

Section III. Socioeconomic Condition

Two general frameworks have been used to examine relationships between socioeconomic conditions and health outcomes: *compositional* and *contextual*. Compositional approaches focus primarily on the socioeconomic and behavioral characteristics of individuals and their associated health outcomes. Individual socioeconomic characteristics are typically defined along measures of socioeconomic status (SES). Common measures of socioeconomic status include income, educational attainment, and occupation (Adler and Ostrove, 1999). Strong relationships have long been recognized between individuals of lower economic status and more adverse health outcomes. However, strong relationships do not exist for all diseases and are not uniform for all populations defined by ethnicity, gender, age, and geography. Nor is there a clear understanding of how SES influences the health outcomes of more disadvantaged individuals. Theoretically, individuals of lower economic status are at greater risk of poor health because they suffer from some level of *deprivation* that results in lack of basic needs (food, clothing, housing), access to medical care and resources, access to recreational/physical activities, employment opportunities, etc. In addition, individuals who suffer from various forms of deprivation may be more likely to adopt higher risk health behaviors (Winkleby *et al*, 1999).

However, the influence individual SES has on individual health outcomes may be mediated by other factors such as ethnicity and gender, as well as the quality and extent

of social, economic, and medical care infrastructures that exist in different places.

There is a growing awareness in the public health community that a person's health (both physical and mental) is linked to contextual circumstances and events in addition to the influence of individual risks. Contextual approaches examine the social and economic conditions that affect all individuals who share a particular environment: the *social environment*. (Kaplan, 1999). The variation in social landscapes in the U.S. and Appalachian region reflects underlying differences in the contexts in which regions and local areas have developed and adapted to changes over time. Distinct geographic variability in health outcomes suggests that contextual differences across geographic space may influence the overall health of regional and local populations.

In general, the Appalachian region has lagged economically from other parts of the U.S. Relatively high levels of unemployment, low regional incomes, and educational deficits continue to contribute to a lower standard of living than enjoyed in many areas of the U.S. (Isserman, 1997). However, there are significant levels of socioeconomic diversity within Appalachia. For example, metropolitan areas in the region have more diversified economies, higher per capita incomes, and greater access to medical care than non-metropolitan areas (Barnett *et al*, 1998). Local socioeconomic differences within the Appalachian region are likely to be key contributors to disparities in health outcomes with those areas having diminished access to social, economic, and medical care resources experiencing more adverse outcomes. However, direct associations are also likely to vary throughout the region.

The data and analyses presented in this section are intended to reveal *potential* associations between county-level health outcomes and prevailing socioeconomic conditions. We did not measure comprehensive associations, but provide a basis from which to chart further work relating socioeconomic conditions to health outcomes in the region.

In this study we examined a number of specific indices which describe the socioeconomic conditions of counties in the Appalachian region including rurality, unemployment, income, poverty, and education. In part, these variables represent indicators of relative access to medical care, with more rural and low income areas more likely to have diminished access.

While related to individual SES indicators, collective indices of socioeconomic status help to define the general socioeconomic condition of local populations. These socioeconomic conditions provide the social context within which institutions and regulatory systems are developed that are related to health care, education, public safety, working conditions, and local and regional economic development. We were not able to break out the socioeconomic variables used in this analysis by ethnicity, gender, and age and therefore cannot control such variations at the county-level for socioeconomic data as we have done for the health disparities data. While region-wide these variables are highly correlated, local differences in the interaction of these variables may help to explain differential public health outcomes among counties which are similar on a single (or several) indicators. Where possible a temporal comparison has been made to clarify local socioeconomic changes that have taken place over the study period.

Data and Methods

The primary data resources for this section are the 1990 and 2000 census. Additional information was obtained from the Area Resource File (February 2001 release). The Area Resource File (ARF) was compiled by the National Center for Health Workforce Information & Analysis, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services. Data were analyzed for the years 1990 and 2000 census years. The year 1990 represents the baseline from which mortality data were analyzed in Section I. In addition to the 1990 census data, the 2000 data are representative of prevailing socioeconomic conditions that may have influenced the hospitalization rates derived from the HCUP data in Section II. The analyses of both the 1990 and 2000 census help to reveal important ways in which local areas are changing with respect to socioeconomic condition and may highlight regions and specific areas that have experienced both beneficial and adverse socioeconomic change.

The following variables were extracted for each of the 406 Appalachian counties, and for the basis of comparison, non-Appalachian U.S. counties:

- Percent Urban Population
- Population per Square Mile
- Unemployment Rate
- Per Capita Income
- Median Family Income
- Percent of Persons Living Below the Poverty Level
- Percent of Persons 25 years and older with at least a high school diploma
- Percent of Persons 25 years and older with a college degree

Generally, 1990 represents the baseline “exposure” period for subsequent health outcomes, i.e. there is a lag-time between conditions which exist for a particular time and outcomes which may result from these conditions. Many of these socioeconomic variables do not show dramatic fluctuations over relatively short periods of time and, as a result, likely reflect contemporary conditions as well as those in the recent past. For those variables that do change or fluctuate over time the relative differences between counties remain, with some exceptions, fairly consistent.

The data in this section are intended to address potential associations between socioeconomic condition and health status. We have not attempted to analyze specific associations. Although, some variables may appear in this analysis to be associated with comparable measures of health status, additional analysis is required.

Population Distribution

Two general variables are utilized here to reflect the distribution of the population among counties within the region: Percent Urban Population and Population per Square Mile. The Census Bureau defines urbanized areas as those which have a population concentration of at least 50,000 inhabitants, generally consisting of a central city and the surrounding, closely settled, contiguous territory. Included in the urban population are persons living in places of 2,500 or more inhabitants outside urbanized areas. Population per square mile is an indicator of overall population density within each county.

Together these variables reveal the location of major population centers within the region (see maps on pages 174 and 175), as well as a general lack of many major metropolitan areas. Major metropolitan areas are typically those areas with the most well-developed socioeconomic and public health infrastructures. In addition, these variables provide some important clues about the general distribution of the population within each county. In places where the percent urban population is low, many people are likely to be distributed in relatively isolated rural areas, and there are several potential implications of these distributions that may have an impact on public health outcomes. Populations that are distributed in relatively isolated locations are also more likely to have reduced access to medical care facilities that are more typically found in urban settings. Transportation infrastructures and access to public transportation are more likely to benefit urban residents than rural counterparts.

Unemployment

Rates of unemployment are calculated as the number of people actively seeking work divided by the total number of people in the civilian labor force. High rates of unemployment have been shown to be highly correlated with adverse public health outcomes (Brenner, 1987). For individuals, unemployment may result in economic hardships that limit lifestyle choices, options for health insurance, as well as access to medical care resources. When communities suffer persistently high rates of unemployment, social infrastructures that serve these communities may be difficult to establish and those that exist may break down. In addition, unemployment is

a key indicator of local and regional development. However, the true burden of unemployment is hard to estimate due to the fact that standard unemployment definitions do not include the long-term unemployed, often referred to as discouraged workers, or those individuals who are not seeking work due to disability.

