Coastal Trends Report Series

Population Trends Along the Coastal United States: 1980-2008

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

Assessing the effects of current and projected population growth and development in the nation's coastal areas has been a continuing effort within the Special Projects office of NOAA's National Ocean Service. The mission of Special Projects is to enhance the performance and capacity of NOAA's National Ocean Service and its partners through strategic problem solving, integration, and innovation, as well as to ensure more effective and efficient delivery of products and services to the coastal stewardship community. Special Projects conducts analyses and assessments for coastal areas and works to identify issues and solutions, assemble and synthesize data, evaluate and prioritize options, and develop products that support quality coastal resource management.

This report updates a previous report issued by Special Projects that was compiled over a decade ago. It provides coastal population data, trends, and projections, and is intended to help provide insight as to where coastal population has occurred in the past few decades and where it is likely to occur in the next five years. This report will also be included in the Assessments section of NOAA's forthcoming Spatial Trends in Coastal Socioeconomics (STICS) Web site (http://stics.noaa.gov).

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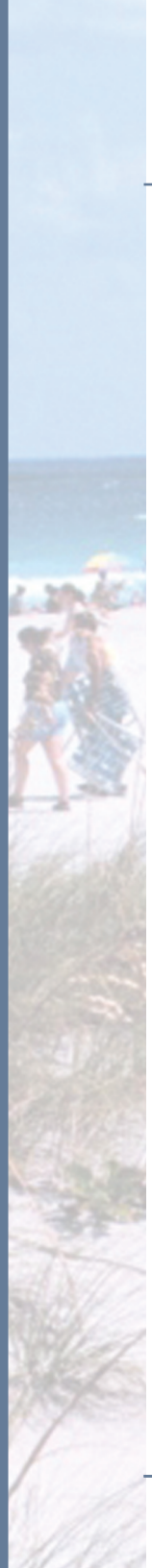

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Population Trends Along the Coastal United States:

1980-2008

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Introduction

Coastal areas are home to a wealth of natural resources and are rich with diverse species, habitat types, and nutrients (WRI, 2000). They also sustain a wealth of economic activity. Employment, recreation and tourism, waterborne commerce, and energy and mineral production are driving forces of population migration to these areas (Bookman et al., 1999; The Heinz Center, 2000; U.S. Commission on Ocean Policy, 2004). Coastal management policies seek to balance economic growth and environmental protection. The value of coastal resources is illustrated in the breadth and depth of their use. Ironically, the qualities that make them so desirable are the very ones that have led to their endangerment.

Coastal ecosystems are pressured by population growth, leaving them vulnerable to pollution, habitat degradation and loss, overfishing, invasive species, and increased coastal hazards such as sea-level rise (WRI, 2000; Hinrichsen, 1998; National Safety Council, 1998). It was estimated that in 2003, approximately 153 million people (53 percent of the nation's population) lived in the 673 U.S. coastal counties, an increase of 33 million people since 1980. With such a large percentage of the population living in coastal areas, it is no wonder that 10 of the 15 most populous cities in the United States are located in coastal counties (U.S. Census Bureau, 2001d).

An estimated 153 million people lived in coastal counties in 2003.

Since 1980, coastal population growth has generally reflected the same rate of growth as the entire nation, but in the limited space of coastal counties. This increasing density, coupled with the fast-growing economy of coastal areas (Colgan, 2004), will make the task of managing coastal resources increasingly difficult, especially with the nation's coastal population expected to increase by more than 7 million by 2008 and 12 million by 2015 (W&PE, 2003).

South Florida; South Florida Water Management District (SFWMD)

Coastal areas are also subject to major population influxes during peak vacation periods. Ocean City, MD, for example, had almost 4 million seasonal visitors between the Memorial Day and Labor Day holidays in 2003 (Ocean City Public Relations Office, 2004). With more people comes the need for increased infrastructure, which may lead to even more negative effects on natural resources (National Safety Council, 1998). In the next few decades, coastal areas will also see a growing proportion of older Americans and an unprecedented number of Americans reaching retirement age. This also has the potential to place demands on coastal resources as there will be more time for people to enjoy the many coastal amenities (Culliton, 1998).

This report updates a previous population report issued by the National Ocean Service, NOAA (Culliton et al., 1990) and focuses on population change along our nation's coast from 1980 to 2008. Historical population trends and short-term projections of population change in the nation's coastal areas are provided. It is anticipated that coastal decision makers and stakeholders will use this update to enhance coastal management.

Geographic Units

Physical boundaries and natural characteristics of the landscape, such as watersheds, provide meaningful geographic areas to evaluate the environmental consequences of a growing population. However, local and community-level decisions and legislation are usually made within the frame of political boundaries. The U.S. Census Bureau compiles population data using several different geographic units. There are 30 coastal states in the United States containing a total of 673 coastal counties, boroughs, parishes, or county equivalents. NOAA's Special Projects office defines a county as coastal if one of the following criteria is met: (1) at a minimum, 15 percent of the county's total land area is located within a coastal watershed or (2) a portion of or an entire county accounts for at least 15 percent of a coastal cataloging unit.[1] For the purposes of this report, coastal states and counties are grouped into five regions: Northeast, Southeast, Gulf of Mexico, Pacific, and Great Lakes. The number of states and coastal counties contained in each region is shown below.

TABLE 1. Coastal geographic regions, states, and counties

Region	Number of States	Number of Coastal Counties	Land Area (Sq. Mi.)
Northeast	11	180	82,124
Southeast	4	103	63,516
Gulf of Mexico	6	144	116,644
Pacific	5	88	511,073
Great Lakes	8	158	115,418

Source: National Ocean Service/NOAA

Population Data

Population data for U.S. counties for 1980, 1990, 2000, and 2003 were obtained from the U.S. Census Bureau. The U.S. Census Bureau does not make population projections for the county level, but rather at the state and national levels. County-level population projections were obtained from three private firms and compared. Datasets from Geolytics, Inc., NPA Data Services, Inc., and Woods and Poole Economics, Inc., were aggregated to the state level and compared both to state projections developed by the U.S. Census Bureau and to each other. At the state level, all three datasets were comparable, not demonstrating significant differences. After further analyses, the Woods and Poole Economics, Inc., dataset demonstrated more conservative population projection estimates, and was used for this report.

Woods and Poole Economics, Inc., employs a four-step process to generate county population projections. First, forecasts of total United States variables such as income, earnings, population, and inflation are made. Second, the country is divided into 172 Economic Areas (EA). Employment is projected and used to estimate earnings within each EA. EAs are defined by the Bureau of Economic Analysis to meet minimum size and other criteria necessary to facilitate regional analyses such as projections. County to county commuting flows are analyzed in defining the EA boundaries in an effort to ensure that, to the extent possible, each EA is both the place of work and the place of residence for its labor force (Johnson, 1995). Third, total population for each EA is projected based on net migration rates projected from employment opportunities. Last, following this process using EAs as the control data, county population projections are generated (W&PE, 2003).

Making estimates of future data is not an exact science. The methods Woods and Poole Economics, Inc., employ to make projections are based on analysis of historical data. Consequently, limitations are inherent to the data, and projections should not be interpreted as future predictions. Woods and Poole Economics, Inc. (2003) notes that economic and demographic events may result in outcomes different from the projections and that limitations may result from making projections for small geographic areas. Ultimately, the projections presented in this report are not intended to highlight the projected population change of individual counties but rather to present, on a regional basis, where change is likely to occur.

National Overview

Regional and State Trends

Our coasts are among the most rapidly growing and developed areas in the nation. In 2003, the coastal population was greatest in the Northeast and Pacific regions, followed by the Great Lakes, Gulf of Mexico, and finally the Southeast. Figure 1 shows the regional distribution of coastal population in 2003. Figure 2 shows the distribution of this population on a county basis.

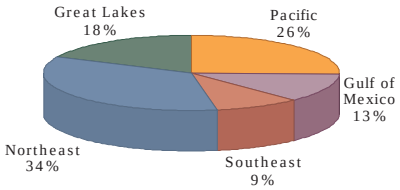


FIGURE 1. Regional distribution of the nation's coastal population in 2003

Source: U.S. Census Bureau

Total coastal population between the years 1980 and 2003 increased by 33 million people or 28 percent, roughly consistent with the nation's rate of increase. Coastal population within the Pacific region showed the largest gain during this time with almost 12 million people, followed by the Northeast with 8 million people. The Southeast region, however, exhibited the largest rate of change with a 58 percent increase, followed by the Pacific at 46 percent, and the Gulf of Mexico at 45 percent. The rate of growth in the Northeast and Great Lakes regions was considerably smaller with 18 percent and 6 percent increases, respectively. Percent population change in coastal counties is presented in Figure 3.

The Southeast has increasingly become a leading destination for retirees and job-seekers. Between the years 1995 and 2000, the Census Bureau reported that the highest levels of migration were to states that fall within the Southeast region and the Gulf of Mexico region, particularly to Florida, Georgia, and North Carolina (Franklin, 2003).

In contrast, the lowest levels of migration were to states found in the Northeast region. Additionally, New York, Pennsylvania, and New Jersey saw a considerable amount of population lost to out-migration during this period (Franklin, 2003).

The leading states in terms of absolute and percent coastal population change during the past two decades are found in Table 2. California led in coastal population change, increasing by 9.9 million people, over twice the growth of any other state (with the exception of Florida). This represents an increase of 1,179 persons every day in California's coastal areas. The coastal population change in Florida ranks second, accounting for an additional 7.1 million people. Other leaders in coastal population change included Texas, Washington, and Michigan. Of the states listed, half are within the Northeast region alone.

As one of the main drivers of coastal population increase in the Southeast and Gulf of Mexico regions, Florida shows the greatest percent population change between 1980 and 2003, reaching nearly 75 percent. Alaska and Washington also show high rates of growth, increasing by 63 percent and 54 percent, respectively.

