housing usually is associated with economic growth and transition. In 1990, the median year of home construction in the Southern Appalachians was 1969; the median year of construction for the seven surrounding states was 1970.

A decrease in the proportion of homes that lack complete plumbing facilities is also an indicator of social progress. In the Southern Appalachians, the proportion lacking complete facilities decreased from 15.4 percent in 1970 to 1.7 percent in 1990. In the seven surrounding states, the average dropped from 13.6 to 1.4 percent over this same period.

Expressed in 1990 dollars, the value of houses in the study area rose from $38,000 in 1970 to $59,700 in 1990 (fig. 2.10). Comparable values for the surrounding seven states were $48,000 in 1970 and $70,000 in 1990.

The average number of people per household in the region decreased from 3.2 in 1970 to 2.6 in 1990. This trend is similar to the one for the seven-state area. Farm families often are

Figure 2.11 Percentage of families in the Southern Appalachians below the poverty level, (a) 1970 and (b) 1990; (Source: U.S. Census). **(a)** About 20 percent of families in the region were below the poverty level in 1970, compared with 17.4 percent for the seven-states region. The majority of these families are in northern Georgia, western North Carolina, and eastern Tennessee. **(b)** By 1990, the percentage of families below the poverty level in the region dropped below the percentage for the seven-states area. The average percent below the poverty level in 1990 for the Southern Appalachians was 10.7 percent.



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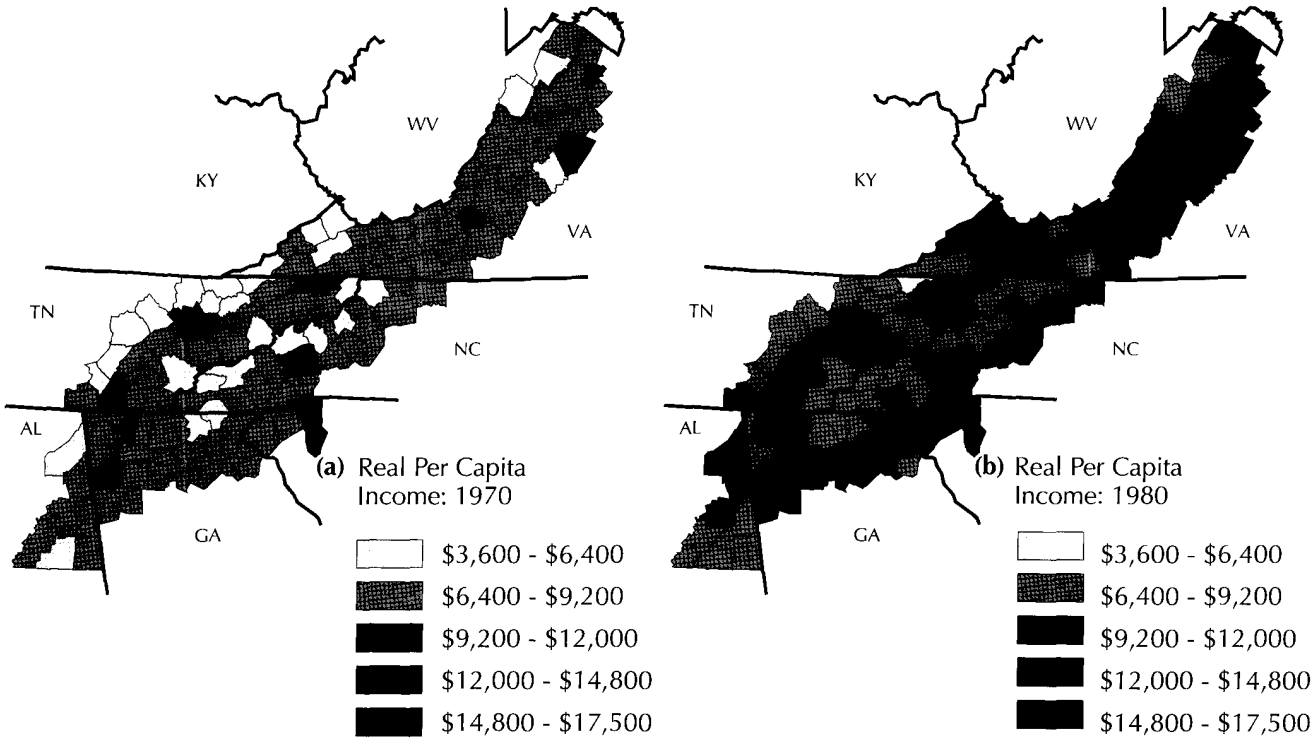
larger than average. The largest averages in the study area were in northern Georgia and northern Virginia.

Increases in female heads of household can sometimes indicate increasing social disunity and poverty. They also are a reflection of the divorce rate, which has risen across the nation. The proportion of Southern Appalachian households headed by females increased from 8.9 percent in 1970 to 10.5 percent in 1990. This proportion increased from 10.1 to 12.6 in the seven-state area.

Income

In 1970, 20 percent of Southern Appalachian families had incomes below the poverty level (fig. 2.11). This proportion was 3 percentage points higher than in the seven-state area. By 1990, the proportion of families living below the poverty level had dropped to 10.7 percent. In that year, 11.2 percent of families in the surrounding states had incomes below the poverty level, indicating slightly better gains in the Southern Appalachians.

Over the same period, however, real (inflation-adjusted) increases in per-capita income were somewhat lower in the Southern Appalachians than in the surrounding seven states (fig. 2.12). In the region, per-capita incomes were $7,000 in 1970, $10,000 in 1980, and $11,000 in 1990. Incomes in the seven-state area were $8,800 in 1970, $12,500 in 1980, and $13,700 in 1990.



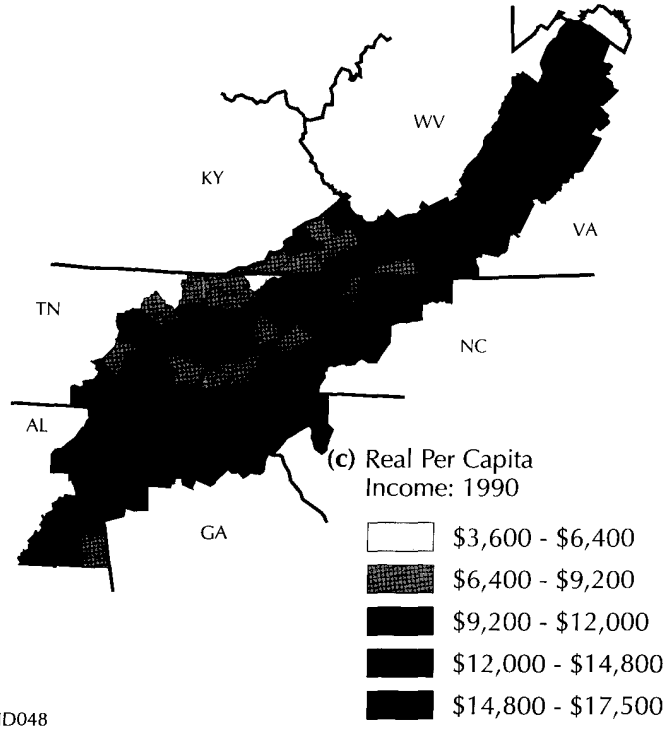


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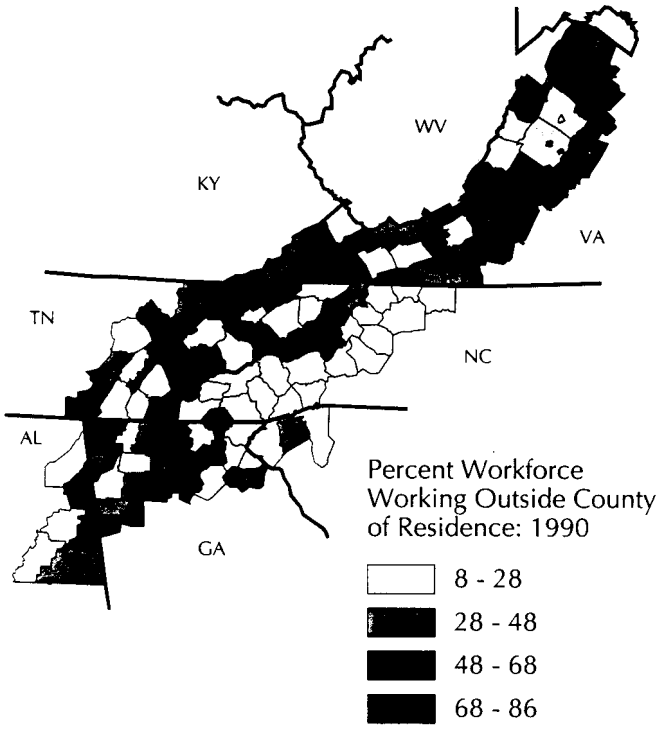
Figure 2.12 1970, 1980, 1990 real per capita Income in Southern Appalachia (1990 dollars), (a) 1970; (b) 1980; (c) 1990; (Source: U.S. Census). **(a)** The average real per capital income in 1970 for the region was $7,618 and $8,814 for the seven-states area. The counties with the higher income are located near metropolitan areas. **(b)** The average real per capita income increased from 1970 to $10,138 for the region. This average, although increasing, is still below the seven-states average of $12,466. There was only a slight increase in real per capita income for both the region and the seven-states area in 1990. The new region average was $10,950 while the seven-states average was $13,738.

Figure 2.13 Percentage of workforce working outside county of residence in Southern Appalachia, 1990 (Source: U.S. Census). Approximately 30 percent of the workforce in Southern Appalachia work in counties outside their county of residence. The largest percentages of these workers are found in western Virginia.



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In 1970, unemployment was 3.7 percent in the region and in the seven contiguous states. By 1980, the rate had increased to 6.5 percent in the region, but fell again about 1 percent by 1990.

In addition to salary, factors defining the employment situation include distance and time to commute to place of employment. In 1990, 30 percent of the Southern Appalachian workers were employed outside their county of residence (fig. 2.13). In some counties, over two-thirds of resident workers commuted to another county to work. Average travel time to work was 21 minutes in the Southern Appalachian region, 1 minute less than in the surrounding seven-state area.

Retired people are becoming important contributors to the regional economy. In 1987, counties with 30 percent or more of land area in federal ownership were concentrated in western North Carolina, northern Georgia, and western Virginia. Most federal land is in national forests and parks, which make the areas near them attractive as retirement destinations. In the 1980s, these destinations were concentrated in northern Georgia and western North Carolina. To classify as a retirement destination, the number of people 60 or more years old in a county had to increase by over 15 percent between 1980 and 1990.

Employment by Economic Sector

The relative shares of total employment in various sectors of the economy changed considerably between 1980 and 1990. Agricultural industries dropped from a 3.2 percent share of total employment in 1980 to 2.8 percent in 1990. Over this same period, share of total employment in agriculture decreased from 3.0 to 2.6 percent in the surrounding seven states. Only four counties had 20 percent or more of their work force engaged in farming in 1987 to 1989.

The mining industry's share of the work force in the Southern Appalachians declined from 1.6 to 0.9 percent between 1980 and 1990. Mining continues to be a major industry only in southeastern Virginia. Increased mechanization accounted for much of the decrease in mining employment. Southwestern Virginia had 15 percent or more of its work force employed in mining in the late 1980s, but mining makes up a relatively small portion of the entire region's economy.

Construction employment in the region rose from 7.4 percent of the total in 1980 to 8.1 percent in 1990. A similar increase occurred in the seven surrounding states. Construction's share of total employment in 1990 was highest in northern Virginia, northern Georgia near Atlanta, and western North Carolina.

Manufacturing's share of total employment decreased from 35 percent in 1980 to 29 percent in 1990 (fig. 2.14). Transportation's share of total employment also decreased slightly in both the Southern Appalachians and the seven-state area. The proportion in 1990 was 6.8 percent in the region and 7.9 percent in the seven surrounding states. Government's share of employment also decreased.

In contrast, Southern Appalachian employment in the wholesale and retail trade sectors rose from 19 to 22 percent between 1980 and 1990. An even larger increase occurred in the service sector (fig. 2.15). This sector's share of

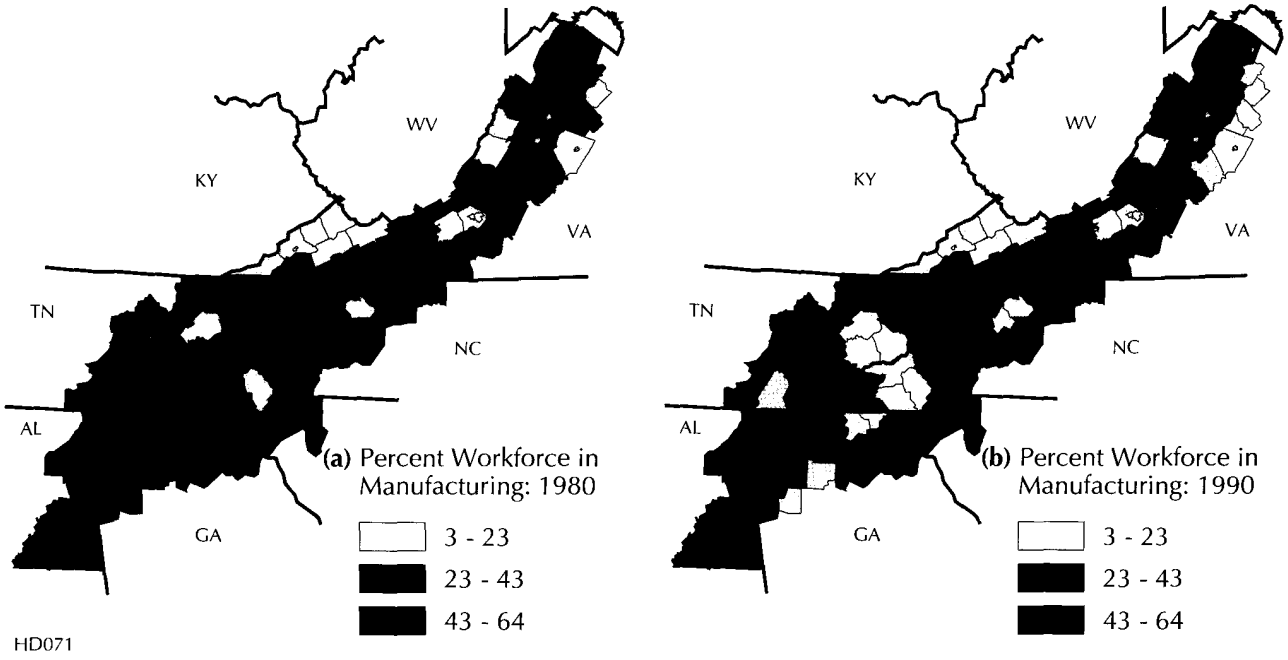


Figure 2.14 Percentage of workforce in manufacturing in Southern Appalachia, (a) 1980 and (b) 1990, (Source: U.S. Census). **(a)** In 1980, the average percentage of the workforce that is in the manufacturing industry in the region is 34.6 percent. This is comparably greater than the average percentage for the seven-states area of 28.5 percent. **(b)** By 1990, the average percentage of the region's workforce in the manufacturing industry had decreased by 5 percent. The majority of high percentage areas are in northeastern Alabama, northwestern Georgia, western North Carolina and southwestern Virginia.

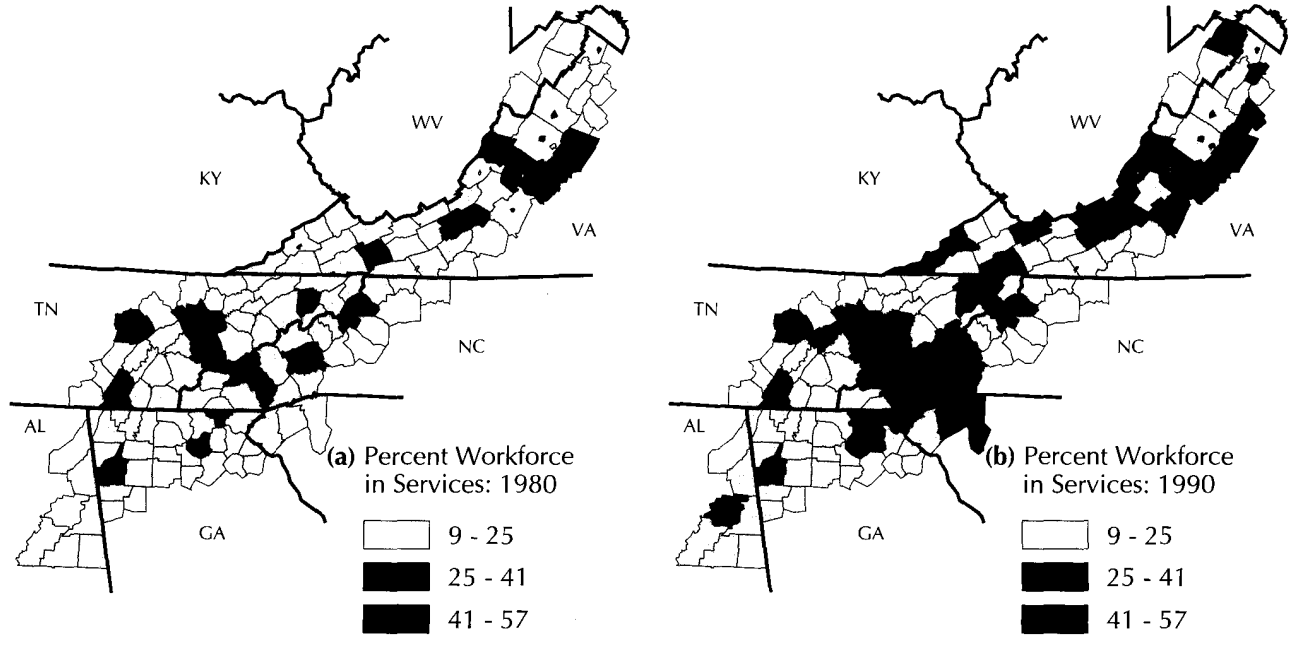
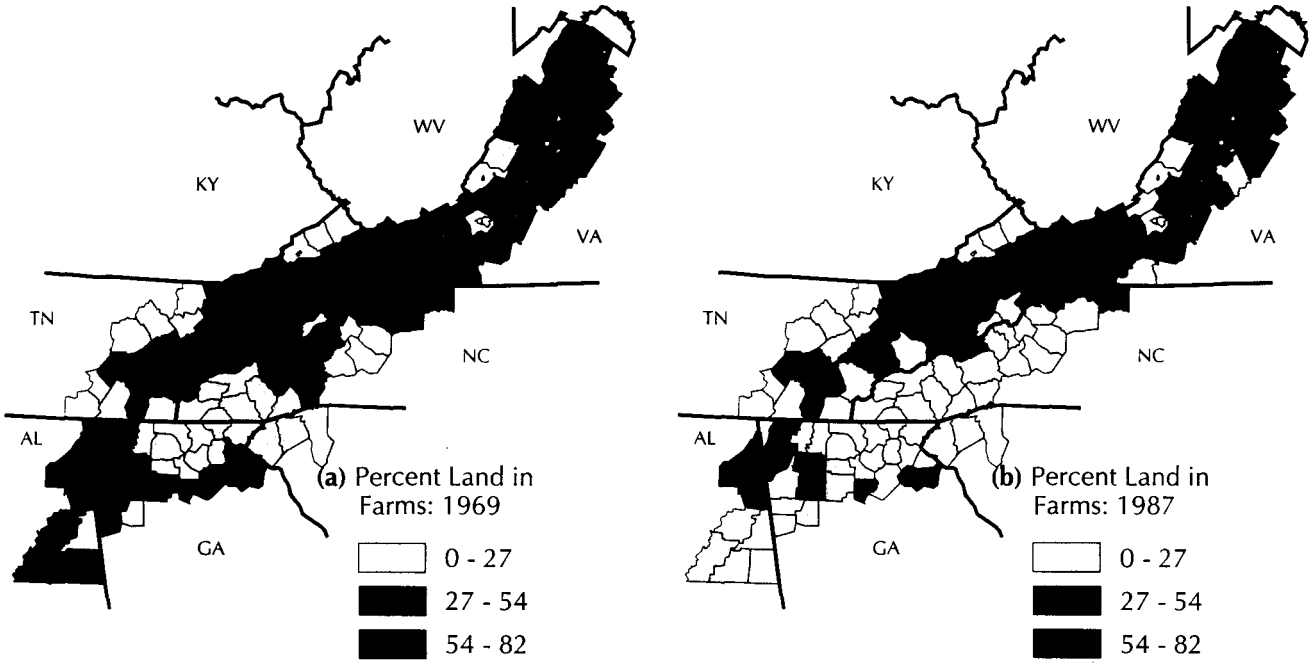


Figure 2.15 Percentage of Southern Appalachian workforce in the service industry, (a) 1980 and (b) 1990, (Source: U.S. Census). **(a)** In 1980, the percentage of the region's workforce that was in the service industry was 23.4 percent compared with 25 percent of the seven-states total. The distribution of counties with more than 25 percent of their workforce in the service industry is rather sporadic. **(b)** By 1990, the percentage of the region's workforce in the service industry had increased to 26.8 percent. Not only did the overall percentage grow, the number of counties with over 25 percent of their workforce in the service industry grew.

Figure 2.16 Percentage of land in farms in Southern Appalachia, (a) 1969 and (b) 1987, (Source: U.S. Census). **(a)** In 1969, the average percentage of land farms in each county of Southern Appalachia is 34.1 percent. This was well below the seven-states average of 41.2 percent. The counties with the highest percentages were mostly located in eastern Tennessee and southwestern Virginia. **(b)** By 1987, there was a substantial decline in the percentage of land in farms. The decrease of about nine percent, left the 1987 average at 25.5 percent. The majority of this percentage decrease is evident in the more southern counties of the region.



HD081

total employment rose from 23 percent in 1980 to 27 percent in 1990. Similar increases occurred in the seven states and across the nation as a whole.

Farming

Data from the Census of Agriculture for 1969, 1978, and 1987 documented a decline in farming activity in the Southern Appalachians (U.S. Department of Commerce, Bureau of Census 1969, 1978, 1987). The average number of farms per county decreased from 837 in 1968 to 577 in 1987. This decrease did not seem to result from consolidation of operations. The percentage of land area in the Southern Appalachians in agricultural uses decreased from 34 percent in 1969 to 25 percent in 1987 (fig. 2.16). Decreases in the seven-state area were even larger.

The average value of farms more than doubled between 1969 and 1978 in both the Southern Appalachians and in the seven contiguous states (fig. 2.17), but farm values dropped in both areas between 1978 and 1987. In the study area, average value was $103,000 in 1969, $216,000 in 1978, and $191,000 in 1987. The decline in farm values through the 1980s was part of a national trend. Over that period, values dropped an average of almost 12 percent in the study region, and 33 percent in the surrounding states.

