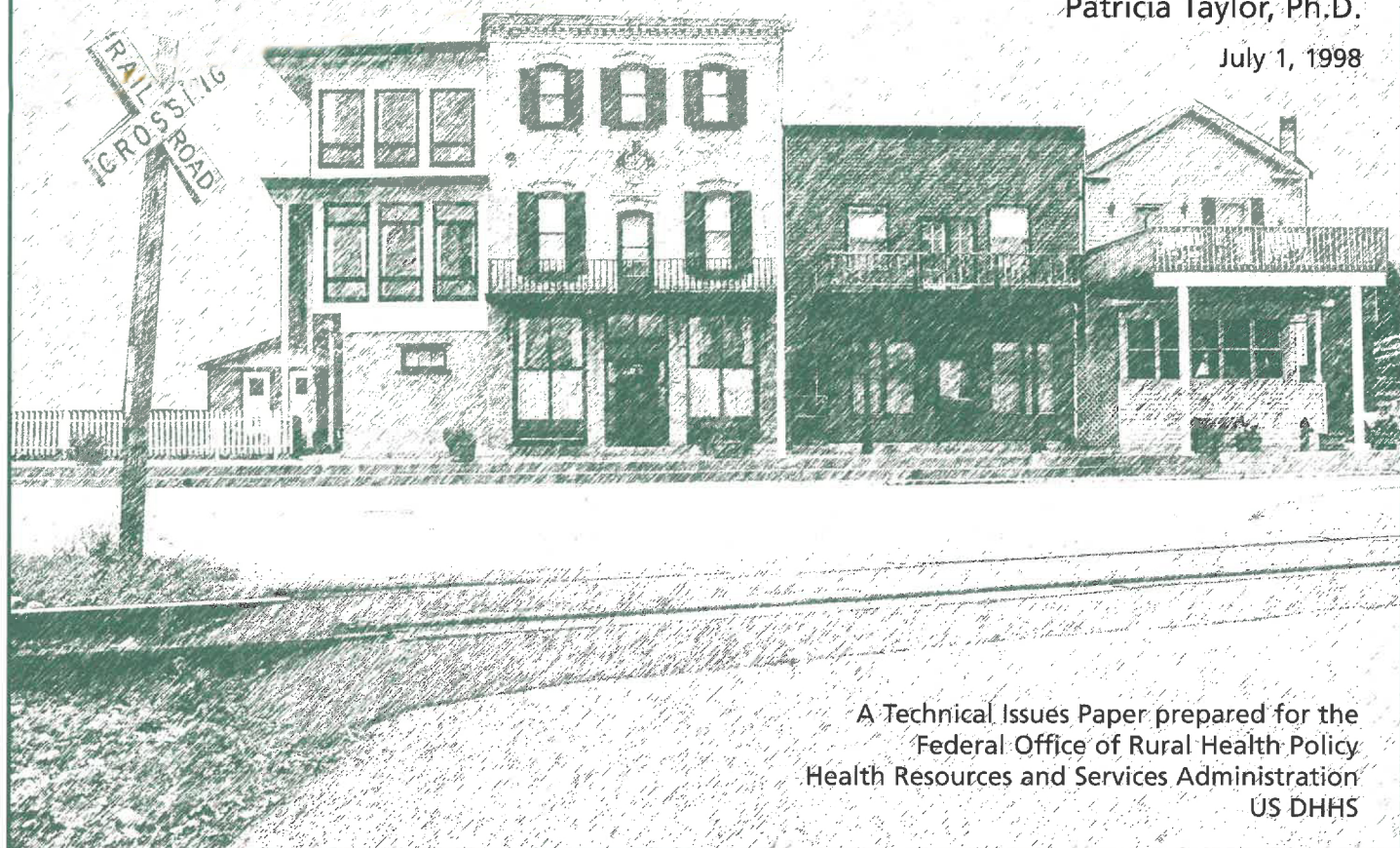


Definitions of Rural:

A Handbook for Health Policy Makers and Researchers

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Introduction

“...the perceived magnitude of rural health care problems and the impact of any change in public policy depend on how ‘rural’ is defined.”—Maria Hewitt (1992)

In developing policies to address problems of access and health status for rural people in the United States, policy makers must specify the definition of “rural.” At the national level, there are two major ways to define rural: the Office of Management and Budget metropolitan-nonmetropolitan classification of counties and the US Bureau of the Census classification of areas and population.

Neither of these two principal, nationally-applicable definitions completely and adequately captures the essence of what is rural nor provides a universally-applicable method that precisely separates urban from rural populations or places.

This handbook was commissioned by the Federal Office of Rural Health Policy as part of its continuing efforts to support policy-relevant rural health services research and analysis. It describes these two major methods of describing rurality, the OMB and Census methods, and major variations of those methods. The report is meant to assist policy makers in identifying classification methods they can use to target programs and policies to rural problems and to guide policy analysts in understanding how to delineate urban and rural populations and areas.

“Until the population is uniformly defined, it is very difficult to address...problems in an unambiguous manner from secondary data sources”—Vernon Briggs, Jr. (1981)

Executive Summary

Policy makers are often required to define what is “rural” or “urban” in order to apply national policies. There are two principal definitions of rural used by the federal government: the Office of Management and Budget’s (OMB) “Metropolitan-Nonmetropolitan” system and the Bureau of the Census’ “Urban-Rural” classification of populations.

The Bureau of the Census defines *urban* as comprising all territory, population, and housing units located in *urbanized areas* (UAs) and in places of 2,500 or more inhabitants outside of UAs. Territory, population and housing units that the Census Bureau does not classify as urban are classified as rural. In the 1990 census, 24.8 percent of the national population was classified as rural. The rural proportion has decreased since 1870 even though the total number of people classified as rural has increased along with the increase of the nation’s population.

Metropolitan and nonmetropolitan areas are defined on the basis of counties by the OMB. Metropolitan Areas contain: (1) core counties with one or more central cities of at least 50,000 residents or with a Census Bureau-defined urbanized area and a total metro area population of 100,000 or more, and (2) fringe counties that are economically tied to the core counties. Nonmetropolitan counties are outside the boundaries of metro areas and have no cities with as many as 50,000 residents. In 1996, 2,522 of 3,139 counties or county-equivalents were classified as nonmetropolitan. These counties included 52,393,300 persons or 19.8 percent of the total 1996 national population estimate of 264,100,960.

Rural and urban areas and populations identified by the OMB and Census systems have substantial disparities. In 1990, 37.3 percent of nonmetropolitan people lived in urban areas and 13.8 percent of metropolitan people were classified as rural. This incomplete overlap represents one of several problems in accurately describing rural and urban populations using these two, dichotomous systems of classification.

Agencies and offices in the Federal Government have created variations of these systems in order to more accurately target programs and projects. These include the application of

the Census Bureau “Urbanized Area” definition as part of the criteria for designation of Rural Health Clinics under P.L. 95-210 and amendments. A modification of the OMB system developed by Goldsmith is used in the eligibility standards for application of the Universal Service Provisions of the Telecommunications Act of 1996 (P.L. 104-104). The US Administration on Aging has created a ZIP-code-based system of identifying rural and urban areas to apply provisions of the 1992 Amendments to the Older Americans Act.

The OMB and Census methods are most often used in policy analysis and research and there are delineations within the OMB system which are used to classify counties according to their relative “urbanicity” or “rurality.” These include the Urban Influence or Urbanicity Codes and the Rural-Urban Continuum Codes developed by the US Department of Agriculture. The USDA also classifies nonmetropolitan counties on the basis of their primary economic activity. The Economic Research Service (ERS) of the USDA is working with the Federal Office of Rural Health Policy to create a hybrid of the OMB and Census systems using census tracts as the basic unit of designation.

There are a significant number of counties and areas in the United States which are very sparsely populated and which have unique problems in health service delivery and access related to this settlement pattern. Places with 6 or fewer persons per square mile are considered “frontier” counties or communities and 383 counties (excluding Alaska boroughs) met this criterion in 1995.

The identification of areas as “urban,” “rural,” or “frontier” continues to be a problem for policy makers. There is clear evidence that the characteristics that distinguish rural and frontier places from urban communities have important effects on health service delivery and access. New data analysis methods and improvements to geographic information systems (GIS) are making it possible to more carefully and accurately identify the range of rural and urban places.

Federal Definitions of Rurality

The federal government has been involved in the classification of areas and populations into rural and urban categories since the beginnings of the Republic; these classifications were designed for statistical purposes and to target programs and funds. The current classifications of urban and rural places and people on a national basis date back to the first decade of this century. In general, “rural” is a term used by the Census Bureau to classify people who live in places with small populations or unincorporated areas with population density less than 1,000 per square mile. Non-

- There are two principal definitions of rurality used for federal health care policy
- The Census Bureau bases its definition on a combination of population density, relationship to cities, and population size
- The Office of Management and Budget (OMB) classifies counties on the basis of their population size and integration with large cities

metropolitan is used by the US Office of Management and Budget (OMB) and refers to counties that do not meet minimum population requirements, do not have a central city or do not relate closely to larger urban places. The OMB classification deals

with counties, governmental jurisdictions which have traditionally been used to report health as well as population data. Since most national health data are reported at the county level, it is often easier to classify many populations or groups on the basis of the metropolitan designation.

Other agencies have created definitions for their own programs, but those definitions usually depend upon a combination of the OMB and Census criteria. For example, the rules guiding federal grants for solid waste disposal projects for rural communities specify that those grants can be made to “municipalities with a population of five thousand or less, or counties with a population of ten thousand or less, or less than twenty persons per square mile and not within a metropolitan area” (42 U.S.C. Ch. 82 Sec. IV § 6949).