TABLE 2. Leading states in coastal population growth, 1980-2003

State	Total Change (Million Persons)	State	Percent Change
California	9.9	Florida	75
Florida	7.1	Alaska	63
Texas	2.5	Washington	54
Washington	1.7	Texas	52
Virginia	1.6	Virginia	48
New York	1.6	California	47
New Jersey	1.2	New Hampshire	46
Maryland	1.2	Delaware	38
Michigan	0.8	Georgia	35
Massachusetts	0.7	South Carolina	33

Source: U.S. Census Bureau

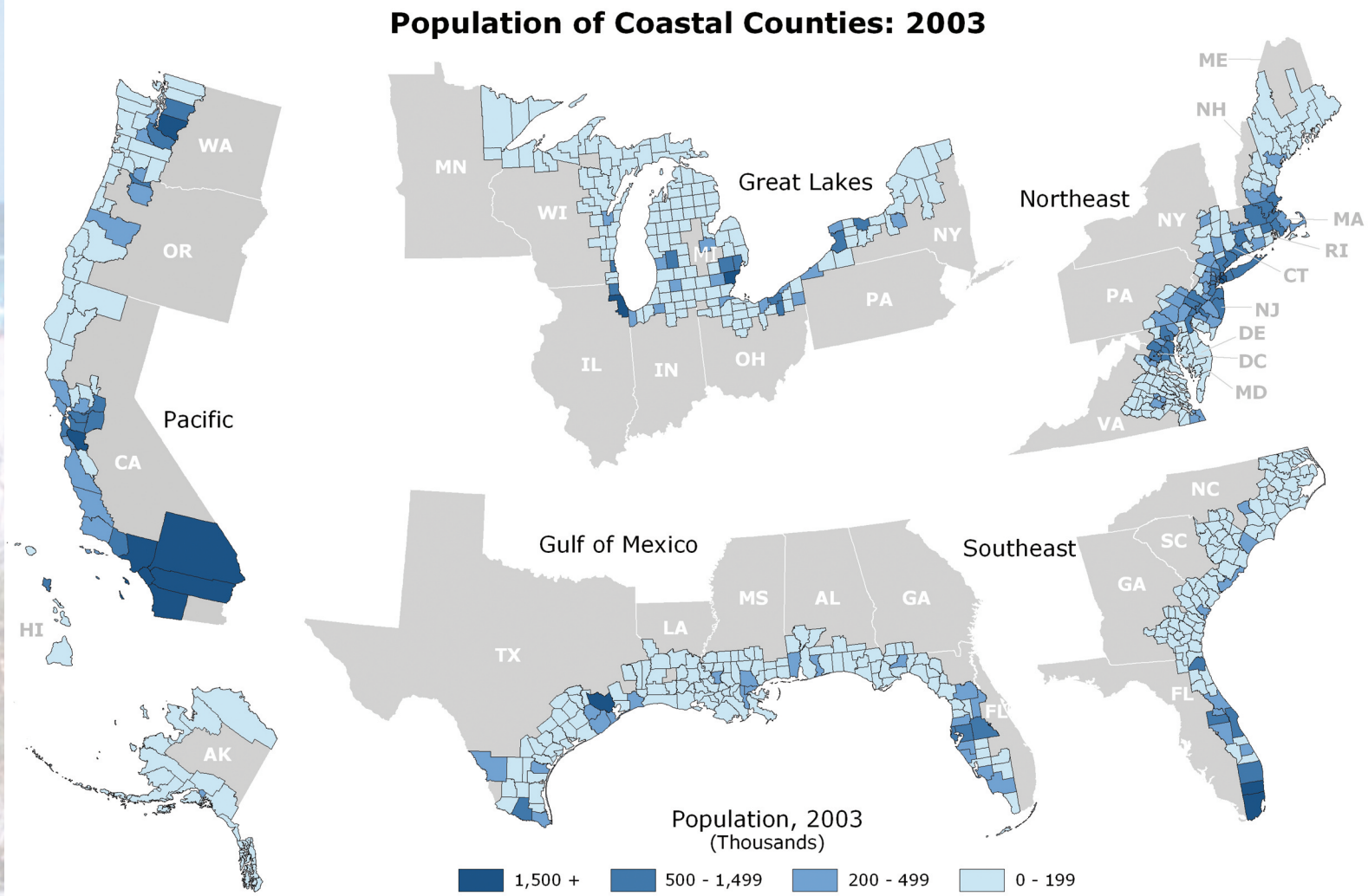


FIGURE 2. Coastal county population in 2003

Source: U.S. Census Bureau

Leading Coastal Counties in Population in 2003 (Millions)

Los Angeles, CA	9.9	Harris, TX	3.6	San Diego, CA	2.9
Cook, IL	5.4	Orange, CA	3.0	Kings (Brooklyn), NY	2.5

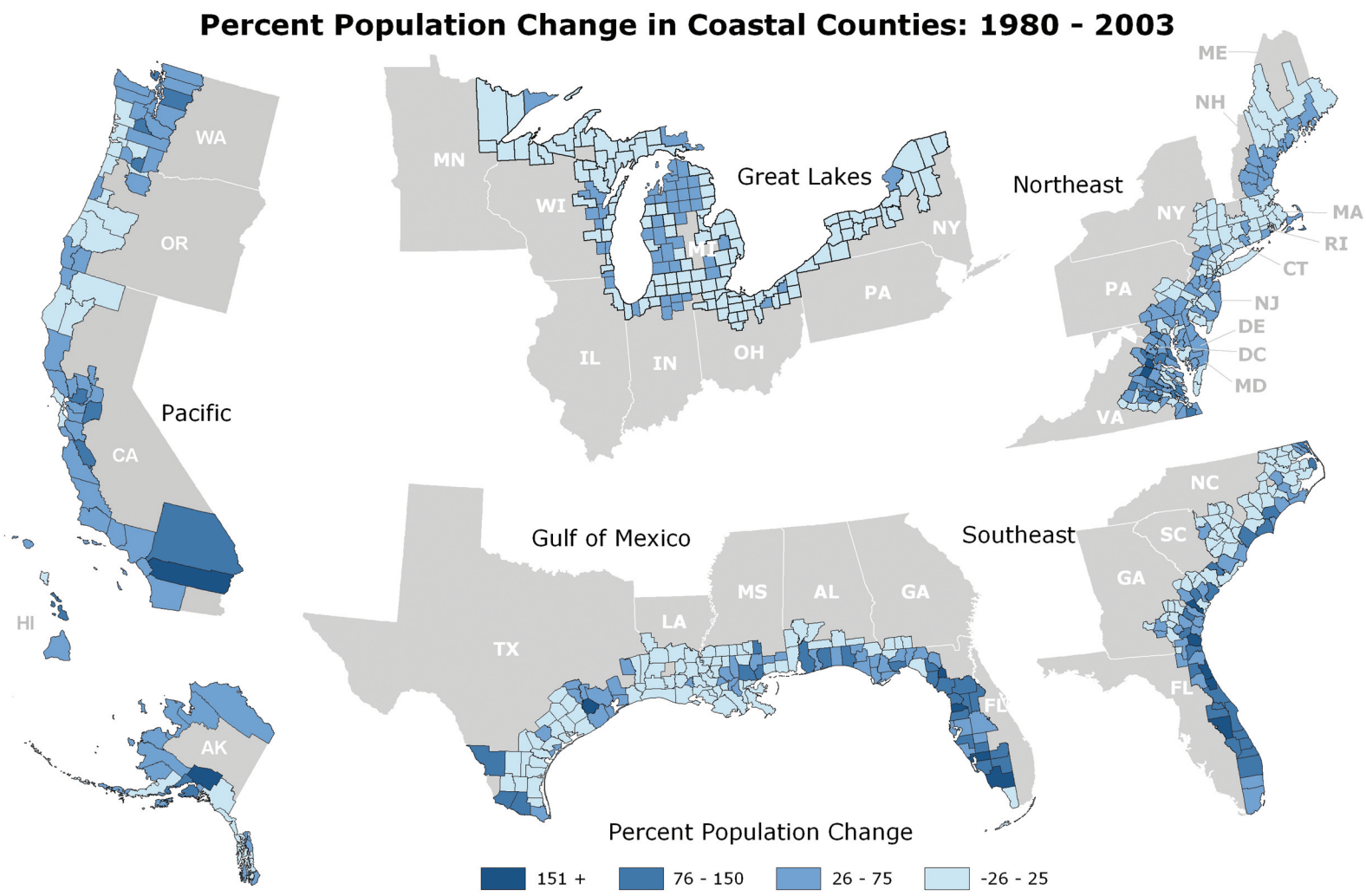


FIGURE 3. Coastal county percent population change in 2003

Source: U.S. Census Bureau

Leading Coastal Counties in Percent Population Change, 1980 to 2003

Flagler, FL	470	Matanuska-Susitna, AK	284	Collier, FL	233
Osceola, FL	318	Camden, GA	240	Hernando, FL	223

Population in Coastal Counties

Population Trends

Coastal counties constitute only 17 percent of the total land area of the United States (not including Alaska), but account for 53 percent of the total population. This ratio of coastal county population to the population of the United States as a whole has remained relatively stable (between approximately 52 and 54 percent) since 1970. Coastal county population is not growing significantly faster than noncoastal population, but rather, it is the continued population growth in the limited land area of coastal counties that is of growing importance and the focus of increasing attention.

Coastal counties contain 53% of the nation's population, yet, excluding Alaska, account for only 17% of U.S. land area.

Of the 10 coastal counties that experienced the greatest increases in population from 1980 to 2003, six are in California, three are in Florida, and one is in Texas. The combined population increase of these 10 counties alone accounts for 30 percent of the coastal population growth during this period. Los Angeles, CA, had the highest growth overall, followed by Harris, TX, and Riverside, CA. In contrast, approximately 14 percent of all U.S. coastal counties (the majority located in the Great Lakes and Northeast regions) lost population.

Washington, DC; Hisham S. Ibrahim/ Getty Images

It is projected that San Diego, CA, will be the leading coastal county in population increase in the years to come (2003-2008). It, along with Orange, San Bernardino, and Riverside counties, CA, will account for 12 percent of the nation's expected total coastal population increase. Counties in South Florida (Broward, Palm Beach, Orange, and Miami-Dade) along with Harris County, TX, also are anticipated to experience major growth during this period.