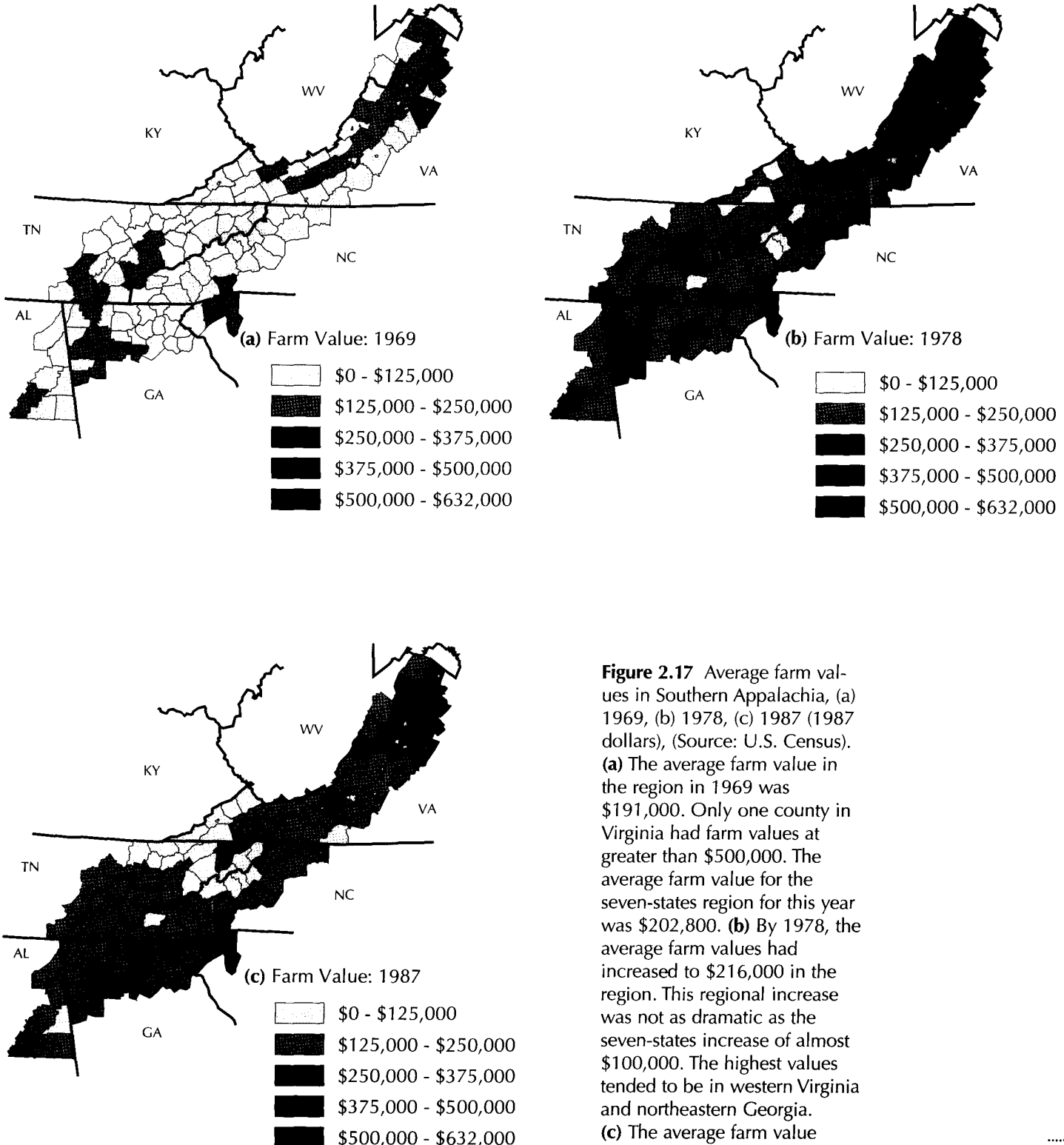


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Figure 2.17 Average farm values in Southern Appalachia, (a) 1969, (b) 1978, (c) 1987 (1987 dollars), (Source: U.S. Census). **(a)** The average farm value in the region in 1969 was $191,000. Only one county in Virginia had farm values at greater than $500,000. The average farm value for the seven-states region for this year was $202,800. **(b)** By 1978, the average farm values had increased to $216,000 in the region. This regional increase was not as dramatic as the seven-states increase of almost $100,000. The highest values tended to be in western Virginia and northeastern Georgia. **(c)** The average farm value remained constant into 1987 although the distribution of farms with higher values became less concentrated. By 1987, the seven-states farm value had decreased.

Question 2:

How has the changing social pattern of the Southern Appalachians affected management of natural resources in the region, and what future effects of social trends can we predict?

Key Findings

Population Growth is Creating Pressures

The most pronounced change in the social pattern of the Southern Appalachians since 1970 has been population growth. Urban, road, and housing development in association with increased population is particularly significant. While relatively little forest land has been lost, growth and development have taken farmland, pastures, and open space generally, and they have affected management of natural resources. Resource managers are accommodating the needs and desires of people new to the Southern Appalachians. Many of these new people are recent retirees. In some areas, such as north of the Atlanta metropolitan area, many in the current workforce live in the highlands, but commute to jobs in the city.

New Residents Have Moved Into the Region

In addition to retirees, many new people have migrated to the Southern Appalachians to live and work at jobs in the growing service and trade sectors. More jobs are now related to recreation and tourism than in previous decades. Service employment has grown faster than traditional employment in manufacturing, agriculture, and the resource-extraction industries, particularly timber.

Newcomers have greatly and irreversibly changed the social climate in which resource management takes place. For example, retirees who have recently come to the region seem to feel differently about natural resource preservation than long-time residents, many of whose incomes have depended on extraction and manufacturing from natural resources. Such differences in preferences cause conflicts over resource management, often with the resource manager caught in the middle. For example, clearcutting usually is protested, especially when it occurs in sight of roads. Managers of natural resources have had to respond to new sets of values and preferences, particularly increased demand for land and water resources for scenery, recreation, and tourism.

Population Growth is Projected to Continue

The population of the Southern Appalachians is projected to grow 12.3 percent by 2010, somewhat less than the 13.1 percent for the United States as a whole. But 12.3 percent represents a large number of additional people in the region in a little under 15 years. Most of that growth is expected to be in northern Georgia, western North Carolina, portions of eastern Tennessee, and northwest Virginia. Growth in population density is perhaps the best indicator of potential human impact. Of counties having more than 25 percent of area in public ownership, Blount, Sevier, and Carter in Tennessee and Habersham in Georgia are expected to grow the most. White, Murray, and Lumpkin counties in Georgia; Smyth in Virginia; and Transylvania in North Carolina will grow the next most rapidly in density. Some counties with large areas of commercial forest land and with large mileages of streams may also be impacted by population growth.

Observations

Rapid growth of population in the region, similar to most other parts of the country, is the single social change most impacting the status of natural resources of Southern Appalachian ecosystems. Population growth, new residents with preferences different from long-term residents, and a general "spilling out" of people onto the countryside are changing forever the character of the landscape of the region.

Increased population density across all counties and development of former farms, forests, and pastures removes habitat for most species of wildlife and fish. Of particular

concern recently have been declines of populations and habitat for neotropical songbirds, fox, trout, and many other species. Continuing development pushed by human population growth and greater affluence will, in all likelihood, result in even greater losses of habitat and thus impact even more animal populations in the region.

More people and the resulting greater amounts of land conversions also impact water quantity, quality, and use. As cities expand, as residential developments are created, and as isolated homes and industries are newly developed, streams of all sizes and qualities are impacted. Development near and along streams, particularly attractive to retirees and tourists, effectively removes or alters riparian vegetation and soils. More roads means more flooding, siltation and introduction of pollutants. Greater numbers of people lead to greater water use and treatment costs and greater interruption of natural cycles. Human development and habitation often occur at higher elevations, resulting in downstream impacts. Some impacts are occurring on public land, and even on designated wilderness.

Development at higher elevations also impacts the visual qualities of the region. Some developments can be seen from 50 or more miles away. Scenery in the Southern Appalachians has always been one of the most precious resources of the region. Since the late 1900s, tourists and seasonal residents have used the region as a playground and retirement destination. Urban sprawl, strip industrial and business development, and roading have tremendously changed the scenic character of the area. In unmeasured ways, the tourism potential and economic growth of the region have been impacted.

Along with development and changing of ownership patterns from long timers to newcomers, is loss of access to land and water for recreation and general aesthetic purposes. Generally, as an area is developed and urban pressures become more of a dominating force, private lands are posted and public lands become more crowded. The trend in the Southern Appalachians and more generally across the country is to greater restrictions of access to private land. Greater private land restrictions lead to greater pressures on public land, including designated wilderness and parks.

Public use and enjoyment of national forests, national parks, and public reservoirs has steadily grown since World War II. More recreation pressures from residents and from visitors to the region make the work of the resource manager more difficult. Ecosystem management and planning generally entail establishment of desired ecosystem conditions. Management then is designed to sustain those conditions while providing both commodity and noncommodity uses. Instituting ecosystem management in the face of urban growth, rural development, and rising public recreational pressures will be a major challenge for resource managers in the Southern Appalachians.

Data and Methods of Analysis

The data used and cited in this section were analyzed by simple descriptive statistical methods. Data sources include the Census of Housing and Population, the Agricultural Census, USDA Forest Service Forest Inventory and Analysis (FIA) units, the National Resources Inventory, and files from the U.S. Bureau of Mines. Projections for the section on future human impacts are from the Bureau of Economic Analysis (BEA) (1990) and are based on the 1990 census. In Virginia, independent cities are described separately from the counties in which they are embedded. To obtain the data needed for entire counties, some information for Virginia's independent cities was combined with data for areas outside the cities. This practice is followed by BEA.

Human Impact Trends – Detailed Results of the Analysis

Current Human Impacts

Figure 2.18 shows the counties where increases in population density have been greatest. Nearly all counties experienced some increase in density, but the increases were largest north of the Atlanta metropolitan area and in a few counties in Virginia. Population density in some counties doubled in just 20 years. The only counties where population density decreased over the last two decades are in southwestern Virginia.

Data from the Bureau of Mines show that the seven states in which the Southern Appalachians are located contributed only slightly to the total production of fuel and non-fuel minerals in the United States in 1980. In 1992, the Southeast produced about 42 percent of the lumber in the United States, up from around 31 percent in 1970. The majority of this lumber was softwood, mostly southern pine.

Almost 80 percent of the forest land in the Southern Appalachians is privately owned. In only a few counties is there more public than private land. These counties include Rabun, Towns, and Union in Georgia; Clay, Graham, and Macon in North Carolina; Carter, Polk, and Unicoi in Tennessee; and Alleghany, Augusta, Bath, and Craig in Virginia. By 1992, 694,200 acres, about 2.4 percent of the total private forest land in the region, had been developed. The percentage of area developed, however, does not adequately capture the impact of spreading human habitation and development. Question 7 addresses in more detail and breadth the status of private land in the region.

The slight loss of forest land was mainly the result of the growing population in the Southern Appalachians. To accommodate population increases, significant areas were developed for shopping malls, housing, and roads.

Potential Future Human Impact

The United States population from the 1990 census was 248.7 million. By 2010, that total is projected to rise to 281.4 million an increase of 13.1 percent. The projected rise in the Southern Appalachians of 12.3 percent, therefore, is

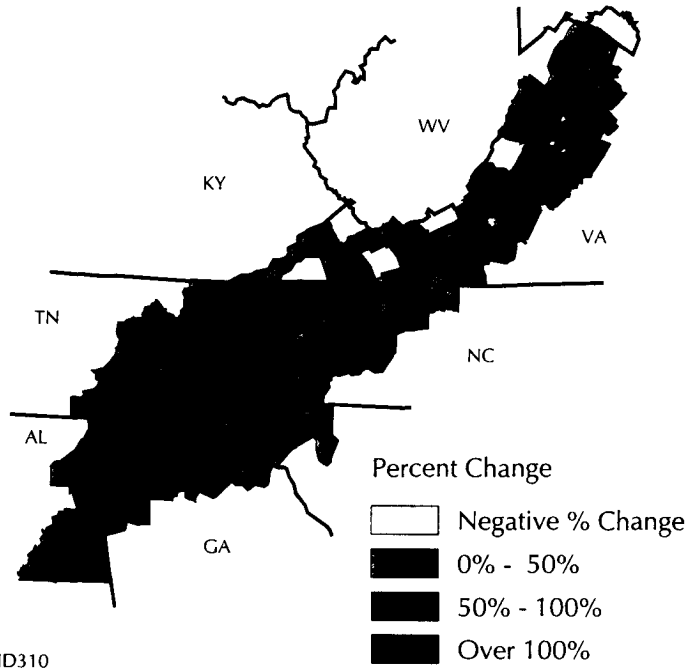


Figure 2.18 Percentage change in population density in the Southern Appalachians counties, 1970-1990 (Source: 1970, 1980, and 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce). Between 1970 and 1990, the population densities throughout most of the Southern Appalachians increased. Some counties experienced greater than 100 percent growth, most of which were located in north Georgia, in close proximity to Atlanta.

slightly below the national average. The rate of growth is expected to range from 0 to 27.7 percent among counties.

Projected percentage increases by 2010 in populations for the states in which the Southern Appalachian region is located are: Alabama, 5.2; Georgia, 17.5; North Carolina, 12.2; South Carolina, 9.5; Tennessee, 14.2; Virginia, 20.1; and West Virginia, 1.9. Projected increases for West Virginia, Alabama, and South Carolina are small relative to those for North Carolina and Tennessee, which are close to the national average. Projections for Georgia and Virginia are well above the national average. Especially in Georgia and Virginia, the high projected rates of population growth are likely to place unusually high pressures on the natural resources there.

The present and projected populations of the individual counties in the study area indicate the distribution of future population pressures, where resource management may be most challenging. These estimates are shown in figure 2.19.

All seven of the counties in Alabama have projected rates well below the national and regional averages. In contrast, Georgia has only a few counties with below-average projected rates of growth, many have above-average projected rates. The highest is Dawson County with a projected rate of increase of 27.7 percent. Projected growth rates among North Carolina counties in the study area range from 4.2 percent in Graham to 16.6 percent in Macon. All three of South Carolina's mountain counties have projected growth rates below the national average. Similarly, the three West Virginia counties have projected growth rates somewhat below the national average. The state as a whole has a very low projected growth rate.

In Tennessee, projected rates of population growth in Southern Appalachian counties range from 0 for Hancock County to 21.4 percent for Sevier County. Virginia's expected rate of population increase is the highest of any state connected with the region (20.1 percent). Projected rates are lower than the statewide average in all but three of the counties in the region. There is little doubt, however, that the rapid projected growth of population in Virginia overall will put great pressure on Appalachian counties in that state and across the entire region. Similarly, population growth in Georgia will put pressure on the region's resources.

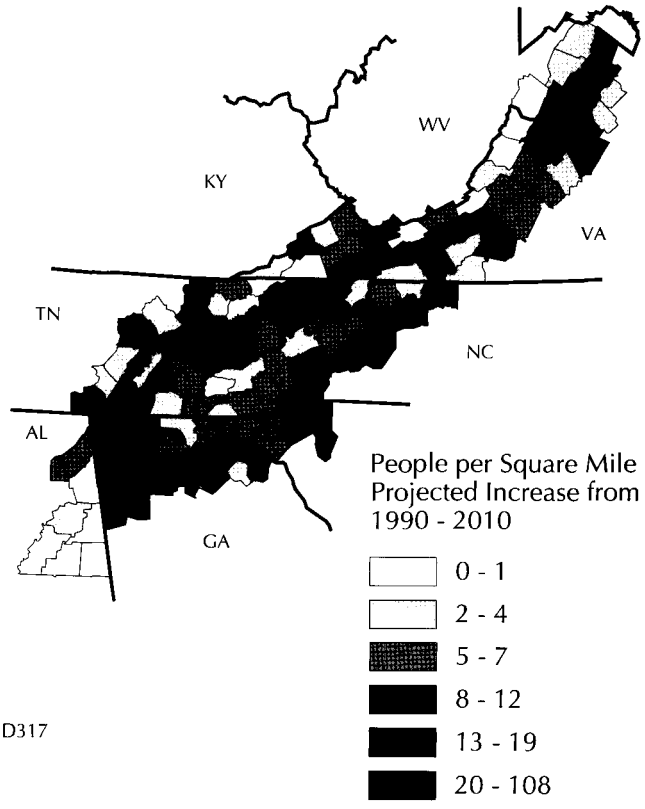


Figure 2.19 Projected increase in population per square mile, 1990 to 2010. (Source: County Projections to 2040, 1992 Bureau of Economic Analysis, U.S. Department of Commerce). Significant increases in population per square mile are projected for the year 2010 for many counties in the Southern Appalachian region.

Table 2.2 Projected increase in persons per square mile (ppsm) through 2010 in Southern Appalachian region counties with 25 percent or more of total area in public ownership.

County	Population Increase (ppsm)	Public Ownership (%)
Swain, NC	2	69.6
Rabun, GA	8	62.3
Graham, NC	1	58.7
Polk, TN	4	55.7
Craig, VA	0	55.0
Towns, GA	8	53.9
Bath, VA	1	50.9
Macon, NC	8	47.2
Union, GA	5	47.0
Unicoi, TN	6	46.8
Clay, NC	5	46.6
Fanning, GA	4	42.5
Haywood, NC	7	40.5
Carter, TN	15	38.0
Transylvania, NC	10	36.4
Monroe, TN	7	35.8
Sevier, TN	19	35.7
Smyth, VA	13	34.6
Page, VA	6	32.2
Lumpkin, GA	10	32.1
Bland, VA	1	31.7
Cherokee, NC	7	31.2
Blount, TN	24	30.4
Murray, GA	15	29.6
Pendleton, WV	1	29.4
Stephens, GA	20	29.0
Cleburn, AL	0	27.9
White, GA	11	27.5
Giles, VA	5	27.0
Highland, VA	0	26.6
McDowell, NC	8	26.1
Botetourt, VA	3	26.0
Johnson, TN	2	25.8
Habersham, GA	18	25.2

(Source: County Projections to 2040, 1992 Bureau of Economic Analysis, U.S. Department of Commerce)

Projected growth in persons per square mile was also examined separately in counties with large public holdings. Thirty-four counties have more than 25 percent of total land area in public ownership. Among these counties, Blount County, TN, is particularly noticeable with a projected increase of 24 ppsm and a public ownership of 30.4 percent. All 34 of the counties with 25 percent or more of total area in public ownership are listed in table 2.2.

Projected growth in population density was examined for counties with the greatest area of commercial forest. Results suggest some potentially significant pressures on commercial forest management (table 2.3).

Growth in population density also was examined in counties with the greatest area of streams. The National Resources Inventory

Table 2.3 Projected growth in population density for Southern Appalachian region counties that have the greatest amount of commercial forest land, 2010.

County	Population Density (ppsm)	Commercial Forest Area (1,000 acres)
Buncombe, NC	30	22.4
Paulding, GA	25	10.3
Dawson, GA	12	10.1
Murray, GA	15	8.2
Botetourt, VA	3	6.9
Haywood, NC	7	6.7
Campbell, TN	8	5.8
Cumberland, TN	8	5.8
Hawkins, TN	8	5.7
Rhea, TN	9	5.5
Sullivan, TN	34	4.8
Patrick, VA	16	4.3
Hall, GA	36	2.9
Mitchell, NC	7	2.8
Pulaski, VA	12	2.4
Jackson, NC	6	1.9
Wythe, VA	14	1.9
Cherokee, NC	7	1.6
Greenville, SC	40	1.6
Burke, NC	19	1.5
Macon, NC	8	1.4
Whitfield, GA	54	1.2
Transylvania, NC	10	1.1
Amherst, VA	5	1.1
Wilkes, NC	10	1
Oconee, SC	7	0.9
Caldwell, NC	15	0.8
Pickens, SC	17	0.8
Surry, NC	14	0.7
Swain, NC	2	0.7
Warren, VA	19	0.7
Stephens, GA	20	0.5
Franklin, VA	12	0.5
Cherokee, GA	55	0.4
Floyd, GA	22	0.4
Haralson, GA	9	0.4
Madison, NC	2	0.4
Giles, VA	5	0.4
Bartow, GA	19	0.3
Polk, GA	8	0.3
Grayson, VA	3	0.3
Russell, VA	11	0.3
Shenand, VA	14	0.3
Smyth, VA	13	0.3
Forsythe, GA	43	0.2
Buchanan, VA	5	0.2
Madison, VA	2	0.2
Page, VA	6	0.2
Scott, VA	2	0.2
Tazewell, VA	12	0.2
Banks, GA	5	0.1
Catoosa, GA	58	0.1
Dade, GA	9	0.1

ppsm = persons per square mile
(Source: County Projections to 2040, 1992 Bureau of Economic Analysis, U.S. Department of Commerce)

Table 2.4 Total stream area and projected increase in population density for the 50 percent of Southern Appalachian region counties having the greatest stream area, 2010.

County	Stream Area (1000 acres)	Population Density Increase (ppsm)
Pulaski, VA	8.5	12
Buncombe, NC	4.1	30
Franklin, VA	3.8	12
Grayson, VA	3.6	3
Greenville, SC	3.5	40
Washington, TN	3.4	42
Loudon, TN	3.3	10
Hampshie, WV	3	3
Hardy, WV	2.9	3
Ashe, NC	2.8	5
Wilkes, NC	2.6	10
Knox, TN	2.6	108
Sevier, TN	2.5	19
Cherokee, AL	2.4	1
Greene, TN	2.3	10
Page, VA	2.3	6
Pendleton, WV	2.3	1
Burke, NC	2.2	19
Dickenson, VA	2.2	4
Russell, VA	2.2	11
Haywood, NC	2.1	7
Cocke, TN	2.1	7
Hawkins, TN	2.1	8
Nelson, VA	2	4
De Kalb, AL	1.9	6
Caldwell, NC	1.9	15
Pickens, SC	1.9	17
Cumberland, TN	1.9	8
Warren, VA	1.9	19
Cherokee, GA	1.8	55
Hamilton, TN	1.8	85
Monroe, TN	1.8	7
Bath, VA	1.8	1
Shenand, VA	1.8	14
Talladega, AL	1.7	0
Transylvania, NC	1.7	10
Marion, TN	1.7	8
Madison, VA	1.7	2
Patrick, VA	1.7	16
Calhoun, AL	1.6	4
Hendersn, NC	1.6	28
Madison, NC	1.6	2
Clay, AL	1.5	1
Randolph, AL	1.5	2
Bartow, GA	1.5	19
Yancey, NC	1.5	7
Oconee, SC	1.5	7
Carter, TN	1.5	15
Sullivan, TN	1.5	34
Botetourt, VA	1.5	3
Gordon, GA	1.4	18
Cherokee, NC	1.4	7
Surry, NC	1.4	14
Wattage, NC	1.4	18
Morgan, TN	1.4	3
Wythe, VA	1.4	14
Hall, GA	1.3	36
Jackson, NC	1.3	6
Swain, NC	1.3	2

ppsm= persons per square mile

(Source: County Projections to 2040, 1992 Bureau of Economic Analysis, U.S. Department of Commerce)

separates streams into categories based on width and then lists area in acres. Counties with high stream concentrations and large increases in human density are Buncombe County, NC; Greenville County, SC; and Washington and Knox Counties, TN (table 2.4).

Question 3:

How might management of natural resources impact the economic and social status of local communities in the region, particularly communities near major tracts of public land?