The Census Bureau and Definitions of Urban and Rural

Rural was first used by the Census Bureau in 1874 when it was defined as the population of a county living outside cities or towns with 8,000 or more inhabitants (Whitaker, 1982). That population threshold was changed to 2,500 in 1910. The Census Bureau now defines “urban” as comprising

all territory, population, and housing units in urbanized areas and in places of 2,500 or more persons outside urbanized areas. The terms urban, urbanized area, and rural are specifically defined by the Census Bureau. Other federal agencies, state agencies, local officials, and private groups may use these same terms to identify areas based on different criteria.

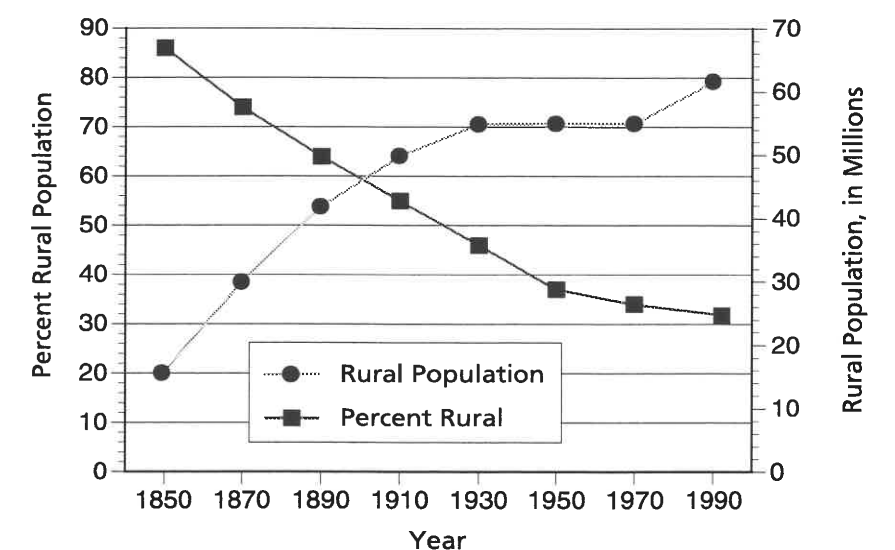
An urbanized area (UA) is defined as a continuously built-up area with a population of 50,000 or more. UAs comprise one or more central places and the adjacent densely settled surrounding area with a population density generally exceeding 1,000 inhabitants per square mile. There are urban places outside of UAs which are any incorporated place or Census Designated Place (CDP) with at least 2,500 inhabitants. A CDP is a densely settled population center that has a name and a community identity and is not part of any incorporated place.

All territories, populations, and housing units that the Census Bureau does not classify as urban are classified as rural (Bureau of the Census, 1994). For instance, a rural place is any incorporated place or CDP with fewer than 2,500 inhabitants that is located outside of a UA. A place is either entirely urban or entirely rural, except when designated as an extended city. An extended city is an incorporated place that contains large expanses of sparsely populated territory for which the Census Bureau provides separate urban and rural

All territories, populations, and housing units that the Census Bureau does not classify as urban are classified as rural

population counts. Territory outside of urbanized areas and urban places is designated rural, and can have population densities as high as 999 per square mile and as low as 1 or 2 per square mile.

Total Rural Population and Proportion Population Classified as Rural, 1850-1990



URBANIZED AREAS (UAs)

- The Census Bureau delineates urbanized areas (UAs) to provide a better separation of urban and rural territory, population, and housing in the vicinity of large places.
- A UA comprises one or more places ("central place") and the adjacent densely settled surrounding territory ("urban fringe") that together have a minimum of 50,000 persons.
- The urban fringe generally consists of contiguous territory having a density of at least 1,000 persons per square mile. The urban fringe also includes outlying territory of such density if it is connected to the core of the contiguous area by road and is within 1 1/2 road miles of that core, or within 5 road miles of the core but separated by water or other undevelopable territory.

The rural population is currently divided into farm and non-farm classifications. Populations were enumerated in these categories by the census as early as 1860. Farm population, under current census definitions, includes people living in rural areas on properties of one acre of land or more where \$1,000 or more of agricultural products were sold (or would have been sold) in the past 12 months. In 1860, the farm population was 48.1 percent of the total, and in 1920, 30 percent. In the 1990 census the rural-farm population was 1.9 percent of the total population; in 1996, the Census Bureau announced plans to curtail reporting of this classification.

Map 1 on page 14 displays the proportion of each state's population classified as rural by the 1990 census and Table 5 on page 13, the number and proportion of people classified as rural by the census by state. The table shows that the "most rural" states according to the numbers of rural people are Pennsylvania, Texas, and North Carolina. According to proportion of population classified as rural, Vermont, West Virginia and Maine are the top three. The table reveals some unexpected variations—for example, Delaware has more rural people than Nevada or Wyoming and New Jersey has more rural people than North and South Dakota combined.

The US Census Bureau describes its definitions of "urban" and "rural" in the document, 1990 Census of Population and Housing, "Population and Housing Unit Counts," (CPH-2-1.) and a description is included on their World Wide Web page at <http://www.census.gov:80/population/censusdata/urdef.txt>. Detailed criteria for the designation of Urbanized Areas can be obtained from the Chief, Geography Division, US Bureau of the Census, Washington, DC 20233. A complete guide to Census Geography is available in the "Geographic Areas Reference Manual" issued in November, 1994 by the Economics and Statistics Administration, Bureau of the Census.

US Office of Management and Budget Metropolitan-Nonmetropolitan System

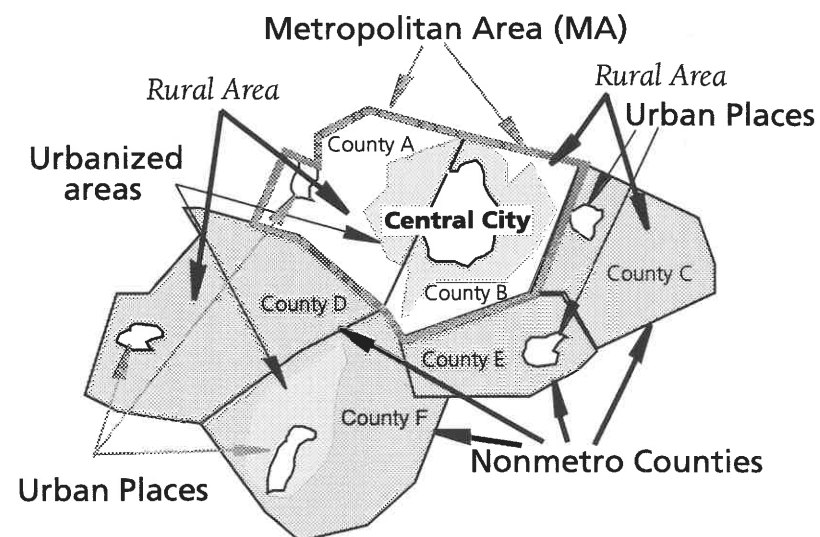
The US Office of Management and Budget defines Metropolitan Areas (MA) according to published standards that are applied to Census Bureau data. Map 2 highlights United States counties *not* classified as metropolitan as of June 1997. Alaska, Hawaii, and the six New England states have slightly different treatment. Alaska is classified into boroughs except for its one county, Anchorage, which is classified as metropolitan due to its urban nature. The boroughs are easily considered county-

equivalents, and all of Alaska except Anchorage is considered rural by most federal health programs. The major islands of Hawaii are county equivalent units. Oahu is classified as metropolitan and the other islands are classed as nonmetropolitan. The New England states' metropolitan areas are classified as New England county metropolitan areas (NECMAs). They are defined in terms of cities and towns but generally follow county boundaries.

The general concept of a metropolitan area is that of a core area containing a large population nucleus, together with adjacent counties having a high degree of economic and social integration with that core. Currently defined MAs are based on the application of 1990 standards to 1990 decennial census data (Federal Register on March 30, 1990). These definitions were announced by OMB effective June 30, 1993. The designation of counties as metropolitan or nonmetropolitan is a continuous process.

Standard definitions of metropolitan areas were first issued in 1949 by the Bureau of the Budget, the predecessor of OMB, under the designation "standard metropolitan area" (SMA). The

The Relationship Between Metropolitan Areas (MAs), Urbanized Areas, and Urban and Rural Areas



- The number of nonmetropolitan counties changes from year to year
- Since 1983, 117 counties have been redesignated metropolitan
- Not all redesignations are from nonmetro to metro, occasionally a metro county will "revert" to nonmetro status

created, except from 1977 to 1981 when they were the responsibility of the Office of Federal Statistical Policy and Standards in the US Department of Commerce. The standards for defining metropolitan areas were modified in 1958, 1971, 1975, 1980, 1990, and 1993.

The current OMB standards generally provide that each MA must include at least:

- (a) One city with 50,000 or more inhabitants, or
- (b) A Census Bureau-defined urbanized area (of at least 50,000 inhabitants) and a total metropolitan population of at least 100,000 (75,000 in New England).

Under these standards, the county (or counties) that contains the largest city becomes the central county (or counties if the city covers more than one county) of a MA. Any adjacent counties that have at least 50 percent of their population in the urbanized area surrounding the largest city are also included in the MA. Additional "outlying counties" are included in the MA if a substantial proportion of the employed people in the county commute to the central place. There are other characteristics which are considered, including population density and percent urban.