The largest rate of change from 1980 to 2003 occurred in coastal counties found in Florida, Alaska, Georgia, Texas, and Virginia. Flagler County, FL, located in the Southeast, increased 470 percent, followed by Osceola County, FL, at 318 percent. Several additional counties in Florida experienced substantial rates of increase during this time as well. Florida has increasingly become a "retirement magnet," a migratory destination for retirees in recent decades (Frey, 2003). The largest state-to-state migration between 1995 to 2000, for example, was from New York to Florida, reflecting this migratory trend (Perry, 2003).

Despite the continual population growth in coastal counties, recent trends have also shown an increase in migration from coastal states to noncoastal states. For instance, from 1995 to 2000, California contributed to large migration flows to Nevada and Arizona (attributed to retiree migration and other economic factors) (Perry, 2003). In addition, California has contributed to at least one-third of Colorado's net migration during this period (Perry, 2003). At the county level, Maricopa County, AZ, and Clark County, NV, are expected to be two of the four leading counties in population growth in the entire United States from 2003 to 2008. Overall, from 1990-2003, noncoastal counties emerged as having a greater population increase than coastal counties. This greater population growth and percent change in noncoastal counties is expected to continue from 2003 to 2008.

San Francisco, CA; Jeremy Woodhouse/Getty Images

Population Density

Most of the nation's most densely populated areas are located along the coast. In fact, 23 of the 25 most densely populated U.S. counties are coastal. Coastal counties average 300 persons per square mile, much higher than the national average of 98 persons per square mile (population density values presented in this report exclude Alaska because its extensive coastal land area dilutes the national average). The most densely populated counties in the nation, New York (Manhattan), Kings (Brooklyn), Bronx, and Queens comprise portions of New York City. Together, these counties average almost 39 thousand persons per square mile.

Since 1980, population density has increased in coastal counties by 65 persons per square mile, or by 28 percent. By 2008, it is expected to increase by 13 persons per square mile, or 4 percent. The ratio of national, coastal state, and noncoastal county population density to coastal population density has remained relatively constant since 1980 (only fluctuating by fractions of a percent). Figure 4 demonstrates this trend. For example, the population density of the nation as a whole has been approximately one-third that of coastal counties throughout this period. The population density of noncoastal counties has remained between 18% and 19% of coastal county population density. Figure 5 shows the population density of coastal counties nationwide.

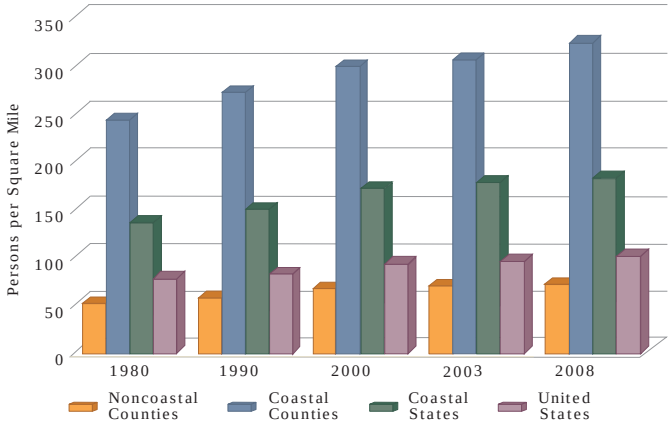


FIGURE 4. Population density of the United States, coastal states, coastal counties and noncoastal counties from 1980 to 2008

Source: U.S. Census Bureau and W&PE, Inc.

Leading States in Coastal Population Density in 2003 *(Persons per Square Mile)*

Illinois	4,330	Massachusetts	939
New Jersey	1,208	Pennsylvania	794
Rhode Island	1,030	Connecticut	719

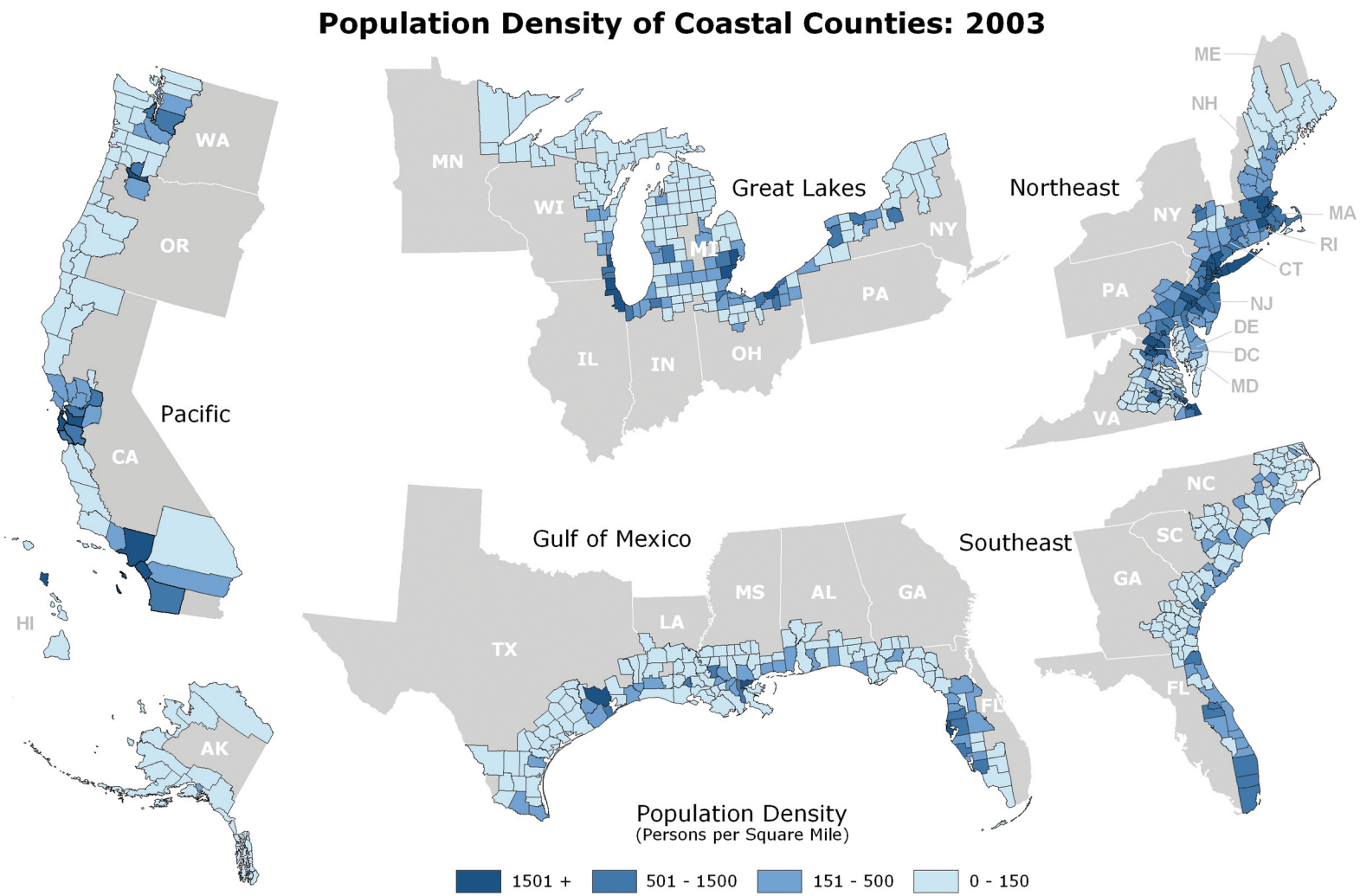


FIGURE 5. Coastal county population density in 2003

Source: U.S. Census Bureau

Leading Coastal Counties in Population Density in 2003 (Thousands of Persons per Square Mile)

NewYork, NY	68	Bronx, NY	32	San Francisco, CA	16
Kings, NY	35	Queens, NY	20	Hudson, NJ	13

Building Along the Coast

Housing

In 2000, coastal counties contained 52 percent of the nation's total housing supply (comparable to the proportion of coastal population to total U.S. population). The leading states in total housing units in coastal counties were California, Florida, and New York. Together, these states comprised 41 percent of the coastal county total.

At the county level, Los Angeles County, CA, had the highest number of housing units at approximately 3.3 million, double that of any other county except Cook County, IL, with 2.1 million housing units. Total housing units within coastal counties are shown in Appendix B.

Seasonal Housing

One component of total housing units is seasonal or vacation homes. The location and growth in the number of seasonal housing units indicate areas where people congregate seasonally or for short periods. In 2000, there were approximately 2.1 million seasonal homes in coastal counties (54 percent of the nation's total). Florida had the largest number of seasonal housing units, 24 percent of the coastal county total, followed by Michigan, California, and New York. Figure 6 shows total seasonal housing units within coastal counties in 2000.

More than 1,540 single-family housing units are permitted for construction every day in coastal counties.

Several coastal counties that are low in population emerge as being popular seasonal destinations. For instance, looking beyond the dominance of Florida and Southern California, large numbers of seasonal homes are found in Maine, the Outer Banks of North Carolina, northern Michigan, Maryland, and Delaware (Figure 6). It is important to note that some coastal counties and communities are subject to intense development not indicated by total housing or seasonal housing numbers.

Commercial, hotel, and recreational construction is an important component of the coastal economy and contributes significantly to overall development in some areas.

Building Permits

The construction of single-family and multi-family homes may act as an indicator of both economic growth as well as increased "sprawl" along the coastline. The number of building permits issued for homes helps pinpoint where the greatest amount of residential development has occurred. In coastal counties from 1999 to 2003, 2.8 million building permits were issued for the construction of single-family housing units (43% of the nation's total) and 1 million building permits were issued for the construction of multi-family housing units (51% of the nation's total). Within this five-year period, the leading states in single-family unit construction were found in all five regions. Florida and California combined made up 37% of all permits issued for single-family units and 42% of all multi-family units in coastal counties (U.S. Census Bureau, 2000, 2001a, 2002, 2003a, 2004). Table 3 shows the 10 leading states in coastal residential housing construction during this five-year period.

TABLE 3. Leading coastal states in building permits issued for single-family and multi-family housing units from 1999 to 2003.