Key Findings

Differing Social Mix in Communities Near Public Lands

Between 1970 and 1990, the quality of education improved significantly in rural areas of the Southern Appalachians, especially in counties with much public land. The distribution of whites and African Americans has become more distinct. Whites are more likely to live in rural areas and near public land, while blacks are more likely to live in urban areas. The distribution of age groups has become less distinct. More young people are likely to live in rural areas, while working-age people are more likely to live in urban areas. Retirement-age people more frequently live near public land.

Rural communities close to public land have changed much less than urban communities. Families seem more stable with more marriages, fewer divorces, and longer tenure at the same address. Although per-capita incomes are slightly lower and poverty rates slightly higher in rural areas, differences have lessened greatly from 1970 to 1990.

Counties with high proportions of public land tend to have fewer rental houses, more vacant and seasonal houses, and homes of lower median value. People in rural counties, especially in counties with more public land, have slightly lower mortality rates than people in urban counties. Finally, people in these rural counties are considerably more likely to participate in civic activities, such as elections.

The social and demographic characteristics of Southern Appalachian communities vary widely. Management policies applied regionally, therefore, can have significantly different effects in different communities. Makers of public policy, therefore, should carefully consider the needs and vulnerabilities of individual communities.

Natural-Resource-Based Industries Important, But Not Dominant

Natural-resource-based industries make up about 12 percent of the region's output and 10 percent of its employment. In six counties primary wood-products manufacturing has a 10 percent or greater share of total output. Secondary wood-products manufacturing accounts for more than 10 percent of total output in 18 counties. Mining is important only in southwestern Virginia. Outdoor recreation-based tourism contributes almost $6 billion to business sales in the region and stimulates employment of over 100,000 regional workers.

Local Community Residents Seek Recognition

Focus groups of people living near national forests call for a better balance of input from local and regional special interests. To them, recreation, tourism, and resource protection are important, but so are timber and other commodities. They believe potential effects on local communities of forest management options need to be taken carefully into account when land management plans are being formulated.

Community residents do not feel that the Forest Service informs or involves them adequately, or that they are truly heard. They support scientific management, and seemingly ecosystem management, as an overall philosophy, but they fear that outside interests may push it too far and hurt local communities. In particular, they do not want to lose their access to public land. They seek balanced management with utilization and preservation responsibly undertaken. To them, a key to better community relations is a good educational program to help people living near national forests better understand what ecosystem management is and how it might affect them.

Sensitivity to effects on communities from resource management should be heightened. Findings supporting this conclusion are that rural and urban areas differ in social makeup,

that counties with more public land also differ in social makeup from other counties, that the Southern Appalachian economy is still very much natural resource dependent, that residents of communities near public land are sensitive to land management choices and that environmental justice (or injustice) is inconclusive as an issue. The region's communities are still in lower economic status than surrounding state populations and their economy is more dependent on natural resources. While these communities are transitioning to become more like areas in the rest of the states in which the Southern Appalachian region is located, land management agencies and collaborative planning efforts must be tuned in to the more localized circumstances and needs of regional communities.

Communities near public land sense the pressures from outside interests that have a stake in the national resources represented by national forests and parks. They seek more of a voice in the direction of management of these public lands. But local communities near public land differ substantially among themselves in social and economic makeup. Planners and policy staff of public agencies will be challenged to account for these differences and be aware of the potentials for inequitable effects of resource management choices, particularly negative ones, among local communities. Of particular concern is the need to balance local interests among retirement, logging, and tourism communities. An effective and affordable system is needed for monitoring the effects of management among diverse interests, local and nonlocal. Especially needed are more direct measures of effects than were available for this assessment.

Data and Methods of Analysis

Social status data were obtained from the 1970, 1980, and 1990 Censuses of Population and Housing as well as from the Department of Commerce's County Business Patterns. To determine whether communities near public land differ from other communities correlations were computed between the percentages of total county area that are privately or publicly owned and selected community social conditions. To determine whether social makeup differed between rural and urban counties, correlations between percent of area that is urban or rural were computed to measure association with the same selected social attributes. Correlations are statistical measures of the association between percentages of land area and prevalence of the selected social attributes.

To address natural resource dependency, industries were grouped by 2-digit Standard Industrial Classification (SIC) codes into the 10 most prominent sectors for the region as a whole, for the four sub-regional economies, and for each county. In addition, several special sectors were examined, including forest products, wood-products manufacturing, mining, energy, tourism, wholesale and retail trade, transportation, government, education, housing construction, and agriculture. Data on employment, employee compensation, total industrial output, and imports and exports also were examined.

The primary data source for economic dependency was the Forest Service IMPLAN input-output system. Data in this model are from County Business Patterns, the Bureau of Labor Statistics, the Bureau of Economic Analysis, Regional Information System, and various U.S. Census surveys.

To examine community diversity, communities near five national forest ranger districts were selected. The social makeups of people living in these communities were compared.

To examine community residents' perceptions of potential impact, focus groups were convened near the five districts which represent four national forests: the Chattahoochee in Georgia, the Nantahala in North Carolina, the Cherokee in Tennessee, and the Jefferson in Virginia. Participants were selected through purposeful sampling, including typical case and snowball sampling (Patton 1990). Interviewees included new residents in the communities, people who were born in the communities, and people who were second- and third-generation community residents. The sample at each site included males and females, people in age groups ranging from their middle 20s through their 70s, and a variety of occupations.

Researchers generated a list of questions to guide the focus groups:

1. Tell me about the _____ National Forest and how living near it affects you.
2. Share with us how you feel the _____ National Forest is important to people in your community and how it impacts your community.
3. Describe ways you feel your community and other communities are impacting the _____ National Forest.
4. What do you and your neighbors see as the future for the _____ National Forest?
5. How will the future you envision for this national forest impact you and other people who live in nearby communities?
6. Describe how natural resources in the _____ National Forest are managed.
7. Professionals in the Forest Service talk about applying "ecosystem management" in national forest lands like the _____ National Forest. How do people in your community feel about "ecosystem management"?

To investigate the environmental justice issue in Southern Appalachia, total releases from the EPA toxic release inventory were tallied at the county and neighborhood levels and compared to community demographic characteristics. The EPA data set summarizes annual release reports filed by firms under Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986.

Potential Impacts on Communities: Detailed Results of the Analysis

Status of Communities Near Public Lands

With respect to race, greater percentages of whites are positively associated with greater percentage of county area in public ownership. Blacks tend to live in communities more removed from public lands. Age distributions also differ by county area in public ownership. People under 18 years are more likely to live in counties having more private ownership. People between 18 and 64 are also less likely to live in counties with greater public land area. People 65 and over tend to be more prevalent in counties with more public land area.

In counties that are more rural in character and with more private land, family size tends to be somewhat larger. This, of course, influences age structure in these counties by making the average age somewhat younger. Marital status is also correlated, strongly in this case, with existence of public land. The percentage of persons married is higher and the divorce and separation rates are lower in counties with more public ownership. This relationship is further demonstrated by a positive association between percentage of two-parent households, versus single parent, female headed households.

Per-capita income level, median family income, and percentage of families below the poverty level were moderately positively correlated with percentage of county area in public ownership. This is a change from the 1970s when there were more lower economic status households living in rural communities with substantial public ownership. There is no correlation between unemployment and the presence of more or less public land.

Most of the correlations computed with housing indices as one of the argument variables showed weak associations with the public ownership character of Southern Appalachian counties. Both percentages of owner and renter occupied housing were weakly negatively correlated with greater proportions of area in public ownership. Median market value of housing was weakly negatively correlated with public land. In voting behavior, percentages of the population that voted in the 1976, 1984, and 1992 elections were positively correlated with presence of public land.

Status of Rural Versus Urban Counties

Race is strongly correlated with urbanization in the Southern Appalachians: this correlation strengthened between 1970 and 1990. Whites are more likely to live in rural areas, while blacks are more likely to live in urban areas.

There are notable distinctions in the distribution of the three age categories used in this analysis. People under 18 years of age are more likely to live in the more rural counties, while

distribution of people between 18 and 64 years of age is moderately but positively correlated with urban counties.

Family structure is strongly correlated with residence in the more urban portions of the Southern Appalachians. These correlations indicate that young people are more likely to live in mostly privately owned, rural counties; working-age people are more likely to live in more highly urban counties (where there are more jobs); retirement-age people are only slightly more likely to live in urban counties, and families are typically larger in rural counties.

The marriage rate is lower in counties with more urban area. Likewise, the rate of separations and the divorce rate are positively correlated with the proportion of urban area. Presence of widows is higher in urban areas, and there are proportionately more female heads of household in counties with proportionately more urban area. These correlations indicate that greater percentages of the population in rural areas, while divorce and separation percentages are higher in urban areas.

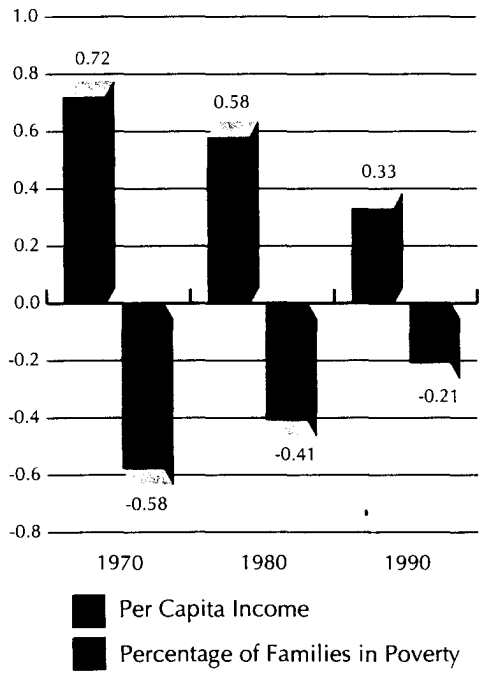


Figure 2.20 Correlation of percent of families in poverty and level of per capita income with nearness to public lands for local communities, 1970, 1980, and 1990. (Source: 1970, 1980, and 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce)

Per-capita income, median family income, and percent of families below the poverty level are moderately correlated with rural character of counties. This is a dramatic change from 1970 when there were very strong correlations between lower economic status and living in rural counties with more public land (fig. 2.20).

The distribution of the labor force follows that of the population in general. Most of the population is in urban areas, where jobs are more plentiful. This pattern is reflected in the moderately negative correlation between level of unemployment and urban character in counties.

Most correlations between the percentages of labor force employed in various economic sectors and rural character are what one might expect. Agriculture, forestry, and mining are obviously more prominent in rural counties. Somewhat unexpected is the strong positive correlation between percent of jobs in construction and rural character. Manufacturing is also positively associated with rural counties, while transportation, communications, and public utilities have no correlation with either rural or urban character.

As expected, wholesale and retail trade are more prevalent in urban counties. Entertainment and recreation jobs are weakly correlated, and professional and related service jobs are strongly correlated with urban areas in counties. Public administration jobs are weakly correlated with urban areas, an unexpected relationship.

Most of the indices relating to housing are more strongly correlated with urban to rural character than with the public ownership character of counties. Renter-occupied housing is very strongly correlated with urban counties, while owner-occupied housing is associated more with rural counties. Vacant and seasonal housing are more common in rural than in urban counties.

People over 25 years of age with a college degree are more likely to live in an urban area, but this correlation has weakened slightly since 1970. The negative correlation between people over 25 with a high school diploma and urban residence has significantly decreased between 1970 and 1990.

The total number of students reflects the distribution of the youngest category of the population and is, therefore, strongly correlated with urban residence. The student-to-teacher ratio is

Table 2.5 Employment, employee compensation, and industrial output of the Southern Appalachian region by sector, 1991.

Sector of Economy	Employment		Employee Compensation		Industrial Output	
	Total (number)	Share of Total (%)	Total (million $)	Share of Total (%)	Total (million $)	Share of Total (%)
Agriculture, forestry, fisheries	114,138	3.6	374.4	0.6	6,817.8	3.3
Mining	18,451	0.6	648.2	1.1	5,941.2	2.9
Construction	236,030	7.4	3,930.1	6.6	18,767.3	9.2
Manufacturing	719,802	22.6	18,190.6	30.4	81,480.7	39.8
Transportation, communication and utilities	119,640	3.8	3,125.9	5.2	11,819.9	5.8
Wholesale/retail trade	650,709	20.4	9,073.6	15.2	19,650.7	9.6
Finance, insurance, real estate	165,988	5.2	2,721.7	4.6	18,045.5	8.8
Services	688,293	21.6	11,388.3	19.1	27,430.3	13.3
Government	443,413	13.8	10,098.9	16.9	14,280.4	7.0
Total	3,187,740	100.0	59,744.1	100.0	204,802.7	100.0

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

higher in urban counties, reflecting larger class sizes in urban schools. Related to this, expenditures per student are negatively correlated with urban area. These correlations indicate that education in rural areas of the Southern Appalachians has improved considerably between 1970 to 1990. Where high illiteracy rates were once associated mostly with rural areas in the region, they are now more likely to occur in urban areas, where there are more students per teacher and less money is spent per student for education.

The mortality rate is moderately correlated with urban residence (r=0.39). Percentage of the population that voted is moderately correlated with rural areas. This correlation has strengthened since 1970. These correlations indicate that people in rural areas, especially in counties with more public land, have a lower mortality rate and are more likely to vote and participate in civic activities.

Economic Dependence on Natural Resources

Manufacturing industries contribute about 40 percent of the value of the Southern Appalachian's total production (table 2.5). In contrast, manufacturing comprises roughly 19 percent of total national production. Manufacturing in the region also accounts for 30 percent of wages and slightly more than 22 percent of employment. Other major sectors in the economy include services, wholesale and retail trade, and government. The Southern Appalachian economy generates output of almost $64 million per 1,000 regional residents. Of this output, the manufacturing sector is highest with output per 1,000 citizens of $25.6 million.

Six specific sectors were examined for their importance to the overall regional economy assessment (table 2.6). The combined natural resources sector shown provides nearly 10 percent of the region's employment, 7 percent of wages, and 12 percent of industry output (table 2.6). Natural resource industries include wood-products manufacturing, forestry, mining, and tourism. Only retail trade has a greater percentage of employment and wages than the natural resources sector among the six special industry groupings. However, natural resource output is a larger percentage of regional output than any of the other sectors.

Table 2.7 shows the importance of exports to the regional economy. The total regional economy imports 27 percent of its consumable

Table 2.6 Employment, employee compensation, and total output of the Southern Appalachian region among six specially identified sectors, 1991.

	Employment		Employee Compensation		Industrial Output	
Sector of Economy	Total (number)	Share of Total (%)	Total (million $)	Share of Total (%)	Total (million $)	Share of Total (%)
Transportation	75,563	2.4	1,788.0	3.0	5,548.0	2.7
Energy	10,296	0.3	381.6	0.6	2,486.3	1.2
Education	152,905	4.8	2,206.8	3.7	2,567.5	1.3
Retail trade	530,888	16.6	5,976.6	10.0	14,046.3	6.9
New housing construction	66,637	2.1	824.3	1.4	5,927.8	2.9
Natural resources	301,795	9.5	4,113.3	6.9	24,785.0	12.1

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

goods and services, while it exports about 35 percent of its total output.

This analysis indicates that the Southern Appalachian region is a very open economy, with about 35 percent of its total production exported. It also imports 27 percent of materials for input into manufacturing and for final consumer demand. Major export industries include mining, manufactured wood products, manufacturing in general, and forest products.

The Southern Appalachian region has long been considered one of the major tourist destinations in the United States. Table 2.8 indicates that a total of over 100 million outdoor recreation-based trips were taken to and within the region annually as of 1995. Almost 80 percent of these trips were exported, i.e., taken to the region by people living outside of the region. The largest single category of activities was developed site recreation, including camping, picnicking, sightseeing, and similar activities in developed areas. The next most frequent type of recreational pursuit was dispersed recreation,

Table 2.7 Total value and percent of total output imported and exported, by sector of the economy, in constant 1991 dollars.

	Imports		Exports	
Sector of economy	Total (million $)	Share of Total Output (%)	Total (million $)	Share of Total Output (%)
Forest products	227.3	53.1	290.3	67.8
Total agriculture	3,130.4	45.9	3,681.9	54.0
Mining	1,825.0	30.7	4,912.9	82.7
Construction	7,569.3	40.3	906.7	4.8
Primary wood manufacturing	1,092.3	37.7	2,044.6	70.6
Secondary wood manufacturing	2,327.0	31.1	4,774.0	63.8
Total manufacturing	29,597.9	36.3	54,206.8	66.5
Transportation	1,313.2	23.7	821.3	14.8
Energy	719.5	28.9	318.5	12.8
Wholesale/retail trade	2,204.9	11.4	1,586.8	8.1
Education	165.4	6.4	174.0	6.8
Services	8,821.3	14.3	4,474.7	7.3
Natural resources	5,757.4	23.2	12,066.7	48.7
Regional share		27.0		34.7

(Source: Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

Table 2.8 Total number and percentage of trips for outdoor recreation exported from the Southern Appalachian region by type of activity, 1995.

Type of Activity	Total Trips (million)	Exported (%)
Developed sites	58.6	82.3
Dispersed	18.1	73.5
Developed water	7.7	78.3
Wilderness	1.1	74.1
Fishing	10.2	73.0
Hunting	2.3	78.0
Nonconsumptive wildlife	5.8	83.4
All activities	103.8	79.4

(Source: Public Area Recreation Visitor Study (PARVS), the Customer Use and Survey Techniques for Operations, Management, Evaluation, and Research (CUSTOMER), and the National Survey on Recreation and the Environment (NSRE) from the Outdoor Recreation and Wilderness Assessment Group, USDA Forest Service, Athens, GA)

i.e., recreation occurring away from developed sites and roads and dispersed into forests and other undeveloped areas of the region. Fishing and nonconsumptive wildlife activities provided the third and fourth most popular opportunities for recreationists visiting the region. Trip exports, like any other commodity or service exported, stimulate the regional economy with new income and jobs beyond those that occur from residents spending money already in the economy for recreation.

Table 2.9 shows total business sales (equivalent to value of total output), wage income, value added (worker and proprietor income plus tax revenues generated) and employment resulting from outdoor recreation on public and private land and developed sites in the region. The value of total output from recreation-based tourism is nearly $6 billion per year, almost as high as the combined value of outputs from agriculture, forestry and fisheries industries (table 2.5). Outdoor-recreation-based tourism does not include business or other travel to the region, nor does it consider much of tourism spending for entertainment, goods, accommodations, food and travel to areas such as Pigeon Forge in Sevier County, TN; Gatlinburg, TN,; and Helen, GA. Estimates of the total magnitude of tourism sales and employment were not available for this assessment. Wilderness, fishing, hunting, and nonconsumptive wildlife (viewing, etc.) activities contribute significant numbers of jobs and income to the region.

Table 2.9 Total business sales, wage income, total value added, and employment by type of outdoor recreation based tourism in the Southern Appalachian region, 1995.

Type of Outdoor Recreation	Total Business Sales (million $)	Total Wages (million $)	Value Added (million $)	Employment (thousands)
Developed sites	3,145.3	995.7	1,798.1	53.5
Dispersed	1,384.7	462.8	833.0	25.4
Developed water	673.6	215.0	386.1	11.8
Wilderness	64.1	18.5	31.7	0.9
Fishing	292.0	85.5	156.7	4.6
Hunting	37.2	10.5	19.8	0.6
Nonconsumptive wildlife	215.6	67.2	123.3	3.8
All activities	5,812.5	1,855.2	3,348.7	100.7

(Source: Greg Alward, Land Management Planning Systems, IMPLAN, Washington Office, USDA Forest Service and the Outdoor Recreation and Wilderness Assessment Group, Forest Service, Athens, GA)

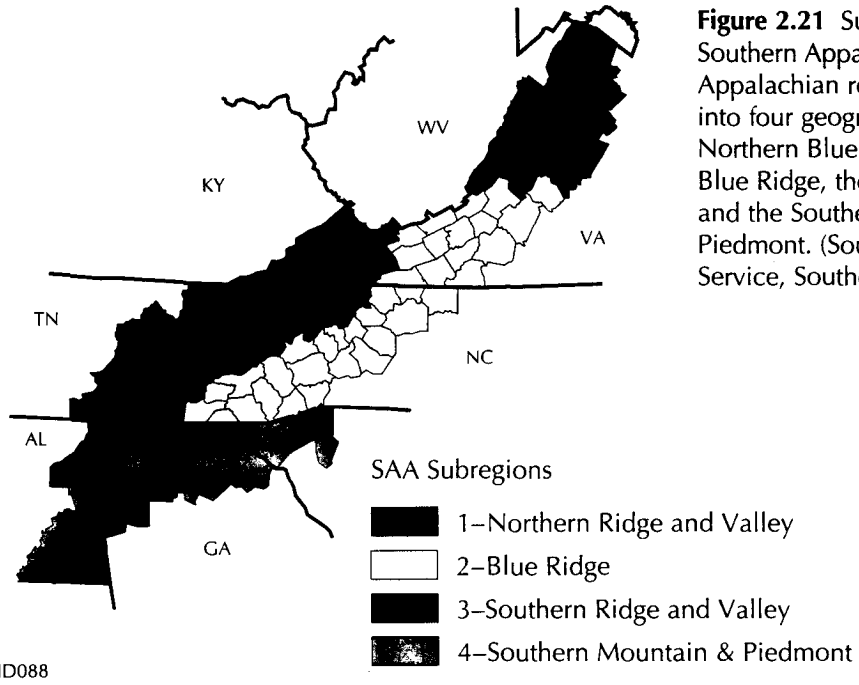


Figure 2.21 Subregions of the Southern Appalachians. The Southern Appalachian region has been divided into four geographic sub-regions: the Northern Blue Ridge, the Southern Blue Ridge, the Ridge and Valley, and the Southern Mountain and Piedmont. (Source: USDA Forest Service, Southern Research Station)

The SAA also examined four economic subregions (fig. 2.21). The Southern Ridge and Valley subregion has an $85.6 billion economy, an output over four times that of the Northern Ridge and Valley, and almost twice that of the Blue Ridge and the Southern Mountain and Piedmont subregions. In all the subregions, manufacturing is the most important single sector (fig. 2.22). However, government services employ a larger percentage of workers in the Northern Ridge and Valley and Southern Ridge and Valley subregions, than in the other two subregions. Forest products is a very small share of any of the subregions' economies.