In 1990, the U.S. average unemployment was 6.3%. In Appalachia the average unemployment was 6.8%. County-level unemployment rates ranged from 2.0% to 25.5% in among non-Appalachian U.S. counties and from 2.7% to 21.9% among counties within the Appalachian region. The county distribution of unemployment rates for both non-Appalachian and Appalachian counties are shown in Figures 1 and 2 for the years 1990 and 2000. While the disparities in unemployment rates among non-Appalachian counties in the U.S. had increased between 1990 and 2000 (as indicated by the range of values in the respective years), the disparities in unemployment among Appalachian counties appears to have decreased. However in both years, Appalachia had a higher proportion of counties represented by higher rates of unemployment than non-Appalachian U.S. counties.

The geographic distribution of county unemployment rates for the years 1990 and 2000 are shown on the maps on page 176. In 1990 clusters of counties with high rates of unemployment, relative to other counties in the region, are evident primarily in Central West Virginia, Southeastern Ohio, and Eastern Kentucky. Despite an apparent decrease in unemployment rates, as indicated by the distribution of values for the year 2000, there appears to be a persistence of relatively high unemployment among counties in Central West Virginia, Southeastern Ohio, and Eastern Kentucky.

Per Capita Income

Per capita income represents the income for all wage earners divided by the total population. Geographic differences in per capita income reflect differences in wage levels across the region and may also reflect differential access to social, economic, and medical care resources. Higher incomes generally mean more money is put into local economies, which enhances the economic vitality of local areas and the region as a whole. In 1990, the U.S. per capita income was \$14,420 compared with \$11,673 for Appalachia. In 1990, per capita income for non-Appalachian U.S. counties ranged from \$3,417 to \$28,381. For Appalachia counties 1990 per capita incomes ranged from \$5,152 to \$24,833. In 2000, U.S. per capita income had risen to \$21,587 and Appalachia's per capita income rose to \$18,230. For non-Appalachian U.S. counties ranged from \$5,213 to \$44,962. For Appalachia counties, 2000 per capita incomes ranged from \$9,716 to \$29,144.

The distributions of county-level per capita income values for 1990 and 2000 are shown in Figures 3 and 4 respectively. It appears over this period of time that the distributions of per capita incomes among Appalachian counties have become slightly more commensurate with counties outside of Appalachia. However, Appalachian counties continue to be more represented in the lower income categories than non-Appalachian U.S. counties. The maps on page 177 show the geographic distribution of per capita incomes in the Appalachian region for both 1990 and 2000. While the absolute per capita income values have

increased between 1990 and 2000, the relative geographic distribution of income appears to have changed very little. Concentrations of low per capita income counties, relative to other Appalachian counties, have persisted primarily in Eastern Kentucky and Central and Southern West Virginia.

Figure 1.

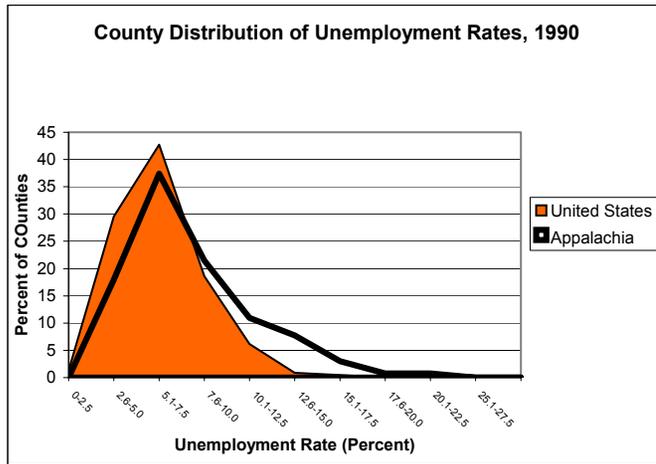


Figure 2.

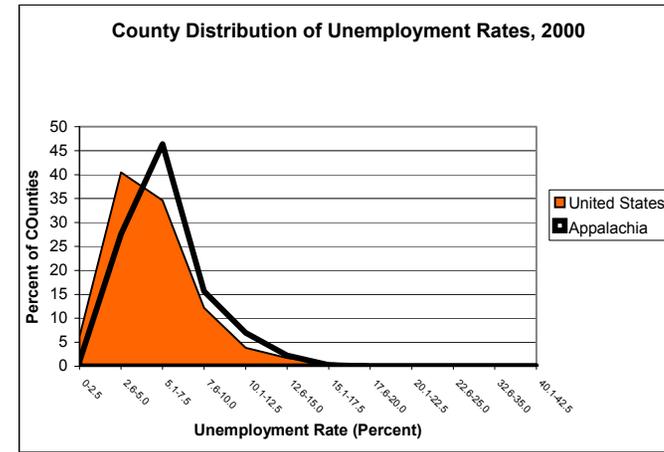


Figure 3.

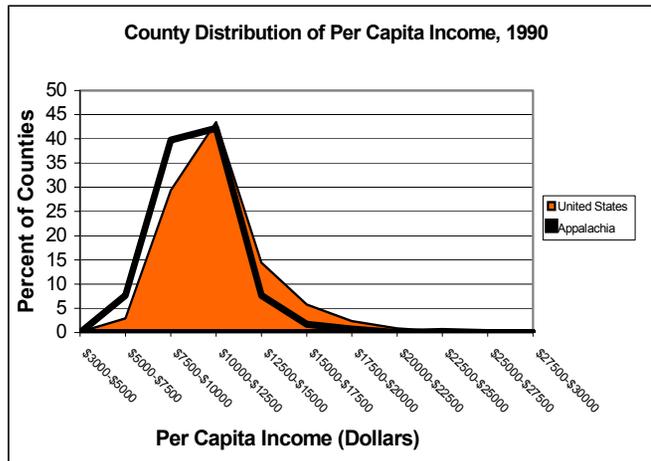
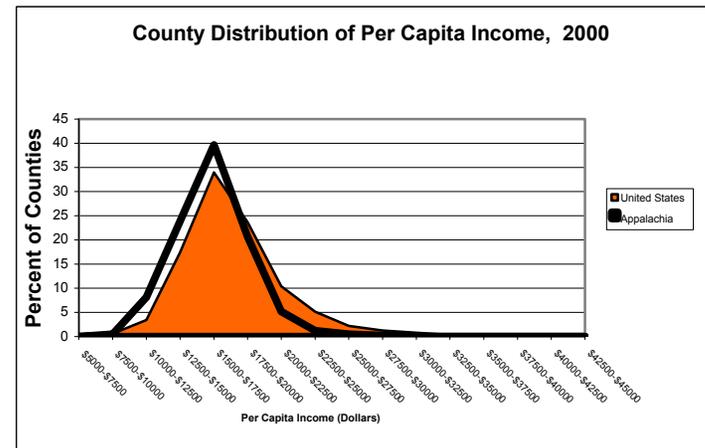


Figure 4.



Median Family Income

Family income is the sum of income received by all family members in a household. Median family income indicates that point at which incomes of half of the families are higher and half are lower. While not directly comparable to per capita income, median family income provides a better understood measure of income relating to families rather than individuals.

In 1990, the median family income for non-Appalachian U.S. counties ranged from \$10,903 to \$65,201. For Appalachian counties, median family income range from \$11,110 to \$48,000 in 1990. In 2000 the median family income for non-Appalachian U.S. counties ranged from \$14,167 to \$97,225. For Appalachian counties, median family income range from \$18,034 to \$74,003 in 2000. The graphs in Figures 5 and 6 show the county distribution of median family income for U.S. and Appalachian counties for the years 1990 and 2000.