State	Building Permits for Single-Family Units (Thousands)	State	Building Permits for Multi-Family Units (Thousands)
Florida	607	Florida	264
California	443	California	186
Texas	199	New York	103
Michigan	193	Texas	66
Virginia	142	Washington	53
Washington	118	Illinois	45
New Jersey	113	New Jersey	42
Maryland	105	Virginia	40
New York	101	Michigan	36
Pennsylvania	90	Maryland	26

Source: U.S. Census Bureau

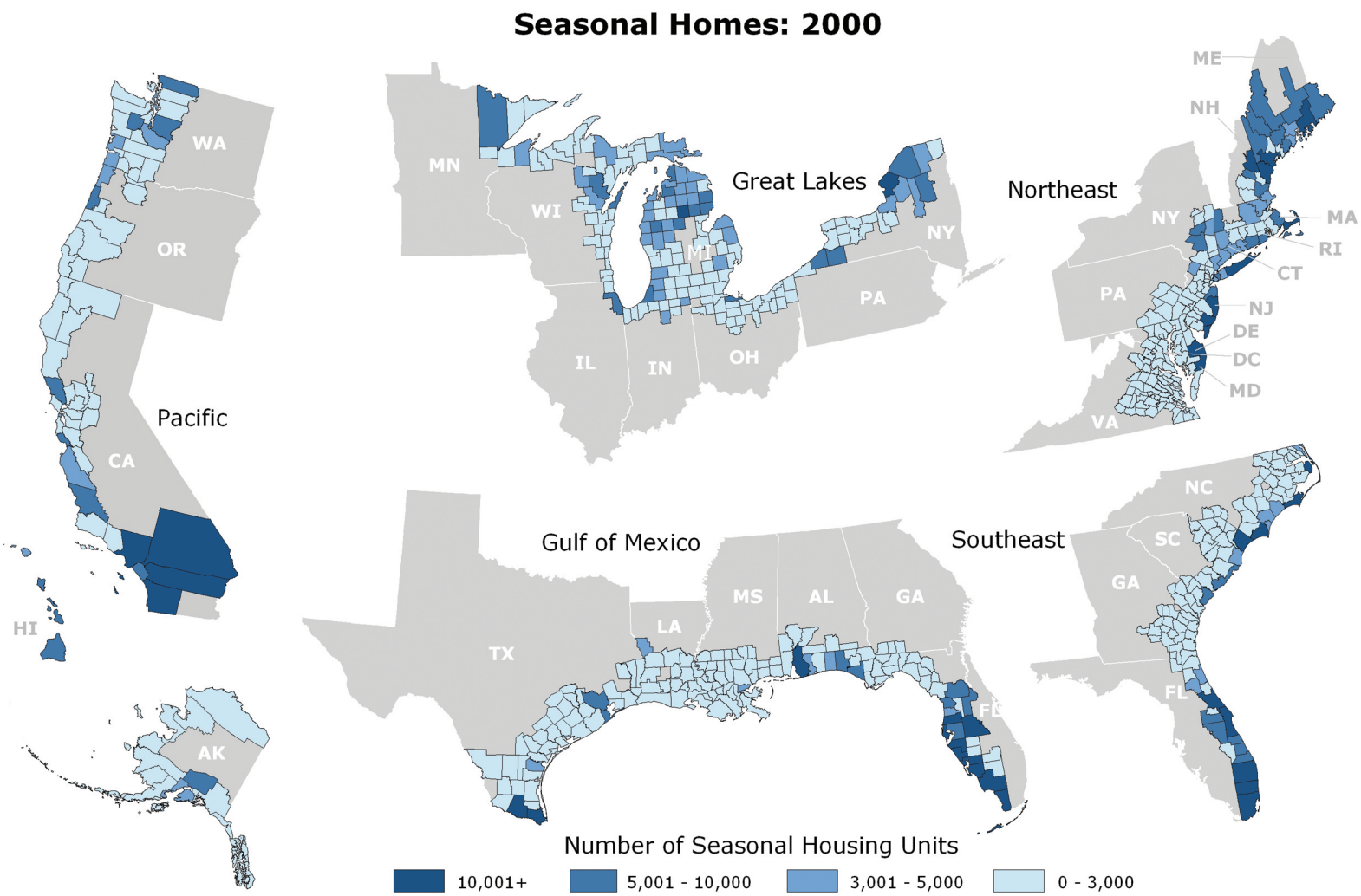


FIGURE 6. Seasonal housing units in 2000

Source: U.S. Census Bureau

Leading States in Coastal Seasonal Housing in 2000 (Thousands)

Florida	506	California	177	New Jersey	115
Michigan	230	New York	173	Massachusetts	95

Characteristics of the Coastal Population

Age

The breakdown of age groups can be a useful method to gauge the direction of population in coastal counties with regard to community lifestyle priorities (e.g., active marine recreation, family-oriented activities, senior-oriented features). Figure 7 provides a breakdown of age groups in 2000 for coastal and noncoastal counties. The majority of the population within each age group lives in coastal counties. The difference between coastal and noncoastal county population is largest in the under-16 age group and in the 35-44 age group, which encompasses a significant portion of the Baby Boomer generation. In these age groups, coastal county population exceeded noncoastal population by approximately 3.2 and 3.3 million persons, respectively. In 2000, Baby Boomers ranged in age from 36 to 54 (Center for Health Communication, Harvard School of Public Health, 2004).

Between 1980 and 2000, middle-aged adults rose from 21 to 30 percent of the population in coastal counties.

In coastal counties, over the 20-year period from 1980 to 2000, the 35–44 and 45–54 age groups saw a significant increase in population, rising from 21 percent of the total coastal population to 30 percent of the total coastal population. The proportion of young adults (aged 18-24) fell from 13 percent to 9 percent of the total during this same time period. However, in the year 2000, the proportion of the population within each age group that resided in coastal counties (and within each specific coastal region) was relatively consistent with the national average (falling within 1 to 2 percent).

The oldest age group (65 and older) is often one of special interest because of the assumption that older Americans retire to warmer areas near the ocean. The data do not show any great change over the years, as this group increased 1 percent of the total coastal population each decade (from 1980 to 2000). Of growing attention, however, is the number of Americans that will enter the 65 and over age group in the upcoming decades.

Patuxent River, Maryland; Mary Holinger NODC/NOAA

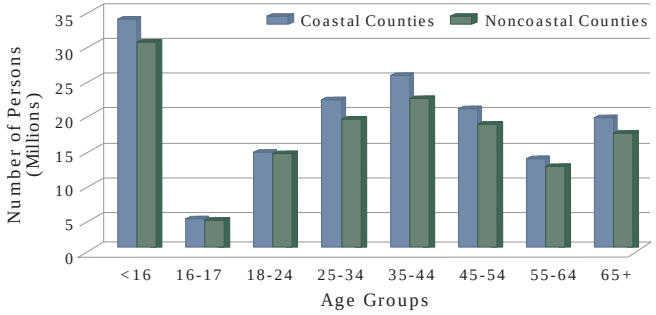


FIGURE 7. Population by age group in coastal and noncoastal counties in 2000

Source: U.S. Census Bureau

Income

Income is a demographic attribute that can be very illustrative in the study of the geographic patterns of population. The geographic breakdown of income in coastal counties and between coastal and noncoastal counties can be an important determinant of why certain geographic areas are chosen over others and what attributes are important to residency patterns. Figure 9 shows the median household income of coastal counties.

Counties that fall within the highest category (median household income greater than $58,000) appear to surround, are adjacent to, or are within commuting distance of large cities such as New York, Boston, Philadelphia, Chicago, Los Angeles, and San Francisco. Counties exhibiting the lowest median household income category (less than $34,000) tend to be found in more rural areas, particularly in the Southeast and Gulf of Mexico regions.

Median household income for coastal counties is approximately 17% higher than noncoastal counties.

Baltimore and Montgomery Counties, MD; M. Crossett

On average, coastal counties have a higher median household income than noncoastal counties, differing by almost 17%. However, this difference decreases when coastal counties are compared to noncoastal counties within coastal states. The difference in average median household income is reduced to 14%.

Median household income within coastal and noncoastal counties also differs within regions (Figure 8) as the location of large cities and the cost of living may vary. For instance, in the Northeast region, the average median household income in coastal counties is almost $13,000 greater than noncoastal counties. The Pacific region shows a similar pattern with a difference of $8,600. In the Gulf of Mexico region, there is less than one percent difference between coastal and noncoastal counties. The Southeast region is the only region where the average of median household income of noncoastal counties exceeds coastal counties.

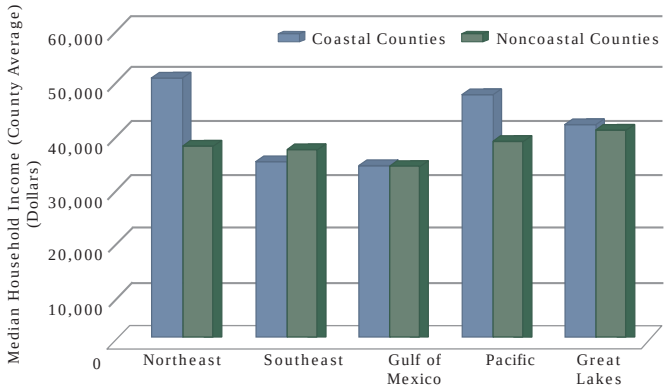


FIGURE 8. Coastal and noncoastal median household income (county average) by region in 2000