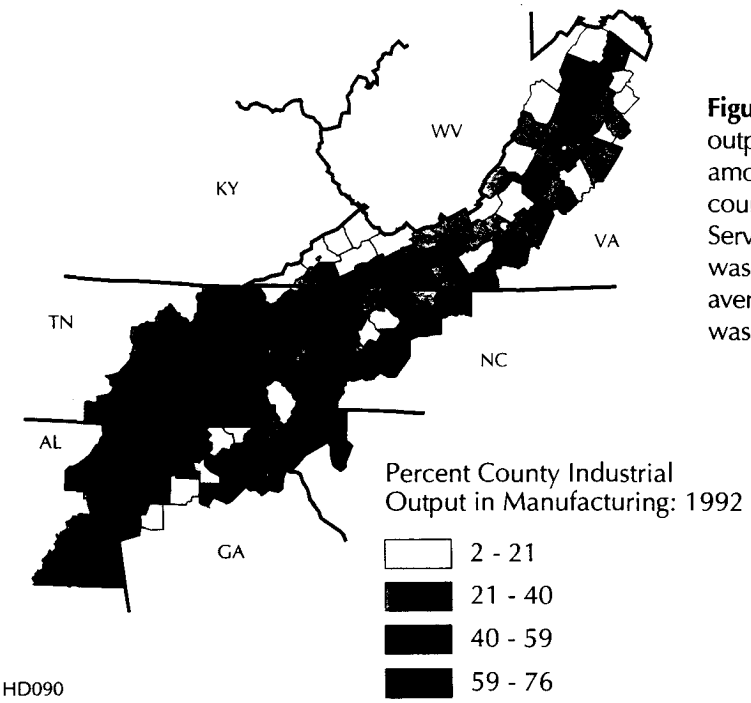


Figure 2.22 Percent of total industrial output in the manufacturing sector among Southern Appalachian counties, 1992 (Source: USDA Forest Service, IMPLAN). Industrial output was heavy throughout the region. The average percent of industrial output was 36.6 percent.

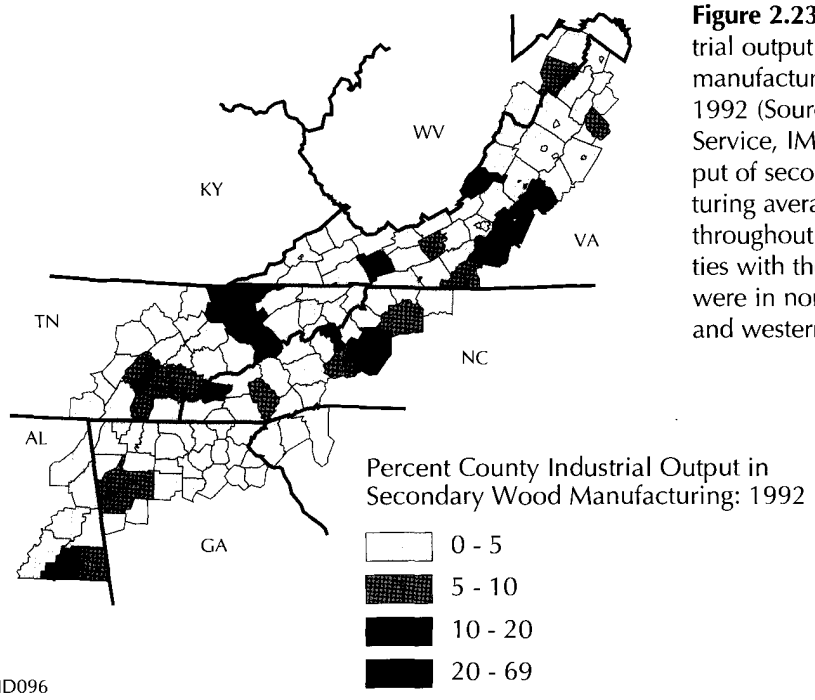


Figure 2.23 Percentage of industrial output in secondary wood manufacturing and in services, 1992 (Source: USDA Forest Service, IMPLAN). Industrial output of secondary wood manufacturing averaged about four percent throughout the region. The counties with the higher percentages were in northeastern Tennessee and western Virginia.

Wood-products manufacturing is particularly important in the Blue Ridge subregion, where it represents about 8 percent of total industrial output. In the other three subregions, wood products is only 4 to 5 percent of total output.

All four subregions export more goods and services than they import. The largest exporter is general manufacturing. Manufacturing imports range between 38 to 41 percent of total industrial output, while manufacturing exports range between 68 to 75 percent.

Economic importance of resource-dependent industries was examined at the county level. Manufacturing output was greatest in the central and southern counties of the Southern Appalachians (fig. 2.22). In only six counties was primary wood-products manufacturing more than 10 percent of total industrial output. Secondary wood-products manufacturing, on the other hand, was over 10 percent of industrial output in the central and eastern part of region (fig. 2.23).

Social Diversity of Communities Near Selected Public Lands

Two levels of analysis were undertaken to examine social diversity among communities (census block groups) within the region. The first was to briefly compare the social make-up of communities neighboring five national forest ranger districts with surrounding state and regional social make-up. The second was to examine the degree of diversity among communities near the selected five districts.

The five districts chosen were Brasstown, Tallulah, Watauga, Tusquitee, and Deerfield. These were chosen because they are good examples of the ranger districts across the Southern Appalachians. Local communities around these districts were identified as all block groups having at least 20 percent of their area within 10 miles of the boundaries of the ranger districts.

Table 2.10 summarizes the diversity of the populations among the states containing the Southern Appalachians. These data provide a basis for comparisons with the local communities surrounding the five districts shown in table 2.11.

Local communities near districts have lower per-capita income, lower average education rates, higher average poverty levels, and lower average proportions of populations of working age (18 to 65) than the surrounding states. In fact, local people near the ranger districts live in several to many communities that differ considerably from one another. For example, looking at the Deerfield Ranger District (fig. 2.24), population and population density vary widely among the nearby communities. More dense population is found, as expected, near towns,

Table 2.10 Population and characteristics for states containing the Southern Appalachians and for the U.S., 1990.

	AL	GA	KY	MD	NC
Total Population	4,040,587	6,478,216	3,685,296	4,781,468	6,628,637
Population Density	77.08	108.99	91.19	385.37	123.16
Total Heads of Households	1,506,790	2,366,615	1,379,782	1,748,991	2,517,026
Per Capita Income	$11,486	$13,631	$11,153	$17,730	$12,885
Median Family Income	$28,688	$33,529	$27,028	$45,034	$31,548
% Population in Poverty	17.91	14.25	18.50	8.06	12.52
% Population <18 years old	26.20	26.66	25.89	24.31	24.23
% Population >65 years old	12.94	10.10	12.67	10.82	12.13
% White non-Hispanic	73.25	70.23	91.71	69.64	75.09
% Native American	0.41	0.21	0.16	0.27	1.21
% Population >18 No HS Diploma	23.76	21.03	25.07	16.15	21.88
% Population Agricultural	1.00	1.05	1.57	0.71	1.26
% Heads of Households at Address >5yrs	54.58	46.38	53.65	50.02	51.87

	SC	TN	VA	WV	US
Total Population	3,486,703	4,877,185	6,187,358	1,793,477	248,709,873
Population Density	108.94	115.72	144.67	74.01	65.67
Total Heads of Households	1,258,044	1,853,725	2,291,830	688,557	91,947,410
Per Capita Income	$11,897	$12,255	$15,713	$10,520	N/A
Median Family Income	$30,797	$29,546	$38,213	$25,602	N/A
% Population in Poverty	14.85	15.27	9.88	19.24	12.76
% Population <18 years old	26.39	24.94	24.32	24.73	25.57
% Population >65 years old	11.38	12.69	10.74	14.99	12.56
% White non-Hispanic	68.60	82.59	76.01	95.89	75.76
% Native American	0.24	0.21	0.25	0.14	0.79
% Population >18 No HS Diploma	22.47	23.95	18.28	24.68	18.30
% Population Agricultural	0.96	1.00	0.94	0.76	1.14
% Heads of Households at Address >5yrs	52.81	51.12	47.45	61.79	50.87

(Source: 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce)

but there are pockets of dense population and uneven distribution outside urban areas. Also, composition of population is very diverse among communities. Interestingly, young and old age groups seem to be negatively correlated with each other. Communities with higher percentage populations of young people (under 18 years of age) experience low percentages of older people (over 65 years of age) and vice versa. This may be the result of the community being populated with working-age people with children, as supported by earlier findings. Where population is most dense, there seem to be higher concentrations of people under the age of 18. Race seems to be fairly evenly distributed, except for greater concentrations of African Americans in urban communities.

Education levels are also diverse across communities. Communities with low education levels (26 to 30 percent with no high school diploma) can be found among communities having comparatively high education levels. The percent of people in personal poverty varies across communities. No strong ties of poverty to agricultural employment or to urbanness appear to exist.

To summarize, communities around ranger districts appear very diverse, however homogeneous they may appear when viewed from a regional perspective. Population density, education level, income, marital status, family size, household and individual poverty rates, race, and age vary considerably from community to community.

Community Residents' Perceptions of Impact on Their Community

Residents in all of the communities near the five districts said that national forests are important to them and provide a barrier to overdevelopment in their area. Residents perceived that the local ranger district enhances the economy of their local community with jobs, timber harvesting, tourism, and recreation facilities. Residents said that while the forests

Table 2.11 Area and population characteristics of local communities near five ranger districts, Southern Appalachian region, 1990.

	Ranger Districts				
	Brasstown	Tallulah	Watauga	Tusquitee	Deerfield
Total Area in Square Miles	1,713	1,598	1,494	2,452	1,592
Total Population	58,861	53,659	150,626	87,250	56,637
Population Per Square Mile	34	34	101	36	36
Number of Households	23,423	21,575	58,968	34,390	21,346
Per Capita Income	$10,541	$11,937	$9,922	$9,639	$12,572
Median Family Income	$24,769	$26,377	$24,072	$22,735	$32,876
Percent of Individual Poverty	17	15	18	19	10
Percent of Population under 18 years old	21	22	22	22	22
Percent of Population over 65 years old	19	18	15	19	15
Percent of Population - White, non-Hispanic	98	96	98	98	92
Percent of Population - Native American	0.63	0.26	0.21	1.16	0.10
Percent of Population over 18 years old with No High School Diploma	30	27	30	32	24
Percent of Population employed in Farming, Forestry, or Fishing	2	2	1	2	3
Percent of Households at the Same Address for more than 5 Years	58	59	59	61	71

(Source: 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce)

take up much of the land in area, they also increase land values because proximity to a forest is desirable.

Certain needs were commonly perceived:

1. The need to balance forest uses among recreation, timber, tourism, and protection.
2. The need for the Forest Service to seek the perspectives of local residents, as well as outside special interests about issues and plans.
3. The need to educate adults and children in local communities about issues through Forest Service generated meetings and mailings which are friendly, interactive, informative (rather than problem-presenting), and present- and future-oriented. This need would emphasize Forest Service personnel and community residents sharing ideas equally.
4. The need to continue selective timber harvesting while making it a profitable endeavor.
5. The need to encourage tourism, but without degrading recreation opportunities for local residents.
6. The need to establish and maintain good rapport and communication between local residents and regional and national Forest Service units, just as they already experience with local Forest Service districts and rangers.
7. The need to make more informed decisions to preserve wilderness for the future, but to still allow local residents access for recreational purposes.
8. The need for the Forest Service to more equally inform all residents about plans and emerging issues through a variety of communication strategies.

Balance clearly emerged as the core concept among residents' perceptions of needs. Residents said that the Forest Service should establish this balance by doing a better job of seeking local residents' perspectives and by taking account of those perspectives in decisions about forest use. Residents feel that forest use can be enhanced if regional- and national-level Forest Service units purposefully focus more on communication and collaboration with local residents. They feel that Forest Service personnel at all levels should spend more time in the communities and on the forests.

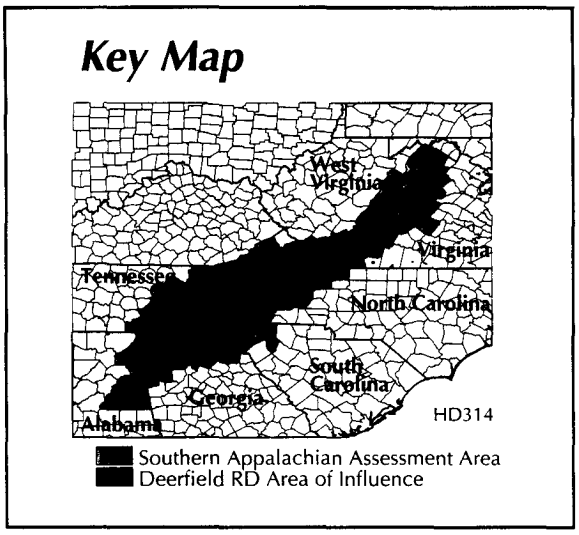
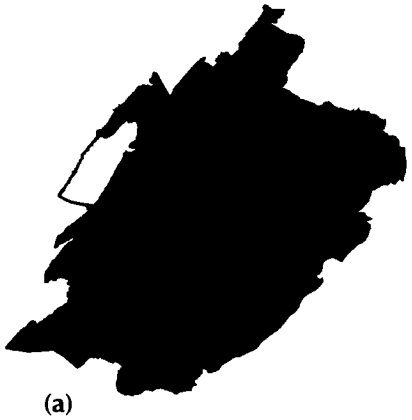
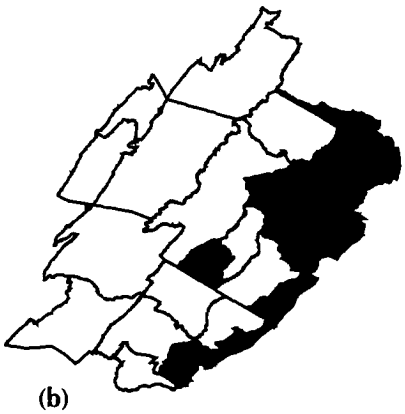


Figure 2.24 (a-i) Comparison of population and age characteristics of local communities of Deerfield Ranger District, Virginia (Source: 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce).



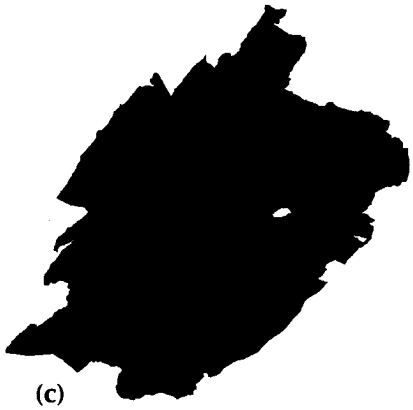
(a)

Total Population Numbers
- 0-500
- 501-750
- 751-1000
- 1001-1500
- 1501-2000



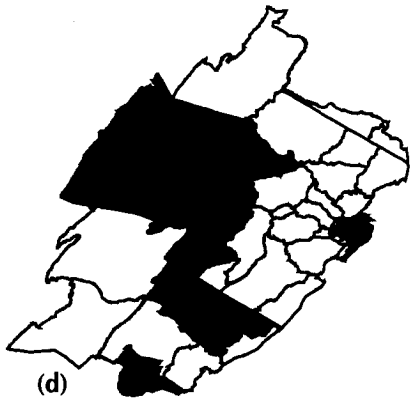
(b)

Population/Sq.Mile
- 0-25
- 26-75
- 76-150
- 151-300
- 301-5000



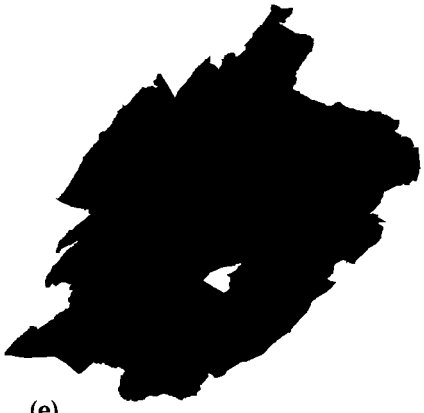
(c)

% People <18 Years Old
- 0-10%
- 11-20%
- 21-24%
- 25-26%
- 27-30%



(d)

% People Over 65 Years Old
- 0-15%
- 16-19%
- 20-22%
- 23-30%
- 31-40%



(e)

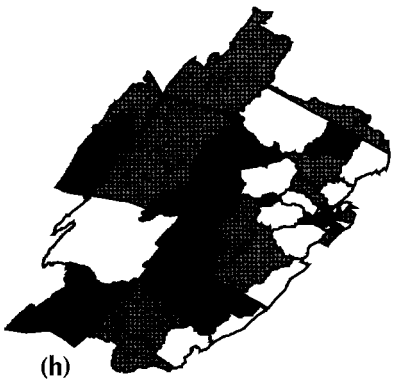
% White, Non-Hispanic
- 0-75%
- 76-90%
- 91-93%
- 94-98%
- 99-100%

(f)

% Personal Poverty
- 0-0.05
- 0.06-0.1
- 0.11-0.15
- 0.16-.25
- 0.26-0.50

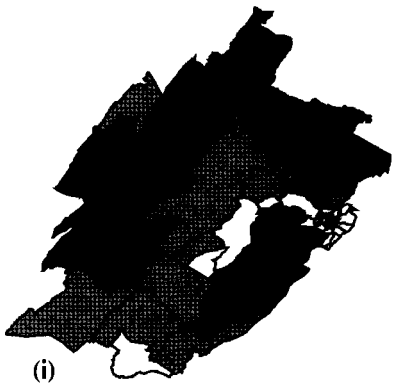
(g)

% <9th Grade Education
- 0-10%
- 11-15%
- 16-20%
- 21-25%
- 26-30%



(h)

% 9-12th Grade, No Diploma
- 0-10%
- 11-15%
- 16-20%
- 21-25%
- 26-30%



(i)

% People in Farm/Fish/Forest Occupations.
- 0-1%
- 2-4%
- 5-7%
- 8-10%
- 11-30%

One of the primary concerns of residents is that special interest groups, being larger, have a larger voice in forest management decision-making than local communities. One participant said, "Yes, it's theirs as much as ours, but those environmentalists get listened to more than us!" Another asserted that the "local people don't say enough, and the people not from around here don't have enough to do and don't know what they're talking about." Thus, residents feel that their long experience in the local area gives them better insights.

Residents feel that decisions are being made about timber, access to forest and wildlife areas, and recreation without their input. They want to be better informed of Forest Service meetings and specifically invited to them so that they can become aware of plans. One person said, "You have to have a balance... There needs to be some reasonable scientific management so that if there is an endangered species of plant or animal, we do our best to save them, and I think that's very important for the Forest Service to do. But, if extremists start making the rules, then they may take it a little too far."

One of the primary concerns of local residents is the Forest Service tendency to restrict use by closing roads or otherwise limiting access. They perceive wilderness areas as important for preserving trees and natural habitats, but they also want access to these areas. One person said, "My objection to wilderness areas is that there is no road. I won't be able to walk back in there 15-20 miles much longer. What good is it if you can't get back there?" Other residents emphasized the ecological value of wilderness: "I'm more interested in what the forests, the trees, do to the kinds of life we are going to lead." Another resident emphasized the heritage value, "We need some wilderness. Now you can't take your grandchildren out and share what we saw." One participant said residents' positions could be summarized as: "No more clearcutting and no more wilderness, we have enough."

Residents perceive an alternative between the two extremes of clearcutting and wilderness. "Clearcutting tears up everything, but forests have been managed for years without that." "Selective cutting is what you are talking about. The clearcuts is what made people agree to wilderness." The balance for local residents would be efficient management of the forests for recreation, timber harvests through selective cutting, and maintenance of small areas of wilderness throughout the forests, rather than large inaccessible areas of wilderness. Both tourism and timber bring money into local communities.

Participants noted three primary communication needs: (1) the Forest Service needs to better educate itself about the composition and perceptions of the various communities it serves, (2) all residents of all communities need ongoing communication to keep them informed of Forest Service plans, and (3) an interactive trusting relationship needs to be established. The perceived problem with many current meetings is that they are held after a problem has emerged. Not all citizens are informed about such meetings, and issues are presented in a manner that is often unintelligible to residents. One resident reflected, "They put out requests for comments and they hold meetings – and I've been on some of their mailing lists – but they don't use terms that are intelligible." One participant suggested that "it would be good if the Forest Service would plan a meeting, maybe at the courthouse, something in the newspaper, invite interested people to a meeting. Ask, 'hey folks, what do you think we need to do with our forest. Are we doing right; are we doing wrong?' But there's never any communication unless the local citizens initiate it."

Participants discussed the lack of clarity in information distributed by the Forest Service. One participant stated that she/he had an advanced degree, and "I can't understand the material. Have a seminar and explain it to us instead of just sending 20 pages I can't understand. We want to help, but ask us."

Participants suggested that a good education program is necessary to help them understand ecosystem management. The Forest Service is beginning to "shift toward the schools and that involved the young children and that's wonderful." Another participant cautioned that the Woodsy Owl and Smokey Bear education efforts in schools are not in all local schools. Two participants ended the discussion about ecosystem management with the suggestions to "Make more of an effort to be in the community about decisions that affect the community before the decision is made. Achieve an understanding with them before there's a problem. Make more of an effort to get to know the

Table 2.12 Southern Appalachian region counties ranking in top 210 in the nation in toxic releases.

County	Toxic Release Inventory Ranking	African American Population	Family Poverty Rate (percent)	African American Poverty
Floyd, GA	123	13.6	10.9	31.6
Caldwell, NC	65	5.6	8.1	29.2
Haywood, NC	185	1.2	9.5	19.0
Carter, TN	113	0.8	14.5	21.2
Hamblen, TN	8	4.6	11.1	28.2
Hamilton, TN	109	19.0	10.2	31.2
Hawkens, TN	117	1.8	14.3	15.5
Louden, TN	187	1.2	10.7	28.3
Sullivan, TN	7	1.7	10.4	39.5
Allegheny, VA	70	2.7	7.0	17.4
Frederick, VA	75	1.7	4.8	4.7
Giles, VA	33	1.6	9.5	13.7
Southern Appalachian Regional Average		5.0	12.1	25.7

(Source: EPA 1993 Toxic Release Inventory (TRI) and 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce)

people in their districts." Residents assert that the forests belong to everybody, and that all should have a voice in what is done with the land.

The Environmental Justice Issue

In 1982, the siting of a polychlorinated biphenyl (PCB) landfill in Warren County, NC, focused national attention on the issue of environmental justice (Mohai and Bryant 1992). The next year the General Accounting Office (GAO) completed a study of communities around four hazardous waste sites in the Southern United States and found that three of four sites were located in predominantly African-American communities. Fourteen of 15 subsequent research studies have shown pollution inequitably distributed by income and/or race (Mohai and Bryant 1992). In studies where race and income were both accounted for, four of five found race more strongly related to siting location than income. These findings and their implication for low income and minority communities have spurred today's environmental justice concern.

In February 1994, Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was issued by President Clinton. Agencies were advised to develop implementation strategies by February 1995. In these strategies, as a minimum, agencies were to revise programs, policies, planning and public participation processes, enforcement, and/or rulemaking to: (1) promote enforcement of environmental and health statutes in areas with minority and low-income populations; (2) ensure greater public participation; (3) improve research and data collection relating to the health and environment of minority and low income populations; and, (4) identify differential patterns of subsistence use of natural resources among those populations.

In 1993, 12 out of 151, or 8 percent, of Southern Appalachian counties were among the 210 highest toxic polluters. Only 6.6 percent of U.S. counties were among the top 210. Table 2.12 shows the 12 counties and their ranking, racial, and income characteristics. Interpretation of these descriptive statistics does not suggest that siting decisions were based on race. The proportions of African-Americans in the populations there were generally lower than the regional average. An investigation of the income characteristics of these counties attests to their relative affluence. Only 3 of the 12 high-polluting counties had higher rates of poverty than the regional average. Half of the counties had lower than average rates of African-American poverty and half had higher rates of African-American poverty, suggesting there is little relationship between minority poverty and siting of pollution in the region.

