Chapter 2

POPULATION AND DEMOGRAPHIC TRENDS

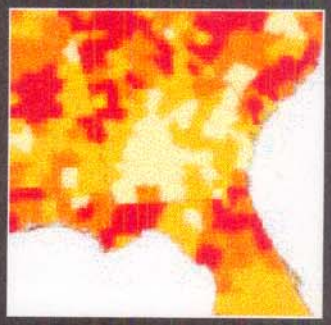
H. Ken Cordell and Edward A. Macie

Project Leader, USDA Forest Service, Southern Research Station, 320 Green Street, Athens, GA 30602-2044, kcordell@fs.fed.us

Regional Urban Forester, USDA Forest Service, Region 8, 1720 Peachtree Road NW, Atlanta, GA 30367, emacie@fs.fed.us

Introduction

This chapter reports significant population, demographic, and other social trends and predicts where in the South these factors are likely to drive further urban expansion. We first examine the primary causes of population growth, which are relative birth and death rates and immigration. Next, we outline the changing social composition of the South, including age trends and evolving racial and ethnic composition. We look at growth of urban areas and its flip side, rural transition, which indeed is occurring. As an indicator of some of the economic changes occurring, we examine employment trends that are related to urban expansion. Finally, we examine various dimensions describing southerners, including rural land ownership, lifestyles, and outdoor recreational activities. ▶



To illustrate the significance of the previous social demands and trends, a number of maps are presented. These maps overlay the distribution of forecast social conditions onto the locations of forest, water, wetland, and wildlife habitat resources throughout the region. These maps identify where human pressures are likely to have the greatest effects on natural resources by 2020. Data sources used to describe demands and trends include the Census of Population (U.S. Department of Commerce, Bureau of the Census 2000b), Forest Service Renewable Resources Planning Act assessment data (Cordell and others 1999), rural landowner surveys (Teasley and others 1999), Natural Resources Conservation Service data describing rural lands (U.S. Department of Agriculture, Natural Resources Conservation Service 2000), and the National Survey on Recreation and the Environment [Cordell and others, in press (b)].

Population and Other Social Trends

The Drivers of Population Growth

Table 2.1—Population of most heavily populated Southern States, the South, and the United States, 2000

Census unit	Population
	Million
Texas	20.9
Florida	16.0
Georgia	8.2
North Carolina	8.0
Virginia	7.1
South	91.5
United States	281.4

Source: U.S. Department of Commerce, Bureau of the Census 2000c.

Of the social changes underway, population growth will undoubtedly be the most significant in shaping the future of the South's wildland-urban interface. In April 2000, the population of the United States was estimated to be 281,421,906. Of that number, 91,486,129 lived in the 13-State region from Virginia to Texas (**table 2.1**) (U.S. Department of Commerce, Bureau of the Census 2000c). Between April 1, 1990, and April 1, 2000, this region's population grew 13.9 percent and now accounts for 32.5 percent of the national total. The South's share is increasing relative to shares of other regions.

The three fundamental drivers of population change are births, deaths, and net immigration rates. The current birth rate in the South is 16.5 per 1,000-population per year, which is just below the national average for the 48 contiguous States. Across a wide band of counties stretching across the South from coastal and Piedmont North Carolina to Louisiana and coastal Texas, however, birth rates are well above the region-wide and national rates. Some rates reach 30 to 40 per 1,000 per year. The death rate across the South, at 10.2 per 1,000 per year, is just at the national average. In Florida and in parts of Mississippi and Arkansas, death rates exceed this region-wide average, reaching 15 to 25 deaths per 1,000 per year in many counties. The South's birth rate of 16.5, being substantially higher than its death rate of 10.2, results in a net population gain (called a "natural increase") of 6.3 people per 1,000-population per year. At this rate, around 600,000 people are added to the South's resident population per year through natural increases, adding tremendous pressures for urban expansion and development to accommodate needs for new housing, retail outlets, and transportation.

Immigration from other countries and migration from other regions to the South are additional sources of population growth. They exceed the natural increases from net birth rate. Between 1981 and 1990, 7.3 million immigrants moved into the United States from other parts of the world. Exiting emigrants during this same period numbered 1.6 million. Thus, net immigration was just over 5.7 million. The statistics account only for legal immigration (U.S. Department of Commerce, Bureau of the Census 1992). Illegal immigration is believed to be much larger—over 1 million per year by some estimates. As in the Nation as a whole, net immigration to the South has continued to rise dramatically decade by decade.

"One of the things that concerns me is the changing demographics . . . . Let's talk about the Houston area. By the year 2030, the population is supposed to double." Texas

Migration to the South from other regions of this country is highly significant. In 1981, 1.47 million people moved into this region from other parts of the United States, while approximately 1 million moved out. The net increase was 470,000 (U.S. Department of Commerce, Bureau of the Census 2000a). People moving into the South from abroad that year totaled 401,000 making a legal net gain of 871,000. In 1998, net internal migration totaled 271,000, while movers from abroad totaled 544,000. The South's net gain, excluding illegal immigration, was 815,000. That total was greater than the totals across all other U.S. regions combined. With migration pressures of this magnitude, mostly to already burgeoning metropolitan areas like Houston, TX, Atlanta, GA, and Miami, FL, former rural areas and forests are being converted to urban interface zones at unprecedented rates.

Social Composition, Age, and Ethnicity

Like population growth, aging is a major component of social change in the United States and in the South. Aging is likely to have profound effects on future recreation, development, and agricultural demands on our forests and other rural lands, especially those in attractive retirement destinations (**fig. 2.1**). The median age of the U.S. population has been rising steadily from 18.9 years in 1850 to 32.8 years in 1990. In the South, median ages among the States range from a low of just under 34.5 in Texas to a high of over 42 in Florida. In all the States, median age is expected to rise, with Virginia, Alabama, Mississippi, and Arkansas leading in this increase. A dominant reason for the rising median age of the region's population is rising life expectancy due to better diets and medical care. For people born in 1950, average life expectancy is just under 70 years (Barrick and Zayatz 1996). For people born in 2000, life expectancy is around 74 for males and just over 80 for females.

Photo courtesy of Virginia Department of Forestry

Figure 2.1
Forested areas in the wildland-urban interface are attractive as retirement destinations across the South.

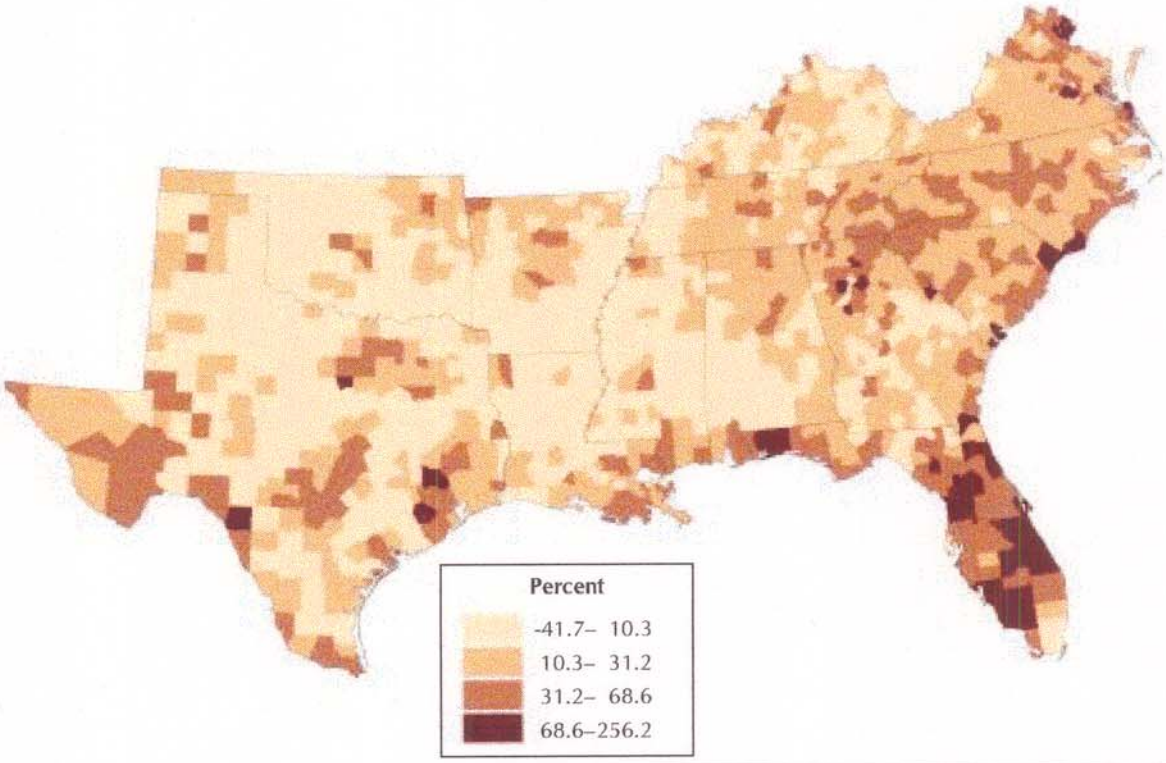


Figure 2.2
Distribution among counties of change in U.S. population 65 and older, 1980-90. (Source: Woods and Poole Economics, Incorporated 1997.)