Changes in the designation of MAs since the 1950 census have consisted chiefly of (1) the recognition of new MAs as core areas if they reached the minimum required city or area population; and (2) the addition of counties or New England cities and towns to existing MAs as new census data showed them to qualify. Also, some formerly separate MAs have been merged with other areas, and occasionally territory has been transferred from one MA to another or from a MA to a nonmetropolitan territory. Map 3 depicts the counties that have changed status from nonmetropolitan to metropolitan since 1983; 118 counties have been redesignated between June 30, 1983 and June 30, 1995.

Most changes in metropolitan designations have taken place on the basis of analysis of decennial census data. There are policies for making changes between censuses and updates can occur at any time. Because of

term was changed to "standard metropolitan statistical area" (SMSA) in 1959, and to "metropolitan statistical area" (MSA) in 1983. The current collective term "metropolitan area" (MA) became effective in 1990. OMB has been responsible for defining the official metropolitan areas since they were first

these changes in standards, users must be cautious in comparing metropolitan and nonmetropolitan area data for different years. For some purposes, comparing data for MAs defined at different dates may be appropriate. For example, when describing changes in the total nonmetropolitan population over time, using the counties designated in 1970 and 1990 would be acceptable. However, to compare a change in a stable set of counties, the same set of designated counties would be used. In 1997, nonmetropolitan counties made up 73 percent of all counties, or 2,250 out of 3,081 counties or county-equivalent units.

MAs are used by federal agencies for collecting, analyzing, and publishing data and for implementing programs and resource allocation (though the criteria are not specifically designed for this). One example is the use of MA status for the categorization of hospitals as either rural or urban for purposes of Medicare reimbursement. The business community utilizes MAs in investment decisions and market feasibility studies; the data, however, are not intended for this use and the OMB will not alter them, nor provide support for non-statistical uses.

The Office of Management and Budget publishes bulletins describing their decisions and actions. The most current description of Metropolitan Area definitions is included in METROPOLITAN AREAS 1995 LISTS I-IV, Statistical Policy Office, Office of Management and Budget, Attachments to OMB Bulletin No. 95-04. That bulletin is available on the World Wide Web at <http://www.whitehouse.gov/WH/EOP/OMB/html/bulletins/95-04attachintro.html>. Documentation can be obtained from the Statistical Policy Office of the Office of Information and Regulatory Affairs of the OMB. Inquiries can be directed to Maria E. Gonzales, (202) 395-7313.

OMB's Metro-Nonmetro and Census' Urban-Rural Definitions: Strengths and Weaknesses

The fact that there are two primary federal definitions that identify "rurality" in the United States creates some confusion and a degree of controversy. The confusion stems from the fact that the two definitions do not completely overlap; they apply

Overlap of OMB and Census Definitions of Populations

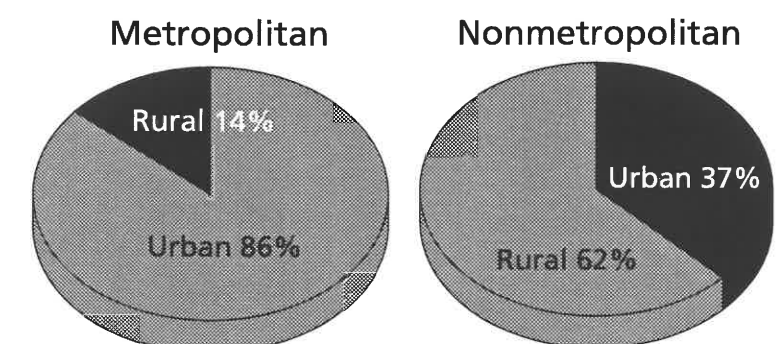


Table 1. Comparison of Rural-Urban and Metropolitan-Nonmetropolitan Populations

	Nonmetro	Metro	Total	Rural	Urban	Total
Number	50,985,524	197,724,349	248,709,873	61,680,049	187,029,824	248,709,873
Percent	20.5%	79.5%	100%	24.8%	75.2%	100%
Percentages in Overlapping Categories						
Rural	63.6%	14.8%	Nonmetro	52.5%	9.9%	
Urban	36.4%	85.2%	Metro	47.5%	90.1%	

Source: USDA, Economic Research Service calculation from 1990 Census.

to different geographies and they were created for different reasons. Metropolitan counties are not synonymous with wholly urban counties but often contain significant rural populations (as defined by the Census). Nonmetropolitan counties have significant urban populations. Table 1 examines the counties designated metropolitan and nonmetropolitan as of 1994 and shows how the 1990 Census Bureau population classifications of urban and rural were distributed across them. For example, the table shows that 14.8 percent of the population in metropolitan counties were classified as rural by the Census. These 29.2 million people made up 47.5 percent of the total US rural population.

Applying either of the two systems to populations or areas creates some degree of inaccuracy since neither system perfectly agrees with the common understanding of rural and urban. Metropolitan counties may include substantial rural areas, as are found in the larger, western counties, especially in California and Arizona. Likewise, a MA may fail to include significant suburban populations in adjacent counties. The Census Bureau's urban population includes many people living in towns with less than 10,000. Its rural population includes significant numbers living close to named places in areas where the population density can be as high as 999 people per square mile. It is clear that neither method is perfect for the depiction of a "rural" population where rural means persons in lower density or smaller settlements who are at some distance from populous towns or cities. This fact has been recognized by several analysts (Jonas & Wilson, 1997; Goldsmith, Puskin & Stiles, 1992) and by demographers and geographers who have proposed alternative systems (Ghelfi & Parker, 1995; Pickard, 1988; Cromartie & Swanson, 1995).

The problems that accompany the application of the Census or the OMB definitions or a combination of the two to a policy-related program for the allocation of resources or the identification of need have recently been highlighted by the

application of the Universal Service provisions of the Federal Telecommunications Act of 1996. Regulations implemented subsequent to the Act recognized the imprecision of the Census Bureau and OMB systems and called for a hybrid, the Goldsmith variant, which attempts to deal with the problem of substantial rural areas included in MA counties. The specifics of the Goldsmith system are described in the next section along with other variations of the federal designation systems.

Variants of Principal Federal Definitions Used in Federal Policy

Non-Urbanized Areas—The Definition of Geographic Eligibility for the Rural Health Clinic Program

The problem of appropriately identifying rural areas was recognized in the legislation creating Rural Health Clinics (RHCs). In December, 1977, Congress passed Public Law 95-210, the Rural Health Clinic Services Act, to redress problems with reimbursement of nurse practitioners and physician assistants (nurse midwives were later added) in rural clinics and increase the availability and accessibility of primary care services for residents of rural communities. It was apparent that the OMB definition excluded certain areas which were clearly rural in nature but did not fall within nonmetropolitan counties. These areas were most often located in western states where counties covered immense expanses of geography and included sparsely populated areas. The solution was to use the Census Bureau definition of "Urbanized Area" (which is described above) as the factor for *excluding* sites for Rural Health Clinic designation. Clinics located outside of "Urbanized Areas" are geographically eligible for RHC designation.

Large Metropolitan Counties and Rural Populations (The Goldsmith Modification)

Residents of metropolitan counties are generally thought to have easy access to the relatively concentrated health services of the county's central areas. However, some metropolitan counties are so large that they contain small towns and rural, sparsely populated areas that are isolated from these central clusters and their corresponding health services by physical barriers. Using 1980 census data, Harold Goldsmith, Dena Puskin, and Dianne Stiles (1992) described a methodology to identify small towns and rural areas within large metropolitan counties (LMCs) that were isolated from central areas by distance or other physical features. The process involves first identifying the LMCs, defined as metropolitan counties having at least 1,225 square miles. The next step is to identify the large (> 25,000 inhabitants) cities in the county. The final step

is to identify the rural census tracts in those eligible counties that are without easy geographical access to any large cities. The most important criterion used to identify these isolated rural tracts is that comparatively few persons in these tracts commuted to work in the cities and their suburbs (less than 15 percent of the labor force).

Additional criteria used in the identification of the LMCs isolated rural census tracts are described in the Goldsmith, Puskin, and Stiles monograph, "Improving the Operational Definition of 'Rural Areas' for Federal Programs," available on the Internet at <http://www.nal.usda.gov/orhp/goldsmit.htm>.

An analysis of the application of the work by Goldsmith and colleagues, using 1980 census data, revealed that just over 32 million people live in LMCs in the 20 states with at least one such county, and that 6.2 percent of the population of LMCs resided in isolated rural areas. This represents a 4 percent increase in the number of persons considered to reside in rural areas. The state with the largest number of isolated rural populations within LMCs was California, with nearly one million such residents. Many states have no LMCs.

The "Goldsmith" variant was developed for the Federal Office of Rural Health Policy's Rural Health Outreach Grant Program and is now also used in that Office's Rural Network Development and Telemedicine grant programs. It has been adopted by the Federal Communications Commission as one component of the definition of "rural" that is used to determine the eligibility of public and private nonprofit health care providers for a telecommunications rate subsidy as provided in the Telecommunications Act of 1996, P.L. 104-104, in the Universal Services Provision of the Act.

The Goldsmith Modification has been useful for expanding the eligibility for federal programs that assist rural populations—to include the isolated rural populations of large metropolitan counties. However, its authors and the federal agencies that use the modification recognize its limitations. The principal one is that the criteria for identifying isolated rural areas have been applied to only very large counties though it is obvious there are equally isolated areas in many of the smaller counties of the nation. Also, it has not been possible to thoroughly update the designation of rural census tracts. Goldsmith, et al., used a special 1980 census data set in their original work and the requisite special data base from the 1990 census has not, to date, been compiled. If the Goldsmith Modification were modified to be more accurate, then perhaps the urbanized areas of nonmetropolitan counties should be considered for re-classification out of the "rural" category.