The distributions for U.S. and Appalachian counties are very similar for both years, with the majority of counties in both instances having similar median family income values. However, Appalachian counties tend to be represented more in the lower income ranges than in the higher ranges compared with U.S. counties outside of Appalachia. The maps on page 178 show the geographic distribution of median family incomes for 1989 and 1997. The geographic distribution of median family incomes is very similar to the distribution of per capita income, with lower incomes being represented by counties in the Central Appalachian counties in Eastern Kentucky, and Central and Southern West Virginia.

Percent Living Below Poverty Level

Poverty statistics provide a basic indicator of the socioeconomic status of populations within given areas. In general, poverty is one of the most important social determinants of disease. While poverty does not influence all diseases in the same way, strong positive relationships have been consistently shown between poverty and cardiovascular diseases, gastrointestinal disease, chronic respiratory disease, as well as other adverse health outcomes, and accidental and violent deaths (Adler and Ostrove, 1999). Typically, individuals who live in poverty have limited lifestyle choices and may therefore be more susceptible to disease risk factors than those individuals with more economic resources. In addition, individuals who live in poverty are less likely to have access to high-quality healthcare, education, and health information.

Individuals are classified below poverty if their total individual income was less than the poverty threshold specified for the applicable family size, age of householder, and number of related children under 18 present as defined by the federal government's official poverty definition (U.S. Census Bureau). For example, the 1990 poverty threshold for an individual, under the age of 65 and with no children, was \$6,268. In 2000 the threshold for this same individual was \$8,259. Poverty thresholds defined by the federal government apply equally to all areas of the country and do not account for geographic variations in the cost-of-living.

In general, areas with high rates of poverty tend to be associated with high rates of disease mortality and morbidity. However, the calculation of poverty thresholds and local

variations in costs-of-living may limit comparability between poverty status and health outcomes for some areas. Despite this limitation, poverty statistics provide a general indication of areas with high proportions of people living with relatively lower socioeconomic status.

Poverty rates in non-Appalachian U.S. counties ranged from 0.0% to 63.1% in 1990. For Appalachian counties, poverty rates ranged from 3.2% to 52.1% in 1990. In 2000, the range of poverty rates decreased in both non-Appalachia counties and Appalachian counties ranging from 0.0% to 56.9% and 5.2% to 45.4% respectively. Figures 7 and 8 show the distribution of poverty rates for both non-Appalachian U.S. counties those within the Appalachian region.

For each year, the shape of the two distributions is very similar. However, Appalachian counties tend to be more represented in the higher poverty rate categories. The maps on page 179 show the geographic distribution of poverty rates for Appalachian counties. The geographic distribution of poverty rates is very similar to the distribution of per capita income and median family income with higher poverty rates being represented by counties in the Central Appalachian counties in Eastern Kentucky, and Central and Southern West Virginia. In general, it appears that high rates of poverty are associated with highly rural areas.

Educational Attainment

Educational attainment is a commonly used measure of *human capital*. Human capital refers to the "knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-

being" (OECD, 2001). While educational attainment is linked to income earning ability, it may also encompass factors that reflect the broader values associated with a healthy population.

We have examined two variables in this study that describe educational attainment levels; the percent of persons 25 years and older with at least a high school diploma, and the percent of persons 25 years and older with a college degree. Persons who complete higher levels of education are more likely to achieve economic success than those who have not. Although many jobs have minimum educational requirements, completing more years of education may increase job potential and thereby protect against unemployment. In general, higher levels of educational attainment lead to higher wages and income as well as jobs with opportunities for advancement. Educational attainment is not only related to economic well-being but also socio-emotional well-being.

Dramatic differences in educational attainment are evident among counties in the U.S. and Appalachia. In 1990, the percent of persons with at least a high school diploma in non-Appalachian U.S. counties ranged from 31.6% to 95.5% and from 35.5% to 87.2% for Appalachian counties. In the same year the percent of persons with a college degree ranged from 3.7% to 53.4% among non-Appalachian counties and from 3.7% to 41.7% among Appalachian counties. By the year 2000, the ranges of values for both indicators show significant improvement. In 2000, the percent of persons with at least a high school diploma in non-Appalachian U.S. counties ranged from 34.7% to 97.0% and from 49.2% to 91.4% for Appalachian counties. The percent of persons with a college degree ranged from 4.9% to 60.5% among non-Appalachian

counties and from 5.6% to 47.6% among Appalachian counties.

Figure 5.

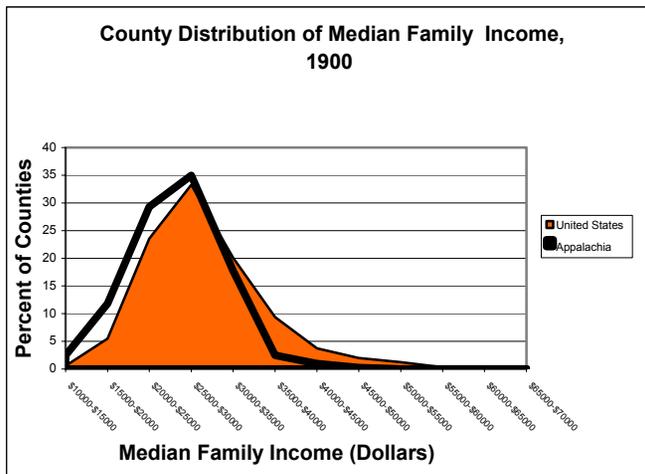


Figure 7.

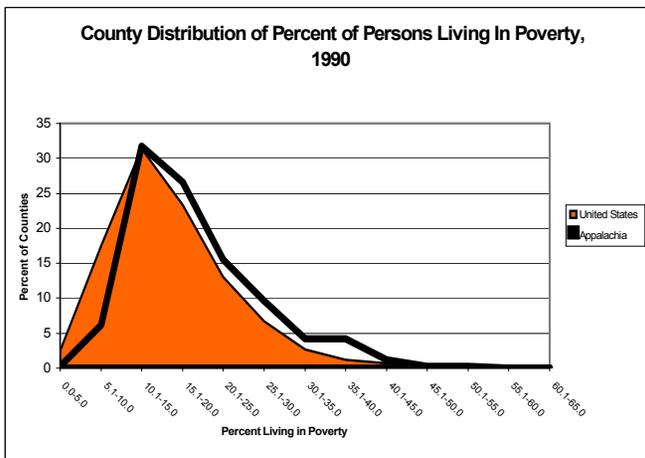


Figure 6.

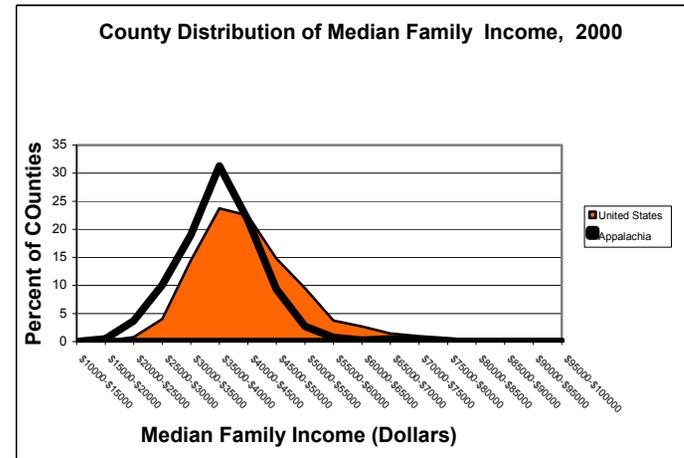


Figure 8.