A highly significant outcome of population aging is the unprecedented increase in number of retirees. **Figure 2.2** shows changes in numbers of residents over 65 years old between 1980 and 1990 across the counties of the South. The overall regional increase was 25.7 percent. The most rapid increases were in most of Florida, along the Atlantic coast, down the Southern Appalachians to Atlanta, along the gulf coast, and in eastern Texas. Over the region, the percentage of the population age 65 and over is projected to continue to rise from about 12.5 percent in 2000 to over 17 percent by 2020 (Woods and Poole Economics, Incorporated 1997). This increase is likely to have profound effects on forest ecosystems. It means continued development of retirement communities, second homes, and recreation facilities like golf courses, all of which lead to the creation of new interface areas. It also means more potential for interactions between interface residents and forest management practices, such as fire, recreation, and timber management (Marcin 1993).

"A lot of our population growth is part-time or seasonal, but their impact is felt all year round." Florida

Increasing ethnic diversity is another primary component of social change in the South. The makeup of the population is shifting rapidly. In the 1990s, non-Hispanic Whites made up approximately 72.4 percent of the region-wide population. Of minority populations, Hispanic residents made up 8.9 percent, Blacks

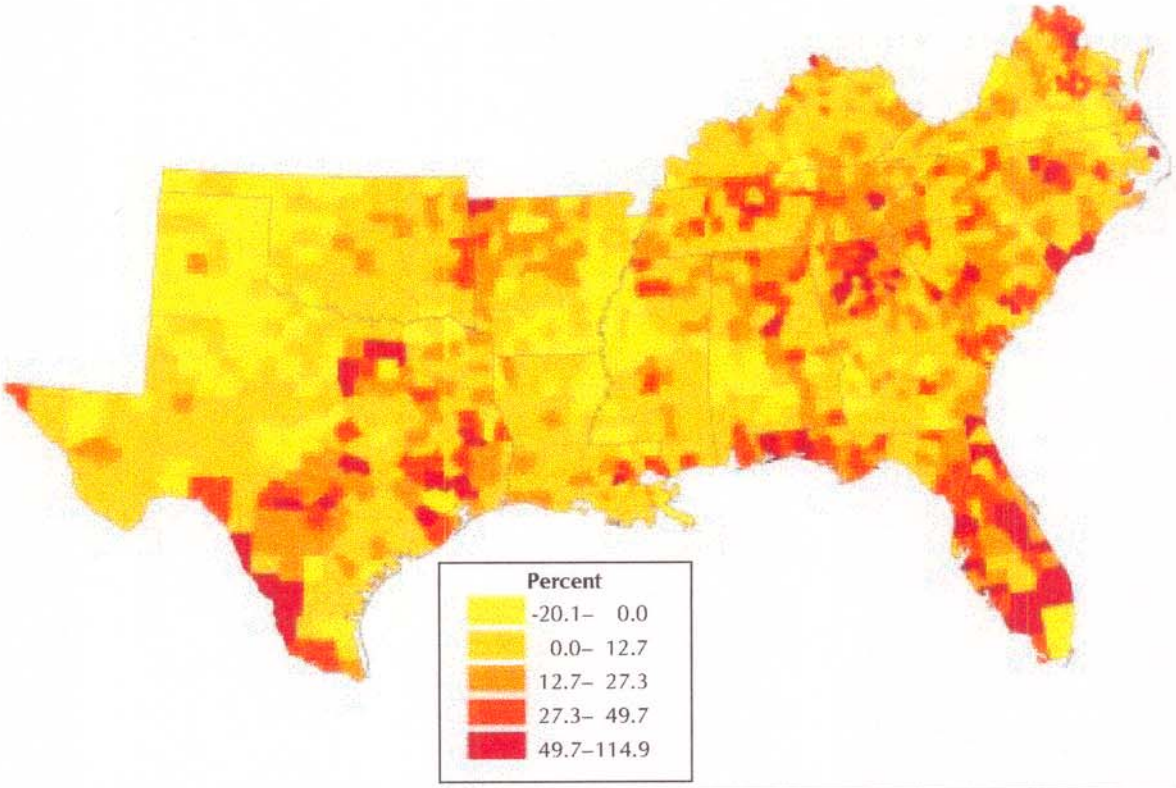


Figure 2.3
Distribution of projected change in the South's population, 2000-20. (Source: Woods and Poole Economics, Incorporated 1997.)

made up 16.7 percent, and Asian and other races made up just over 2 percent. The trends now are similar in the South to those in the rest of the United States. Non-Hispanic Whites are steadily becoming a smaller percentage of the total population. Research has shown that Whites, Blacks, Hispanics, Asians, and others differ in how each uses and values southern forests and other natural resources [Cordell and others, in press (a)]. Resulting changes in collective public positions on natural resource management and protection will likely end up being the social trend with the greatest impact on how we collectively view and use forests.

Population Projections

Between 2000 and 2020, the South's population is projected to increase another 23.8 million, reaching almost 114 million people by the close of those two decades. **Figure 2.3** shows projected distribution of percentage population growth over counties of the South between 2000 and 2020. Over the region, the percentage of the population age 65 and over is projected to increase from about 12.5 percent in 2000 to over 17 percent by 2020 (Woods and Poole Economics, Incorporated 1997). Ethnic composition is shifting rapidly in this region. By 2020, Hispanics are expected to account for about 16.2 percent of the population, Blacks 19.5 percent, and Asians and others around 3 percent (Woods and Poole Economics, Incorporated 1997). Non-Hispanic Whites, as a proportion of the population, will drop to about 61 percent by 2020 and just over 50 percent by 2050.

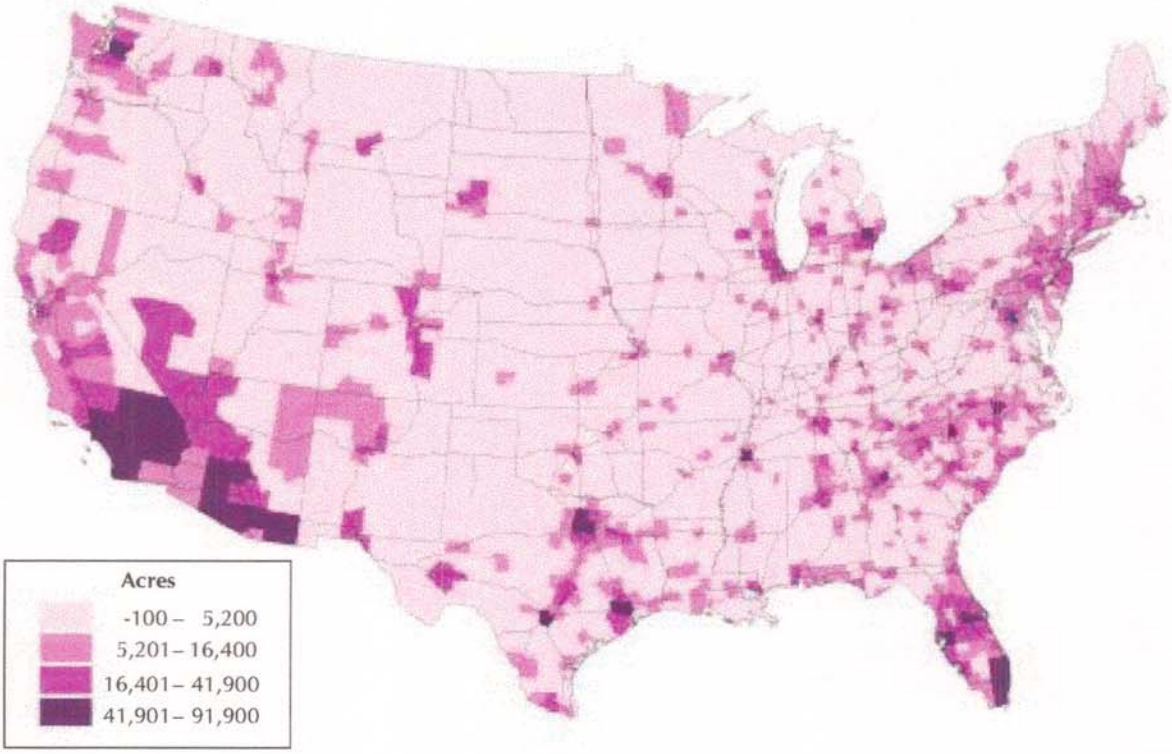


Figure 2.4
Change in acreage from rural to urban across the United States, 1982–92. (Source: Woods and Poole Economics, Incorporated 1997.)

Urban Growth

In the South and the Nation, population growth is primarily in urban areas. In 1790 when the first U.S. census of population was done, only 5 percent of the country's population lived in the few large cities of that time. By 1920, the population balance between rural and urban had shifted, and the population became predominantly an urban one. By 1990, 75 percent of the people in the United States lived in urban areas. Since then, metropolitan counties have accounted for about 82 percent of all growth, even though they make up only 18 percent of the total land base (U.S. Department of Commerce, Bureau of the Census 1997). Today, over 80 percent of the U.S. population is urban, and well over 2 million more urban residents are added each year.