US Administration on Aging Definition of Rural

The US Administration on Aging (AoA) was required by the 1992 Amendments to the Older Americans Act to produce a standard definition of rural. The AoA initially chose to use the Census Bureau definition but, based on their assessment that this was not practical to implement, created a "modified census definition of rural" which reads as follows:

Rural—an area that is not urban. Urban areas comprise (1) urbanized areas (a central place and its adjacent densely settled territories with a combined minimum population of 50,000) and (2) and incorporated place or a census designated place with 20,000 or more inhabitants.

To operationalize this definition required a compromise since data were not collected at the levels identified in the definition. The AoA chose to combine the identification of urbanized areas as defined by the Census Bureau and ZIP code postal boundaries to classify all ZIP code areas as either urban or rural. There are two criteria for designation of a ZIP area as urban: (1) if one percent or more of the ZIP area falls within an urbanized area; and (2) if a ZIP area is affiliated with a place of 20,000 to 49,000 residents located outside an urbanized area. All other ZIP areas are classified as rural. The designations distributed by the AoA in the summer of 1996 were based on 1995 ZIP areas provided by a private vendor, Claritas Corporation, and the AoA noted that these ZIP areas are likely to change.

Copies of the "Guidebook for Operationalizing AoA's Definition of Rural" are available from the National Resource and Policy Center on Rural Long-Term Care. Contact Mercedes Bern-Klug at (913) 588-1266. E-mail: MBERNKLU@KUMC.EDU.

Table 2.
USDA Urban Influence Codes

Code	Definition - Counties
	(No "0" coding used in this system)
1	Large—Central and fringe counties of metropolitan areas of 1 million population or more
2	Small—Counties in metropolitan areas of fewer than 1 million population
3	Adjacent to a large metropolitan area with a city of 10,000 or more
4	Adjacent to a large metropolitan area without a city of at least 10,000
5	Adjacent to a small metropolitan area with a city of 10,000 or more
6	Adjacent to a small metropolitan area without a city of at least 10,000
7	Not adjacent to a metropolitan area and with a city of 10,000 or more
8	Not adjacent to a metropolitan area and with a city of 2,500 to 9,999
9	Not adjacent to a metropolitan area and with no city or a city with a population less than 2,500

Note: Adjacent counties are physically adjacent to one or more MAs and have at least 2 percent or more of the employed labor force in the nonmetropolitan county commuting to central metropolitan counties. The metro-nonmetropolitan definition is based on the Office of Management and Budget definition as of June 1, 1993.

Classifications of Rurality
Within Federal Designations

Urban Influence Codes

The US Department of Agriculture (USDA) has worked with county-level data systems and has developed several variants over the years; the work of USDA demographers Calvin Beale and Glenn Fuguitt cover many of these variations (Beale and Johnson, 1995; Butler and Beale, 1994; Fuguitt, 1975). In 1980, the USDA circulated a classification scheme which described nonmetropolitan counties according to their "accessibility to metropolitan centers and small cities" (Deavers and Brown, 1980).

The problem of inter-county relationships has been one that has challenged analysts for some time. Responding to the need to consider inter-county flow outside metropolitan areas, Linda Ghelfi and Timothy Parker of the Economic Research Service in the USDA proposed another set of codes, the Urban Influence codes, to help categorize counties to reflect their economic and social roles as opposed to their relative population size and physical adjacency. This new system is based on the theory that access to larger metropolitan economies, such as centers of information, communication, trade, and finance, provides an economic development advantage for smaller nonmetropolitan economies (Ghelfi and Parker, 1995). Table 2 summarizes the 9-level Urban Influence coding systems.

The Urban Influence codes take into account two factors: the county's largest city and the county's proximity to other counties with large, urban populations. The codes divide the 3,141 counties and independent cities in the United States into 9 groups. Metropolitan counties are classified by the size of the metropolitan area—populations of more than one million and those with less. Nonmetropolitan counties are classified by their adjacency to these metropolitan areas—adjacent to a large metropolitan area, adjacent to a small metropolitan area, and not adjacent to a metropolitan area. Within each of these categories, nonmetropolitan counties are further classified by the size of their own largest city.

The Urban Influence system accounts for the effect of smaller, central cities in its structure. This would be important in health policy due to the structure of health care systems which involve threshold levels of institution size and complexity of the medical community based on the population of the largest city in a service area. Map 4 shows the 9-level system created in 1993 using 1990 data.

The Urban Influence codes are available from the Economic Research Service of the USDA at their Internet site, <http://www.econ.ag.gov/briefing/rural/data/urbinfl.txt>. For further information contact Linda Ghelfi, USDA, Economic Research Service, 1800 M St., NW., Washington, DC 20036-5831. Phone: (202) 219-0484 E-mail: lgheffi@

Table 3. USDA, ERS Rural-Urban Continuum Codes

Code	Metropolitan Counties:
0	Central counties of metropolitan areas of 1 million population or more
1	Fringe counties of metropolitan areas of 1 million population or more
2	Counties in metropolitan areas of 250,000 to 1 million population
3	Counties in metropolitan areas of fewer than 250,000 population
Code	Nonmetropolitan Counties:
4	Urban population of 20,000 or more, adjacent to a metropolitan area
5	Urban population of 20,000 or more, not adjacent to a metropolitan area
6	Urban population of 2,500 to 19,999, adjacent to a metropolitan area
7	Urban population of 2,500 to 19,999, not adjacent to a metropolitan area
8	Completely rural or less than 2,500 urban population, adjacent to a metro area
9	Completely rural or less than 2,500 urban population, not adjacent to a metro area

(Source: Butler and Beale, 1994)

ECON.AG.GOV or Tim Parker at the same address, E-mail: tparker@ECON.AG.GOV.

Rural-Urban Continuum Codes for
Metropolitan and Nonmetropolitan Counties

The Rural-Urban Continuum Codes (RUCC) classify all US counties into 10 categories. The classification scheme groups metropolitan counties into four levels by size, and nonmetropolitan counties into six categories by the size of the urban population (number of people living in towns of 2,500 or more) and adjacency to a metropolitan area. The codes were originally developed in 1975, and were updated in 1983 and slightly revised in 1988. They are sometimes called "Beale Codes," after Calvin Beale, who contributed to their development. These codes allow researchers to break county data into sub-groups beyond the basic metropolitan–nonmetropolitan classification. This is especially useful for the analysis of factors or characteristics of nonmetropolitan areas that are related to population density and metropolitan influence. Table 3 describes the specific levels of the RUCC. The nonmetropolitan levels are described by the USDA as "Urbanized" (Codes 4 and 5), "Less Urbanized" (Codes 6 and 7), and "Thinly Populated" (Codes 8 and 9).

Metropolitan counties are further classified by the population size of the entire MA of which they are a part; then counties in MAs of one million or more are assigned a code by whether they are central or more peripheral counties. For those counties classified as nonmetropolitan, counties adjacent to a MA are identified. Adjacent counties 1) are physically adjacent to one or more MAs and 2) have at least two percent of the employed labor force in the nonmetropolitan county commuting to central metropolitan counties. Finally, nonmetropolitan counties not meeting the above criteria for adjacency are classified as "not adjacent." Map 5 depicts the counties by the Rural-Urban Continuum Code designations as of 1994.

Rural-Urban Continuum Codes classifying all US counties are available on the Internet. The World Wide Web site <http://jan.mannlib.cornell.edu/data-sets/rural/89021/> provides a full file. Questions concerning the file can be directed to Margaret Butler, Economic Research Service, 1800 M St., NW., Washington, DC 20036-5831. Phone (202) 219-0534, E-mail Mbutler@econ.ag.gov.

A Comparison of the Urban Influence Codes
With The Rural-Urban Continuum Codes

While the Urban Influence Codes break metropolitan areas only into large and small, the Rural Urban Continuum Codes differentiate the larger counties into "central" and "fringe" classifications. This can be of use when considering specific issues of adjacency. However, analyses showed that there was little difference in population and economic growth between nonmetropolitan counties adjacent to either the central or the fringe metropolitan counties.

Looking at the maps of the RUCC (Map 5) and the Urban Influence Codes (Map 4), it is apparent that the Urban Influence system more effectively creates regional areas that appear to reflect the tendency of economic systems to "centralize" around very large metropolitan counties. The latter centralization follows the structure of health care services, where very large, tertiary care health centers and medical schools are located in the central, large metropolitan counties and their influence on referral patterns is likely to be stronger in adjacent versus non-adjacent counties. It also shows the location of non-adjacent nonmetropolitan counties with smaller cities (>10,000), where secondary care health centers and specialists are likely to be located.

Table 4. Classification for USDA ERS Typology of Primary Economic Activity

Six Economic Activities (#)	Five Policy Areas (#)
1. Farming-Dependent (556)	1. Retirement Destination (190)
2. Mining-Dependent (146)	2. Federal Lands (270)
3. Manufacturing-Dependent (506)	3. Commuting (381)
4. Government-Dependent (244)	4. Persistent Poverty (535)
5. Services-Dependent (323)	5. Transfers-Dependent (381)
6. Non-Specialized (484)	

In Development: Sub-County Definitions of Metropolitan and Nonmetropolitan Areas and the Rural-Urban Continuum Using Census Tracts as the Basic Unit

The Economic Research Service (ERS) in the USDA, and the Office of Rural Health Policy, DHHS, are collaborating to develop a more precise definition of populations along the rural-urban continuum. This system will use the OMB criteria (with minor modifications) but apply them at the census tract level rather than the whole county. John Cromartie of the ERS and Richard Morrill of the University of Washington are the geographers developing this system. The first publication on their methodology and early results are expected in late 1998. The impetus for this project came from early work in the ERS by Cromartie and Linda Swanson (1995) published in *Rural Development Perspectives*.