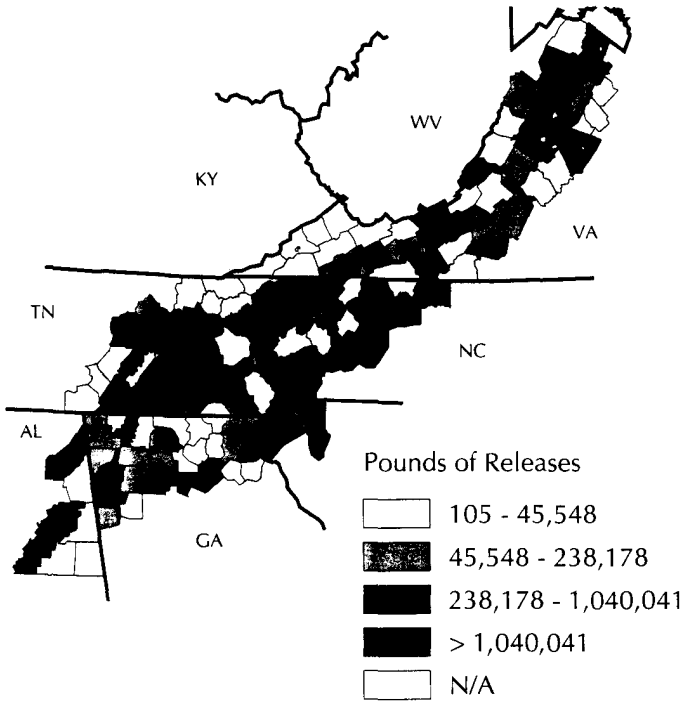


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Figure 2.25 Level of toxic release in Southern Appalachians counties, 1990 (Source: 1987-1992 Toxic Release Inventory, Office of Pollution, Prevention, and Toxics, U.S. Environmental Protection Agency). This shows the total level of toxic releases for each county.

Figure 2.25 shows all Southern Appalachian counties by level of toxic release. The income characteristics of these counties are shown in table 2.13. The counties with the highest levels of release (the upper quartile) are shaded. As a group, these counties had the highest median family incomes and the lowest poverty rates. The counties with the lowest amount of pollution had the lowest median family incomes and greater than average number of families living in poverty. The race-related statistics, however, show mixed results. In terms of population diversity, African-American populations in the high-pollution counties were proportionately above the regional average while the African-American populations of the lowest polluting counties were below the regional average. The average African-American population across Southern Appalachian counties included in this analysis was 5 percent. These results suggest that siting may have occurred disproportionately in counties with higher proportions of blacks, but that income of both blacks and whites in these counties were higher than average.

Considering the low racial diversity in the Southern Appalachians, the county level of analysis may be too broad to detect environmental injustice. It is more desirable to look at relations between neighborhood racial and income characteristics and point-source pollution location. Kriesel and Centner (1995), for example, found differential impact at higher resolution (within 1 mile of census block group). Minority and low-income communities in Georgia were disproportionately located within 1 mile of a toxic release site. When controlling for income, the race effect persisted.

Due to time constraints for the SAA, we were not able to address the environmental justice issue at the block group level. Ranger district and area-of-influence maps presented in answer to Question 3 of this document illustrate block-group diversity that could fruitfully be analyzed in future studies. Important environmental justice indicators, such as race and income, vary considerably among block groups. These neighborhood-level patterns of diversity provide an important basis for future investigation. Environmental justice is an issue that can be more broadly defined than solely through analysis of racial and income characteristics and EPA toxic release data. Alternative strategies for analysis include looking at communities stratified by blue collar versus white collar status. This approach may be especially

Table 2.13 Category of toxic release by county and selected community characteristics.

Releases by Quartile	Median Family Income (dollars)	Family Poverty Rate	African American Poverty Rate	African American Population
			(percent)	
1st	24,666	10.1	25.3	6.5
2nd	24,527	10.6	23.6	5.4
3rd	23,229	11.8	24.3	3.3
4th	22,132	13.6	25.2	4.1
Southern Appalachian Regional Average	23,149	12.07	25.7	5.0

(Source: EPA Toxic Release Inventory (TRI) 1990 and 1990 Census of Population and Housing, Bureau of Census, U.S. Department of Commerce)

valuable in the Southern Appalachians, where racial diversity is low. Additional environmental indicators could include air quality, stream turbidity and toxicity ratings, and average residential elevation to show whether groups are generally below or above most of the downhill water flow. Variables particularly related to forestry include forest cover, species abundance, and stream water quality. It is strongly recommended that the environmental justice issue be reanalyzed using more advanced methods.

Question 4:

To what extent have interests or publics outside of the Southern Appalachians affected the status and management of the region's ecosystems and public land?

Key Findings

Outside Groups Are Active in the Region

A survey of a sample of 150 environmental groups reveals that the groups affect public land management in the region largely through technical assistance to management agencies (especially on plant and water-related issues) and through public outreach and environmental education activities (focusing particularly on fish and wildlife-related topics). Representatives of five federal land management agencies perceive that environmental groups influence management of public land in the region through input on planning proposals and environmental impact statements and through the creation of "community-led" organizations, such as the Oak Ridge Reservation Resource Management Organization.

Wildlife and Land Management Are Primary Concerns

Additional points revealed by the survey of environmental groups are: (1) Most environmental groups (69 percent) were formed after 1970. (2) Most organizations state that protection of natural resources, especially wildlife, is their greatest concern. (3) Urban encroachment and poor management of forests, farms, and other natural resources were considered the greatest threat to natural resources. (4) The primary products or services associated with the various organizations were technical assistance (41 percent), environmental education and public communication (31 percent), and antidevelopment activities (17 percent).

It is clear that public land managers must work closely and skillfully with environmental groups. While keeping the needs and desires of local communities and businesses in mind, mandates for the national resources represented by federal lands in the region may in some instances push nonlocal interests ahead of local interests. Environmental and industry groups alike are much better informed and equipped to analyze and argue management options and the potential consequences of those options.

Interest groups have had a profound influence on the status of natural resources of the Southern Appalachian region. Large numbers of organized interests have involved themselves in planning and other decision making across an array of issues from local to regional in scale. In all likelihood, this interest and involvement will increase in the future. As the region grows as a tourism destination, pressures for environmentally and aesthetically sensitive management options also will grow.

Outside investment in the region was not covered in this analysis. For many years, resource extraction companies and tourism developers have invested in the region. That pattern also is likely to grow in the future. As transportation and communication improve inside the region and among regions, investment and development will continue to grow. Investment may become the dominant source of pressure on how public lands are managed.

Data and Methods of Analysis

This question was addressed by: (1) Compiling a list of environmental-related organizations around the region and mailing a questionnaire to a sample of these organizations requesting in-depth information about their role in natural resource policies and issues in the region. (2) Interviewing representatives of the major federal land management agencies in the region.

Compilation of Environmental-Related Organizations

A list of 1,942 organizations involved with, or affected by the management of, the region's ecosystems and public lands was compiled. Organizations were placed into one of the three categories: (1) "Internal" (located within the 135 county region); (2) "Adjacent" (located outside the region, but within one of the seven states of the study area – Alabama, Georgia, Kentucky, North Carolina, Tennessee, South Carolina, Virginia), and (3) "External" (major environmental organizations located in any of the remaining 43 states). In total, 718 internal groups, 794 adjacent groups, and 430 major external groups were identified. The list was generated from published conservation directories (national, state, and local); nonprofit agency mailing lists (e.g., Sierra Club chapters, state United Way chapters); local and national television and radio listings; local newspapers and newsletters (e.g., Chattanooga Quarterly); federal, state, and local governmental agency mailing lists (e.g., departments of natural resources, state chambers of commerce, state institutes of environmental policy), and state universities.

Mail-back Questionnaire

In June 1995, a mail-back questionnaire was sent to a representative sample of organizations from the compiled list. A total of 150 organizations (52 internal, 69 adjacent, and 29 external) responded to six questions: (1) "Year

Table 2.14 Missions and natural resource values of sample organizations.

Category	Mission[1] (percent of organizations reporting)	Values[2] (percent of organizations reporting)
Water resources		
Protection	5.4	8.0
Education and research	2.0	0
Quality	2.0	5.9
Wetlands	1.4	1.1
Fish and wildlife		
Habitat protection	3.4	6.4
Population protection	4.1	8.0
Education and research	1.4	0
Endangered species	1.4	0.5
Agriculture		
Sustainable practices	4.7	3.7
Economic development	.6	0
Forest Resources		
Protection	6.1	4.8
Timber production	9.5	5.9
Plants & Vegetation		
Protection	.6	3.7
Education and research	1.4	0
Area development		
Urban	1.4	0
Rural	2.0	0.5
Tourism	4.7	0.5
Social		
Historic and archeological	4.1	5.9
Recycling	5.4	0
Aesthetic and recreational	10.1	21.4
Natural resources (not specified)		
Protection	8.8	9.1
Education and research	12.2	0
Management and planning	4.7	0.5
Biodiversity	2.7	13.9

[1] Number of respondents = 148; two organizations had missing data.

[2] Number of respondents = 187; total sums to more than 150 because of multiple values reported by some organizations.

(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

organization was formed," (2) "Number of members in organization," (3) "General mission or purpose of organization," (4) "Most important natural resource values in the Southern Appalachian region," (5) "Greatest threats to those natural resource values," and (6) "Outcomes of the major environmental projects conducted in the past 10-15 years."

Detailed Results of the Analysis

Most of the sample organizations (64 percent) were formed after 1970. Only 11 percent were formed before 1920. Over one-third (38 percent) of the organizations had more than 500 members, 18 percent had 100 to 499 members, 11 percent had 50 to 99 members, 21 percent had 10 to 49 members, and 11 percent had less than 10 members. Two organizations did not supply all of the requested data.

Table 2.14 shows the missions and natural resource values of the sample organizations. Most reported that their general mission or purpose concerned the protection of natural resources, including water, fish and wildlife, land, or plants (28 percent). Other responses included education and public communication

Table 2.15 Major perceived threats to Southern Appalachian region natural resource values of sample organizations.

Category and Threat	Positive Response[1] (percent of organizations reporting)
Water Resources	
Pollution	6.7
Dams and impoundments	.8
Fish and wildlife	
Loss of habitat	2.5
Loss of populations	.4
Pests	1.2
Agriculture	
Overgrazing	.4
Poor management practices	3.8
Forest resources	
Clearcutting	11.8
Wood products	2.5
Poor management practices	3.4
Plants and vegetation	
Loss of plants	.8
Area development	
Urban communities	17.2
Rural communities	2.9
Second homes	2.5
Tourism	.4
Government Interference	
Poor legislation	5.5
Social	
Loss of history	.4
Poor waste management	6.3
Recreation overuse	2.5
Social apathy	3.4
Radical environmental groups	2.1
Natural resources (not specified)	
Lack of education	7.1
Poor management practices	8.8
Mining	
Mineral extraction	2.9
Atmospheric	
Pollution and acid rain	2.9

[1]Number of respondents = 238; total sums to more than 150 because of multiple values reported by some organizations.

(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

(21 percent), aesthetics or provision of recreation opportunities (10 percent), and timber production (10 percent).

When asked about which natural resource values they consider to be most important in the region, most organizations reported protection of natural resources, especially wildlife-related resources (40 percent). Other responses included aesthetics and recreation opportunities (21 percent), maintaining biodiversity (14 percent), wood production (6 percent), historical and archeological preservation (6 percent), and water quality (6 percent).

Table 2.15 shows the major perceived threats to natural resources values in the region. Primary threats included urban development (17 percent), poor resource management practices (16 percent), clearcutting and logging (12 percent), lack of environmental education (7 percent), ineffective waste management and recycling programs (6 percent), and improper environmental legislation (5 percent).

The major outcomes of environment-related projects that the sample organizations are involved with are shown in table 2.16. Primary outcomes include the provision of technical assistance, especially about plant and water issues, environmental education and public communication, antidevelopment initiatives, and land acquisition.

Interviews with Federal Agency Representatives

From April to August 1995, representatives (public affairs or liaison officers) of seven federal agencies in the region were contacted: The Blue Ridge Parkway, the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service, the Forest Service, the National Park Service (Great Smoky Mountains National Park), the Oak Ridge National Laboratory, and the Tennessee Valley Authority. Two questions were asked: (1) "Describe the

Table 2.16 Desired outcomes of sample organizations.

Category	Positive Responses[1] (percent of organizations reporting)
Antidevelopment	
Wetlands	1.4
Water impoundments	5.0
Mining	.7
Forestry and timber	3.6
Tourism	.7
Nuclear energy	3.6
Road and home construction	2.1
Environmental education	
Historic	1.4
Forestry	5.0
Fish and wildlife	11.4
Plants	3.6
Atmospheric	.7
Natural resources (not specified)	8.6
Technical assistance	
Agriculture and land	2.9
Forestry	5.0
Water	9.3
Waste management	7.8
Fish and wildlife	.7
Plants	13.6
Other	
Legislation	2.1
Trails maintenance	2.9
Foundations	2.1
Land acquisition	6.4
Donations and grants	2.9

[1]Number of respondents = 140; ten organizations had missing data.
(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

history of the agency's environmental planning process within the region since 1980" and (2) "Identify the major organizations and groups (located both within and outside of the region) who have affected those policy changes."

History of Environmental Planning in The Southern Appalachians Since 1980

(1) U.S. Fish and Wildlife Service (FWS): The FWS does not directly manage land or water resources in the region. Its primary responsibility in environmental planning is to provide technical assistance to other public agencies on the management and provision of wildlife and habitat, with particular emphasis on threatened and endangered species.

(2) National Park Service (NPS) – Great Smoky Mountains National Park (GSMNP): The following issues have been at the forefront of the GSMNP environmental planning since the early 1980s: (a) North Shore road settlement in North Carolina, (b) aircraft sightseeing overflights, (c) completion of the Foothills Parkway and (d) Class I Area air quality responsibilities.

(a) The issue of whether to build a remaining 21-mile section of North Shore Road along Fontana Reservoir has been long debated on economic and environmental grounds. In 1992, the estimated cost of the proposed road construction was $125 million. The road is needed to provide access to area cemeteries, which the NPS has a responsibility to maintain. Primary environmental concerns include the effect on wildlife, the exposition of Anakeesta rock which produces acids and heavy metals that are leached by rainfall into streams and kill aquatic life, and possible faulting due to unstable rock formations. A related environmental issue is proposed wilderness designation that includes a portion of the proposed North Shore road. Wilderness designation would prohibit motorized use and have implications for cemetery access.

(b) The increase in low-altitude sightseeing flights in and around the GSMNP has resulted in impacts on visitor enjoyment and safety and on resource protection. Landings are prohibited within the GSMNP, but the NPS has no regulatory authority over overflights.

(c) To date only 22.5 miles of the 72-mile Foothills Parkway are completed and open to traffic. The NPS considers completion of the Parkway necessary for providing scenic vistas of the northern portion of the Great Smoky Mountains.

(d) Monitoring and research conducted in the GSMNP have shown that airborne pollutants are significantly impacting Park resources and visitor enjoyment. Problems include ozone effects on vegetation, visibility impairment from regional haze, and effects of acid deposition on the aquatic and terrestrial resources.

(3) Oak Ridge National Laboratory (ORNL): The Oak Ridge Reservation was purchased by the wartime Manhattan Project. At the time, environmental planning was not a major consideration. Much of the land was not developed, but was left intact and used as a buffer around the facilities. Over the past 50 years, lack of disturbance has resulted in the establishment of several communities, such as cedar barrens, river bluffs, and wetlands, which are less common in surrounding areas. Today, the Oak Ridge Reservation has over 1,000 vascular plant species, of which 22 are state-listed and 4 are candidates for federal listing. It also has in excess of 300 wildlife species, an unknown number of which are state-listed. The Nature Conservancy reports 272 known occurrences of significant species and communities. Recently, the Oak Ridge area has been targeted for industrial and residential development.

(4) Tennessee Valley Authority (TVA): Since 1980, two of the most controversial environmental issues facing the TVA have concerned (a) forest management practices and (b) water management projects. The TVA employs a professional forestry staff that works cooperatively with the forest products industries and manages TVA land. Much of this work has involved limited timber sales and outreach activities with private landowners. The portable chip mill industry has been seeking water-use permits on or near TVA reservoirs and lakes. Water management, in the form of flood control, navigation, and generation of hydroelectric power, is a legislated mandate of the TVA. Recent planning issues are related to aquatic vegetation control, control of disease-bearing insects, nurturing of threatened and endangered species, and maintaining water quality and aesthetics for recreation use by managing lake levels and dam releases.

(5) The USDA Forest Service is the largest single land-management entity in the Southern Appalachians. The National Forest Management

Act of 1976 (NFMA) and its implementing regulations, which were written in 1979 and revised in 1982, called for detailed land management planning on all the national forests. Plans for the national forests in the Southern Appalachians were completed between 1984 and 1987.

In the planning process on each national forest, issues of concern to interested publics were identified at the outset in a formal public involvement process. These issues were tracked throughout the planning process, and their resolution was reported. The specific issues that were identified are too numerous to mention here.

The completed plans describe strategies, goals and objectives, standards and guidelines, areas where specified management activities will occur, and monitoring and evaluation schemes. The plans are permissive; that is, they allow certain activities to occur. They do not, however, contain the site-specific decisions needed to implement projects. Implementation decisions must be made separately for individual projects that are deemed to be consistent with the forest plan. In making implementation decisions and taking actions, the forest manager is bound by the National Environmental Policy Act (NEPA) to analyze and disclose to the public the effects of decisions and actions.

In 1995, all but the George Washington, Nantahala, and Pisgah National Forests began to revise their forest plans. The results of the SAA will be a valuable source of data and information for making these revisions. The George Washington National Forest completed revisions of its plan in 1993, and the Pisgah and Nantahala National Forests completed a significant amendment to their plan in 1994.

Influence of Environmental Organizations on Land Management in Southern Appalachians

(1) U.S. Fish and Wildlife Service: Public involvement in FWS environmental planning and management has focused primarily on issues concerning endangered species populations and habitats. The FWS gets public input through two primary means, "Listing Actions" and "Recovery Plans." Under Listing Actions, the FWS prepares a regulation for listing a species as endangered. Public input on the proposal is solicited for 30 days before the listing can pass. In a separate effort, the FWS publishes a notice in the federal registry to solicit input from the public on a Recovery Plan. The Recovery Plan, however, has limited legal ramifications.

(2) National Park Service:

(a) North Shore Road settlement; interested publics and groups involved in the road-building/wilderness/cemetery issue include Congressional delegations from North Carolina and Tennessee, the TVA, Swain County Commissioners, Tennessee Great Smoky Mountains Park Commission, the Wilderness Society, the Sierra Club, the Wildlife Federation, the North Shore Historical (Cemetery) Association, the Non-partisan Citizens Against Wilderness in North Carolina, other environmental and recreational organizations (including anglers and other backcountry user-groups), and GSMNP neighbors. The NPS sought public input on the issue through its General Management Plan. The outcome has been a decision not to support the construction of the North Shore road of Fontana Lake, but to ensure cemetery access by maintaining existing nonpublic use roads and trails.

(b) Aircraft overflights; major interest groups include the National Parks and Conservation Association, park visitors (especially backcountry users seeking solitude), nearby communities, and tour operators. Several communities (Gatlinburg, Pigeon Forge, Sevierville, and Townsend) prohibit landings within city limits, and Pigeon Forge city ordinances have proposed eliminating tour operations. As of January 1995, the local issue is being considered in the Sevier County Circuit Court. On a national level, the issue of overflights in national parks is to be considered by Congress.

(c) Foothills Parkway construction; Leaders of neighboring Tennessee communities, the Tennessee Congressional delegation, and the Foothills Parkway Association support completion of the project. Some adjacent landowners are concerned over possible pollution of their wells and streams, as well as the increased traffic and the visual impact of the roadway on scenery. (d) Class I Area air quality responsibilities; the EPA, the Forest Service, and several environmental organizations, including the National Park Conservation Association, support the NPS position on air quality

emission standards. Tennessee Luttrell and other industries, along with some states, have opposed an adverse impact determination on grounds that it will limit economic growth. One of the outcomes of public input has been the creation in 1992 of the Southern Appalachian Mountains Initiative (SAMI), a voluntary, multi-organizational, state-driven initiative charged with preventing future adverse effects from human-induced air pollution on the region.

(3) Oak Ridge National Laboratory: In the early 1980s, the Oak Ridge Reservation Resource Management Organization was formed to solicit input on land-use impacts on the Reservation. Interested parties involved in its formation included groups and individuals representing utilities, security, site development, forestry, wetland preservation, and threatened and endangered species issues. More recently, an environmental evaluation, known as the "Common Ground Process," has been developed to solicit external stakeholder input about use of the Oak Ridge area in the future.

(4) Tennessee Valley Authority: Since 1980, the public has affected TVA management practices related to at least three environmental issues: (1) reservoir planning, (2) endangered species, and (3) chemical treatment in water bodies. In the late 1980s and early 1990s, a public planning review was conducted in association with an Environmental Impact Statement. Meetings and workshops were held at key locations near the approximately 40 reservoirs within the TVA jurisdiction. Stakeholder groups that were involved included, lake homeowners (and associations), recreation user groups (e.g., Bass Fisherman's Association) and individual users, power consumers, industrial organizations, and local, regional and national chapters of environmental organizations (such as the Sierra Club). The primary outcome of the review process was a Lake Improvement Plan that will improve dissolved oxygen levels and water quality in TVA reservoirs.

No new reservoir projects have been proposed since the Duck River in the early 1970s. While the controversies surrounding the snail darter have not resurfaced, mussels have become the single biggest endangered species issue related to water impoundments in the region. In general, the loss of mussel species, however, has not received tremendous public attention.

Recently, the use of chemicals in the treatment of aquatic vegetation has generated public concern. Not only has the use of chemical treatments led to conflicts among user groups (such as anglers versus boaters), the general public has been concerned about water quality levels. In the past 2 years, public involvement has resulted in a shift away from TVA use of chemicals to other types of vegetation control including natural manipulation, control of lake levels, and mechanical harvesters.

(5) USDA Forest Service: In its forest planning efforts in the Southern Appalachians, the Forest Service has attempted systematically to broaden the set of interest groups and agencies involved in its decision-making processes. Among those involved have been: (1) representatives of federal, state, local, and tribal governments; (2) local and national representatives of environmental groups; (3) local and national representatives of forest industry groups; (4) owners of small sawmills, timber buyers, and various proponents of specific industries; (5) owners of nonindustrial private forest land; (6) representatives of a wide range of professional organizations; (7) members of forest recreation user groups; (8) hunters and fishermen; and (9) nonconsuming users of wildlife such as bird watchers and wildlife photographers.

Question 5:

What are the important attitudes and values that Southern Appalachian residents hold toward natural resources and ecosystem management?

Key Findings

Environmental Protection Remains An Important National Concern

Environmental concern remains high in the United States in the 1990s, but most Americans feel that environmental protection and economic growth can be compatible. When people must choose one over the other, their first choice is the environment. Most also feel that environmental protection has not gone far enough.