"Landscapes just change almost overnight before you can even react to anything . . ." Mississippi

The burgeoning urban population drives new development, constantly expanding the wildland-urban interface. Urban and related development is occurring at unprecedented rates in the United States and the South. Between 1992 and 1997, nearly 16 million acres of formerly rural land across the Nation were converted to developed urban land uses. At this rate, over 3 million acres of urban development are being added annually. Notable among southern counties facing

Table 2.2—Changes and projections in urban population and population density in the six largest metropolitan areas and the South, 1995–2020

Region	Population			Population density		Change
	1995	2020	1995–2020	1995	2020	
				Per square mile		*Percent*
Dallas-Ft. Worth	4,449,877	6,625,820	2,175,943	488.75	727.74	48.9
Atlanta	3,431,987	5,254,118	1,822,131	560.21	857.65	53.1
Houston	3,710,847	5,494,718	1,783,871	626.72	927.99	48.1
Tampa-St. Petersburg	2,180,484	3,339,119	1,158,635	853.59	1,307.15	53.1
Miami	2,031,337	2,403,171	371,834	1,044.55	1,235.75	18.3
Memphis	1,068,895	1,341,475	272,580	355.40	446.03	25.5
South	60,750,243	83,968,681	23,218,438	283.14	391.35	38.2

Source: Woods and Poole Economics, Incorporated 1997.

high rates of urbanization between 1982 and 1992 were those along the coast of South Carolina, Georgia, and Florida; counties in the highlands of Virginia and nearby West Virginia; counties in eastern Kentucky and eastern Tennessee; and counties in southern Texas (**fig. 2.4**). A sizeable number of counties in the South were adding urban development at rates of 21 to almost 62 percent during this 10-year period. Of the 20 counties in the country with the greatest number of acres converted to urban uses between 1982 and 1992, 4 were in Texas, 5 were in Florida, 2 were in North Carolina, and 1 was in Georgia. Thus, 12 of the top 20 were in the South. By 1997, when the latest National Resources Inventory (NRI) was completed, the annual rate of urban land development had doubled (U.S. Department of Agriculture 1994). Nationally, total acreage of land developed for urban uses between 1992 and 1997 was greatest in 10 States. Six of those States were in the South, and in each of those Southern States, more than 500,000 acres had been converted to urban development. Topping the list nationally was Texas with 1.2 million acres. Other States on this list were Georgia with 1 million, Florida with 945,000, North Carolina with 782,000, Tennessee with 612,000, and South Carolina with 540,000.

Urban Population Projections

The urban population of the United States is predicted to grow by 18.8 percent between 2000 and 2020, compared to 12.4 percent growth in rural counties. **Table 2.2** provides projections for the South and its six largest metropolitan areas. The predicted growth of 23.2 million new southern urban residents between 1995 and 2020 will exceed the combined growth of the North and Pacific coast regions during this period. While the urban areas of the North will continue to be the most densely populated among U.S. regions, at over 540 people per square mile, population density will be rising faster in the South, reaching 391 persons per square mile by 2020. Except for cities in Florida, population growth in southern cities is driven less by natural and cultural amenities than it is by economic opportunities and employment. Florida cities are growing largely because they are high-amenity retirement destinations and because of massive Hispanic immigration. As

urban expansion accelerates and urban population growth continues, the region is likely to see a moderate shift in public attitude away from protection of forested interface lands. There are also likely to be shifts in the way the future population uses forests and other natural lands.

Rural Transition

Seventy-six percent of the Nation's counties (2,305) are classified by the Federal Government as rural. While rural counties account for 83 percent of the Nation's land, they account for < 20 percent of its population (Rural Policy Research Institute 1999). Between 1980 and 1990, a number of counties in the South experienced population losses. Included were counties in northern Texas and parts of Arkansas, Mississippi, Alabama, Georgia, West Virginia, and Kentucky.

In most rural counties, however, population grew in the 1980s, particularly in parts of Texas and Florida. During this decade, the South experienced a 3.1-percent rate of rural population growth. In the 1990s, however, the population of rural counties in the South grew 7.5 percent. In some, growth exceeded 100 percent. Such rapid growth is expected to continue along sections of the Atlantic and gulf coasts. On average, populations of southern rural counties are expected to grow by 11.5 percent. Over the same period, population growth rates in rural counties are expected to be 23.3 percent in Pacific Coast States and 8.0 percent in the North. In terms of population density, the rural South will gain more than any other region of the country (4.2 people per square mile). Many of these rapidly growing rural areas are connected one to the other, or to nearby metropolitan areas, by interstate highways. This interstate linkage demonstrates the influence that Federal policies, such as the creation of the National Interstate Highway System, can have in opening land previously in agriculture and forests to growth and development. Such development, of course, will further expand the wildland-urban interface (see chapter 4).

Nationally, between 1982 and 1992, around 13.3 million acres of rural land were converted to urban and other built-up uses. This total included 6.5 million acres in the South, where more rural acreage was converted than in any other region. Expressed as a percentage change rate, this 33-percent, 10-year pace of land conversion indicates a greater-than-national rate of expansion of the South's wildland-urban interface. The NRI data for 1992–97 showed that loss of rural land had accelerated in every State in the Nation. The highest acreage losses between 1992 and 1997 occurred in Texas (1.14 million), Georgia (1.05 million), Florida (0.92 million), and North Carolina (0.75 million). Large-scale conversion to urban development also occurred in Virginia, Kentucky, and Georgia. Of the top 20 counties in rural land area converted, 3 were in Virginia, 2 in Kentucky, and 2 in Texas. Comparing the ratio of rural area converted to growth of population among regions revealed that the South had the highest annual ratio at 3.2 converted acres per added rural resident. This ratio indicates the considerable impact that new residents have on land development and, subsequently, forest ecosystems (see chapter 5).

The Shifting Economy

Shifts in employment among sectors of the economy help to identify changing demand pressures on natural resources, changes in industry makeup, and transitions in the ways people make their living and conduct their lives. Many of the

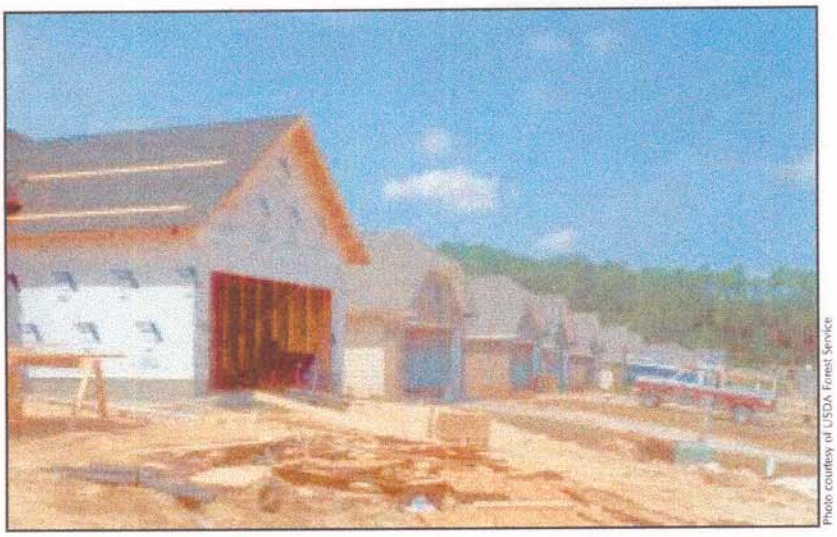


Photo courtesy of USDA Forest Service

Figure 2.5
Greater employment in construction indicates greater pressures to expand the wildland-urban interface.

employment shifts are closely linked to the transition of the South from a rural to an urban region. People working in urban services, retail stores, or other urban jobs usually view the role and importance of forests and other natural resources differently from their rural neighbors.

Many of the significant shifts that have been occurring over the past 20 years among sectors of the South's economy have been driven by a continuing transition from a rural to an urban society. For more than 20 years, employment in farming, as a share of total employment, has been in decline. In large part, this decline has been due to increased large-scale corporate farming and associated upscaling of technology, mechanization, and use of chemicals. Unable to compete, small farms have all but disappeared. Along with them have gone many of the low-technology, labor-intensive farming practices of the past. From 1975 to 1995, the percentage of people employed in farming in the South dropped by about 7 percent. By the late 1990s, farming was an even smaller proportion of the region's workforce, and by 2020, only 12 to 13 percent of the South's workers are expected to be employed in farming. While employment in farming has been declining, employment in the agricultural service industry, which distributes such commodities as fertilizers, insecticides, and farm equipment, has been increasing. Between 1975 and 1995, the percentage of southern workers employed in agricultural services had roughly doubled. Unlike the growth in agricultural services, jobs in the mining, forestry, and fisheries industries are expected to remain somewhat stable through to 2020.