Source: U.S. Census Bureau

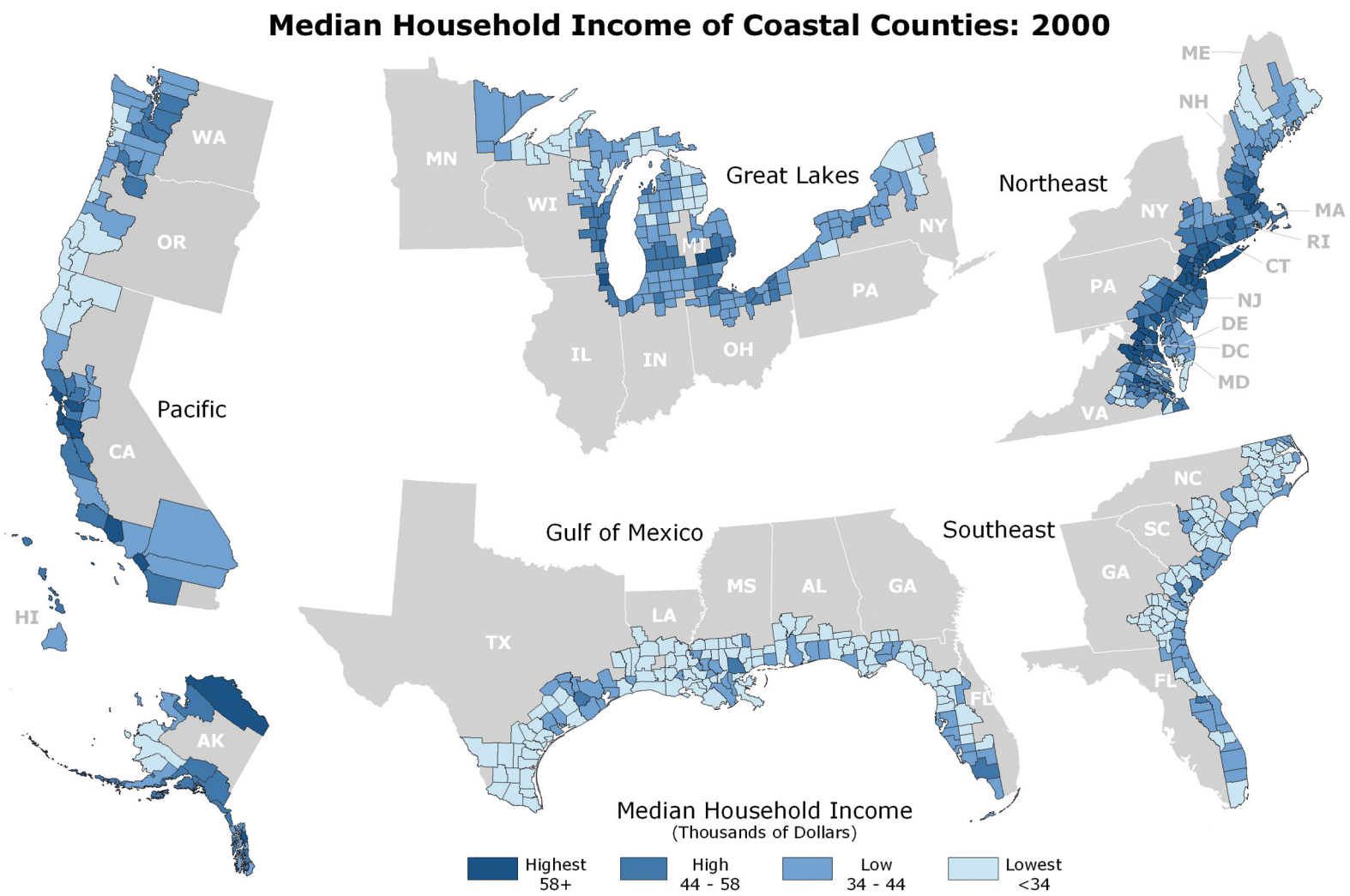


FIGURE 9. Median household income in 2000

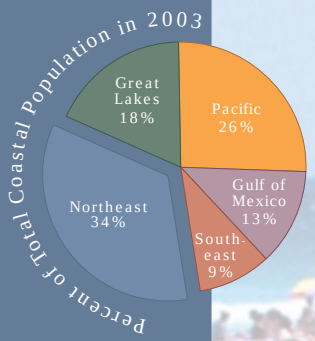
Source: U.S. Census Bureau

Leading States in Median Household Income in 2000 (Dollars)

Connecticut	55,500	Maryland	51,300	California	48,700
New Jersey	55,200	Massachusetts	48,900	New Hampshire	48,700

Regional Trends

Northeast Region



The Northeast region is the most populated coastal region in the United States. In 2003, 52.6 million people, or 34 percent of the nation's total coastal population, resided there. The Northeast region extends from northern Maine south to the tidewaters of Virginia, encompassing the coastlines of 11 states. Ten of the 11 states in the region have the majority of their populations in coastal counties. The 180 coastal counties found in this region (including the District of Columbia) constitute 40 percent of the region's total land area and contain 77 percent of the region's population. Of the nation's 10 largest metropolitan areas, four are located along the coast of this region: New York, Washington DC/Baltimore, Philadelphia, and Boston.

Population Density

In 2003, the population density of the combined coastal counties in this region was 641 persons per square mile, up from 543 in 1980, and is expected to climb to 661 in 2008. This is over 11 times the nation's noncoastal population density (not including Alaska). Of the 25 most densely populated coastal counties in the United States, 21 are found in the Northeast region.

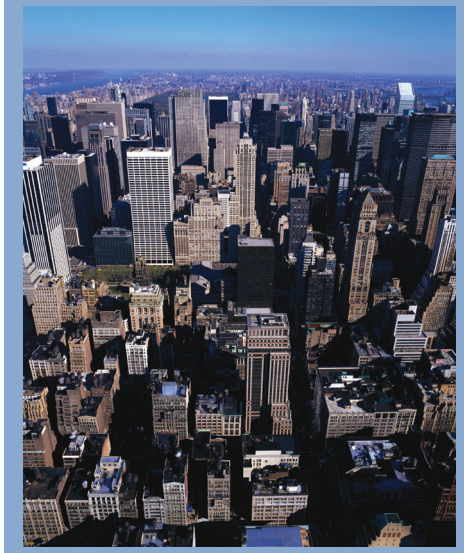
Hot Spots of Growth

From 2003 to 2008, the Northeast coastal population is expected to increase by approximately 1.7 million people. This change will occur most heavily in counties that fall within, are adjacent to, or are one county beyond major metropolitan centers. Six of the counties expecting large population increases will be found in and around New York City and four outside of Washington, DC (Figure 10). For instance, Fairfax, VA, located adjacent to Washington, DC, is expected to show the greatest increase, growing by over 100,000 people in this five-year period. Queens County, Kings County, and Suffolk County, NY, are all expected to increase between 54,000 and 86,000 people.

In contrast to population change, percent population change from 2003 to 2008 reveals a different pattern. The greatest percent coastal population change is expected to occur in the two southernmost states of the region, Maryland and Virginia (Figure 11). Of the 10 leading coastal counties in percent population change, eight are located in Virginia and two are located in Maryland, all averaging a 13 percent to 23 percent increase in growth. Additionally, many of these counties are located further from major metropolitan centers than those leading in absolute growth.

Air Quality

Ground-level ozone, created primarily from motor vehicles, industrial emissions, and chemical solvents, has the potential to cause respiratory health problems and is particularly dangerous to children with asthma. Of the 474 counties nationwide that do not meet the 8-hour ozone standard (or that cause a county downwind to fail), 231 are coastal (USEPA 2004). The majority (197) of these coastal counties are found in the Northeast and Great Lakes regions (USEPA 2004).



New York, NY;©Corbis

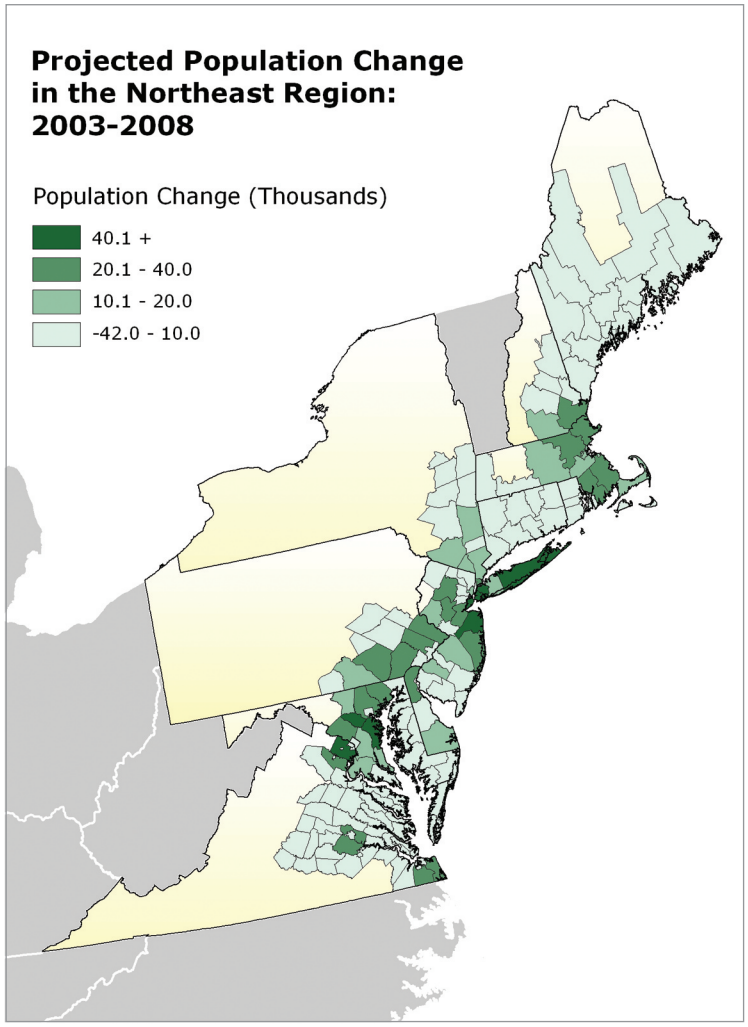


FIGURE 10. Projected population change in the Northeast Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.