Americans view environmental groups favorably, but feel they as individuals do not make a significant difference. Southern Appalachian residents, for the most part, have even indicated willingness to put more personal funds toward collective environmental protection. About one-half feel the environment has gotten worse.

Regional Knowledge About Natural Resource Issues is Low, But Preferences Are Clear

Southern Appalachian residents exhibited moderately positive attitudes and values toward the natural resources of the region, but lacked objective knowledge about related issues. Overall, respondents held slightly stronger environmental attitudes toward fish, wildlife, aquatic, and air issues than toward forest practices and social issues. In addition, respondents were against increasing controls over tourism development and were equally divided over restrictions of second-home development. In contrast, most respondents felt the Endangered Species, Clean Water, and Air Quality Acts had not gone too far in their actions. They agreed that critical plant and animal habitat should not be developed and that protecting habitat for nongame fish was as important as protecting trout habitat. They were, however, in favor of stocking fish in streams and lakes to increase sportfishing opportunities.

Southern Appalachian Residents Have Relatively High Environmental Values

Compared with respondents to similar national surveys, Southern Appalachian residents seem to have somewhat higher environmental values (as scored on the New Environmental Paradigm Scale). Consistent with recent national public opinion polls, crime was rated the most important issue in America. Interestingly, however, more people were concerned about protecting the environment than about reducing the national debt. Respondents also exhibited more environmentally responsible behaviors (such as recycling and contributing money to environmental organizations) than national averages. Almost 60 percent of respondents indicated that they would "make personal sacrifices to protect" their local community and surrounding area, while only 25 percent indicated no attachment to the region.

Few significant and consistent differences in environmental attitudes, knowledge, values, and behaviors were found across the four subregions of the Southern Appalachians.

From the analysis to Question 3, we learned that local communities near public lands seek a voice and a balance in the management of natural resources. When considered in the larger context of all people living in the region, it becomes clearer why local communities are not just interested in their own economic welfare, but are also interested in protection and improvement of the resource. People living in the region, for the most part, lean toward having an improved environment and quality natural settings, rather than strict economic growth. While they do not have good knowledge of the specifics and technical aspects of environmental issues, it is clear that they support measures that will assure they and future generations will have a high quality environment to live and play in.

As agencies adjust management to better assure the health and sustainability of forest ecosystems, they are likely to have support from the people living in the region. As retirees, urban-based, and other new residents move into the region, concerns for the health and aesthetic appearance of the region's ecosystems are likely to strengthen.

Data and Methods of Analysis

Simple descriptive statistics from published sources were used to describe national attitudes toward environmental issues. Sources included national private and university polling firms, such as Roper, Times Mirror, Harris, Southern Focus polls, and the Carolina Poll index.

In addition, approximately 1,200 residents of the Southern Appalachian region were surveyed by telephone to assess their attitudes and values toward natural resource issues and management. Information about length of residence, sense of place, land ownership, environmental knowledge, environmental attitudes, environmental values, environmental behaviors, and socio-demographic background is reported.

Telephone interviews with residents of the region were conducted from August 11 to September 21, 1995, by the Human Dimensions Research Laboratory at the University of Tennessee. Individual respondents were selected from contacted households by asking for the individual in the household who had the most recent birthday. Telephone numbers for households were generated using the random-digit dialing method. A quota sampling procedure was used to generate equal sample sizes across two dimensions: subregion and residence. There were four subregions (as described earlier) and two levels of residence (urban and rural).

Approximately 150 responses were targeted for each cell (e.g., 150 rural residents and 150 urban residents) in the Northern Ridge and Valley subregion. Telephone call-backs were repeated until the targeted sample size per cell was reached. Telephone interviews took an average of about 15 minutes.

Frequencies, means, Chi-Square tests, and analyses of variance with a significance level of $p=0.05$ were used to examine differences between the subregions.

A total of 6,000 telephone numbers were generated during the data collection period. One-fifth were disconnected numbers and 9.7 percent were business or fax numbers. In total, 2,829 people were contacted. Of these 54.4 percent refused to participate in the survey and 1.8 percent terminated part-way through the interview. Final sample size was 1,220, and the response rate was 43.8 percent. Responses were distributed evenly across the four subregions, ranging from 304 to 306.

Detailed Results of the Analysis

Environmental Attitude Surveys in the United States

Environmentalism has become an important and seemingly enduring social phenomenon in America. A comprehensive review of national public opinion data reveals that environmental concerns peaked in 1990 (Dunlap 1992). In 1995, public concern for the environment remains high. A recent survey reports that only 2 percent of the American public reported being unsympathetic to the environmental movement (Times Mirror 1994). Furthermore, many Americans (52 percent) think the 1990s is the last decade when humans will have a chance to save the earth from environmental catastrophe (Times Mirror 1994). Furthermore, in 1994, 29 percent of the American public claimed to be active environmentalists; between 52 and 56 percent were sympathetic, but not active.

There are several important themes of American environmentalism. First, most opinion polls show that the great majority of Americans are concerned with the environment, and many Americans think environmental protection and economic growth can go hand-in-hand. A full 90 percent in 1994 believed we could find a balance that allows both economic progress and environmental protection. When a compromise between economic growth and environmental protection cannot be made, however, the public sides with the environment. Between 1992 and 1994, from 59 to 64 percent of the public reported that environmental protection was more important than economic development when a compromise could not be found (Times Mirror 1994).

Second, Americans continue to believe in regulatory action to protect the environment. In 1992, 63 percent of respondents reported that environmental laws and regulations had not gone far enough. In 1994, 53 percent of the public responded in that manner (Times Mirror 1994). Both percentages are far higher than the 33 percent in a 1980 Roper survey who thought environmental laws had not gone far enough.

Third, environmental groups and organizations are highly respected by the American public. A remarkably high percentage of Americans have a favorable view of environmental groups, and large numbers give money to such groups. A 1990 survey by Environmental Opinion (Dunlap 1992) found that two-thirds of the public agreed that "threats to the environment are as serious as the environmental groups say they are" and only one quarter said that "environmental groups are exaggerating these threats in order to get the public to pay attention to them." Similarly, a 1989 Business Week/Harris poll gave respondents a list of six groups and for each asked, "do you think they do more good than harm or more harm than good?" Seventy-five percent indicated that environmental groups did more

good than harm. Likewise, the Times Mirror survey (1994) reports that 74 percent of the public feels favorable toward environmental groups. These results reflect a high level of public identification with the environmental movement and indicate the high degree of credibility and legitimacy that environmentalism has attained in our society (Dunlap 1992).

While most Americans report high levels of commitment to the environmental movement, fewer feel they can make a big difference through their personal actions. Most Americans (56 percent) feel that their personal effort can make only a small difference when they try to protect the environment. Slightly more than a third (34 percent) think their effort can make a large difference.

In addition to surveys at a national level, some polls have been conducted in parts of the Southern Appalachians. During April 1992, 81 percent of a random sample of adult South Carolina residents reported that it was more important to maintain an acceptable water quality, than to increase the number of jobs in the State (University of South Carolina 1992). In the fall of 1993, 64 percent of a random sample of North Carolina adults agreed with the statement: "Protection of the environment should be given priority, even at the risk of curbing economic growth." Only 26 percent agreed that "Economic growth should be given priority even if the environment suffers to some extent" (University of North Carolina 1993).

During the spring of 1994, North Carolina residents were asked to evaluate whether they thought that the Sierra Club had gone "too far," "not far enough," or "does things just right" to protect the environment. The largest group responded that the Sierra Club was doing "just right" (32 percent), the second largest group felt that the Sierra Club was "going too far" (23 percent), and the smallest group (13 percent) felt the Sierra Club was "not going far enough" (University of North Carolina 1994).

During April 1989, the Atlanta Journal-Constitution Poll (Morris 1989) asked a cross-section of southern census region adults if they would pay an additional $100 each year if it would help to clean the environment. Exactly 50 percent responded "yes" they would pay an additional $100 each year in taxes if it would help to clean the environment and 39 percent responded "no" they would not. The poll also asked if they would be willing to pay a higher price for gasoline, if the money collected would be allocated solely to clean up the environment. Forty-seven percent indicated that they would pay the higher price, while 43 percent indicated that they would not be willing to pay the higher price (Morris 1989).

During October 1993, a cross-section of southern census region adults, as well as a cross-section of nonsouthern census region adults, were asked if they felt that the environment where they lived had become better, worse, or had stayed about the same in the last 10 years. Forty-eight percent of the southerners responded that they felt the environment had gotten worse in the last 10 years as opposed to 43 percent of nonsoutherners. Thirteen percent of southerners thought the environment in their area had gotten better, while 19 percent of the nonsouthern sample thought the environment in their area had gotten better (University of North Carolina 1993).

A review of national and regional environmental attitudes reveals that concern for environment is at an all time high, that a majority of Americans favor environmental protection over economic growth but feel both can be provided, that trust in environmental organization is high, and that most people believe in the value of environmental regulations.

Environmental Knowledge and Attitude Survey of Southern Appalachian Residents

Residence. Almost 96 percent of respondents were year-round residents of the region, and 61.3 percent had lived there all their lives (mean = 43.5 years). Of those who had lived in the region all their lives, their family (including ancestors) had been in the region for an average of 81.8 years. Of those who had not lived there all their lives, the mean length of living in the region was 16.9 years.

There were no significant differences across the four regions in terms of length of residence and ancestral residence. However, there were significantly fewer respondents who were year-round residents in the Southern Mountain and Piedmont subregion than in other subregions. Also, for nonnatives, length of residence in the region was significantly higher in region 3 than other regions.

Sense of Place. Public lands have both utilitarian and emotional values. Sense of place

refers to the emotional attachments people have with a place or landscape (Mitchell and others 1993). Understanding people's attachment to place, particularly in rural communities, is considered important because of the loss of culture or meaning often associated with economic change and development in these communities. Such change might include a shift from an extractive economy to a tourism economy (Mitchell and others 1993; Williams and others 1995). Using a place attachment scale developed by Williams and others (1992), respondents to this survey were asked a series of questions about ties to their local community. Local community was defined as "the surrounding area in which you now live." Since the Williams and others scale measured attachment to a single site (Mt. Rogers Recreation Area in Virginia) as opposed to attachment with unique communities, comparisons with results of this survey were not possible.

Most people (67.6 percent) felt "emotionally attached" to their local community: of these 58.1 percent had very strong ties to their community, indicating that they would be willing to "make personal sacrifices to protect this place." Over one-quarter of all respondents, 25.6 percent, had a negative attachment to their community indicating they "would rather live somewhere else", "have no particular love for this place," or "did not feel like they were from this place". Eight percent had neither a positive nor a negative attachment. There were no significant differences across the four subregions for place attachment.

Rural Land Ownership. Four questions were selected from the 1995 National Private Land Ownership Study (NPLOS) to measure rural land ownership in the region. Two hundred and forty-nine respondents (20.5 percent) owned tracts of rural land of 10 acres or more in the region (average size = 75.1 acres and mean number of years owned was 20.0). Most either intended to "improve the natural conditions of the land and not [use it] as a source of income" (48.3 percent) or "improve the natural condition of the land and use the land as a source of income" (39.9 percent). Only 11.8 percent intended to "use the land primarily as a source of income." Again, there were no significant differences across the four subregions in land ownership, total acreage, years owned, or intent of land use.

Environmental Knowledge. National surveys have shown the public has only low to moderate knowledge about environmental issues. For example, the National Science Board (1993) reported that when asked about acid rain issues, less than one-quarter of U.S. citizens correctly answered questions about location of the ozone hole or knew that car exhaust fumes contribute to acid rain. Supporting previous studies, respondents to the Southern Appalachian survey also demonstrated very low levels of knowledge about issues such as timber harvesting, fish and wildlife, water pollution, and wilderness.

When asked how well informed they thought they were about environmental issues in the region, most respondents (64.2 percent) reported they were at least "moderately informed." However, when asked to respond to 14 objective questions about specific environmental issues (on a "true," "false," "don't know" scale), they performed slightly poorer than someone who would simply have guessed the answers. The mean number of correct scores across all 14 knowledge items was 5.9 (a range of 0 to 14, standard deviation of 2.5). Simply guessing (i.e., providing a random response) to each question would have yielded a mean correct score of 7.0.

Table 2.17 shows the percent of correct and incorrect responses per question. Overall, more than half of the respondents knew that both plants and animals are listed on the Endangered Species list, that the region experiences air pollution, that tourism is a significant employer in the region, and that the Forest Service has reduced clearcutting in the region over the past few years. However, less than one-third knew that rainbow trout are not native to the region and that timber harvesting and motor vehicles are not permitted in federal wilderness.

Environmental Attitudes. Table 2.18 shows the percent of respondents who "agreed," "disagreed," or "neither agreed nor disagreed" with 16 attitude items. Overall, respondents exhibited slightly more of a positive (than negative) attitude toward environmental issues in the region.

Forest issues: Overall, respondents support harvesting dead and downed trees, but were against the use of fire as a management tool, a landscape of "brown and dead trees," and increasing timber harvesting on national forests. Slightly more respondents were against

Table 2.17 Percent of correct and incorrect responses to 15 environmental knowledge questions.

Knowledge Item	Correct Response	True	False	Don't Know
After a forest fire it usually takes 10 to 15 years before the first signs of plants and animals are found.	False	26.1	49.1	24.8
Both plants and animals are included on the T&E Species List.	True	72.3	12.6	15.1
A threatened species is one that is near extinction.	False	69.5	16.6	13.9
In Southern Appalachia, more animals and fish are killed through hunting and fishing than removal of habitat.	False	37.5	38.9	23.7
In Southern Appalachia, more species of fish, crayfish and mussels are T&E than species such as bear and wolves.	True	43.7	21.8	34.5
Rainbow trout are native in Southern Appalachia.	False	51.6	18.6	29.8
The most common pollutant of water is carbon monoxide.	False	23.1	41.9	35.0
Southern Appalachia is one place in the U.S. that does not experience air pollution.	False	9.8	80.0	10.2
Tourism is one of the largest employment industries in Southern Appalachia.	True	59.3	22.4	18.3
Timber harvesting is permitted in federally designated wilderness areas in the Southern Appalachia.	False	50.8	17.6	31.6
Motor vehicles are permitted in federally designated wilderness areas in Southern Appalachia.	False	59.7	17.3	23.0
User fees are charged to hike and camp on National Forests in Southern Appalachia.	False	47.6	30.9	21.5
Timber harvesting is permitted on National Forests in Southern Appalachia.	True	45.4	28.4	26.2
Over the past few years, the Forest Service has reduced the amount of clearcutting on national forests.	True	52.0	14.3	33.8
Most old-growth timber is on private lands.	False	35.5	34.0	30.5

(Source: Southern Appalachian Region Residents Survey, joint study betweenUSDA Forest Service and University of Georgia, Athens, GA)

(versus in favor of) increasing timber harvesting on private lands.

Terrestrial issues: Almost twice as many respondents disagreed with the statement that "the Endangered Species Act had gone too far" than agreed. They also supported not developing critical habitat. While more than one-half felt that it was as important to protect habitat for nongame fish as for trout, over 60 percent supported stocking fish in streams and lakes to increase sportfishing opportunities.

Aquatic and air issues: A large majority (83 percent) agreed that polluting industries should pay water clean-up costs, even if it means a loss of jobs or profit. Most felt that the Water Quality and Air Quality Acts should not be restricted.

Social issues: Respondents were evenly divided on whether there should be more restrictions on second-home development. Slightly more people were against restricting tourism development (51 percent) than were in favor (38 percent). Over two-thirds supported charging a recreation user fee on national forests and increasing the amount of wilderness in the region.

Subregional analysis: Of the 16 attitude items, only 5 were significantly different among the subregions. Overall, respondents in the Southern Mountain and Piedmont subregion had less positive attitudes toward charging recreation user fees and increasing the amount of and using fire as a forest management tool. They had more positive attitudes about increasing the harvest of downed and dead trees, than respondents in other regions.

Table 2.18 Percent of respondents who "agreed," "disagreed," or "neither agreed or disagreed" with 16 environmental issues in the region.

Attitude Toward Issues in the Southern Appalachian Region	Agree	Neither	Disagree
Forest issues			
It is OK if parts of the landscape are brown and consist of dead trees.	25.2	6.2	68.5
There should be more harvesting of dead and downed trees.	70.0	7.3	22.8
Using fire as a management tool in National Forests is a good idea.	32.1	8.6	59.3
There should be more timber harvesting of private forests.	35.8	17.7	46.5
There should be more timber harvesting of National Forests.	17.6	10.3	72.1
Terrestrial issues			
Land that provides critical habitat for plants and animals should not be developed.	72.5	4.7	22.5
The Endangered Species Act has gone too far and should be restricted.	33.6	8.9	57.5
It is more important to protect habitat for trout than non-game species.	29.3	17.7	53.0
More fish should be stocked in streams and lakes to provide increased sportfishing.	62.8	12.8	24.4
Air and water quality issues			
Industries which pollute the water and air should pay for the clean-up even if it means the loss of jobs or profit.	83.5	6.9	9.6
The Water Quality Act has gone too far and needs restricting.	17.2	9.1	73.7
The Air Quality Act has gone too far and needs restricting.	15.2	6.7	88.1
Social issues			
There should be more restrictions on second-home development.	41.7	18.8	39.5
There should be more controls on tourism development.	38.3	11.1	50.6
More public land should be set aside as wilderness.	68.6	7.1	24.3
There should be a user fee to recreate on national forests.	67.6	5.0	27.4

(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

Environmental Values. Has the environment gotten better or worse? Respondents were evenly split in their perceptions of whether the environment has become worse (41.5 percent) or stayed about the same (43.4 percent) in the past 10 years. These results are similar to a 1993 Harris Survey of adults in the United States, which found that 44.5 percent and 41.6 percent, respectively, thought the environment had become worse or stayed the same. There were no significant differences across the four subregions.

The environment versus other social issues: A May 22, 1995, USA Today national poll of adults found crime to be the major social issue facing America today. Southern Appalachian respondents were also more concerned about reducing crime (mean score = 3.0) than health care, the environment, and the national debt. However, people in the region were as concerned with protecting the natural environment (mean = 2.5) as with reforming national health care (mean = 2.6). They demonstrated less concern for reducing the national debt (mean = 2.2).

The new environmental paradigm: Over the past two decades, the New Environmental Paradigm Scale (NEP) (Dunlap and Van Liere 1978) has become popular for measuring public environmental values in the United States.

Table 2.19 Mean scores on dimensions of the New Environmental Paradigm (NEP) Scale by Southern Appalachian region, Washington state, and Kentucky residents.

	Mean Score[1]		
NEP Dimensions	Southern Appalachian Residents	Washington Residents	Kentucky Residents
Balance of nature	12.81	12.84	12.10
Limits to growth	11.60	12.00	10.60
Humans over nature[2]	11.16	11.45	9.75

[1]Scale of scores = 4 to 20

[2]Items in the "Humans over nature" dimension were reverse scored

(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

The NEP is a 12-item scale that purports to measure three dimensions of environmental values: limits to growth, balance of nature, and a nonanthropocentric view of nature (Miles and others 1993). Table 2.19 compares mean scores for each of the three dimensions from the regional survey with results of a recent study of Kentucky residents (Christianson and Arcury 1992) and a study of Washington State residents (Dunlap and Van Liere 1978). Findings show that Southern Appalachian respondents hold stronger environmental values than Kentucky residents, but weaker values than people in Washington. No significant differences were observed across the four subregions.

Environmental Behaviors. Overall, a high proportion of Southern Appalachian respondents indicated they participated in environmentally responsible behaviors (table 2.20). In the past couple of years, over 85 percent had recycled, taken into account the amount of packaging when purchasing goods, and/or watched television shows and read books about the environment. In addition, over one-third had contributed money to an environmental organization, had participated in a clean-up drive, or had voted for a public official because of the candidate's pro-environmental stance. One of the most surprising findings was that over one-half (52.5 percent) had participated in a clean-up drive in the past couple of years.

Southern Appalachian respondents also report higher levels of environmental behaviors than the national average. A national sample of adults in 1990 by the Roper Organization (Schwartz and Miller 1991) showed only 46 percent recycled goods (compared with 59.7 percent who often recycled in our survey), only 8 percent contributed money to environmental organizations (compared with 40.2 percent in our survey), and only 4 percent had written to politicians (compared with 24.7 percent in our survey who had written or called a politician).

Table 2.20 Percent of respondents who had participated in environmental behaviors in the past couple of years.

Environmental Behaviors (past couple of years)	Yes	No
Recycled paper, plastics or glass	91.9	8.1
Taken into account the amount of packaging on goods bought	85.6	14.4
Switched products because of environmental reasons	77.1	22.9
Car pooled to work	32.7	67.3
Watched t.v. shows about the environment	94.6	5.4
Read books about the environment	91.1	8.9
Written or called a public official about an environmental issue	24.7	75.3
Subscribed to environmental publications	28.3	71.7
Attended meetings on environmental issues	24.0	76.0
Contributed money to an environmental group	40.2	59.8
Participated in a clean-up drive	52.5	47.5
Voted for a public official because of their proenvironmental stance	36.6	63.4

(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

Table 2.21 A comparison of socio-demographic background in the Southern Appalachian region survey with the 1990 Census.

Socio-demographic background	1990 Census	Southern Appalachian Survey
	(percent of respondents)	
Gender		
Male	48.3	39.3
Female	51.7	60.7
Residence		
A farm	2.1	8.9
A rural area	54.0	58.8
Suburb	15.9	18.4
City	27.8	14.1
Education levels		
Less than high school	25.8	12.4
High school graduate	23.2	28.4
Some college	13.4	26.2
College graduate	6.8	21.4
Post-graduate	3.3	11.6
Household income		
Under $15,000	30.3	16.5
$15,000 - $24,999	20.2	18.2
$25,000 - $34,999	17.0	20.1
$35,000 - $44,999	12.3	14.0
$45,000 - $54,999	7.9	12.4
More than $55,000	12.3	10.7

(Source: Southern Appalachian Region Residents Survey, joint study between USDA Forest Service and University of Georgia, Athens, GA)

Regional analysis: Of the 12 environmental behaviors, only 4 significantly differed between the four subregions. In all cases, Southern Mountain and Piedmont subregion respondents were most likely to watch tv shows about the environment, write or call a public official, subscribe to environmental publications, and (along with respondents of the Northern Ridge and Valley subregion) contribute money to environmental groups.

Socio-demographics. Table 2.21 compares socio-demographic variables from our survey with the 1990 census. Discrepancies between the sample data and the population data exist because of the quota-sampling procedure used in our survey. Respondents to our survey were more likely to be female and have higher education and income levels than the 1990 census.

Question 6:

With particular emphasis on tourism and extractive and other resource-dependent industries, what are the important economic trends in the Southern Appalachians?

Key Findings

The Southern Appalachian Economy During the 1980s

Between 1977 and 1991, the economy in the Southern Appalachians grew more slowly than the economy of the seven states that include the study region. Industrial output in the region grew 42 percent during those 15 years, while output in the seven-state area grew 54 percent. Employment grew 65 percent in the Southern Appalachians, but 76 percent in the seven-states. Slower growth in the region is probably a result of its predominately rural character.