Greater employment in construction indicates greater pressures to expand the wildland-urban interface (**fig. 2.5**). There was a significant increase in the region's construction employment during the late 1970s, from around 5 percent of the labor force in 1975 to over 5.5 percent in 1980. Since then, construction has accounted for between 5.5 and 5.7 percent of workers. In 1975, about 13 percent of workers were employed in retail trades. Since then, the region-wide proportion has risen significantly. In southern metropolitan areas, such as Atlanta, Charlotte, Houston, Dallas, and Miami, growth in retail employment has been especially significant. As urban population has grown in these and other cities, so too has the need for retail trade workers in stores, shopping malls, and associated manufacturing plants. In 1995, retail trade employment accounted for between 15 and 18 percent of all employment. The service sector is another of the South's economic sectors with direct linkages to urban expansion. By 1995, service workers, mostly

working in urban settings, made up just over 20 percent of the region's labor force.

Percentage of workers employed in farming is projected to continue to decline through 2020. This trend will hold not only in the South, but also for the Nation as a whole (Woods and Poole Economics, Incorporated 1997). Percentages of employment in agricultural services and construction should remain stable at their 1995 levels. Percentages of jobs in services and retail trade, however, will continue to rise. By 2020, a 1- to 3-percent increase in the service sector workforce is expected. Overall, with rapid urban expansion, persistent population growth, and rising numbers of high-income retirees, the South's economy is forecast to continue its vigorous growth and further transition from farming and manufacturing to service, retail, technology, and other urban industries. That growth will mean more development of forest land in the wildland-urban interface, and this development in turn will stimulate even more economic growth.

As economic growth continues, incomes will be driven higher. Projections indicate an average increase for both the Nation and the South of about 27 percent in real per capita income (after adjusting for expected cost-of-living inflation) during the first 20 years of the 21st century. Counties whose per capita income is predicted to grow at more than 30 percent from 2000 to 2020 are scattered across the South, but most are concentrated in northern North Carolina, central Georgia and Alabama, Florida, and central Texas. Growing per capita income will result in more households being in the highest income brackets. Nationally in 1995, just over 2 percent of all households had an income of over $100,000 per year. In the South, the areas where people earning this much per year are likely to increase most rapidly include coastal South Carolina and south Florida. These are among the areas of the South where the greatest levels of urban expansion also are occurring.

Rural Land Ownership

Across Southern States, approximately 432 million acres of rural land is in corporate and individual private tracts, about 78 percent of the region's total area. Texas, by far, has the greatest private total—almost 147 million acres. South Carolina has the least, about 15 million acres. Private land area in the rest of the Southern States ranges from 19 million acres in Virginia to 38 million acres in Oklahoma (U.S. Department of Agriculture, Natural Resources Conservation Service 2000). Among the different categories of ownership in this region, individual ownership is the primary type (**figs. 2.6A, 2.6B**).

The characteristics of rural landowners are important to the status and future of the rural landscape and the character and effects of the advancing wildland-urban interface. Population growth, changes in ethnic diversity, conversion of rural land to urban uses, shifts in the economy and sectors in which people are employed, and many other social changes occurring in the South influence rural land ownership. Increasingly, rural land is being converted from small farms to urban worker and retiree residences. This conversion usually results in tract subdivision and greater fragmentation of the rural landscape. At the same time, the number of absentee versus resident landowners is increasing. Leading motivations for absentee owners are recreation and speculation. Residential development and tract fragmentation are associated with urban expansion. However, absentee owners motivated by the desire to have a rural retreat can act as a buffer to such development. It is unclear what the land ownership patterns of the future will be. The majority of current owners are in their fifties or older, and their land will pass into other hands in the not-too-distant future (Sampson and DeCoster 2000). Important

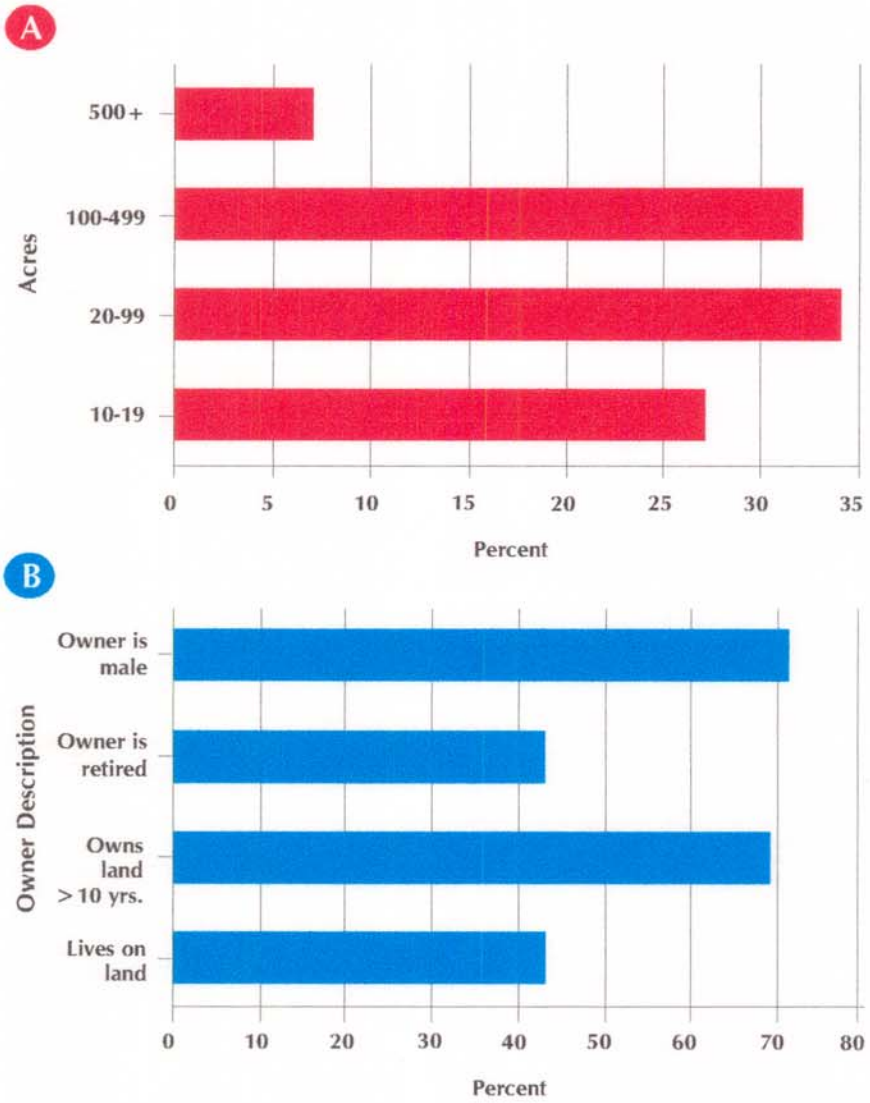


Figure 2.6
(A) Percentage of individual owners by size of tract owned and (B) percentage of landowners by owner description.

changes will likely result from these property transfers. The implications of ownership changes and other trends on public policy, forest ecology, forest management, and social systems are discussed in more depth throughout this Assessment.

The estimated 4 to 5 million individual private owners in the South have a variety of reasons for possessing rural land. Knowing these reasons provides critical insights into more effectively working with owners. Some prominent reasons for owning land are: living in a rural environment, enjoying personal green space, building an estate for heirs, and providing wildlife habitat (Teasley and others 1999). Predicting trends in the interface requires an understanding of what owners want to emphasize in the use of their land (**fig. 2.7**). Study results indicate that owners care about the natural condition of their land. Management practices employed to improve the natural condition varied among owners from no efforts to a number of purposeful practices. The more prominent purposeful practices included prescribed burning, improving wildlife habitat, planting trees, harvesting

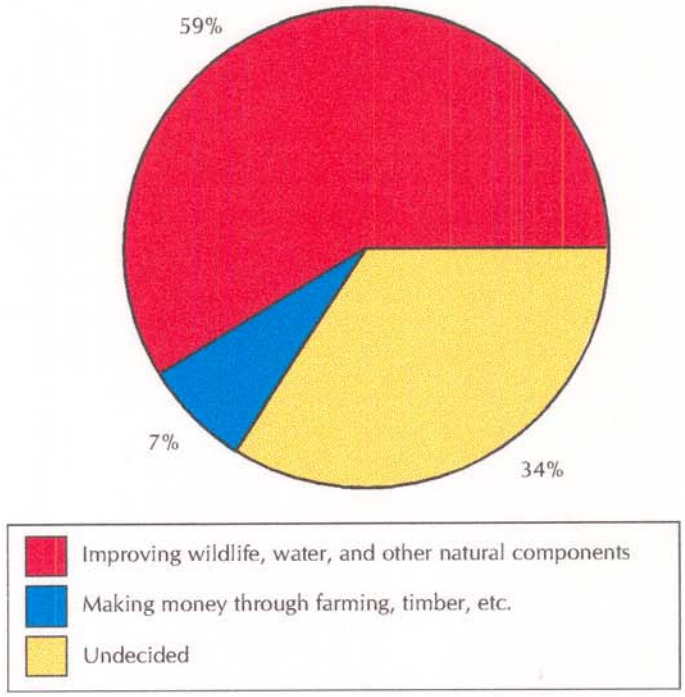


Figure 2.7
Percentage of owners by land management emphasis.

timber, and developing ponds or lakes. Just over 30 percent of owners have undertaken some sort of wetland conservation measure.