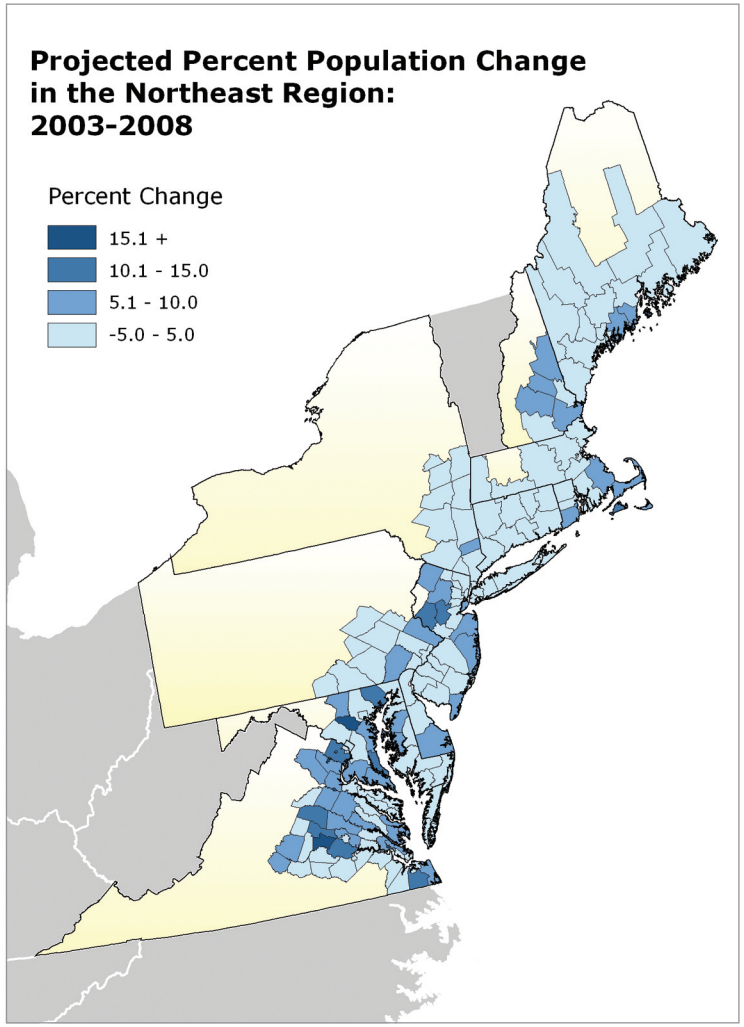
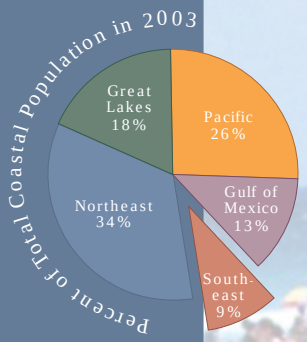


FIGURE 11. Projected percent population change in the Northeast Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.



Southeast Region

The Southeast region is the least populated coastal region of the United States. In 2003, 14 million people, or 9 percent of the nation's coastal county population, resided there. The Southeast region extends from the northern Outer Banks of North Carolina to the southern tip of Florida. Only one of the region's states, Florida, has most of its population living in coastal counties. The 103 coastal counties in this region constitute 33 percent of the region's total land area and contain 37 percent of the region's population. The region's largest metropolitan area found along the coast is Miami/Fort Lauderdale, FL (the twelfth largest in the entire United States).

Population Density

In 2003, the coastal population density of the region was 224 persons per square mile, up from 142 in 1980, and expected to increase to 241 in 2008. The expected population density increase from 1980 to 2008 represents the largest percent increase of any region. The most densely populated counties in the region are Broward County, FL, with 1,437 persons per square mile, and Seminole County, FL, with 1,254 persons per square mile. By 2008, these counties are expected to increase in population density by 10 percent and 14 percent, respectively.

Hot Spots of Growth

From 2003 to 2008, coastal population in the Southeast region is expected to grow by 1.1 million people or 8 percent. This is the largest percent increase of all regions within this period. Of the 10 leading counties in population change, 8 are expected to be in Florida (Figure 12). Population growth will be most prominent in the southernmost portion of Florida, with Broward County expected to increase by 167,000 persons and Palm Beach County expected to increase by 151,000 persons.

Coastal counties with high percent population change are found throughout the region. Particularly, counties in Florida and North Carolina rank highest (Figure 13). For example, Brunswick, NC, is expected to show the greatest percent increase, 17 percent, followed by Nassau, FL, with 16 percent. The fastest-growing counties in South Carolina and Georgia are expected to average 10 to 12 percent growth.

Land Conversion

The nation's coastal counties are losing 1,997 acres of farmland per day to urban and other land uses. This is approximately 2 percent faster than noncoastal counties. The average size of farms in coastal counties has decreased by 15 percent between 1987 and 2002 compared to a decrease of 7 percent in noncoastal counties (USDA, 2004).

Miami-Dade County, Florida; SFWMD

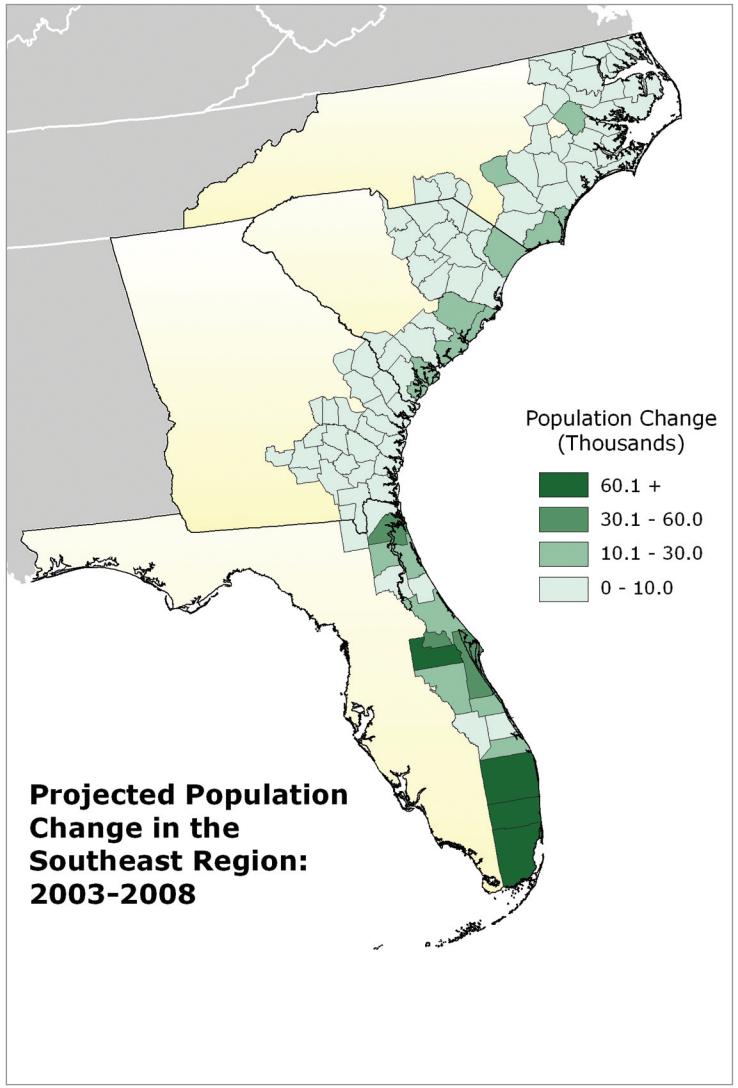


FIGURE 12. Projected population change in the Southeast Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.

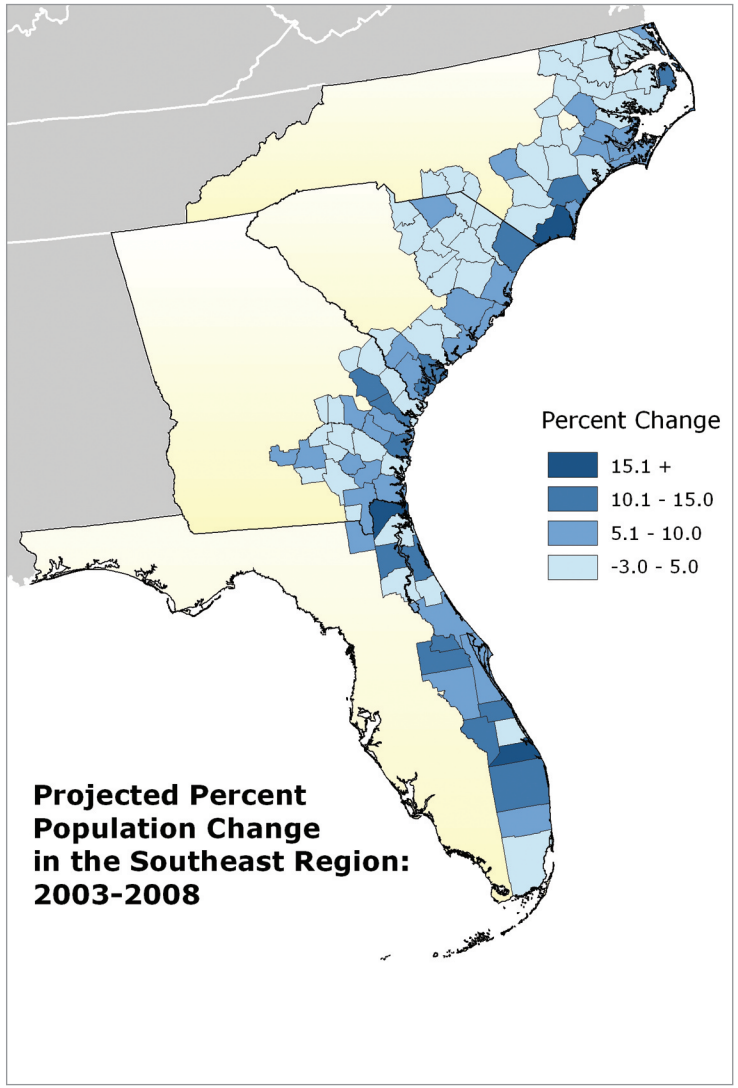
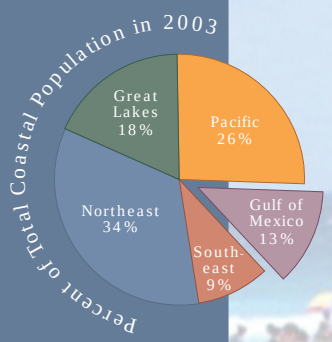


FIGURE 13. Projected percent population change in the Southeast Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.