USDA ERS Typology of Primary Economic Activity

The ERS (1995) developed a rural typology that provides a way to identify groups of US nonmetropolitan counties sharing important economic and policy traits. Through this typology, the ERS provides a way to geographically identify groups of nonmetropolitan counties sharing important economic and policy-relevant traits, and information about economic and sociodemographic conditions that differentiate the county groups. The original typology (1979) summarized the diversity of rural economic and social conditions among nonmetropolitan counties as seven major overlapping themes or types. Four county types reflected dependence on a particular economic specialization: farming, manufacturing, mining, and government. Three county types—persistent poverty, federal lands, and retirement-destination—reflected other special policy-relevant themes. A residual type, labeled unclassified counties, included those counties that met the criteria for none of the types. An update of the typology, using the same concepts and definitions updated to 1986 (where possible), was created to show how the economic and social structure of nonmetropolitan areas changed from 1979. A

substantial increase in the number of unclassified counties in the 1986 update emphasized the need to consider both conceptual and methodological changes in the typology that would maximize its utility during the 1990s. As a result, the third version of the ERS typology, updated in 1993, has been revised and expanded (Cook & Mizer, 1994).

This new typology classifies counties designated as nonmetropolitan in 1993 into one of six *non*-overlapping economic types: farming-dependent, mining-dependent, manufacturing-dependent, government-dependent, services-dependent, and non-specialized. Where appropriate, counties were also classified into five potentially overlapping policy types: retirement-destination, federal lands, commuting, persistent poverty, and transfers-dependent. The overlaps in the new system occur infrequently and usually occur between two types. In West Virginia, 12 of the 43 counties have two classifications and three have three. The counties with three overlaps are all commuting, persistent poverty and transfers-dependent. The ERS methodology is based on the premise that understanding specific economic activities and the sociodemographic attributes of counties will assist in making the best policy decisions for that county.

The Concept of Frontier

There are various typologies for characterizing a county in terms of its population concentration. Population density, a measure of population concentration, is one component of the rural/urban classifications discussed above, and is usually used in conjunction with population size, adjacency to metropolitan areas, and urbanization (Hewitt, 1992). Population density can be defined as the number of people per unit area in a society, region, or country, and is a measure of the intensity of settlement of a region (Austin et al., 1987). Population density is determined by dividing the resident population of a geographic unit by the land area it occupies, usually expressed in the US as square miles. In 1992, densities of counties ranged from 0.15 persons per square mile in Loving County, Texas to 67,613 persons per square mile in New York County, New York (HRSA, 1992). The most sparsely populated areas are often called “frontier” areas. In 1990, two percent of the US population was living in counties with ten or fewer persons per square mile. Map 6 illustrates the distribution of counties considered “frontier” using 6 or fewer persons per square mile as the definition of “frontier.” Map 7 shows where county population density has dropped in recent years to levels that qualify them as “frontier.”

In modern day discussions of health care provision, “frontier” is applied at the county level, and can denote from six to ten persons per square mile; in most cases frontier is defined as 6 or fewer persons per square mile. Demographer

Frank Popper found that as late as 1984, using a definition of less than 6 persons per square mile, there were 394 counties, constituting 45% of the US land area, that would meet his standard (Elison, 1986). Given this notion of frontier as defined by population density, the nation’s frontier is expanding. From 1980 through 1990, 22 additional counties fell below the 6 or fewer per square mile criterion for classification as “frontier,” most of which are in the central plains area of the nation, a region which was characterized by significant population losses during the last decade.

Interest in frontier areas as a policy classification for counties emerged in 1985. At the time rural health providers, public health planners, and US Department of Health and Human Services staff agreed that frontier areas constituted a unique setting in terms of service delivery and should be considered accordingly under different criteria than those used for urban or rural service areas (Elison, 1986). A Frontier Health Care Task Force was convened, under sponsorship of US DHHS Regions VII and VIII, to look at health issues as they applied to frontier areas and try to identify those characteristics distinguishing urban, rural and frontier settings in terms of access to health care services. The work of this task force, in conjunction with the National Rural Health Association, led to modified guidelines for the approval of federal assistance to community health centers in frontier areas. Their guidelines included these alternative definitions (Elison, 1986):

- Service Area: a rational area in the frontier will have at least 500 residents within a 25-mile radius of the health service delivery site or within a logical trade area. Most areas will have between 500-3,000 residents and cover large geographic areas.
- Population Density: the service area will have six or fewer persons per square mile.
- Distance: the service area will be such that the distance from the primary care site to the next level of care will be more than 45 miles and/or 60 minutes.

For frontier areas, the primary service delivery issue is how best to overcome geographic distance and spatial isolation (Cordes, 1985). In many large western counties the nearest health care facility, usually a rural hospital, is more than 100 miles away. After receiving initial emergency treatment there, a patient may be referred to a tertiary care center another 100-200 miles away. In many instances, distances of this length can cause significant problems of access, such as for a pregnant woman requiring a series of prenatal visits and eventually delivery. In general, “low population density” means that the scale of operation of the medical system in rural areas will be noticeably smaller and different than in urban areas. Indeed, it is this characteristic that often leads to fundamental and intrinsic differences in the way health services are delivered, including the use of airborne ambulances, telecommunication linkages between remote outposts and secondary care centers,

and satellite care centers staffed with physician assistants and nurse practitioners (HRSA, 1992).

Other Federal Systems for Classification

There are many other systems of classification used by the many federal agencies. Although this report does not deal with all of these definitions, it is instructional to review some of these other classification systems in order to see how specific and detailed they may become. An example of such a very specific and detailed definition is that used by the US Department of Housing and Urban Development (HUD) which says: “ ‘rural’ and ‘rural area’ mean any open country, or any place, town, village, or city which is not (except in the cases of Pajaro, in the State of California, and Guadalupe, in the State of Arizona) part of or associated with an urban area and which (1) has a population not in excess of 2,500 inhabitants, or (2) has a population in excess of 2,500 but not in excess of 10,000 if it is rural in character, or (3) has a population in excess of 10,000 but not in excess of 20,000, and (A) is not contained within a standard metropolitan statistical area, and (B) has a serious lack of mortgage credit for lower and moderate-income families, as determined by the Secretary and the Secretary of Housing and Urban Development.” (42 US Code, 8A. III. §1490)

Other systems and definitions will undoubtedly be developed to meet the needs of programs and policies. The availability of high speed computers, detailed boundary files, and geographic information systems that can easily calculate distances and spatial relationships make it possible to tailor definitions to better reflect the intentions of policy makers and meet the needs of rural populations.

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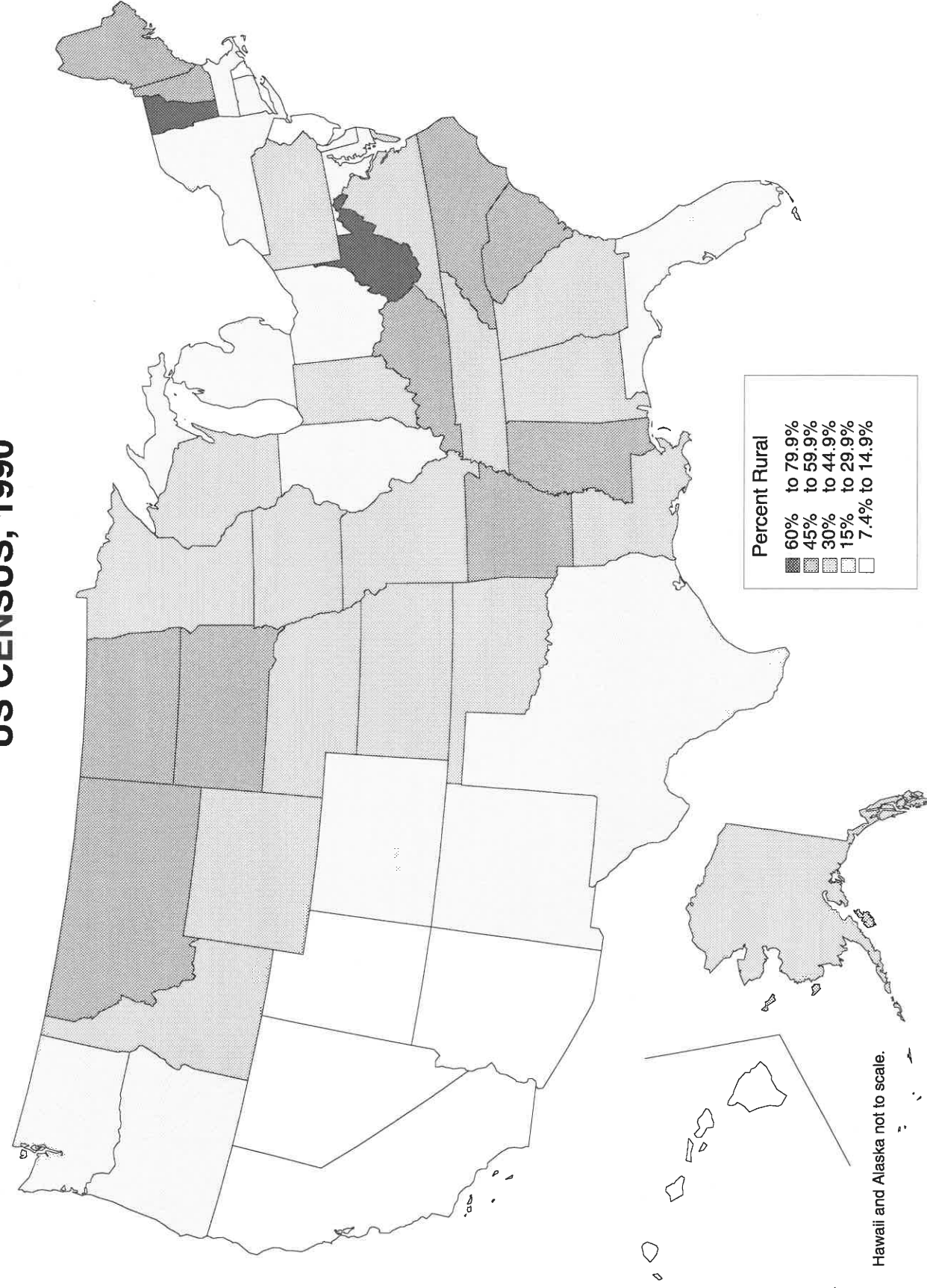
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Table 5. US Bureau of the Census, State Rural Populations, 1990