Such findings suggest a significant conservation ethic among most of the South's private landowners. But there is also potential for a great deal of conflict between this conservation ethic and more traditional views that emphasize economic utility. Increasing fragmentation of tracts suggests a need for neighbors to plan together and set common objectives. Working together, landowners can address issues like the buildup of forest fuel, which can lead to catastrophic interface fires. There is obviously a significant opportunity for State forestry agencies and others to focus more on education and providing incentives for better management of private forest land.

With accelerating urban expansion, private owners increasingly are faced with public use problems, such as littering, illegal hunting, dumping, and property damage. Landowners often post their properties (41 percent of landowners do) to limit these unwanted problems (**fig. 2.8**). Posting reduces use of private land and puts greater recreation and wildlife management pressures on public land.

Twenty percent of owners have definite plans to sell all or part of their land in the future. Thirteen percent plan to add acreage. Fifty-one percent have no definite plans. As urbanization continues across the South, owner plans may shift from their former, historical patterns. Sixteen percent of southern owners report that their land is now next to or only a short walk from a residential subdivision. Thus, a vast proportion of the southern landscape is subject to increasing human influences and interface expansion. Pressures such as rising property taxes, encroaching development, and others will surely continue to grow.

Photo courtesy of USDA Forest Service

Figure 2.8
Increasingly, southern landowners are posting their properties as a way of limiting problems, such as littering and illegal hunting.

Table 2.3—Percentage of residents 16 years or older in 5 regions of the United States who regularly participate in 20 lifestyle activities, 2000

Activity	South	North	Great Plains	Rocky Mtns.	Pacific coast
	Percent				
Belong to environmental group	9.0	7.3	8.6	8.9	8.0
Have a vacation home	15.1	15.1	11.3	15.3	15.5
Commute > 45 minutes	16.6	16.1	12.6	11.8	14.9
Run own business	17.5	14.5	15.4	23.6	21.0
Youth volunteer	20.4	19.9	20.2	19.8	17.3
Play stock market	23.0	24.2	20.1	20.4	21.8
Creative arts	23.9	27.2	23.9	25.6	29.0
Read nature magazines	27.1	25.1	27.6	23.6	26.1
Crafts	27.3	27.2	27.8	32.3	30.4
Collect things	29.8	26.1	26.7	24.3	25.6
Grow a garden	30.6	32.8	34.5	30.4	33.6
Exercise	41.2	40.6	39.4	45.4	46.7
Raise kids	47.0	44.6	46.2	42.2	44.3
Follow sports	48.9	44.3	43.5	43.5	45.3
Eat out	50.6	37.9	43.0	44.7	44.6
Use computer at home	51.8	56.0	50.5	55.6	58.7
Recycle	52.4	75.9	64.7	54.3	77.1
Attend church	57.3	46.5	49.7	44.1	36.0
Care for pets	59.5	56.7	60.3	62.0	60.3
Cook at home	76.9	79.9	80.4	84.0	84.5

Source: Cordell and others, in press (b).

Lifestyles

Demographics, economics, and land ownership information tell only a part of the story of our lives. The ways in which we conduct our lives—our lifestyles—are equally telling. Knowing lifestyles, recreation activities, and choices people make provides insights into what people consider important. Knowing what is important in people's lives translates directly into a better understanding of how they perceive natural areas. More importantly, that knowledge suggests pathways for interface education, outreach, and involvement programs.

Our research shows that southerners are not a great deal different from people in the rest of the country. Our analysis of the lifestyles of southerners indicates that they are more like, than unlike, people who live in other regions. **Table 2.3** reports percentages of residents 16 years or older in 5 regions of the country who regularly participate in 20 lifestyle activities. The source of data is the National Survey on Recreation and the Environment [Cordell and others, in press (b)]. These

activities (not including outdoor recreation, which is presented later) are ordered from the least to the most frequently pursued. Least frequently mentioned were belonging to an environmental group, running one's own business, owning a vacation home, and daily commuting to work more than 45 minutes one way. Most frequently mentioned lifestyle activities include using the Internet and the computer at home, recycling home waste materials, attending church, and caring for pets.

Outdoor Recreation Activities

A highly significant aspect of southerners' lifestyles and how they relate to forested lands is participation in outdoor recreation (Cordell and others 1999). For many, the only direct contact with the South's forests and wildlands is through outdoor recreation. As with other lifestyle activities, knowing which recreation activities people choose gives great insight into their interests, whereabouts, and paths for communication. Recreation and leisure are among the drivers of contemporary rural land settlement and development patterns. Living in the country, having land to recreate on, having a vacation home, and taking trips to tourist destinations are among the reasons people move and travel to rural areas. Examples of tourist destinations include ski resorts in the Southern Appalachians, golf resorts in coastal South Carolina, and camping and lodge resorts in highland areas throughout the region. Over time, these tourism destinations become the leading edge of the wildland-urban interface.

More than 95 percent of southerners participate to some extent in one or more outdoor recreation activities at some time during a typical year. **Table 2.4** displays percentages of the South's and of the United States' populations that participate in the listed recreation activities. By far the most popular activities are those that are relatively easy to do, require little monetary outlay or skill, and are readily accessible. These most popular activities include walking, going to outdoor family gatherings, visiting nature centers, sightseeing, and driving for pleasure. Activities with an emphasis on seeing and learning are prominent among the top one-third of activities in table 2.4. Trail activities, such as hiking, backpacking, and horseback riding, are among those in the middle one-third. More specialized, physically demanding, and skill- or equipment-intensive activities are among those with the lowest participation rates by southerners. In this group are activities occurring in snow and ice settings, which are prominent only at high elevations in the South.

Table 2.4—Recreation activity participation in the South and the United States, 2000

Activity	South	United States
	Percent of population	
Walk for pleasure	83.08	84.85
Family gathering outdoors	71.91	73.85
Visit nature centers	53.69	59.27
Sightseeing	53.04	53.98
Drive for pleasure	52.77	53.66
Picnic	49.73	57.34
View/photograph natural scenery	46.56	55.09
Visit historic sites	43.83	48.71
Swim in streams and lakes	42.35	44.38
View/photograph wildlife	36.83	41.05
View/photograph flowers, etc.	36.68	41.19
Visit the beach	36.45	39.96
All nature viewing/photography	35.92	41.68
Bicycling	35.03	41.63
Freshwater fishing	33.40	27.80
Visit a wilderness	31.11	35.45
View or photograph birds	27.47	30.07
Day hiking	27.43	36.48
Visit waterside besides beach	27.07	27.09
Gather mushrooms, berries, etc.	25.54	27.97
Motorboating	24.86	23.90
View or photograph fish	21.39	21.68
Outdoor team sports	21.33	22.51
Developed camping	20.70	26.83
Visit prehistoric sites	19.53	21.30
Drive off-road	17.81	17.01
Mountain biking	16.15	23.39
Saltwater fishing	13.82	7.90
Primitive camping	13.05	16.18
Hunting	12.77	10.54
Horseback riding	10.59	9.99
Jet skiing	10.03	8.85
Rafting	9.16	9.95
Water-skiing	8.72	7.92
Backpacking	8.61	12.15
Canoeing	7.51	10.23
Snorkeling	6.13	6.95
Downhill skiing	4.37	10.26
Sailing	3.99	5.43
Rowing	3.31	4.99
Scuba diving	2.14	1.77
Snowboarding	2.02	5.83
Kayaking	1.82	3.51
Surfing	1.48	1.52
Snowmobiling	1.36	7.06
Cross-country skiing	1.22	5.03
Windsurfing	.75	.85

Source: Cordell and others, in press (b).

Photo by Larry Korhnak, University of Florida

Figure 2.9
Birdwatching is one of the fastest growing outdoor recreation activities in the South with a growth rate of 13 percent per year.