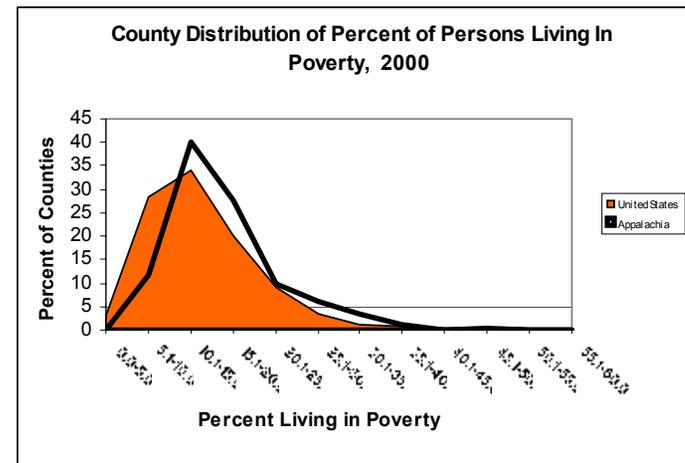


Figure 9.

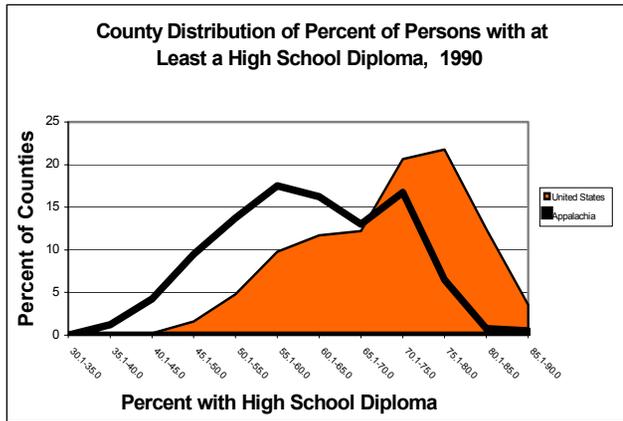


Figure 10.

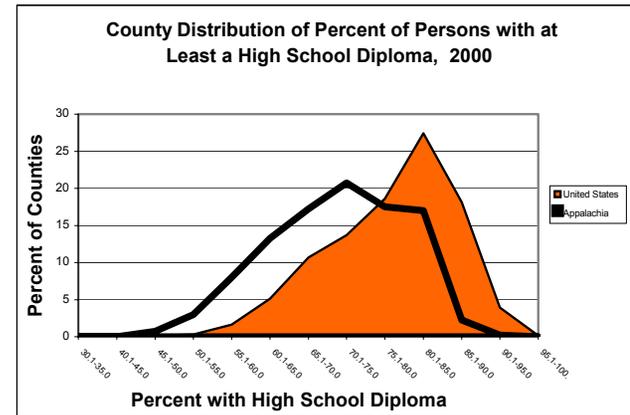


Figure 11.

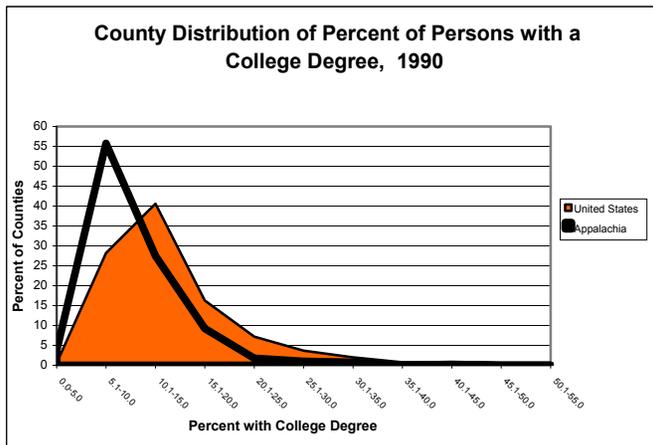
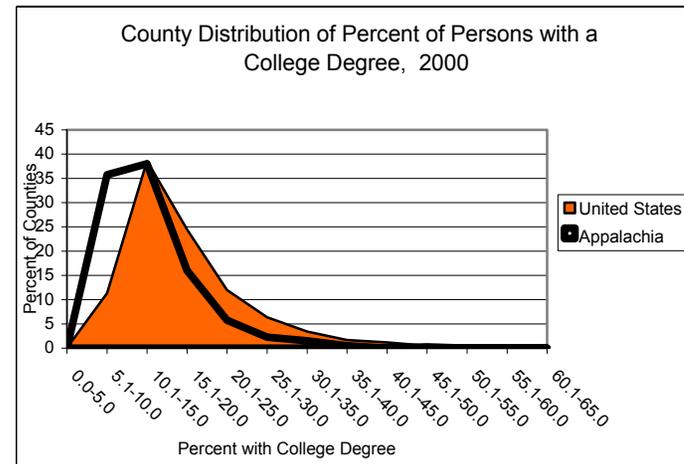


Figure 12.



The county distributions for these indicators of educational attainment are shown in Figures 9-12. Deficiencies in educational attainment are evident in the Appalachian region (relative to the non-Appalachian U.S.) In 1990, Appalachian counties were more represented in lower percentages with both high school diplomas and college degrees when compared to non-Appalachian U.S. counties. Despite improvements in educational attainment for all U.S. counties by the year 2000, the Appalachian region has, in general, continued to lag behind much of the country.

The maps on pages 180 and 181 show the geographic distribution of educational attainment for these two indicators. Low educational attainment is prevalent in Central Appalachia in Eastern Kentucky, Southern West Virginia, Eastern Tennessee, and Western Virginia. These areas correspond quite well to areas which are very rural, have high levels of unemployment and low income levels.

Summary

This section examined a number of socioeconomic indicators that reflect contextual circumstances that exist among county populations in Appalachia.

The Appalachian region is highly rural, with few major metropolitan areas, and a significant portion of the population resides outside of urban areas. Relative to the non-Appalachian U.S., Appalachian counties are generally more represented by more adverse socioeconomic conditions. Appalachia has a greater proportion of counties with higher unemployment rates and levels of poverty, lower incomes, and lower levels of

educational attainment. However, there remains considerable variability within the region. Counties in the Central Appalachian region, consisting of counties in Eastern Kentucky, Southern West Virginia, and Western Virginia, generally experience more adverse socioeconomic conditions compared to counties in other parts of the region.

General socioeconomic improvements within the region between 1990 and 2000 are suggested by increased levels of educational attainment and income, as well as lower levels of poverty. However, relative socioeconomic disparities among counties within the region seem to persist over this time period.

There may be associations between certain socioeconomic indicators and health outcomes in the region. For example, the central part of the Appalachian region experiences adverse health outcomes for many diseases in addition to having generally higher rates of unemployment and poverty, as well as lower incomes and levels of educational attainment. However there does not appear to be consistent relationships between socioeconomic variables and health outcomes region-wide, i.e. many counties that have more adverse socioeconomic conditions do not appear to have comparable adverse health outcomes. We are currently developing methods to evaluate associations between health status and socioeconomic conditions across the region.