Economic Gains to Individuals Were Significant

Real per-capita income in the study area increased by 1.9 percent per year between 1970 and 1980. The increase from 1980 to 1990 was less than 1 percent per year. Concomitantly, poverty declined dramatically during the 20 years since 1970. The proportion

of families below the poverty level decreased from 20 percent in 1970 to 11 percent in 1990. Unemployment in 1990 also was lower than in the 1980s. Having had a large share of its employment in manufacturing has seemed to make the region more vulnerable to general economic contractions in earlier decades. The unemployment rate by 1990 decreased to about 5.6 percent, a rate that today is considered "full employment."

The Region's Economy is Now More Diversified

Growth in real wages in the region was 25 percent over the 14 years between 1977 and 1991. Real wages in the surrounding seven-state area increased 27 percent over this period. Very slow growth in real wages plagued the entire national economy during the last decade.

The Southern Appalachian economy also became more diversified between 1972 and 1991 with manufacturing's share of industrial output decreasing from 52 to 40 percent. Still, manufacturing's share of the region's economy is relatively high. For the nation as a whole, manufacturing represents only about 19 percent of the total economy's output. The service and trade sectors grew significantly in the region, adding diversity and stability.

The increased diversity of the regional economy will make business recessions and related increases in unemployment less severe. Community cohesion could rise because shocks to the economy will be less traumatic. People generally will have more money for leisure activities.

Data and Methods of Analysis

Industries in the region were grouped by 2-digit SIC codes to create the 10 basic sectors of the region's economy. Particular attention was given to extractive and manufacturing industries directly linked to natural resources, such as mining, forest products and wood-products manufacturing, as well as to services and other indirectly linked industries. Significant timber- and mining-dependent areas were identified. Trends were tracked for employment, employee compensation, and industrial output data from 1977 to 1991. Relative shares of the economy were calculated and contrasted between time periods to establish trends. Data were obtained from the Forest Service IMPLAN input-output system.

Detailed Results of the Analysis: Economic Trends, 1970-1990

Between 1977 and 1991, the region's economy became less reliant on manufacturing and more dependent on services and trade. This increase in industry diversity should have helped to stabilize the region's economy. Such trends may at the same time have resulted in growth of low-wage jobs at a pace faster than is typical of manufacturing jobs.

The three economic variables chosen to measure trends in economic activity are: (1) employee compensation, (2) employment, and

Table 2.22 Percentage shares of employment, employee compensation and total industrial output across 10 sectors of the Southern Appalachian region economy, 1977 and 1991.

	Employment		Employee Compensation		Total Output	
Major Sectors	1977	1991	1977	1991	1977	1991
Agriculture, forestry & fisheries	1.8	3.6	0.8	0.6	3.0	3.3
Mining	1.4	0.6	3.6	1.1	3.4	2.9
Construction	7.6	7.4	8.8	6.6	8.0	9.2
Manufacturing	35.8	22.6	38.4	30.4	52.2	39.8
Transportation, communication, & utilities	3.7	3.8	5.4	5.2	5.3	5.8
Wholesale & retail trade	14.8	20.4	11.6	15.2	8.9	9.6
Finance, insurance, & real estate	3.0	5.2	3.3	4.6	8.4	8.8
Services	15.3	21.6	11.4	19.1	9.2	13.3
Government enterprises	14.7	13.8	16.2	16.9	1.5	7.0
Special industries	1.9	1.0	0.6	0.3	0.0	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

Table 2.23 Average annual wages by industrial sector for the Southern Appalachian region and the seven–state region, 1991.

Aggregated Sector	Average Annual Wage	
	Southern Appalachian Region	Seven Surrounding States
Agriculture, forestry & fisheries	$10,700	$13,400
Mining	41,000	44,700
Construction	21,100	22,400
Manufacturing	26,300	28,200
Transportation, communication, & utilities	28,900	33,100
Wholesale & retail trade	15,600	17,600
Finance, insurance, & real estate	16,000	17,600
Services	21,500	22,800
Government enterprises	22,800	25,100
Special industries	6,100	6,500
Overall Average	21,100	22,700

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

(3) value of total industrial output. All dollar values are in 1991 dollars. Table 2.22 contrasts the economy between 1977 and 1991 across 10 broad sectors and shows each sector's share of employment and output.

Mining and manufacturing's share of the economy decreased across all three measures of economic activity (employment, employee compensation, and total industrial output). In the agriculture, forestry, and fisheries sector, total output and employee compensation barely increased between 1977 and 1991.Employment in the agricultural sector is not comparable between 1977 and 1991 because 1977 data do not include self-employed persons. Percentages of the region's total output from construction, services, and government enterprises rose substantially from 1977 to 1991. Outputs from agriculture, transportation, communication, utilities, and finance remained relatively constant.

Manufacturing lost more of its share of the economy than any other sector. In absolute terms, its share decreased from 36 to 23 percent of total employment, from 38 to 30 percent of employee compensation, and from 52 to 40 percent of total output.

Services and wholesale and retail trade increased their shares of the economy significantly. Their shares of employment increased by 7 and 5 percent, respectively. Their shares of employee compensation increased by 8 and 3 percent, but their shares of total output increased by only 4 and less than 1 percent, respectively.

In addition to the percentage distribution of the economy across the 10 sectors, total dollar amounts of employee compensation and output between 1977 and 1991 were examined for the region and for the surrounding seven-state area.

Whereas overall industrial output increased 42 percent between 1977 and 1991 for the Southern Appalachian region, output in the surrounding seven states increased 54 percent. Employee compensation increased by 25 percent in the Southern Appalachians, but by 27 percent in the seven surrounding states. Similarly, employment increased 65 percent in the region compared with 76 percent in the seven-state area.

Among all sectors, the services, trade, finance, and transportation sectors grew the most. Although manufacturing grew moderately in employment and output, it actually decreased in real value of output after adjustment for inflation.

Table 2.23 shows 1991 average wages and salaries for employees and proprietors, both for the Southern Appalachians and for the seven surrounding states. The 1991 average income was $21,000 for the Southern Appalachians and $22,700 for the surrounding states. The mining sector had the highest average wage in the region at $41,000. Transportation, communications, and utilities was the second highest, but much lower than mining, at $28,900. Manufacturing was third at $26,300. Data for calculating average sectoral wages for 1977 were not available.

Table 2.24 Shares of Southern Appalachian region employment, employee compensation, and total industrial output by wood products sectors, 1977 and 1991.

	Employment		Employee Compensation		Total Industrial Output	
	1977	1991	1977	1991	1977	1991
Wood Products Sector	(percent of economy)					
Primary wood products	0.9	0.7	0.9	1.1	1.5	1.4
Secondary wood products	3.4	2.7	3.2	3.1	3.7	3.8
Total	4.3	3.4	4.1	4.2	5.2	5.2

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

The Wood-Products Industry

Between 1977 and 1991, the shares of total Southern Appalachian economic output contributed by primary and secondary wood processing industries remained almost constant (table 2.24).

While their share of regional employee compensation increased, the employment share dropped from 1977 to 1991. Shares of employment dropped significantly because other sectors of the economy grew at faster rates during these years.

Even though regionwide shares largely remained constant or dropped, table 2.25 shows that all three measures of economic activity increased between 1977 and 1991 in the wood using industries. Although wood manufacturing output grew faster in the secondary industries, employee compensation in primary industries increased almost twice as fast as the secondary industries. Employment grew at about the same rate for primary and secondary wood manufacturing.

Counties were identified as timber-significant if 80 percent or more of their total land area was in timberland or national forest (fig. 2.26). Table 2.26 compares employment, employee compensation, and industrial output from 1977 to 1991 for wood-products industries in the three timber-significant areas thus identified in the region. As in the whole region, wood-products manufacturing's shares of the economies of the three timber-significant areas declined between 1977 and 1991.

Table 2.25 Value of and change in economic activity in Southern Appalachian region wood manufacturing sectors, 1977-1991.

Industry Sector	1977 (million $)	1991 (million $)	Change (%)
Primary Wood Manufacturing:			
Employment	16,992	21,916	29
Total industrial output	2,106	2,898	38
Employee compensation	453	662	46
Secondary Wood Manufacturing:			
Employment	66,101	86,160	30
Total industrial output	5,340	7,696	44
Employee compensation	1,513	1,844	22

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

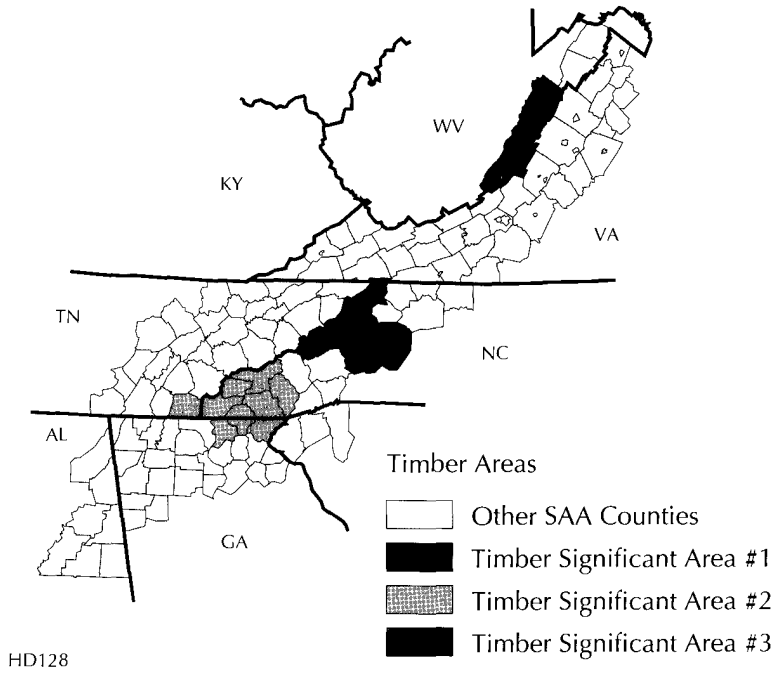

Figure 2.26 Timber Significant Areas in the Southern Appalachians (Source: USDA Forest Service, Southern Research Station). Three timber significant areas, those in which timberland comprised 80 percent or more of the land, were found in the region.

Table 2.26 Wood products as shares of the economies of the Southern Appalachian region as a whole of the three timber-significant areas, 1977 and 1991.

Wood Products Sectors and Timber–Significant Areas	Employment		Employee Compensation		Total Industrial Output	
	1977	1991	1977	1991	1977	1991
	(percent of economy)					
Primary Wood Products Manufacturing						
Area 1	2.5	1.9	2.3	1.6	3.5	3.2
Area 2	1.7	0.9	1.4	1.0	2.1	1.3
Area 3	1.1	0.7	0.8	0.6	1.0	0.7
Region	0.9	0.7	0.9	1.1	1.5	1.4
Secondary Wood Products Manufacturing						
Area 1	0.2	1.0	0.1	2.0	0.2	2.4
Area 2	4.3	2.0	4.6	2.5	4.3	3.4
Area 3	19.4	12.8	20.4	14.7	19.4	12.2
Region	3.4	2.7	3.2	3.1	3.7	3.8
Total Wood Products Manufacturing						
Area 1	2.7	2.9	2.4	3.6	3.7	5.6
Area 2	6.0	2.9	6.0	3.5	6.4	4.7
Area 3	20.5	13.5	21.2	15.3	20.4	12.9
Region	4.3	3.4	4.1	4.2	5.2	5.2

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

Table 2.27 Employment, employee compensation and output from wood manufacturing in three timber-significant areas and in the Southern Appalachian region, 1977-1991.

	Employment			Employee Compensation			Output		
	1977	1991	Change	1977	1991	Change	1977	1991	Change
	(number)		(%)	(million $)		(%)	(million $)		(%)
Primary Wood Manufacturing									
Area 1	123	235	91	2.3	3.3	43	10.8	22.9	112
Area 2	588	657	12	10.1	10.4	3	50.0	51.1	2
Area 3	913	1,098	20	13.7	17.0	24	62.9	75.6	20
Region	16,992	21,916	46	453.0	662.0	46	2106.0	2898.0	38
Secondary Wood Manufacturing									
Area 1	11	121	1100	.1	4.0	4000	0.6	17.7	2950
Area 2	1,485	1,401	-6	34.0	25.4	-25	104.3	130.1	25
Area 3	16,833	20,264	20	369.1	401.3	9	1189.7	1389.3	17
Region	66,101	86,160	30	1513.0	1844.0	22	5340.0	7696.0	44

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

Table 2.27 shows real economic changes from 1977 to 1991. Real growth in wood-products manufacturing was greater in the Southern Appalachians as a whole than in timber-significant areas 2 and 3. Area 1 had substantial growth, but values of output for both years were much smaller than for the other two areas. Between 1977 and 1991, employment and employee compensation declined in area 2.

Between 1977 and 1991, mining's share of the region's economy decreased (table 2.28). While mining's shares decreased for employment (from 2.0 to 1.1) and employee compensation (from 5.8 to 2.0), its share of output (5.6 percent) remained constant between 1977 and 1991.

A further analysis identified 23 counties in which mining provides a significant payroll. Even in the counties with significant mining activity, mining as a share of the economy was small. Coal mining, the most significant of the mining industries, decreased in these counties as a percentage from 1977 to 1991. Coal mining output decreased by 50 percent.

Tourism is not a recognizable separate economic sector. Rather, it is a consumer activity that affects several industrial sectors. The following sectors were assumed to be tourism related: hotels, amusement services, air travel, bus and taxi services, retail trade, restaurants, gas stations, and services such as laundry and auto rental. Dr. Gordon McClung of West Virginia University has estimated the percentage of business stimulated by tourism within each of the above sectors. These percentages were used to estimate direct tourism effects for the region and are reported in table 2.29. The estimates do not capture the full effects of tourism throughout all sectors of the economy.

Table 2.28 Percent of regional total employment, industrial output, and employee compensation in mining, 1977 and 1991.

	Share of Regional Total	
Economic Measure	1977	1991
Variable:		
Employment	2.0	1.1
Total industrial output	5.6	5.6
Employee compensation	5.8	2.0

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

Table 2.29 Trends in direct employee compensation, employment, and total industrial output for tourism industries in the Southern Appalachian region, 1977 and 1991.

	Totals			Percent of the Region's Economy	
	1977	1991	Trend	1977	1991
	(million $ and jobs)		(%)	(%)	(%)
Employee Compensation (wages)	710	631	–11	1.5	1.1
Total Industrial Output (dollars)	1,889	1,643	–13	1.3	0.8
Employment (jobs)	31,742	63,115	99	1.6	2.0

(Source: ES202 Data, 1993, Bureau of Labor Statistics, U.S. Department of Labor; County Business Patterns, 1993, Bureau of the Census, U.S. Department of Commerce; Regional Economic Information System (REIS), 1993, Bureau of Economic Analysis, U.S. Department of Commerce; Bureau of Economic Analysis (estimates) and other surveys, 1993, U.S. Department of Commerce)

Tourism's direct share of Southern Appalachian regional employee compensation and output decreased between 1977 and 1991 (table 2.29). Total employee compensation and industrial output decreased by 11 and 13 percent, respectively, in real dollars. Meanwhile, numbers of employees, many of them part-time or seasonal, doubled.

Question 7:

What are the status of and the priorities for management of private land by non-industrial owners in the region?

Key Findings

Forested and Cultivated Private Land Have Decreased Slightly

The Southern Appalachian region encompasses over 37 million acres, just under 75 percent of which is rural and privately owned. Of these 28 million private acres, almost 19 million are in forest. Forested private land in the region has declined by about 220,000 acres since 1982. Pasture and cropland have decreased. Developed acreage, on the other hand, has increased by more than 600,000 acres.

Agriculture, Forestry, and Recreation Are Major Reasons for Owning

More than three-fourths of private forest land is owned by individuals. Corporations, partnerships, clubs and associations own the remainder. As expected, agriculture and timber harvesting are the overwhelming primary commodity uses of private undeveloped land. Recreation is the dominant noncommodity use. Raising livestock, recreation, enjoyment of a rural lifestyle, and having green space are most often listed as important reasons for owning land in the Southern Appalachians.

Earning Income is Not a High Priority on Private Lands

Income-earning potential of private, nonindustrial forest land in the Southern Appalachians appears to be limited. More than half of owners reported either a net loss or no income from activities on their property. About 30 percent said they earned in excess of $5,000. Many more owners place higher priority on the natural condition of their land than on making money from it. Generally, Southern Appalachian owners are environmentally oriented. Their attitudes are much like those of the general populace as reported in answer to Question 5.

Data and Methods of Analysis

Two primary and two secondary sources of data were analyzed to describe private owners and their holdings in the Southern Appalachians. The primary sources were two mail surveys of private landowners across the United States. The extensive questionnaires covered a variety of issues related to land ownership use and priorities. Responses returned from Southern Appalachian landowners were used from each study.

The first primary source was the 1995 National Private Land Ownership Study (NPLOS) developed in Athens, GA, by the Forest Service, Forestry Sciences Laboratory

and the University of Georgia. The NPLOS database includes information on a sample of private rural landowners in the Southern Appalachians. The second primary source was the 1994 National Private Forest Lands Study developed by the Forest Service at the Northeastern Forest Experiment Station at Radnor, PA. These data describe owners of private forest land and contain a sample of 520 owners in the region.

The secondary data sources included the 1992 National Resources Inventory (NRI) developed by the Natural Resources Conservation Service, formerly the Soil Conservation Service. The NRI, conducted every 5 years, describes rural, nonfederal land and land uses. The Forest Service's FIA data describe the nation's forest lands. Data are updated periodically, one state at a time. County-level data were used from all of the above data sets.

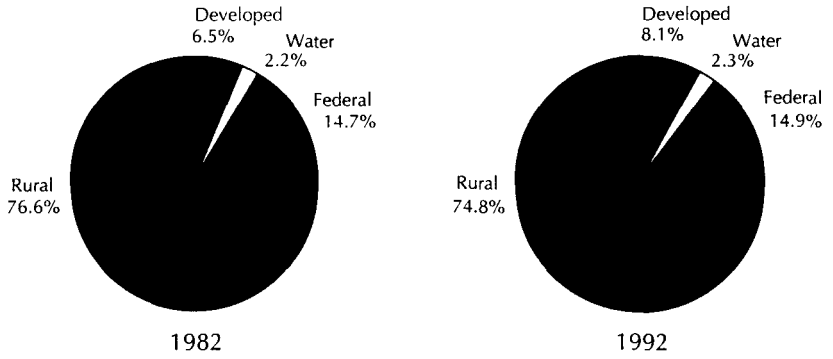

Figure 2.27 Percentage of land distribution in Southern Appalachian region, 1982 and 1992. (Source: 1992 National Resources Inventory, Natural Resources Conservation Service, USDA)

Table 2.30 Surface areas of nonfederal and federal land and water in the Southern Appalachian region, 1982, 1987, and 1992 (thousands of acres).

Year	Federal Land	Water Area	Nonfederal Land			Total Area
			Developed	Rural	Total	
1982	5,499.6	836.3	2,425.6	28,692.2	31,117.8	37,453.7
1987	5,522.0	840.6	2,726.5	28,364.6	31,091.1	37,453.7
1992	5,567.3	846.3	3,042.1	27,998.0	31,040.1	37,453.7

(Source: 1992 National Resources Inventory, Natural Resources Conservation Service, USDA)

Table 2.31 Current status and trends in Southern Appalachian region lands, 1992.

Region	Developed (million acres)	Change Since 1982 (%)	Rural, Nonfederal (million acres)	Change Since 1982 (%)	Total (million acres)
Northern Ridge & Valley	269.7	20.6	3,990.4	–1.4	5,526.2
Blue Ridge	897.9	26.9	7,778.0	–2.9	10,864.8
Southern Ridge & Valley	1,142.4	24.8	10,140.3	–2.3	12,928.1
Southern Mountains & Piedmont	732.1	26.5	6,089.3	–2.7	8,134.6
Region Totals	3,042.1	25.4	27,998.0	–2.4	37,453.7

(Source: 1992 National Resources Inventory, Natural Resources Conservation Service, USDA).

Results of the Analysis

Current Status of Private Rural Land

The region's 135 counties contain over 37 million acres (58,521 square miles) an area roughly the size of Georgia. Rural, private land accounts for nearly three-fourths of that area (fig. 2.27). This proportion is down from almost 77 percent in 1982, a decrease of about 694,000 acres. Federal holdings increased slightly over that 10-year period, but the greatest gain was in urban and developed land. The NRI defines developed land as small to large urban and other built-up areas, including both urban and rural roads. Developed areas increased by about 617,000 acres, a 25-percent increase between 1982 and 1992 (table 2.30).

The growth of developed land and the concurrent decline in private rural acreage was most pronounced in the Blue Ridge subregion, followed closely by the Southern Mountain and Piedmont subregion. Table 2.31 describes the status of private rural land across the four subregions in 1992.

Over two-thirds of the private rural acreage of the region is forested (fig. 2.28). The proportions of land in forest, crops, and pasture have changed little since 1982. However, total acreages in both rural forest and cropland declined during this period because of development (table 2.32). Cropland acreage dropped by almost 300,000 acres, more than the loss of just over 200,000 acres of forest land. The loss of cropland was 12.4 percent, while the loss of forest was 1.1 percent. The loss of cropland was particularly severe in the Blue Ridge and Southern Mountain and Piedmont subregions, where development pressures have been particularly high. Rates of change in those two subregions were more than double those of the other two subregions. The decline in forest land was also proportionally greater in these two subregions.

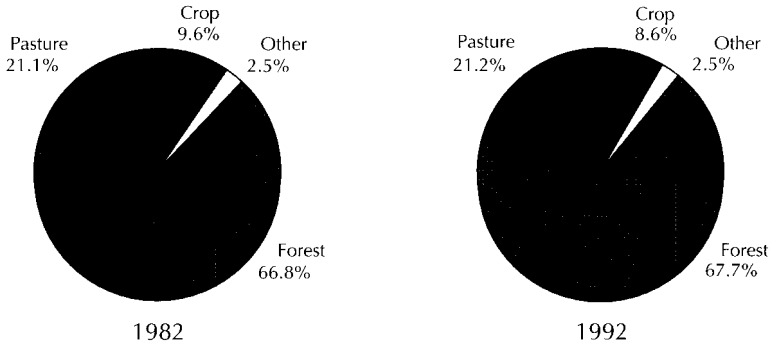

Figure 2.28 Percent of nonfederal rural land in the Southern Appalachian region by type of cover or use, 1982 and 1992. (Source: 1992 National Resources Inventory, Natural Resources Conservation Service, USDA)

Table 2.32 Current status and trends in cover and use of nonfederal rural land in Southern Appalachian subregion, 1990.