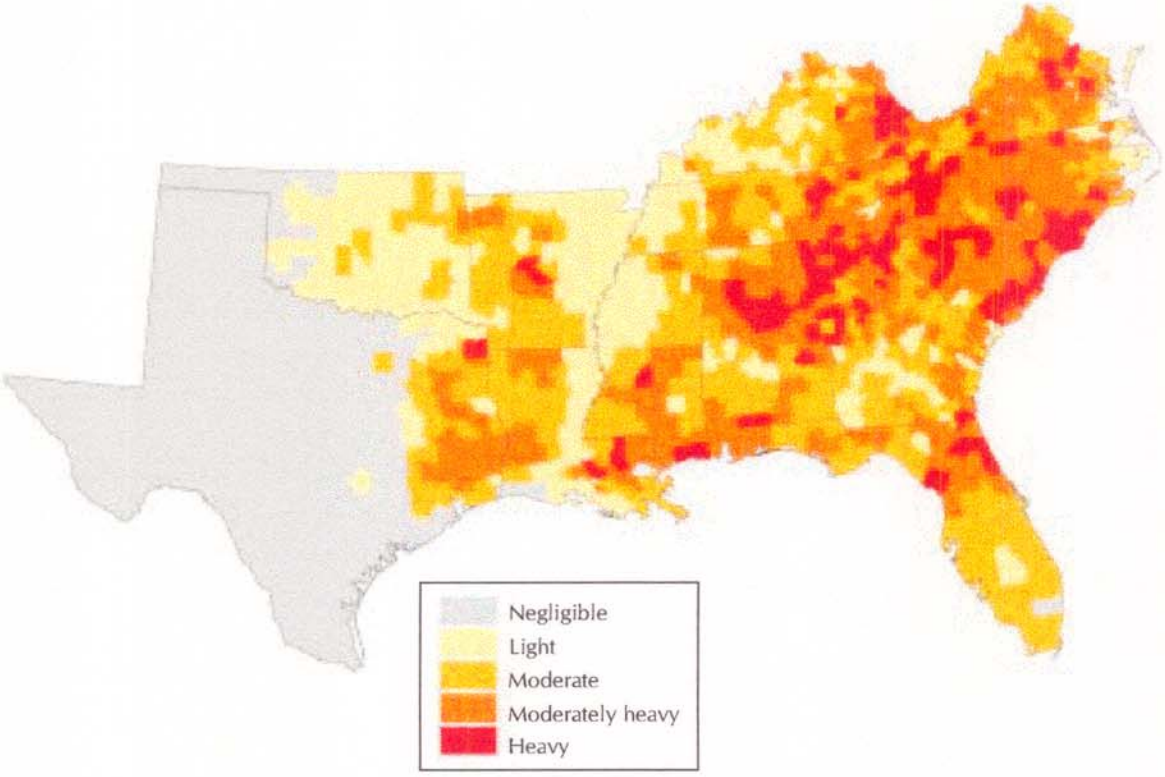
Approximately 69 million people 16 years old or older across the region participate in outdoor recreation to some extent. With this population growing at a rate of 1.3 to 1.4 percent per year, growth of outdoor recreation demand is virtually assured well into the future. What is most interesting, however, is that the growth rate among some activities is much higher than the population growth rate. Activities that are growing fastest are birdwatching (13.1 percent per year) (**fig. 2.9**), hiking on trails (10.9 percent), backpacking (9.2 percent), walking for pleasure (5.1 percent), off-road driving (5.0 percent), primitive camping (4.6 percent), developed camping (4.2 percent), and swimming in rivers, lakes, or the ocean (3.6 percent). Many of these activities occur in mostly rural, forested environments. Urban encroachment on rural forested environments, therefore, can have dramatic effects on opportunities for such activities. Availability of outdoor opportunities is an important lead indicator of demand pressures leading to growth of the wildland-urban interface in future years. This also results in direct pressures on natural resources and how they are managed (see chapters 5 and 6).

Recreation Demand Projections

Using three common outdoor activities as indicators—fishing, hiking, and camping—we examine projections developed to predict growth in number of days of participation for the South to 2020 (Bowker and others 1999). By 2020, days people spend are projected to rise 19 percent for fishing, 48 percent for hiking, and 68 percent for developed camping. Days of participation are forecast to grow faster than the population for about 60 percent of all activities tracked. Recreation demand growth, therefore, will add to urban expansion and to tourist development in rural parts of the region.

The Emerging Wildland-Urban Interface

This section presents the results of a geospatial analysis of land cover characteristics, population growth, and nonagricultural economic development. Cover characteristics include existing forest, public land, water and wetland, and wildlife habitat in southern counties. Projected population growth is in persons per square mile. Nonagricultural employment is used as an indicator of economic development. Conditions are projected to the year 2020. Details of data sources and data treatment can be found in Cordell and Overdevest (2001). The results of this analysis are summarized in six maps as follows: (1) forests and population growth, (2) forests and economic development, (3) forests and recreation demand growth, (4) public land and population growth, (5) water and wetlands and population growth, and (6) wildlife habitat and population growth. These maps collectively reflect the interdisciplinary nature of wildland-urban interface issues discussed throughout this Assessment.



Forests and Population Growth

Population is projected to grow across most counties of the South to 2020 and beyond. Growth will occur in many of the South's counties where forest land is still relatively abundant. Future growth in population will create a variety of pressures on forests, including demands for development, forest gathering, timber harvesting, recreation, and road building. In **figure 2.10**, the clusters of counties where these population pressures will be greatest are highlighted as "population hot spots." They include the Southern Appalachians, northcentral Alabama, the Piedmont of North and South Carolina, and coastal North and South Carolina. Other scattered hot spots of population pressure include northeastern Virginia and coastal Florida, Alabama, and Louisiana.

Figure 2.10
Projected ambient population pressures on forest, 2020. Population hot spots are where pressures on forests are expected to be heaviest.

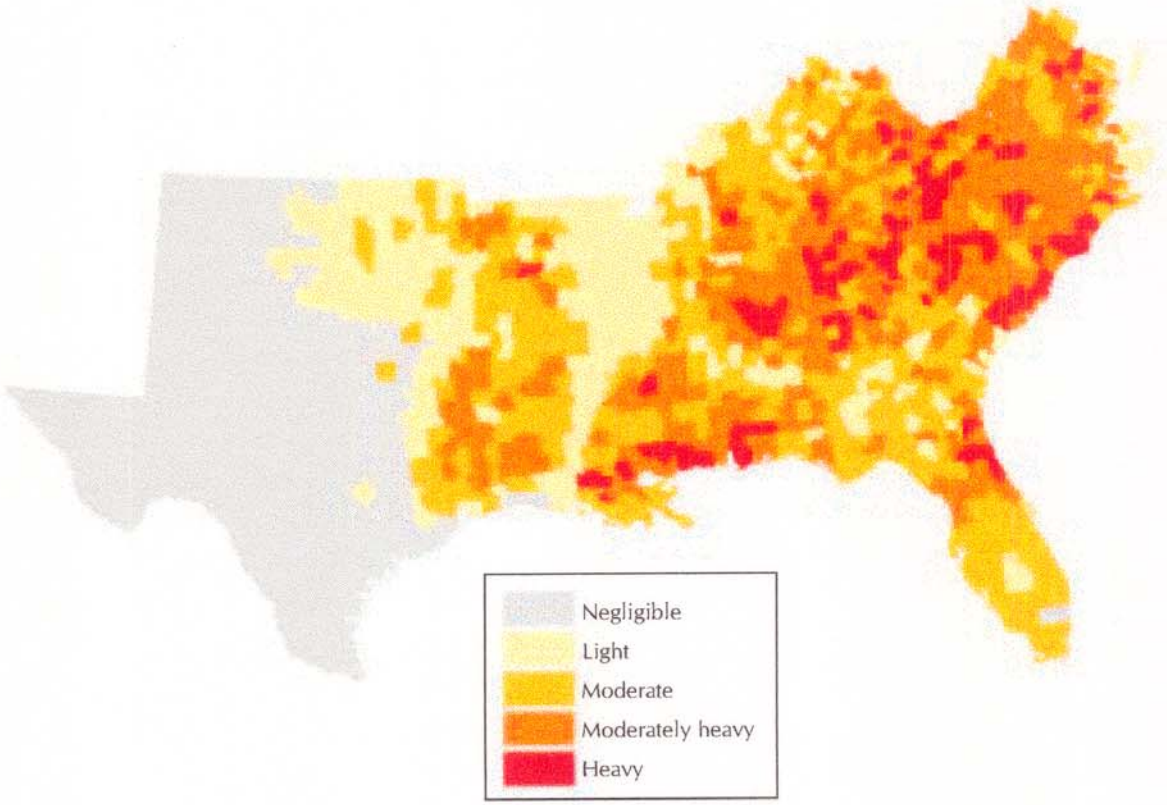


Figure 2.11
Projected ambient nonagricultural pressures on forest, 2020.

Forests and Economic Development

Figure 2.11 displays projected nonagricultural economic development in relation to locations with relatively abundant forest cover. The spatial pattern of coincidence between likely future economic development and forest cover is very similar to population growth and is spatially dependent on location of major highways, especially interstate highways. Differences include more pressure along the gulf coast of southern Mississippi and Louisiana.