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Population Density

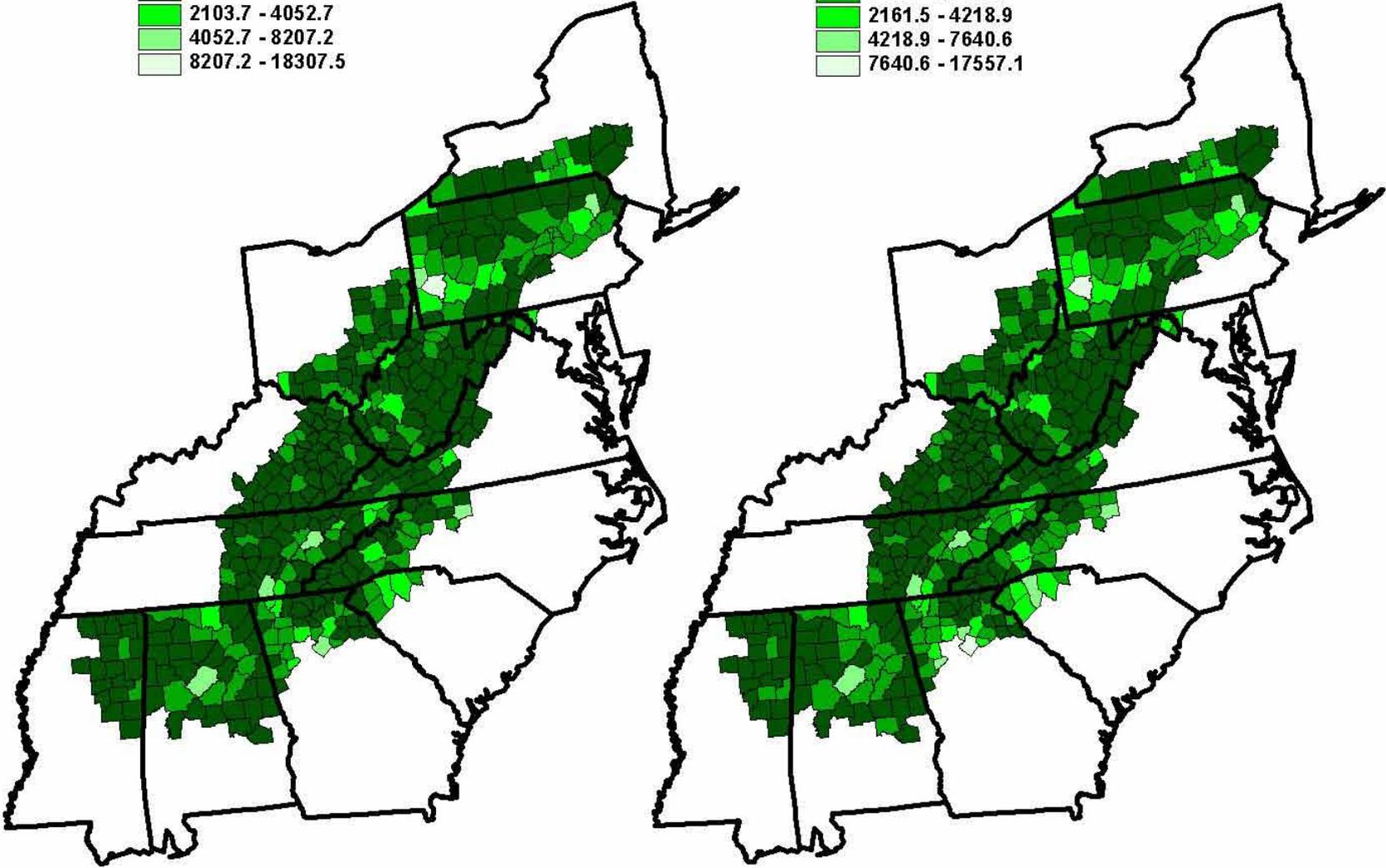
1990

Persons per Square Mile

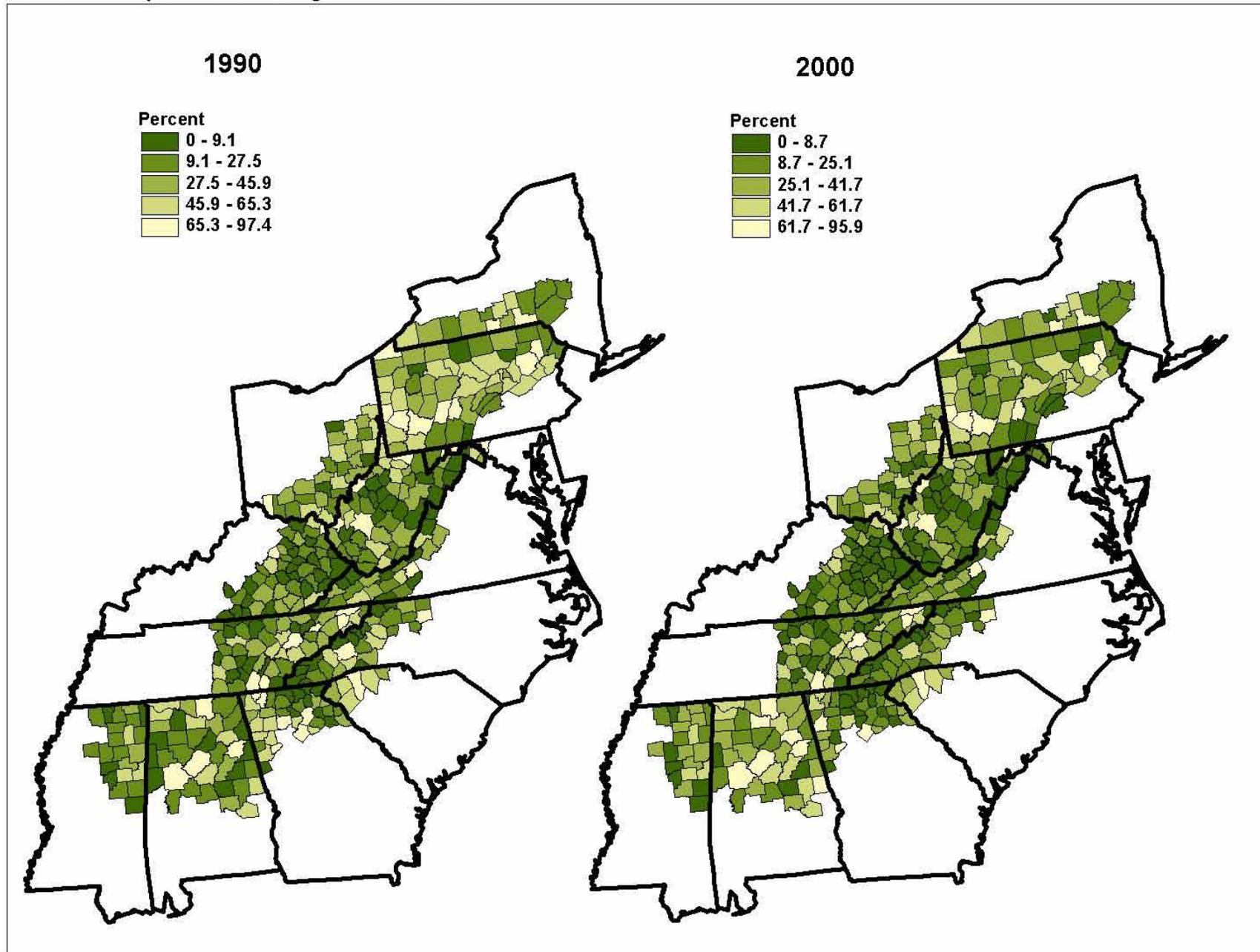