State	Total Population	Rural Population	Percentage Rural
ALABAMA	4,040,587	1,603,072	39.7
ALASKA	550,043	178,808	32.6
ARIZONA	3,665,228	458,255	12.5
ARKANSAS	2,350,725	1,092,704	46.5
CALIFORNIA	29,760,021	2,217,370	7.4
COLORADO	3,294,394	578,850	17.6
CONNECTICUT	3,287,116	686,512	20.9
DELAWARE	666,168	179,011	26.9
D.C.	606,900	0	0.0
FLORIDA	12,937,926	1,968,819	15.2
GEORGIA	6,478,216	2,381,672	36.8
HAWAII	1,108,229	122,711	11.1
IDAHO	1,006,749	428,271	42.5
ILLINOIS	11,430,602	1,760,316	15.4
INDIANA	5,544,159	1,947,953	35.1
IOWA	2,776,755	1,093,693	39.4
KANSAS	2,477,574	764,726	30.9
KENTUCKY	3,685,296	1,775,417	48.2
LOUISIANA	4,219,973	1,347,848	31.9
MAINE	1,227,928	679,572	55.3
MARYLAND	4,781,468	893,402	18.7
MASSACHUSETTS	6,016,425	946,798	15.7
MICHIGAN	9,295,297	2,740,098	29.5
MINNESOTA	4,375,099	1,319,082	30.2
MISSISSIPPI	2,573,216	1,362,110	52.9
MISSOURI	5,117,073	1,601,108	31.3
MONTANA	799,065	378,998	47.4
NEBRASKA	1,578,385	534,427	33.9
NEVADA	1,201,833	139,986	11.6
NEW HAMPSHIRE	1,109,252	543,644	49.0
NEW JERSEY	7,730,188	819,867	10.6
NEW MEXICO	1,515,069	410,443	27.1
NEW YORK	17,990,455	2,827,903	15.7
NORTH CAROLINA	6,628,637	3,293,044	49.7
NORTH DAKOTA	638,800	298,146	46.7
OHIO	10,847,115	2,809,558	25.9
OKLAHOMA	3,145,585	1,015,777	32.3
OREGON	2,842,321	839,123	29.5
PENNSYLVANIA	11,881,643	3,690,922	31.1
RHODE ISLAND	1,003,464	140,324	14.0
SOUTH CAROLINA	3,486,703	1,581,345	45.3
SOUTH DAKOTA	696,004	348,271	50.0
TENNESSEE	4,877,185	1,908,212	39.1
TEXAS	16,986,510	3,348,809	19.7
UTAH	1,722,850	222,989	12.0
VERMONT	562,758	381,797	67.9
VIRGINIA	6,187,358	1,893,128	30.6
WASHINGTON	4,866,692	1,149,173	23.6
WEST VIRGINIA	1,793,477	1,145,608	63.9
WISCONSIN	4,891,769	1,680,037	34.3
WYOMING	453,588	159,042	35.1

Map 1

PERCENT STATE POPULATION CLASSIFIED "RURAL"
US CENSUS, 1990

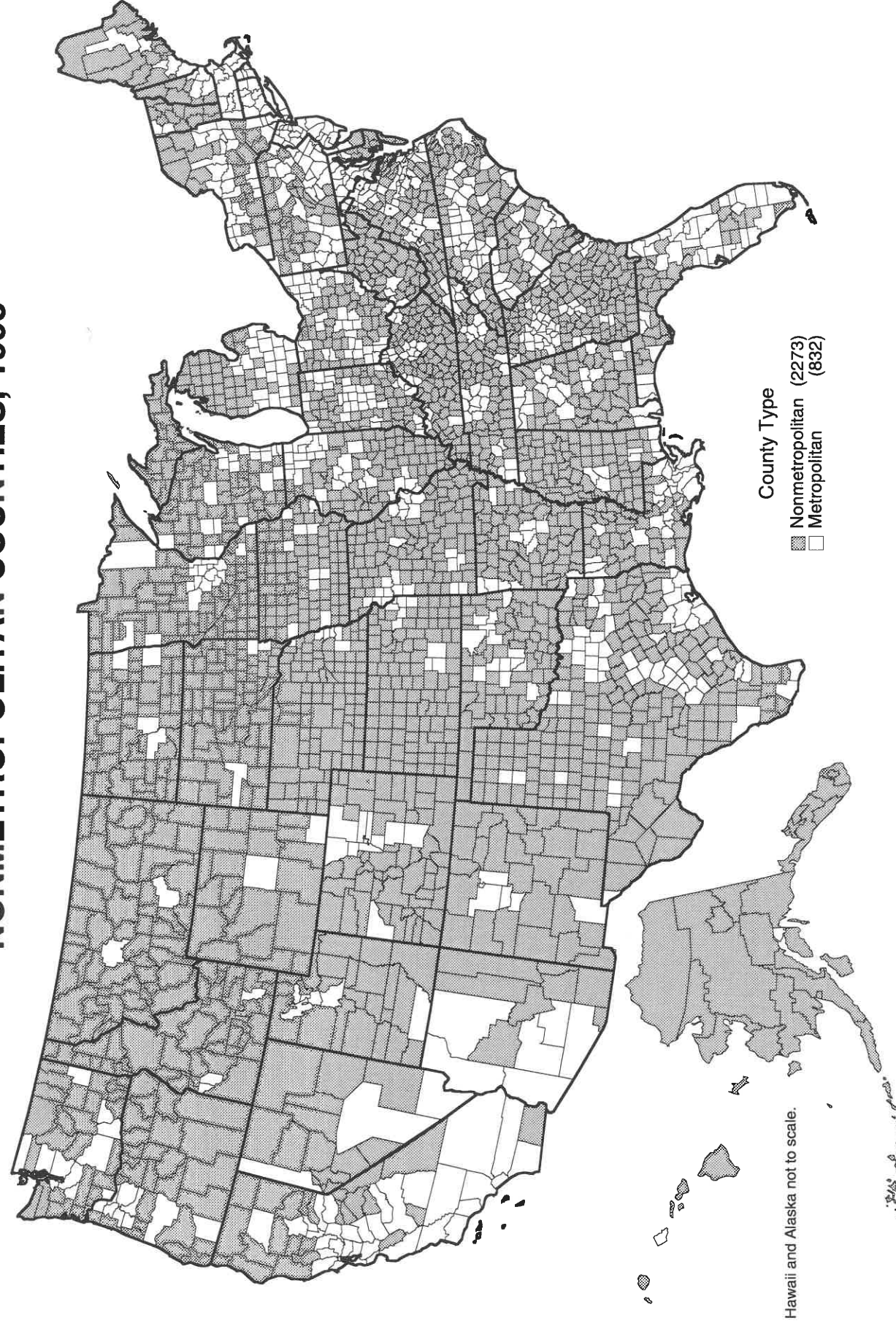


Source: US Bureau of Census, 1990.

Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.