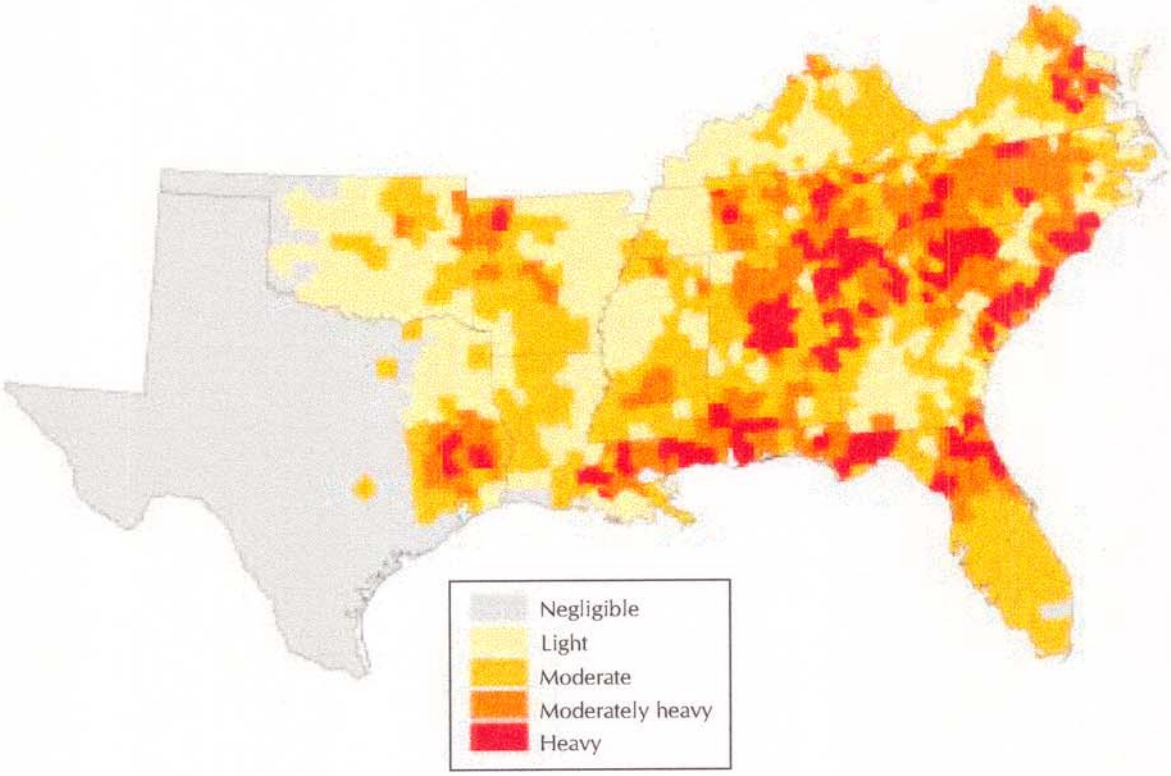


Figure 2.12
Projected ambient recreation pressures on forest, 2020.

Forests and Recreation Demand Growth

Growth in recreation demand puts direct pressures on forest land in the South (**fig. 2.12**) (Cordell and Tarrant, in press). Among those recreation activities considered are off-road vehicle use, camping, hiking, backpacking, fishing, and sightseeing. Hot spots of future recreation demand pressures include gulf coastal Florida, Alabama, Mississippi, and Louisiana; central Alabama; north Georgia; coastal South Carolina; and east Texas. Areas that experience high recreation demands typically end up being developed for tourism, and then ultimately into urban interface areas.

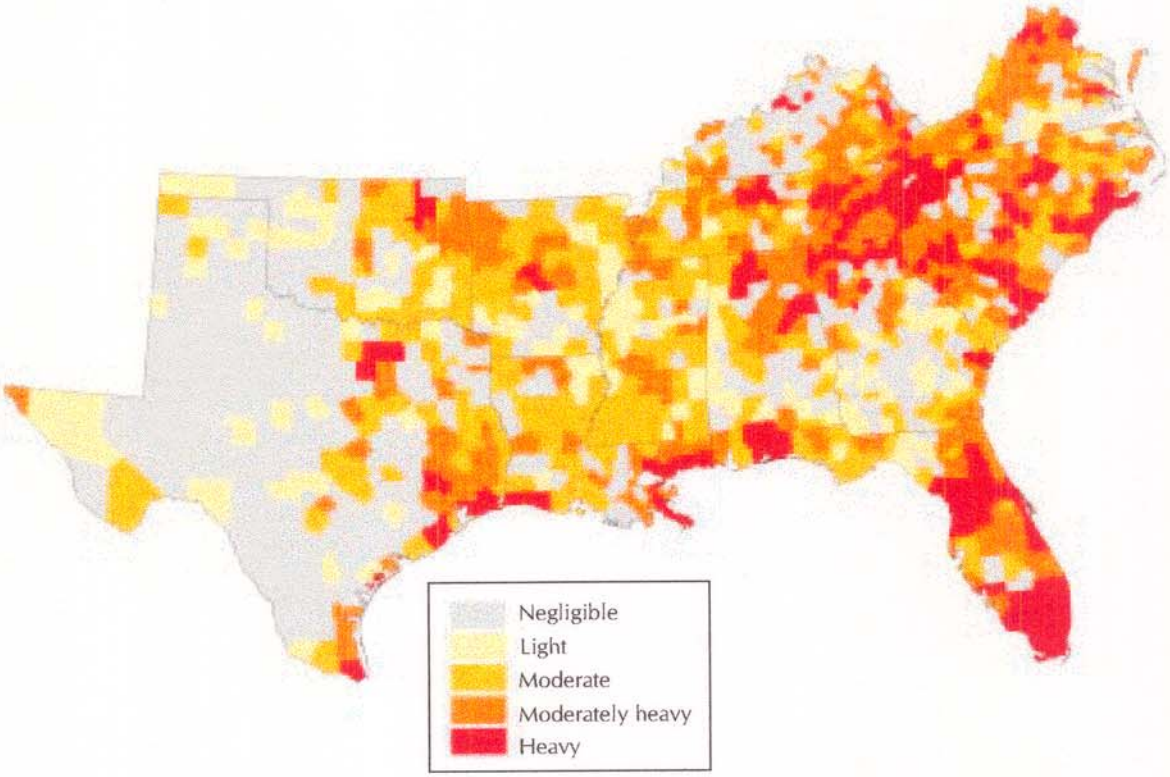


Figure 2.13
Projected ambient population pressures on public land, 2020.

Public Land and Population Growth

Most of the public land in the South is forested and makes major contributions to the amenity character of southern landscapes. Public land includes national forests, national parks, wildlife refuges, Federal reservoirs, and State parks and forests. Migration to high-amenity areas where these public lands are located is putting unprecedented pressures on public land managers. Hot spots where future population growth pressures are likely to be most pronounced can be seen in **figure 2.13**. Especially highlighted are south and central Florida, coastal Alabama, the Southern Appalachians, Cumberland Plateau area of Tennessee, northern Virginia, and coastal North Carolina.

"It seems like every woodlot is for sale, and everybody's looking for that piece of property that's close to public property. They develop and build around it." Florida

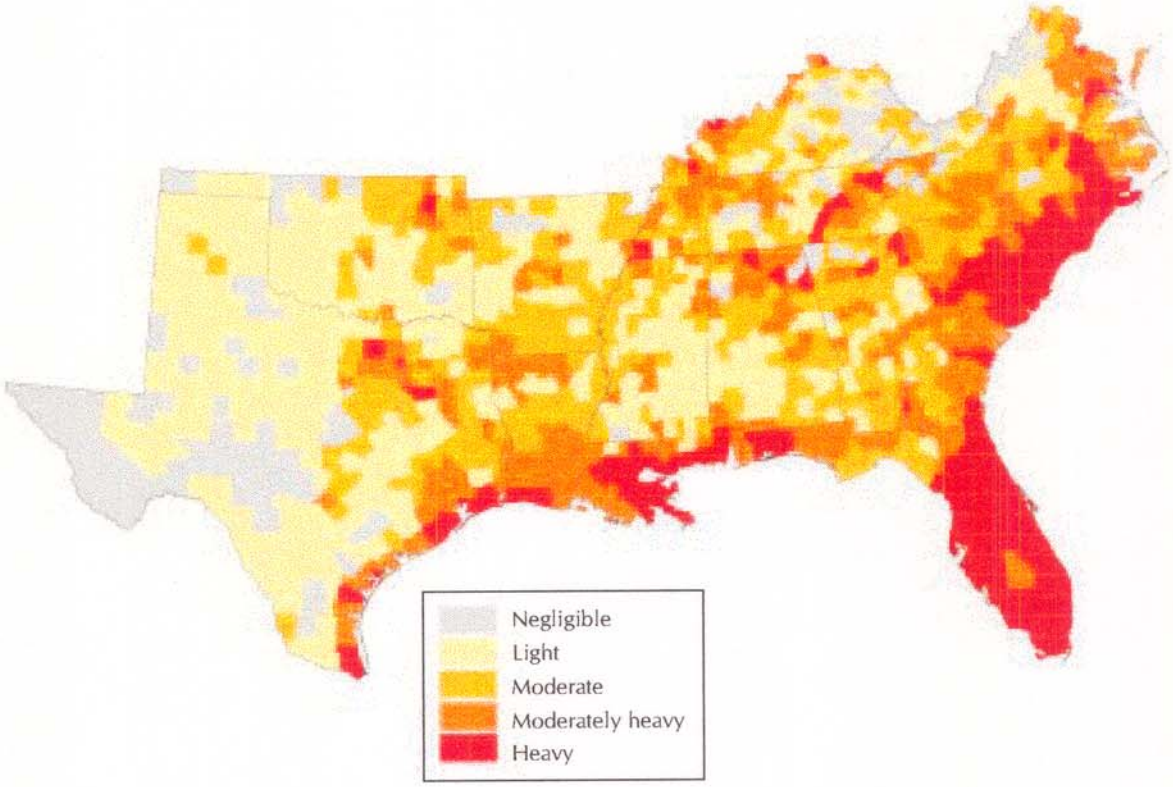


Figure 2.14
Projected ambient population pressures on water and wetlands, 2020.