2000

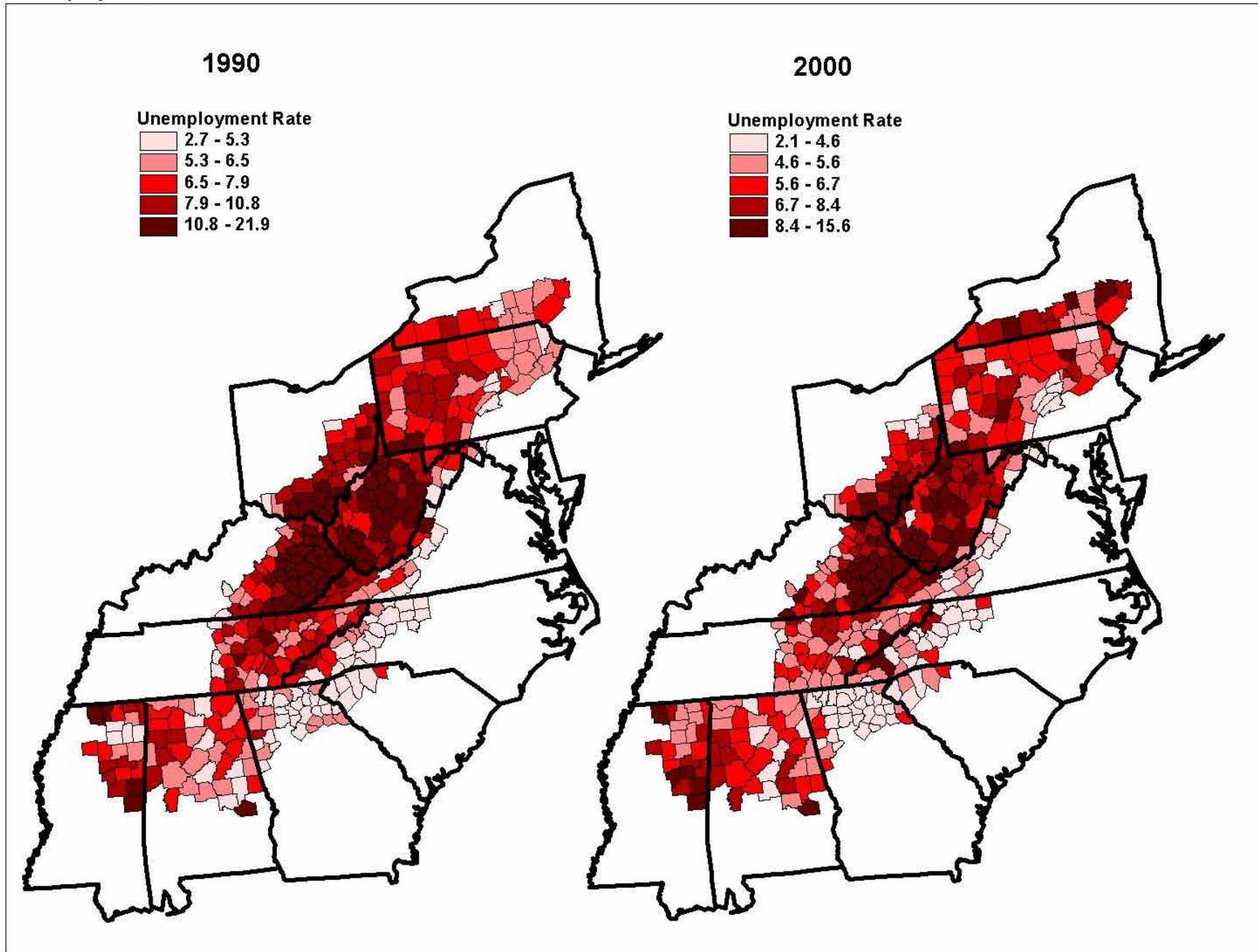
Persons per Square Mile



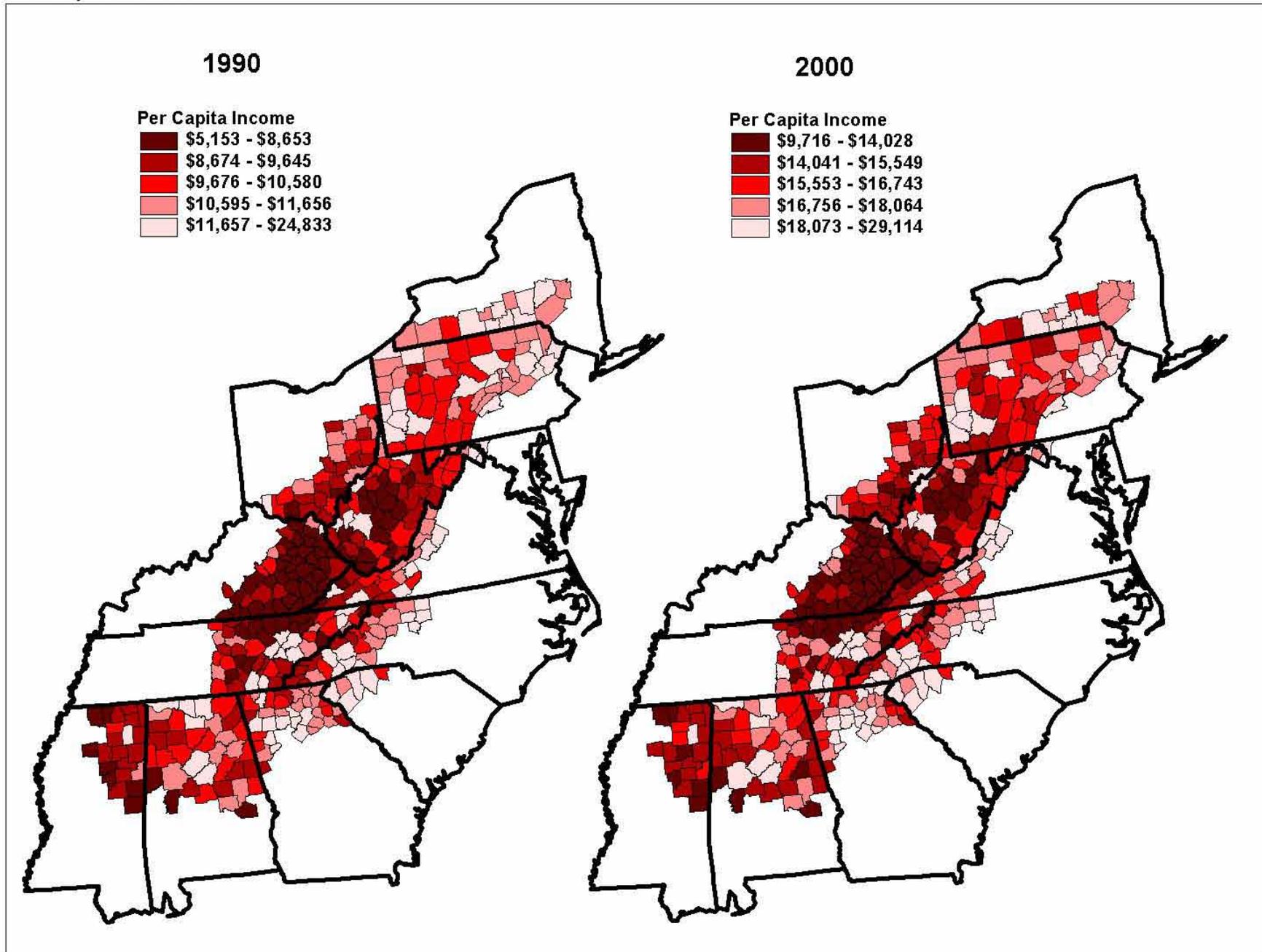
Percent of Population Residing in Urban Areas