Map 2

NONMETROPOLITAN COUNTIES, 1998

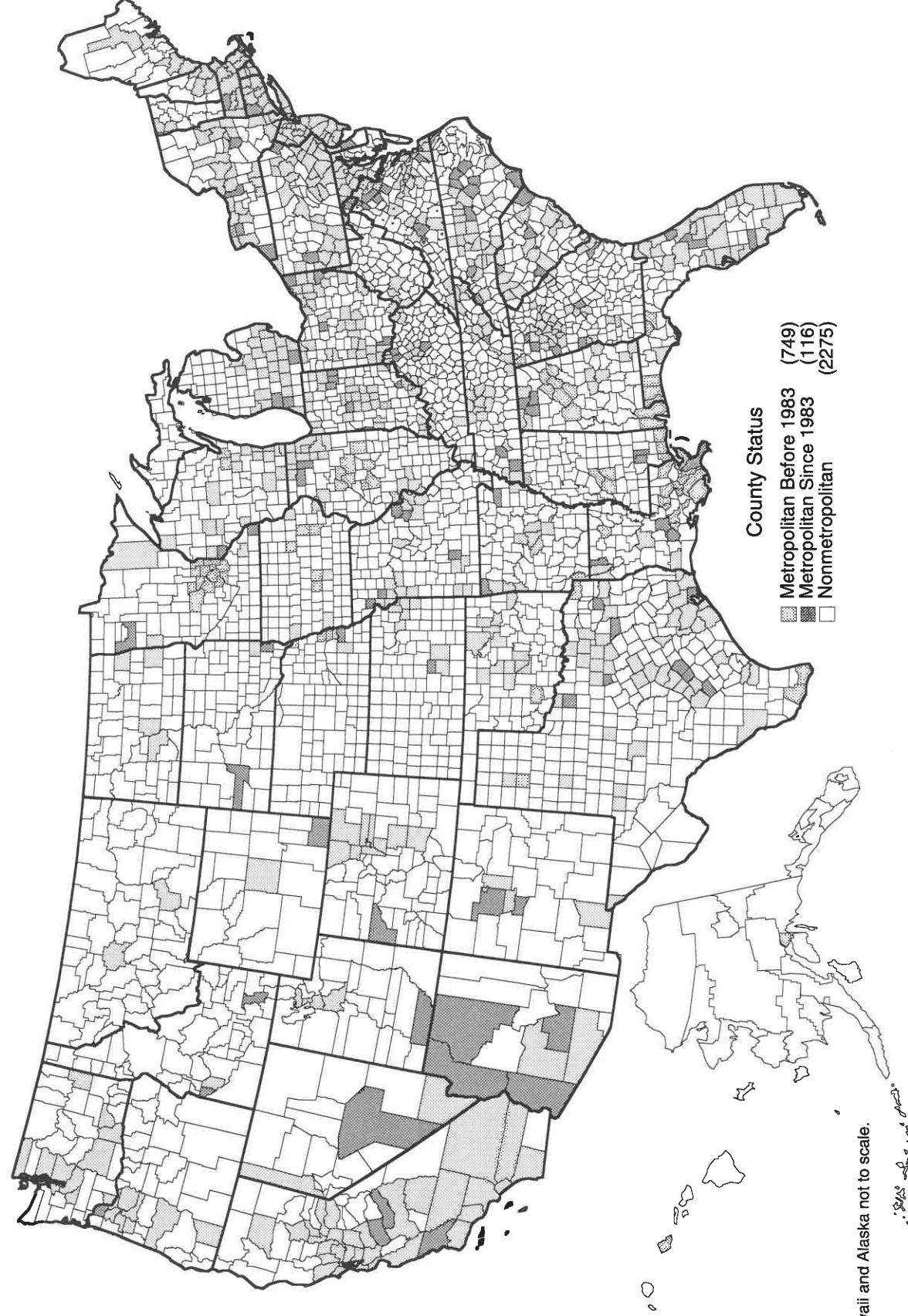


Source: US Bureau of Census; Office of Management and Budget, 1998.

Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.

Map 3

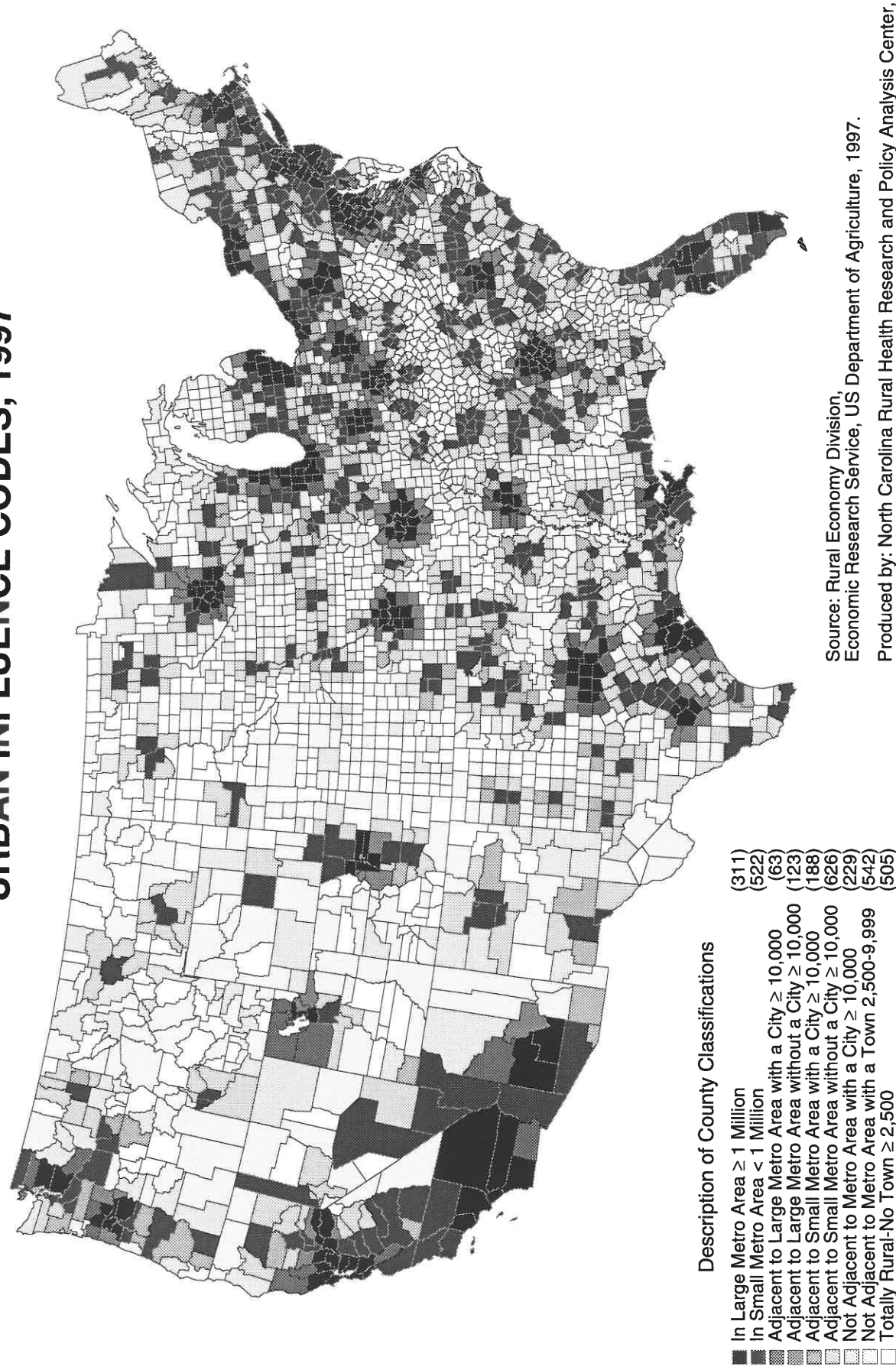
COUNTIES DESIGNATED METROPOLITAN SINCE 1983



Source: Area Resource File, selected years; Office of Management and Budget, 1997.
 Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.

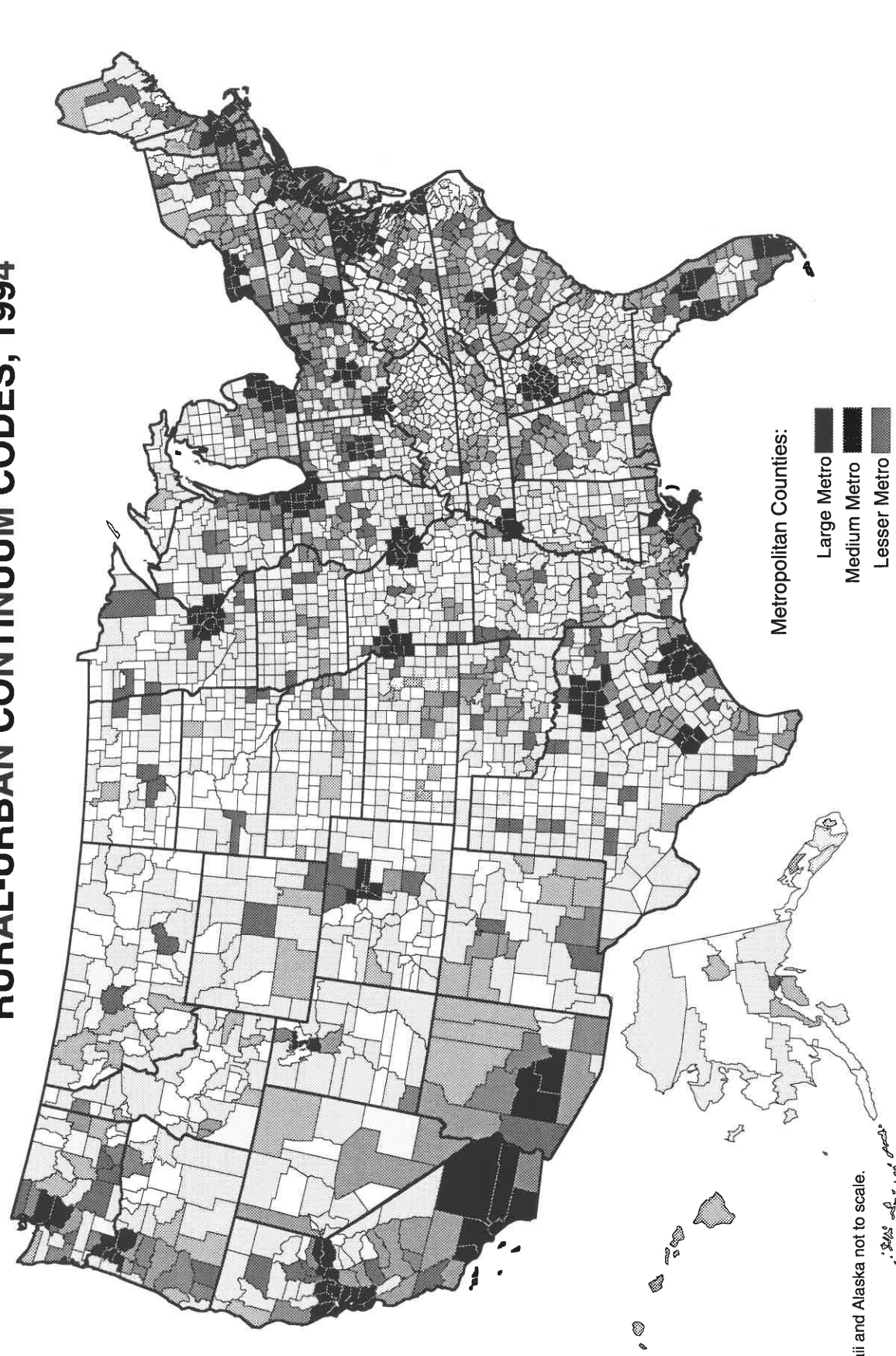
Map 4

URBAN INFLUENCE CODES, 1997



Source: Rural Economy Division, Economic Research Service, US Department of Agriculture, 1997.
 Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.