Water and Wetlands and Population Growth

Water may become the most critical limiting natural resource anywhere in the region. Water shortages, which used to be associated only with the dry Western States, increasingly are a reality for the South. In **figure 2.14**, massive areas of future population pressure on aboveground water and wetland resources can be seen. Hot spots include eastern Virginia; the Coastal Plain of North and South Carolina; almost all of the Florida peninsula; coastal Texas, Louisiana, Mississippi, and Alabama; and a string of counties on the Cumberland Plateau in Tennessee.

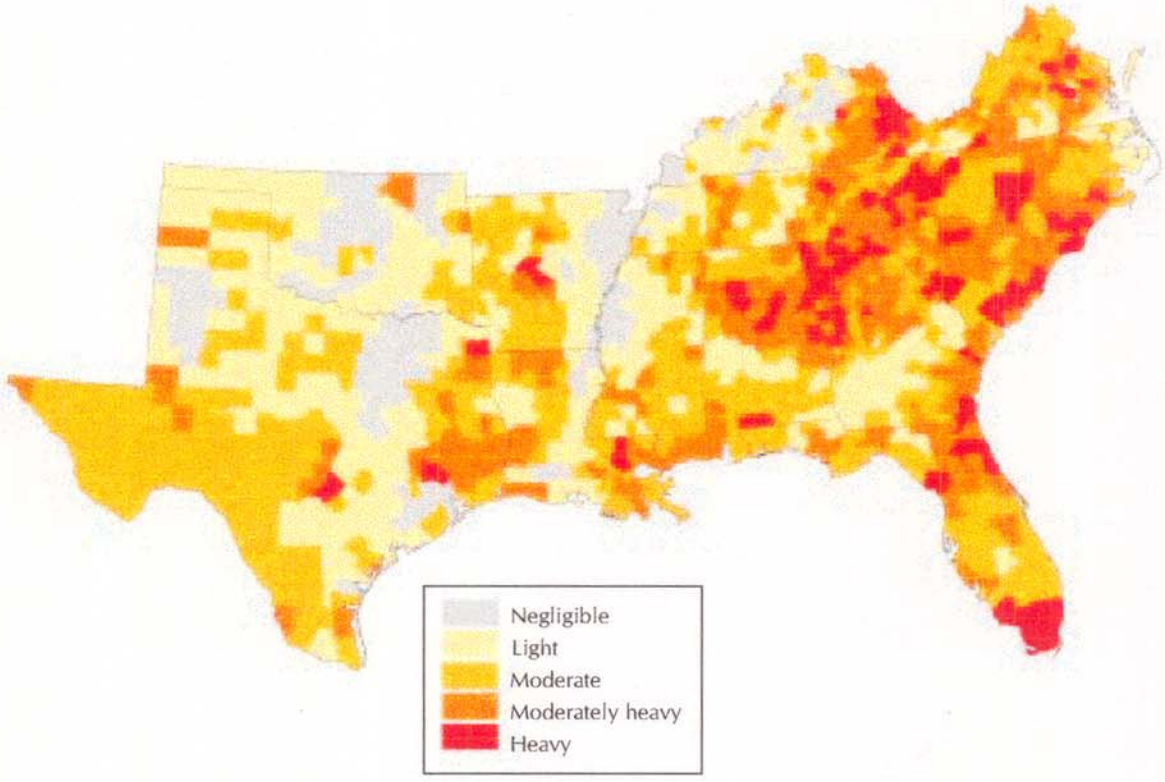


Figure 2.15
Projected ambient population pressures on wildlife habitat, 2020.

Wildlife Habitat and Population Growth

Figure 2.15 shows the distribution of projected population growth overlaid onto the relative abundance of wildlife habitat in the South. Wildlife habitat occurs where there is public land, a large stretch of forest or other undisturbed natural land, and wetlands. Of all the attributes of natural land in the South, wildlife habitat may be the most endangered by human growth pressures. Hot spots most noticeable include south Florida, coastal South Carolina, the Piedmont of North and South Carolina, and the Southern Appalachians.

Needs

Research

There is a critical need to know much more about the rapidly expanding sphere of human influence on the South's rural land and water. Specific areas of need include:

- An efficient system for accessing current data and information on changing population, demographics, economics, recreation demands, and other social trends affecting land uses and urbanization in the South.

- A way to identify the recreational importance and primary users of public land and other open spaces near urban areas in the South.
- Studies of urban residents' attitudes toward land uses and management.
- Data, Geographical Information Systems (GIS) capacity, indexing systems, and other tools for monitoring and forecasting urban expansion, economic development, recreation demands, and other human pressures that cause land use changes.
- Approaches and models for predicting the effects of urbanization and other land use changes in the South on the size, condition, and benefits flowing from urban, rural, and wildland-urban interface forests.

Education

Education will be one of the keys to sustaining forests and other natural land and water in the South. Rapid social, economic, and land use changes point to an urgent need for effective conservation education. To support education initiatives, information is needed about:

- Patterns and trends in urban and rural residents' knowledge, perceptions, and opinions about urban expansion and other southern land use issues, especially the effects of urban expansion on rural land, water, and wildlife as well as human communities.
- The knowledge, opinions, demographics, lifestyles, and other differentiating characteristics for segmenting urban and rural publics, including private landowners.
- Paths for communication across the broad spectrum of people making up the South's population and design of education modules specific to the paths and population segments identified.

Management

Management is interpreted here to mean the broad array of land use policies, incentives, regulations, and practices on public and private land and water in the South. The most critical management initiatives needed include:

- An array of policy approaches and incentives to influence land use decisions to favor sustainable management and conservation of natural land, water, wildlife habitat, open space, and forests.
- Timely guidelines for urban expansion that emphasize minimal land development, ecosystem disturbance, water consumption, and forest fragmentation.
- Effective and lasting coalitions of public and private interests, including developers and urban and rural landowners.
- Giving emphasis to areas of the South identified as hot spots, a system for continuously monitoring attitudes and values and using the results to develop mutually acceptable strategies for accommodating growth while sustaining natural ecosystems.

Tools

Tools for addressing wildland-urban interface research, education, and management must be developed jointly with the wide array of research, conservation education, and management organizations and agencies in the South. Generally, tools would include:

- A consortium of Federal, State, and university research institutions and agencies that would help strengthen and focus resources and expertise in areas such as urban forestry, demography, recreation, wildland protection, ecosystem monitoring, GIS development, land use, wetlands, wildlife, and economics.
- Linking with existing population survey efforts and developing dissemination approaches for keeping researchers, educators, decisionmakers, legislators, and managers current on trends in people's values, opinions, demands, and movements.
- Models for forecasting change scenarios and interactions among population, ethnic makeup, economic growth, recreation/tourism demand, land development, natural cover, and land uses.

Conclusion

Population, demographics, recreation demands, and other social trends are key factors affecting land use and urbanization in the South. Understanding these trends and projections of change is important for identifying where human pressures will have the greatest effects on natural resources and their management in the future.

Literature Cited

Barrick, J; Zayatz, T.A. 1996. Short-range actuarial projections. Actuarial Study 111. Washington, DC: Social Security Administration, Office of Actuarial Studies. (December). 237 p.

Bowker, J.M.; English, D.B.K.; Cordell, H.K. 1999. Projections of outdoor recreation participation to 2050. In: Cordell, H.K.; Betz, C.J.; Bowker, J.M. [and others], eds. Outdoor recreation in American life: a national assessment of demand and supply trends. Champaign, IL: Sagamore Publishing: 323-350.

Cordell, H.K.; Betz, C.J.; Bowker, J.M. [and others], eds. 1999. Outdoor recreation in American life: a national assessment of demand and supply trends. Champaign, IL: Sagamore Publishing. 449 p.

Cordell, H. Ken; Green, Gary T.; Betz, Carter J. [In press (a)]. Recreation and the environment as cultural dimensions in contemporary American society. Leisure Sciences 2002 [Special issue].

Cordell, H.K.; Green, G.T.; Leeworthy, V.R. [and others]. [In press (b)]. The national survey on recreation and the environment—NSRE 2000: the United States' eighth national recreation survey. In: Free time and leisure participation-international perspectives. Oxford, England: CAB International.

Cordell, H.K.; Overdevest, C. 2001. Footprints on the land: implications of population and economic growth for this country's natural lands. In: Footprints on the land: an assessment of demographic trends and the future of natural resources in the United States. Champaign, IL: Sagamore Publishing: 229-284. Chapter 8.