Unemployment Rate



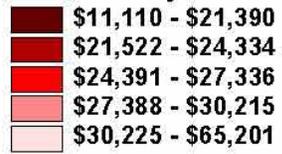
Per Capita Income



Median Family Income

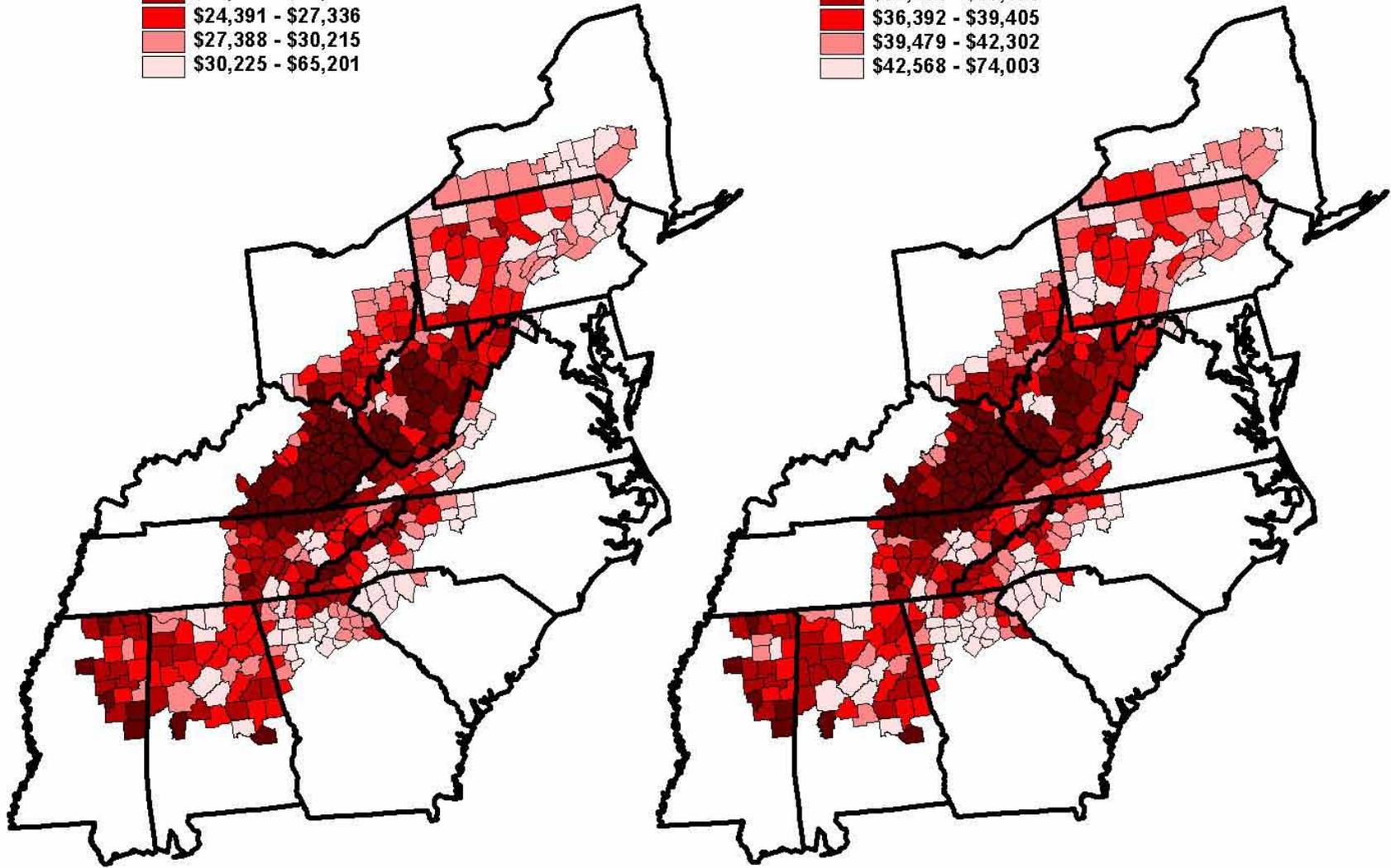
1990

Median Family Income



2000

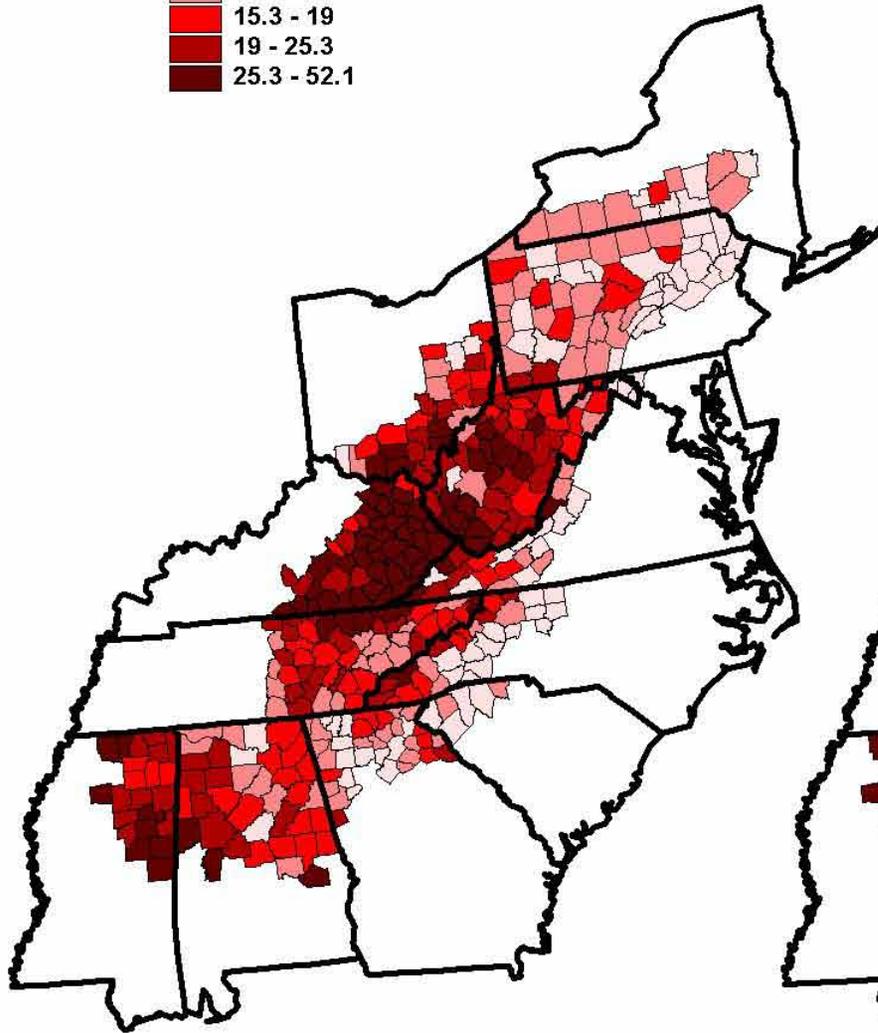
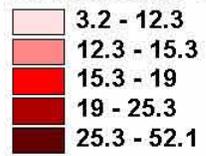
Median Family Income