Gulf of Mexico Region

The Gulf of Mexico region is the fourth most populated coastal region in the United States. In 2003, the region's coastal population was just over 19.1 million, 13 percent of the nation's coastal population. The Gulf of Mexico region extends from the Florida Keys westward to the southern tip of Texas, following the coastline of six states. Only two of the region's states, Louisiana and Florida, have the majority of their populations in coastal counties. The 144 coastal counties found in this region constitute 23 percent of the region's total land area and contain 32 percent of the region's population. Of the nation's 10 largest metropolitan areas, one is located along the coast in this region: Houston-Galveston-Brazoria.

Population Density

In 2003, the population density of coastal counties in this region was 164 persons per square mile, up from 113 in 1980, and expected to increase to 175 in 2008. This is the least densely populated of all the regions (when Alaska is not included in the population density calculation for the Pacific region). Two of the three most densely populated coastal counties in the region are Pinellas, FL, found within the large metropolitan area of Tampa-St. Petersburg-Clearwater, with 3,308 persons per square mile, and Harris, TX, found within Houston-Galveston-Brazoria with 2,080 persons per square mile. By 2008, these counties are expected to increase in population density by 4 percent and 5 percent, respectively.

Hot Spots of Growth

From 2003 to 2008, the Gulf of Mexico's coastal population is expected to grow by just over 1.2 million people or 7 percent. This is the second-highest rate of growth during this period, just behind the Southeast region. The leading coastal counties in population change are found in Texas and along Florida's central Gulf Coast (Figure 14). Harris, TX, located northwest of Galveston Bay and containing the city of Houston, is expected to increase by 168,750 persons. This is more than double that of any other county in this region.

In terms of percentages, coastal population growth is expected to occur heavily in the Florida panhandle, in Alabama, and in southern Texas (Figure 15), where the increase is expected to reach over 18 percent in some counties.

Waterborne Commerce

Nationwide, waterborne tonnage coming through the principal U.S. ports has increased by 14.5 million in the past five years. Of the 10 leaders in waterborne tonnage, seven are found in the Gulf of Mexico. The Port of South Louisiana alone accounts for approximately 9% of all the waterborne tonnage through principal U.S. ports (U.S. Army Corps of Engineers, 1998; 2000).[2]

Tampa, FL; K. Arnold

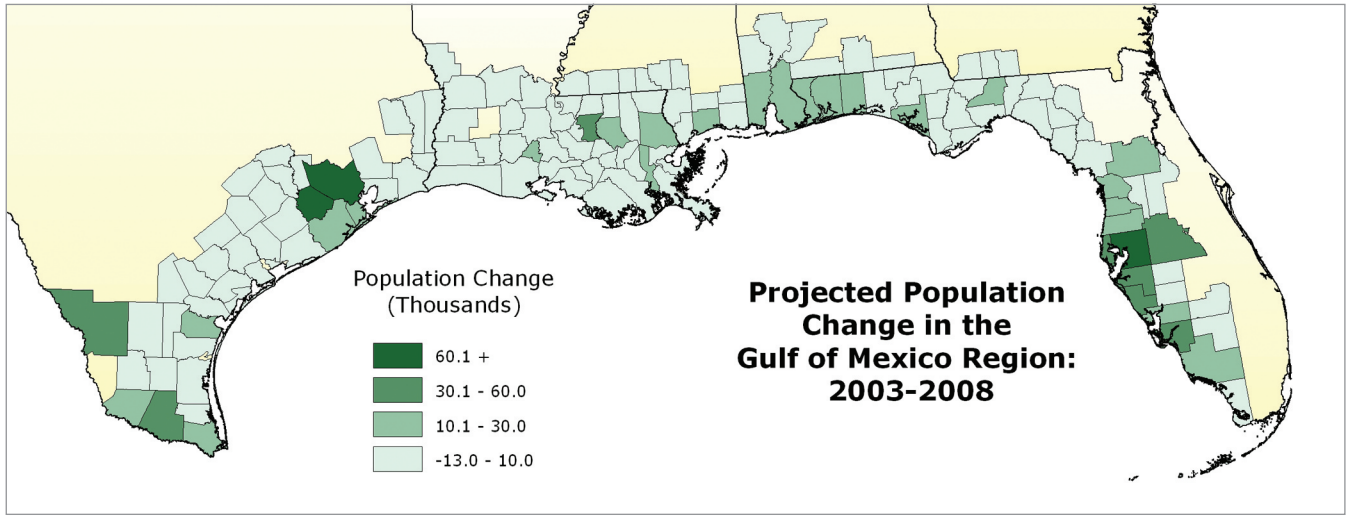


FIGURE 14. Projected population change in the Gulf of Mexico Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.

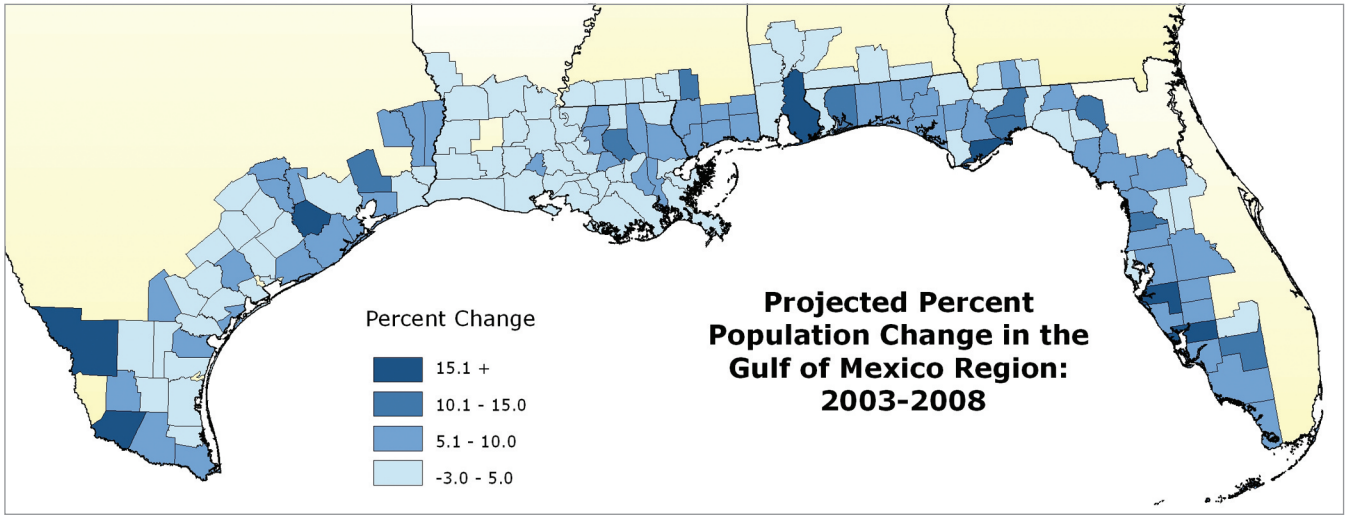
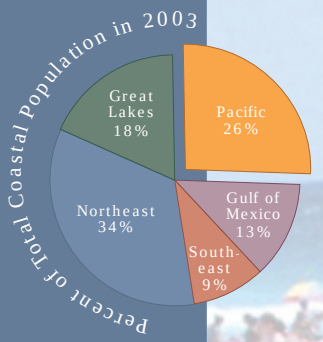


FIGURE 15. Projected percent population change in the Gulf of Mexico Region:2003-2008

Source: U.S. Census Bureau and W&PE, Inc.



Pacific Region

The Pacific region is the second most populated coastal region in the United States. In 2003, the population reached 39.4 million people, or 26 percent of the nation's total coastal population. The Pacific region includes the coastlines of California, Oregon, Washington, Alaska, and the entire state of Hawaii. All five states in the Pacific region have the majority of their populations in coastal counties. The 88 coastal counties constitute 57 percent of the region's total land area and contain 84 percent of the region's population. Of the nation's 10 largest metropolitan areas, two are found along the coast in this region: Los Angeles-Riverside-Orange County, CA, and San Francisco-Oakland-San Jose, CA. Other metropolitan areas include Honolulu, HI, Portland, OR, and Anchorage, AK.

Population Density

In 2003, the coastal population density (not including Alaska) of the Pacific Region was 303 persons per square mile, up from 207 in 1980, and expected to increase to 320 in 2008. Of the 25 most densely populated coastal counties in the United States, two are found in the Pacific region: Orange County, CA, and San Francisco County, CA. The state of Alaska has the smallest coastal population density with an average of 1.4 persons per square mile.

Hot Spots of Growth

From 2003 to 2008, the Pacific region is expected to increase by 2.2 million people or 6 percent in coastal population. A large portion of this growth is expected to occur in Southern California, where four counties make up 37 percent of this projected growth (Figure 16). The 10 leading coastal counties in expected population increase contain, fall within, or are adjacent to the large metropolitan areas of San Diego, CA, Los Angeles-Riverside-Orange County, CA, San Francisco-Oakland-San Jose, CA, Sacramento-Yolo, CA, and Seattle-Tacoma-Bremerton, WA. San Diego County, Orange County, and San Bernardino County, CA, also are expected to be leaders of population growth for the entire nation.

In terms of percentages, coastal population growth presents a much different pattern, where counties in California represent only half of the 10 leading counties in expected percent increase (Figure 17). San Benito, CA, shows the highest expected increase with 19 percent, followed by Jefferson County, WA, with 16 percent.

Population projection data provided by Woods and Poole Economics, Inc., for individual counties in Alaska are insufficient and therefore not presented graphically.