	Acreage by Type of Use						
Subregion	Crop (million)	Change Since 1982 (%)	Pasture (million)	Change Since 1982 (%)	Forest (million)	Change Since 1982 (%)	Total (million)
Northern Ridge & Valley	470.7	–7.2	925.1	–6.8	2,464.7	0.8	3,990.4
Blue Ridge	666.1	–18.0	1,537.8	–1.3	5,408.6	–1.7	7,778.0
Southern Ridge & Valley	880.1	–7.2	2,567.7	–0.4	6,439.4	–0.9	10,145.3
Southern Mountains & Piedmont	389.4	–18.6	914.5	–1.9	4,642.4	–1.9	6,089.3
Total	2,406.3	–12.4	5,945.1	–1.9	18,955.1	–1.1	28,003.0

(Source: 1992 National Resources Inventory, Natural Resources Conservation Service, USDA)

Table 2.33 Acreage and percentage of nonfederal rural land by type of use and primary and secondary designation, 1992.

Type of Land Use	Acreage in Primary Use (million)	Acreage in Primary Use (% of total)	Acreage in Secondary Use (million)	Acreage in Secondary Use (% of total)
Agricultural	27,393.8	95.0	3,108.7	23.8
Recreation	471.7	1.6	9,844.7	75.2
Reserved, dedicated	399.6	1.4	12.4	0.1
Business/commercial	390.2	1.4	54.1	0.4
Transportation	122.2	0.4	25.4	0.2
Residential	57.0	0.2	36.1	0.3
Waste	9.8	0.0	6.1	0.0
Region total	28,844.3	100.0	13,087.5	100.0

(Source: 1992 National Resources Inventory, Natural Resources Conservation Service, USDA)

Both primary and secondary uses of rural private land are of interest (table 2.33). As expected, agriculture (including timber harvesting) is the overwhelming commodity use of private land in the Southern Appalachians. Owners list it as a use across 95 percent of ownerships. More than 75 percent reported recreation as an important use. Agricultural use of private land varies little across the four subregions. Recreational use, however, varies from a high of 83.5 percent in the Southern Mountain and Piedmont subregion to a low of 67.7 in the Northern Ridge and Valley.

The priorities for using and managing private tracts depend heavily on their size, which varies by subregion (table 2.34). Almost 60 percent of tracts in the region as a whole are between 20 and 100 acres, but the Northern Ridge and Valley and the Southern Mountain and Piedmont subregion have proportionally fewer of these smaller tracts and proportionately more tracts of 100-499 acres. Across the region, only about 7 percent of tracts are larger than 500 acres.

People have many reasons for owning land and an individual owner will typically have more than one reason. From the 1995 NPLOS, the most popular reasons identified by sampled Southern Appalachian owners were raising livestock for sale (45 percent), personal recreation opportunities (41 percent), living in a rural environment (35 percent), enjoying my own green space (35 percent), and eventually selling all or part of the land at a profit (32 percent) (table 2.35). Least popular reasons were making money from leasing or charging fees for recreation, growing crops or hay for sale, and having a second home site. A seemingly important 25 percent listed "providing recreation opportunity for others" as important.

Significantly more owners in the Southern Ridge and Valley and Southern Mountain and Piedmont subregions, relative to the rest of the region, listed enjoying their own green space and living in a rural environment as important. Significantly more owners in the Northern Ridge and Valley and Blue Ridge subregions listed providing recreation for others, making an estate for heirs, and growing timber for sale as important reasons for ownership (table 2.35).

About as many owners have sold some of their land (20 percent) as have added acreage (19 percent) since their original purchase or inheritance. However, in the Blue Ridge

Table 2.34 Distribution of ownerships by size of tract in subregion of the Southern Appalachian region, 1985.

Subregion	Size of Tract (in acres) <100 (percent)	100-499 (percent)	500+ (percent)
Northern Ridge & Valley	53.6	37.9	8.4
Blue Ridge	70.4	20.9	8.7
Southern Ridge & Valley	62.0	33.9	4.1
Southern Mountains & Piedmont	51.4	43.3	5.2
Regionwide	59.9	33.4	6.7

(Source: 1985 National Private Landowners Survey, USDA Forest Service, Outdoor Recreation and Wilderness Assessment Group, Athens, GA)

Table 2.35 Reasons given for owning land in the Southern Appalachian region, 1995.

Reasons for Owning[1]	Entire Region	Northern Ridge and Valley and Blue Ridge	Ridge & Valley and Southern Mountain
		(percent of sample)	
Renting dwellings or mobile homes	15.8	17.2	15.0
Having a "second" home site	7.6	9.4	6.7
I inherited the land	9.2	9.4	9.2
Enjoying my own green space	34.8	28.1	38.3
Having a tax shelter	8.2	9.4	7.5
Personal recreation opportunities	40.8	43.8	39.2
Eventually selling all or part of my land at a profit	32.1	29.7	33.3
Providing recreation opportunities for others	25.0	32.8	20.8
Making money from leasing or otherwise charging fees for hunting, fishing, or other recreation	2.7	1.6	3.3
Providing a place for wildlife	20.7	20.3	20.8
Making an estate for heirs	25.0	34.4	20.0
Living in a rural environment	35.3	32.8	36.7
Growing crops or hay for sale	7.6	6.3	8.3
Raising livestock for sale	44.6	42.2	45.8
Growing landscaping shrubbery for sale	12.0	14.1	10.8
Growing nursery trees; Christmas trees for sale	9.8	14.1	7.5
Growing timber for sale	12.5	17.2	10.0

[1]Respondents were instructed to circle as many choices as applied. For this reason, percentages do not sum to 100.
(Source: 1995 National Private Land Owner Survey Study. USDA Forest Service, Outdoor Recreation and Wilderness Assessment Group and the University of Georgia, Dept. of Agriculture & Applied Economics, Athens, GA)

subregion, significantly more have added acreage (27 percent) than have sold acreage (22 percent), and in the Ridge-Valley and Southern Mountain and Piedmont subregions more have sold acreage (20 percent) than have added acreage (15 percent).

Over one-third of owners (36 percent) post some or all of their land to inhibit trespass. More post in the Blue Ridge subregions (44 percent) than in the other two subregions (32 percent). However, significantly more owners in the two Blue Ridge subregions (18 percent), relative to the other subregions (8 percent), allow others outside their family to use their land for recreation. Similarly, only 19 percent of owners in the Blue Ridge subregions completely close some or all of their land to public access, whereas 29 percent of Southern Ridge and Valley and Southern Mountain and Piedmont subregion owners completely close their land to access.

Across the region, more owners plan to decrease than to increase access in the future (8 versus 4 percent). Significantly more owners

Table 2.36 Percentage of owners in the Southern Appalachian region undertaking wetland conservation activities the last 12 months.

Type of Activity	Total Region[1]	Subregions: Blue Ridge[2]	Subregions: Ridge & Valley and Southern Mountains[3]
Preserving wetlands, such as marshes, swamps, etc.	23.5	40.0	16.7
Restoring wetlands by closing drainage systems	7.7	0.0	9.1
Creating wetlands through dams or water diversions	21.4	33.3	18.2
Receiving state or federal assistance for protecting wetlands	13.3	0.0	18.2
I have not undertaken any wetland activities[4]	96.6	94.7	97.5

[1]number of respondents = 168
[2]number of respondents = 57
[3]number of respondents = 111
[4]These numbers reflect the total of each sample that did not partake in any wetland conservation activity. Numbers higher in the table, represent percentages for that group of people that did participate in wetland conservation activity.
(Source: 1995 National Private Land Owner Survey Study. USDA Forest Service, Outdoor Recreation and Wilderness Assessment Group and the University of Georgia, Dept. of Agriculture & Applied Economics, Athens, GA)

will allow more access in the Blue Ridge subregion (18 percent) in the Southern Ridge and Valley and Southern Mountain and Piedmont subregions (3 percent).

Some owners have undertaken wetland conservation activities (table 2.36). Twenty-four percent have taken steps to preserve natural wetlands, 8 percent have closed drainages, 21 percent have created wetlands with dams or diversions, and 13 percent have received government assistance for specific treatments. Large subregional differences exist. Blue Ridge owners are more active in protecting and creating wetlands.

Environmental attitudes have much to do with land use. Among the region's owners, many (82 percent) agree or strongly agree with the statement that, "The balance of nature is very delicate, so we must try to limit economic growth that exploits nature." Fewer (49 percent) agree that "People must rule over nature. Plants and animals are here for our use." In general, more owners in the Blue Ridge subregion strongly agree with limiting economic growth, than in the other subregions, and more Blue Ridge owners than other owners strongly disagree with ruling over nature.

Consistent with the above environmental positions, greater percentages of owners will emphasize the natural makeup of their land in the future (41 percent) than will emphasize making money from their land (19 percent). There are few subregional differences in future plans involving natural versus income outcomes.

Private Landowners

Over the entire region, 79 percent of owners have held title to their tract for more than 10 years, and 39 percent have owned for more than 30 years. On average, owners in Blue Ridge and Southern Appalachian subregions have owned their land for longer periods than those in Northern Ridge and Valley and the Southern Ridge and Valley subregions.

Personal characteristics of owners are revealing. Eighty three percent of sample respondents are male, 93 percent are Caucasian, average age is 61 years, average household size is 2.8 persons, and over three-fourths are married. Owners in the Northern and Blue Ridge subregions average 5 years older than owners in the other two subregions. Forty-four percent have an annual household income of $30,000 or more; 16 percent have an income of less than $10,000 (in 1985 dollars). Nearly 23 percent of owners across the four subregions have not completed high school; 53 percent have completed at least some college. Only 3 percent have attempted any graduate college work in the Southern Mountain and Piedmont subregion. Over 26 percent have completed some graduate study in the Southern Ridge and Valley subregion. Almost one-half (49 percent) of owners across the entire region live on their land, but in the Northern and Blue Ridge subregions, only 42 percent live on their land.

Most owners earn very little income from production activities on their land. Only 15 percent of owners earn more than $5,000 per year from their land (fig. 2.29). Over half either make no income or face a net loss. These

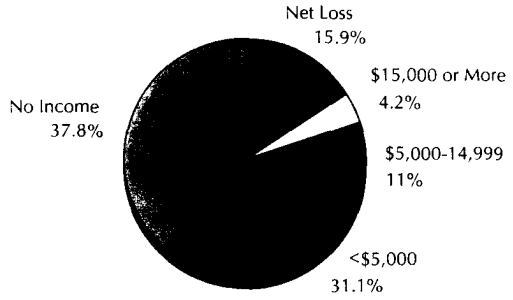

Figure 2.29 Income earning from private, non-industrial lands in the Southern Appalachian region. (Source: 1985 National Private Landowners Survey, Outdoor Recreation and Wilderness Assessment Group, USDA Forest Service, Athens, GA)

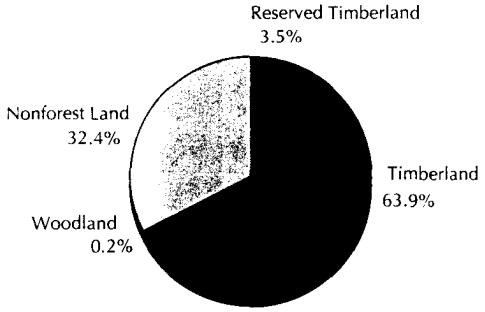

Figure 2.30 Percent distribution of land types in the Southern Appalachian region. (Source: Forest Inventory and Analysis, 1994, USDA Forest Service, Southern Research Station, Asheville, NC)

percentages vary substantially among the subregions. More owners in the northern and southernmost subregions earn over $5,000 per year from their land. Interestingly, owners in these two subregions also more frequently report net losses.

Private Forest Land

Over two-thirds of the Southern Appalachian region's roughly 37 million acres are forested (fig. 2.30). The vast majority of this forest is classified as timberland, which includes land that is not legally reserved for a specific nontimber use (i.e., wilderness or national parks) and land that is capable of growing commercial timber crops. Woodland is forested land that is not sufficiently productive to grow commercial crops of timber. Only 3.5 percent of the region's land is held in reserve and just 0.2 percent is classified as woodland. The Southern Ridge and Valley subregion, and to a lesser extent the Northern Ridge and Valley, have lower proportions of forest land than the rest of the Southern Appalachian region. As one might expect, concentrations of forest land are located at higher elevations, where more national forest or public land is present.

The three major types of forest ownerships in the region are public, forest industry, and nonindustrial private. Of the 23.5 million acres of timberland in the Southern Appalachians, nearly three-quarters are in nonindustrial private ownership (fig. 2.31). Further, about four times as much forest land is in public ownership (20.8 percent) as is in forest industry ownership

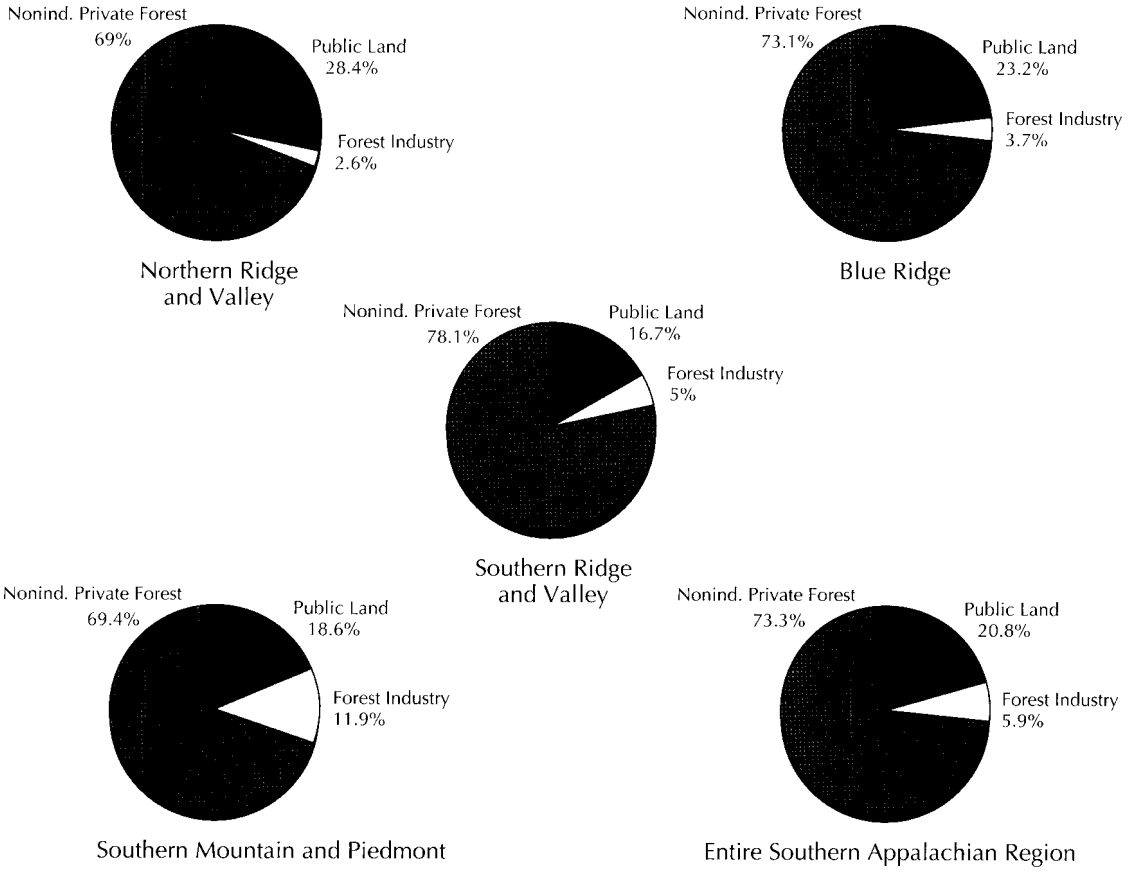

Figure 2.31 Distribution of timberland ownerships, by subregion. (Source: Forest Inventory and Analysis, 1994, USDA Forest Service, Southern Research Station, Asheville, NC)

(5.9 percent). The Southern Mountain and Piedmont subregion has more than twice the percentage of forest industry land as any other region. The Southern Ridge and Valley subregion holds the greatest share of nonindustrial private land, and the Northern Ridge and Valley leads in public land with over 28 percent. Figures 2.32 (a-c) show the distribution of these land classifications across every county in the region. Further information on the status of private forest land in the region is given in figure 2.33. The 1994 Private Forest Lands Study echoes the FIA finding that approximately 75 percent of forest is in individual private ownerships. Oak-pine and oak-hickory forest types dominate across all but the Southern Mountain and Piedmont subregion, where loblolly-shortleaf pine is the most common species.

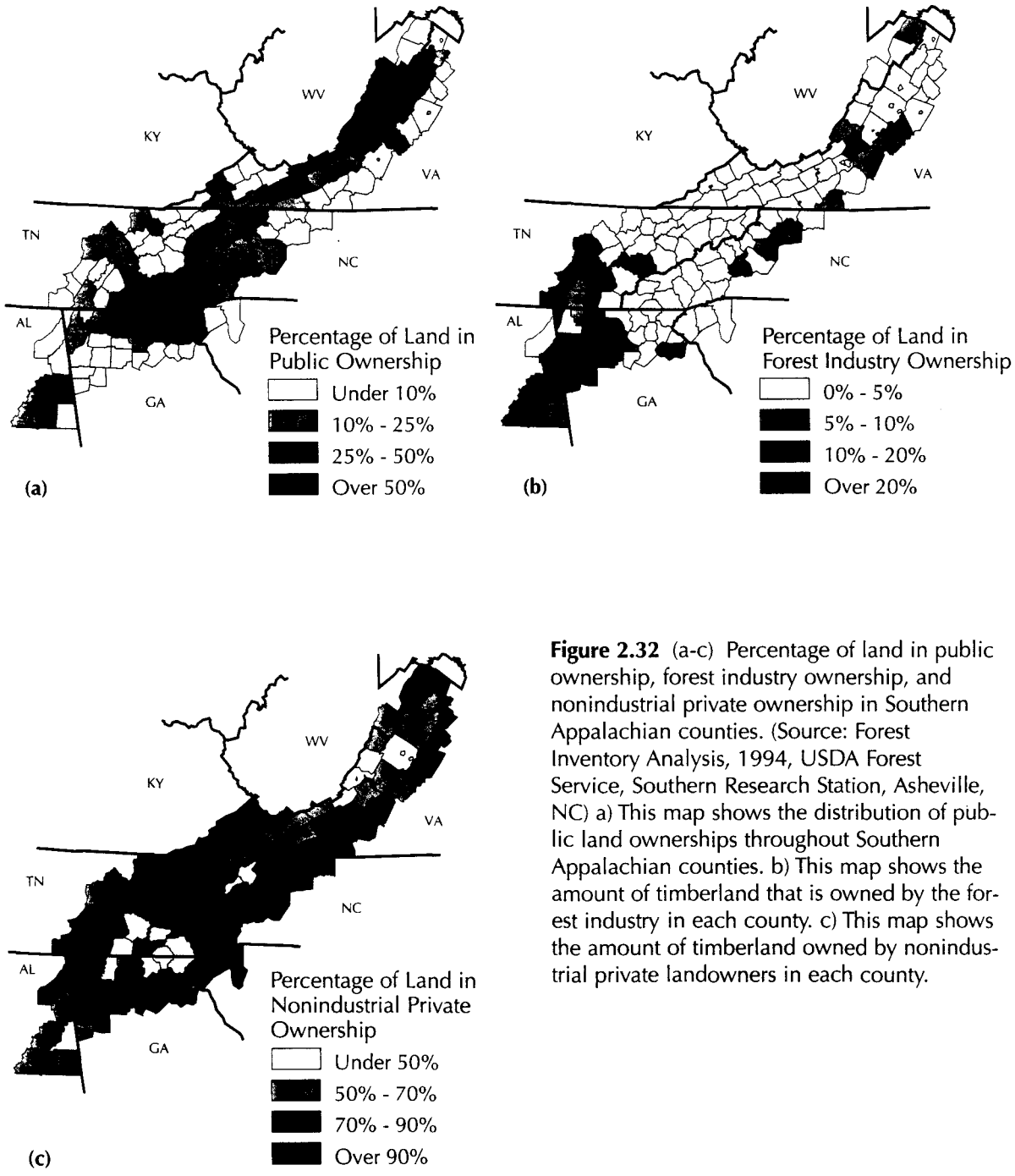

Figure 2.32 (a-c) Percentage of land in public ownership, forest industry ownership, and nonindustrial private ownership in Southern Appalachian counties. (Source: Forest Inventory Analysis, 1994, USDA Forest Service, Southern Research Station, Asheville, NC) a) This map shows the distribution of public land ownerships throughout Southern Appalachian counties. b) This map shows the amount of timberland that is owned by the forest industry in each county. c) This map shows the amount of timberland owned by nonindustrial private landowners in each county.

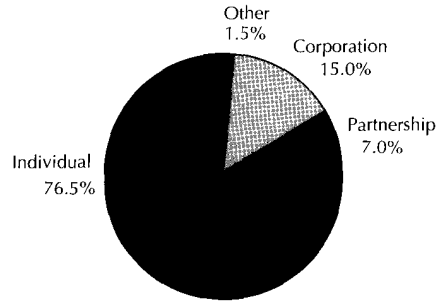

Figure 2.33 Forms of ownership of forest land (total acres), 1994. (Source: 1994 Private Forest Lands Study, T.W. Birch, USDA Forest Service, Northeast Research Station)

Almost two-fifths of private forest owners said the "enjoyment of owning" their land was the primary benefit they most expected over the next 10 years (table 2.37). Twenty-two percent of owners see their land increasing in value and other substantial percentages listed farming or domestic use and recreation as key benefits. In terms of total acres owned, land value gains emerged as the most important future benefit. Enjoyment of ownership still ranked high, but timber production jumped to the third most important expected benefit, reflecting the responses of forest industry.

Private Land Near Public Land

For forest planning and other purposes pertaining to public land, it is important to understand nearby private land. To address this need in part, private land in counties with public land was analyzed separately. Eighty-four of the 135 counties in the region contain national forest land. The NPLOS had 80 respondents and the National Private Forest Lands Survey had 308 owners in these counties.

More than half (58 percent) of these owners possess tracts smaller than 100 acres, while only 6 percent own properties larger than 500 acres. Personal recreation and enjoyment (73 percent) and living in a rural environment (66 percent) were the highest-rated ownership objectives. Just under 40 percent of landowners have owned their property for more than 30 years. This result is partly a function of the mean age of respondents (58 years).

Respondents were also largely male (88 percent), white (94 percent), and married (90 percent). One-third of respondents earned under $20,000 in 1985 annual household income. About 18 percent earned over $50,000 that year. One-fifth of respondents reported a net loss of income from their land in 1985. One-third said they received no income from their land and just under 19 percent earned more than $5,000. The remainder earned less than $5,000.

Table 2.37 Primary ownership benefit expected in the next 10 years for private ownership units and acres of private forest land.

Expected Benefit	Owners (thousands)	Share of Owners (%)	Area (million acres)	Share of Acreage (%)
Land value increase	178.5	22.1	4.9	26.4
Recreation	106.3	13.2	2.5	13.3
Timber production	18.1	2.	3.5	18.9
Farm/domestic use	118.3	14.6	1.9	10.3
Enjoyment of owning	307.6	38.1	4.1	22.1
Firewood	31.5	3.9	0.5	2.7
Other	21.4	2.6	0.7	3.9
No answer	26.0	3.2	0.5	2.5
Total	807.7	99.9	18.6	100.1

(Source: 1994 Private Forests Lands Study, USDA Forest Service, Northeastern Forest Experiment Station, Radnor, PA)