Percent of All Persons Living Below the Poverty Level, 1990 and 2000

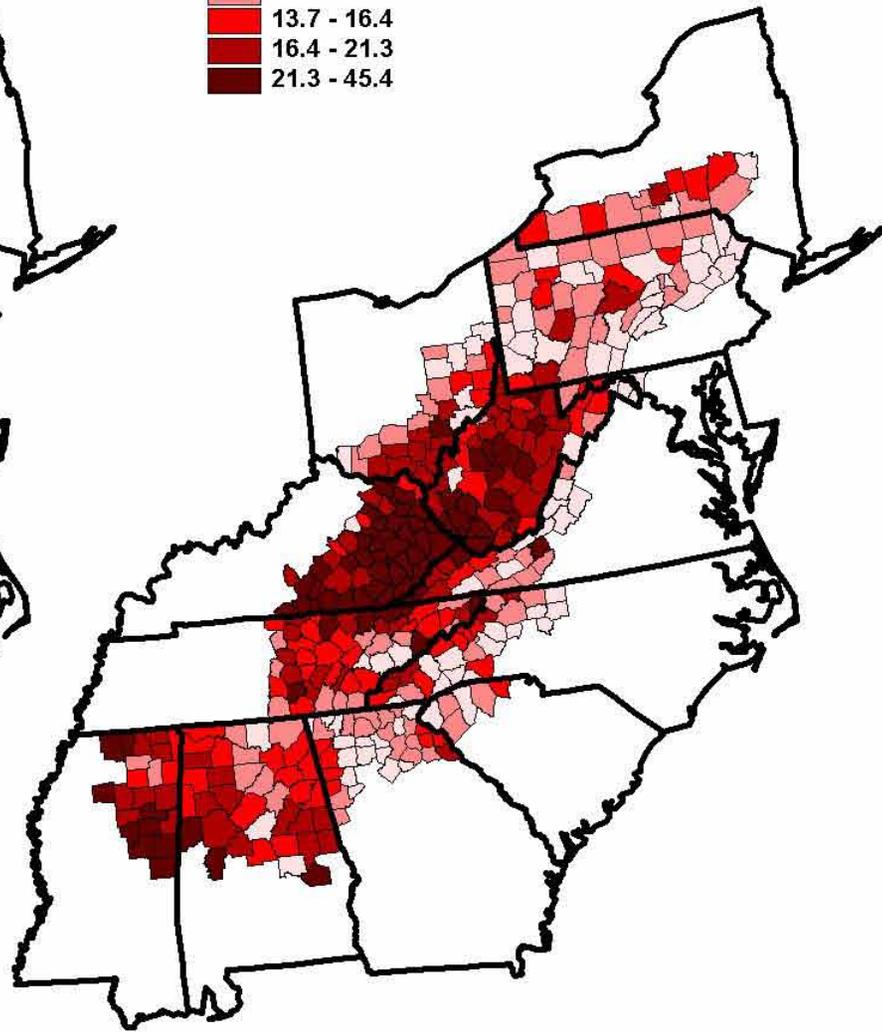
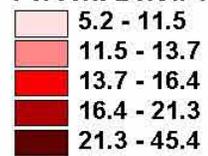
Percent Below Poverty, 1990

Percent Below Poverty

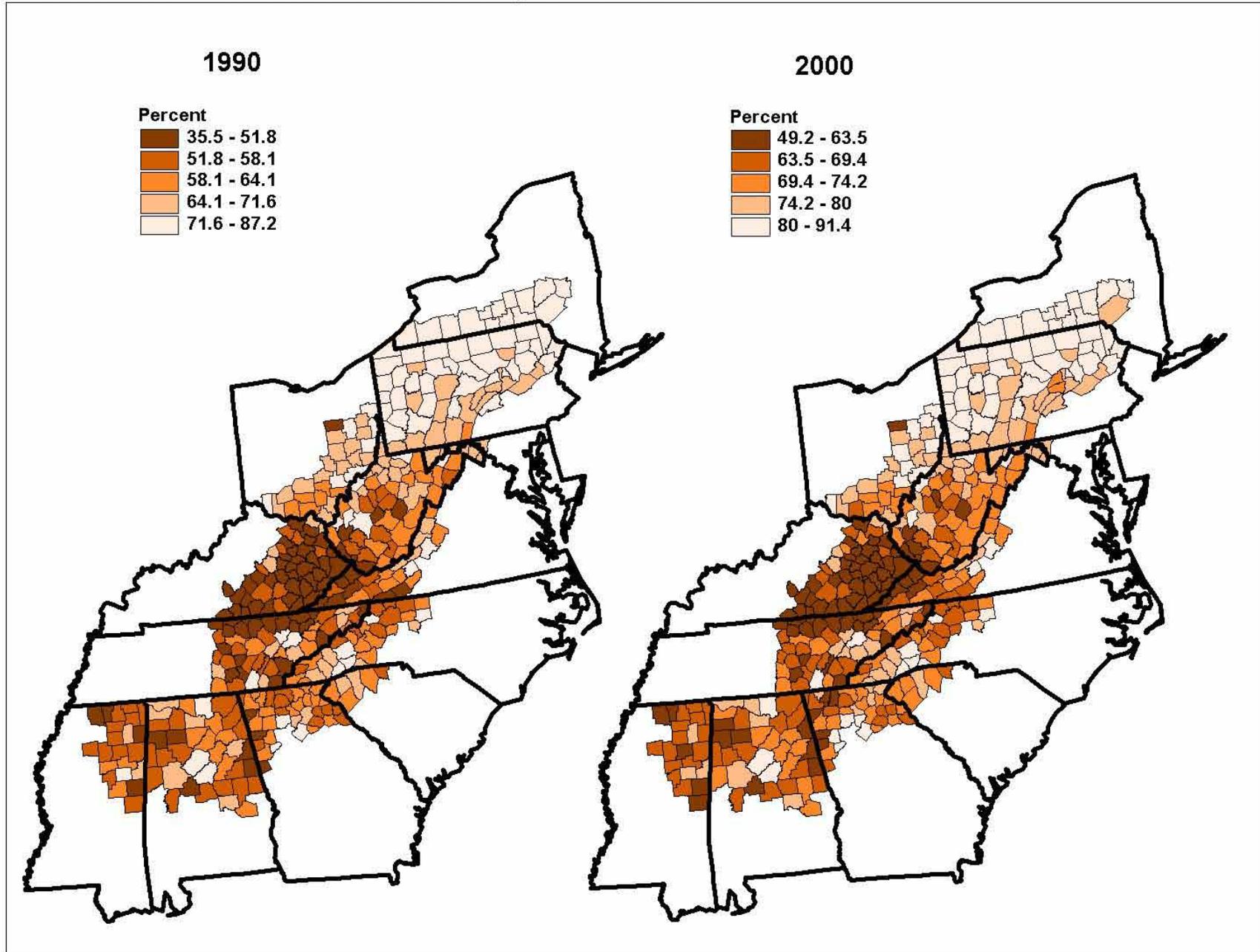


Percent Below Poverty, 2000

Percent Below Poverty



Percent of Persons 25 and Older with at Least a High School Education



Percent of Persons 25 Years of Age and Older with a College Degree