Map 5
RURAL-URBAN CONTINUUM CODES, 1994



Metropolitan Counties:

Large Metro
Medium Metro
Lesser Metro

Nonmetropolitan Counties:

Urbanized:

Less Urbanized:

Thinly Populated:

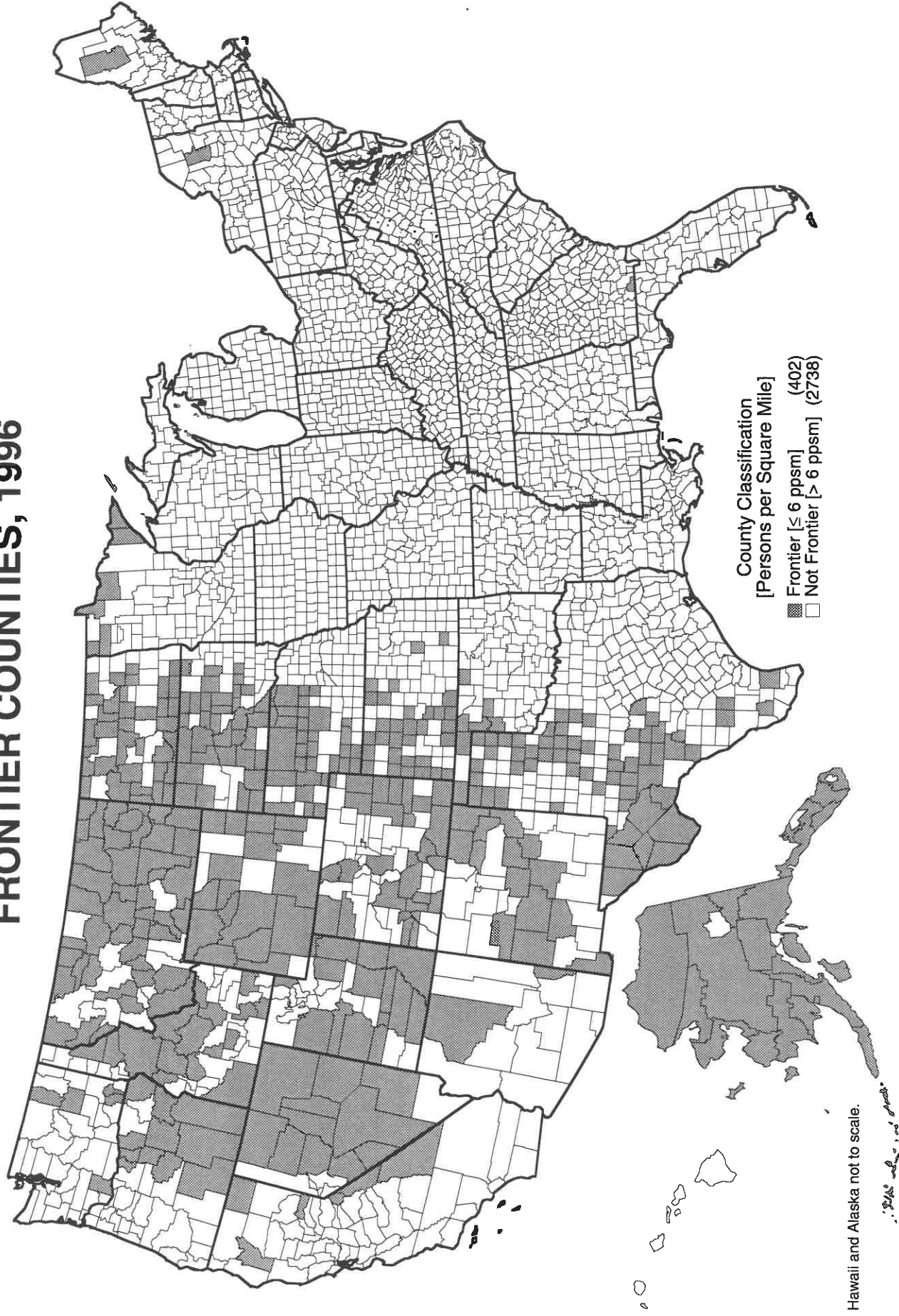
Adjacent to MSA
Not Adjacent to MSA
Adjacent to MSA
Not Adjacent to MSA
Adjacent to MSA
Not Adjacent to MSA

Source: Rural Economy Division, Economic Research Service, US Department of Agriculture, 1995.

Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.

Hawaii and Alaska not to scale.

Map 6
FRONTIER COUNTIES, 1996



County Classification
[Persons per Square Mile]

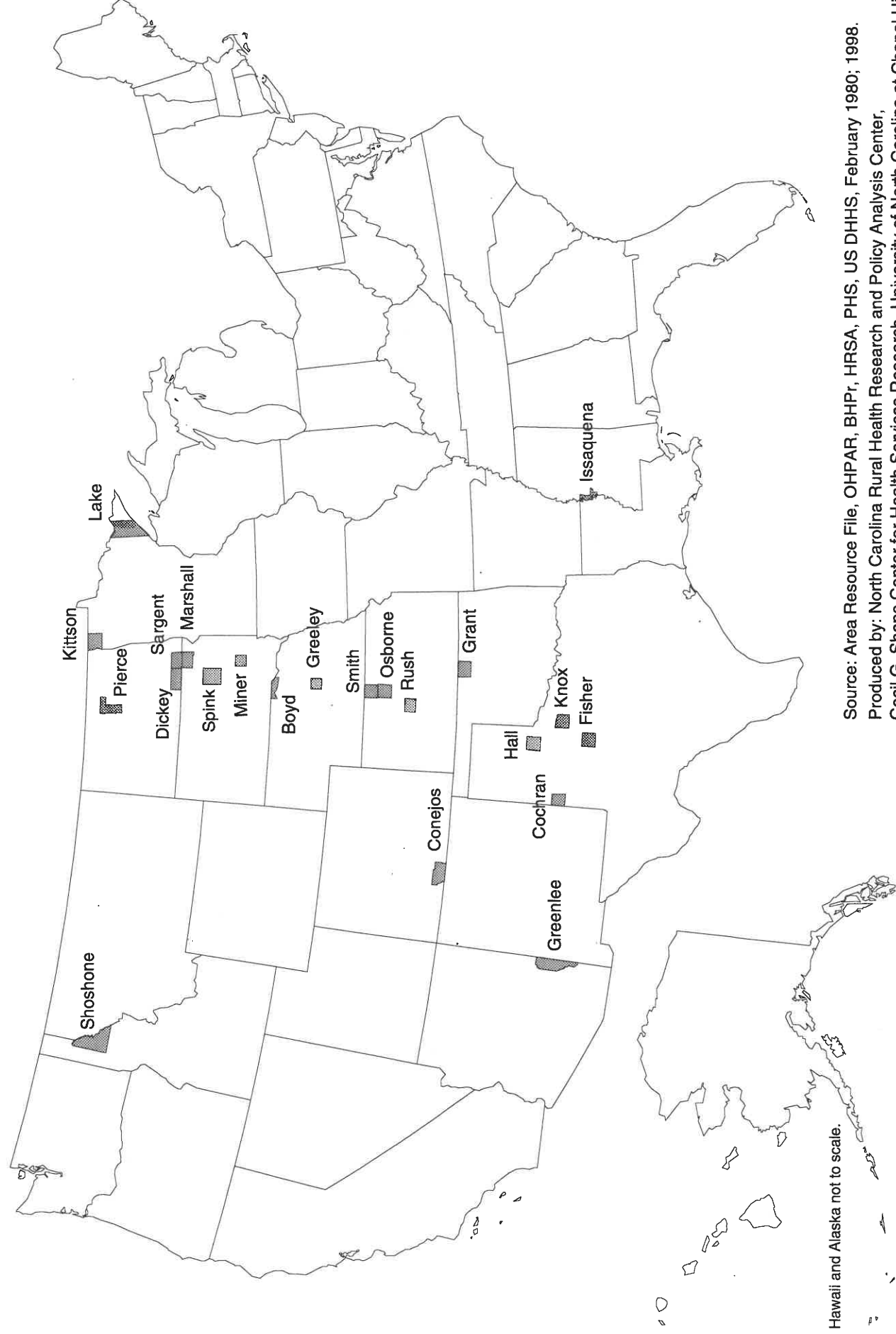
Frontier (≤ 6 ppsm) (402)
Not Frontier (> 6 ppsm) (2738)

Hawaii and Alaska not to scale.

Note: The following metropolitan counties are frontier: Cococino Co., AZ; Nye Co., NV; and Kane Co., UT.
Source: Area Resource File, OHPAR, BHPPr, HRSA, PHS, US DHHS, February 1998.
Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.

Map 7

COUNTIES GAINING FRONTIER STATUS, 1980-1990



Hawaii and Alaska not to scale.

Source: Area Resource File, OHPAR, BHP, HRSA, PHS, US DHHS, February 1980; 1998.
Produced by: North Carolina Rural Health Research and Policy Analysis Center,
Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill,
with support from the Federal Office of Rural Health Policy, HRSA, US DHHS.