Water Consumption

The Pacific region consumes 9.6 billion gallons of water per day. This is more than double that of any other region with the exception of the Gulf of Mexico region (6 billion gallons per day). In total, the nation's coastal counties consume 20 billion gallons of water per day (however, this is four times less than the total water consumption in noncoastal counties) (U.S. Census Bureau, 2001c).[3]

California Aqueduct, CA; Joseph Sohm,©Corbis

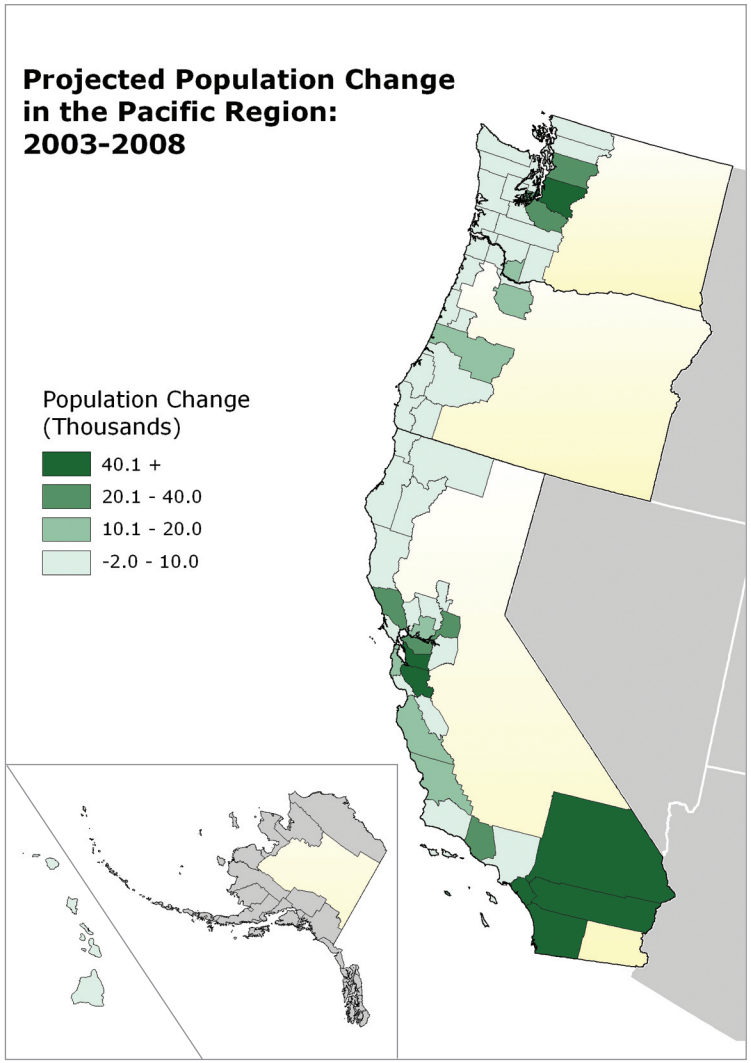


FIGURE 16. Projected population change in the Pacific Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.

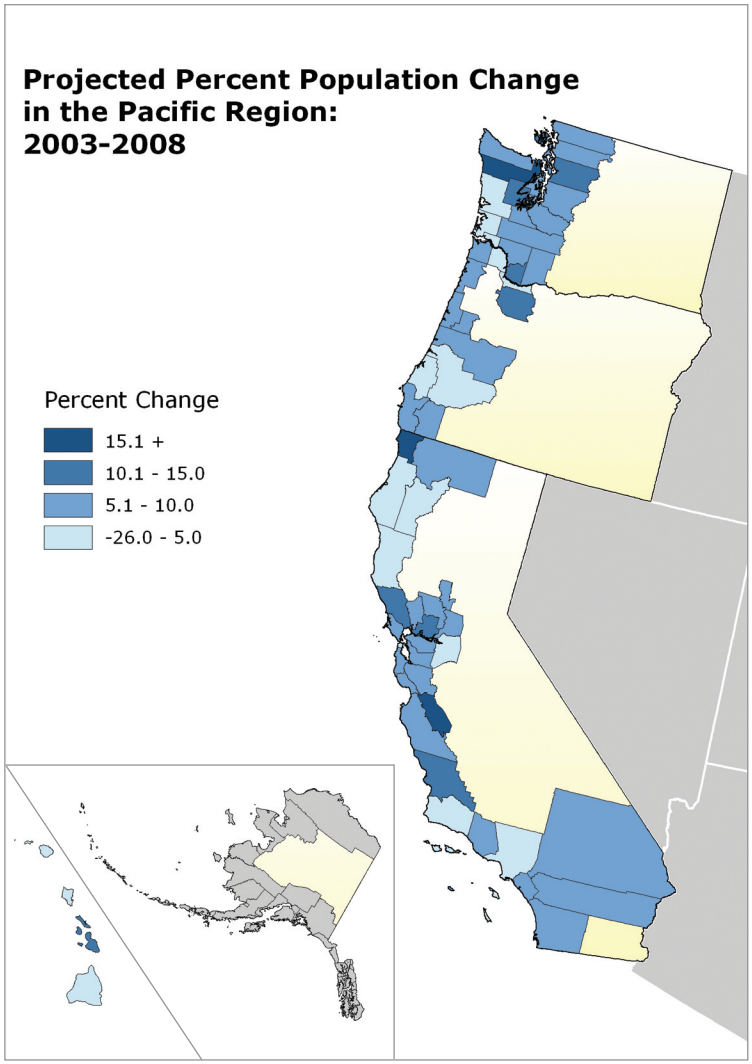
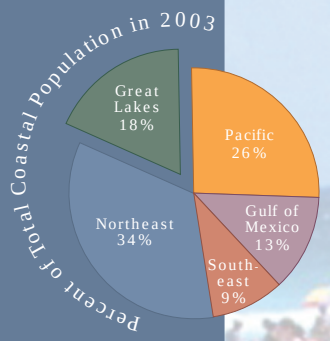


FIGURE 17. Projected percent population change in the Pacific Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.



Great Lakes Region

The Great Lakes region is the third most populated coastal region in the United States. In 2003, 27.5 million people, or 18 percent of the nation's total coastal population, resided there. The Great Lakes region extends from the northeasternmost counties in New York westward toward Minnesota, encompassing the coastlines of eight states along Lake Ontario, Lake Huron, Lake Erie, Lake Michigan, and Lake Superior. Only two states within this region, New York and Michigan, have the majority of their populations in coastal counties. The 158 coastal counties in this region constitute 28 percent of the region's total land area and contain 33 percent of the region's population. Of the nation's 10 largest metropolitan areas, two are found along the coast in this region: Detroit and Chicago.

Population Density

In 2003, the population density of the combined coastal counties in this region was 238 persons per square mile, up from 2226 in 1980, and expected to climb to 244 in 2008. This is the third-highest following the Northeast and Pacific regions. Of the 25 most densely populated coastal counties in the United States, one is found in the Great Lakes region: Cook County, IL.

Hot Spots of Growth

From 2003 to 2008, the Great Lakes coastal population as a whole is expected to increase by approximately 650,000 people. This is the smallest population increase of all regions. As in the Northeast region, coastal population increases and decreases will occur most heavily in counties that fall within, are adjacent to, or are one county beyond major metropolitan centers (Figure 18). Lake County, IL, located north of Chicago, is expected to climb by 74,000 people, and Oakland County, MI, by 72,000 people, the greatest increases of any counties in the region. Of the leading coastal counties in population change, two show large decreases in population.

While the largest overall population increases are expected to occur in southern Michigan, Illinois, and Ohio, coastal counties showing large increases in percent population are located primarily in northern Michigan (Figure 19). Benzie County, MI, is expected to increase by 15 percent, followed by Grand Traverse, MI, and Lake, MI, each of which are expected to increase by 13 percent.

Transportation

Chicago, IL;©Corbis

Between the years 1980 and 2000, the number of vehicles in the nation's coastal counties have increased by 25.5 million (or 43%).[4] The greatest increase was found in the Northeast region, with 8 million additional cars. The greatest percent increase of vehicles was found in the Southeast region, with 74 percent, and the smallest percent increase was in the Great Lakes region, with 24 percent more vehicles. Although the overall number of vehicles has increased since 1980, in 2000 there were fewer vehicles per capita (U.S. Census Bureau, 1980; 2001e).

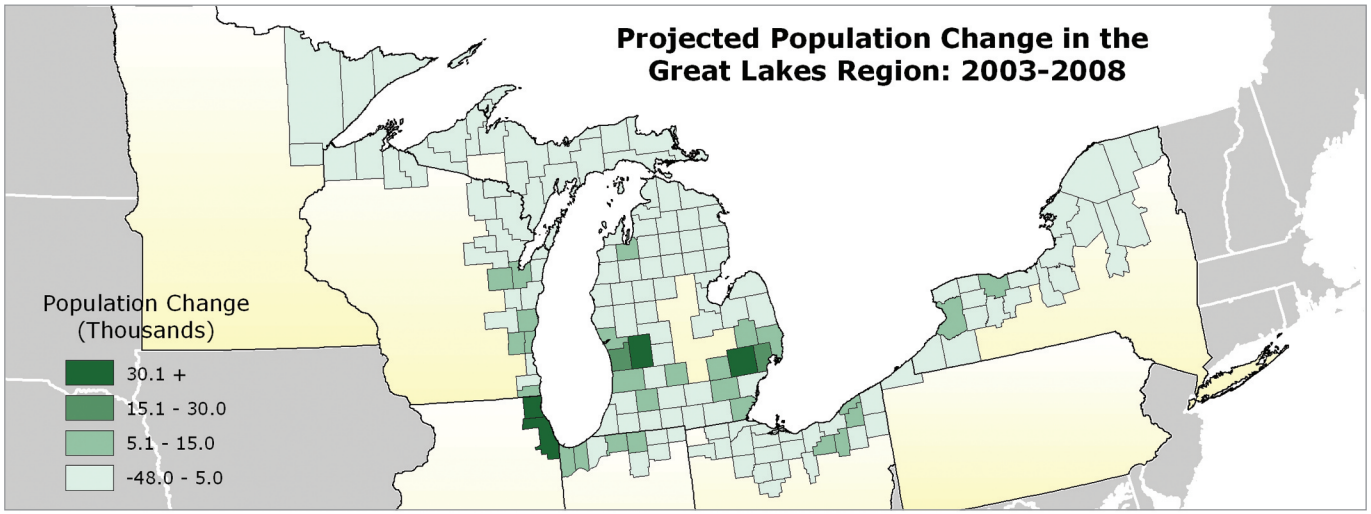


FIGURE 18. Projected population change in the Great Lakes Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.

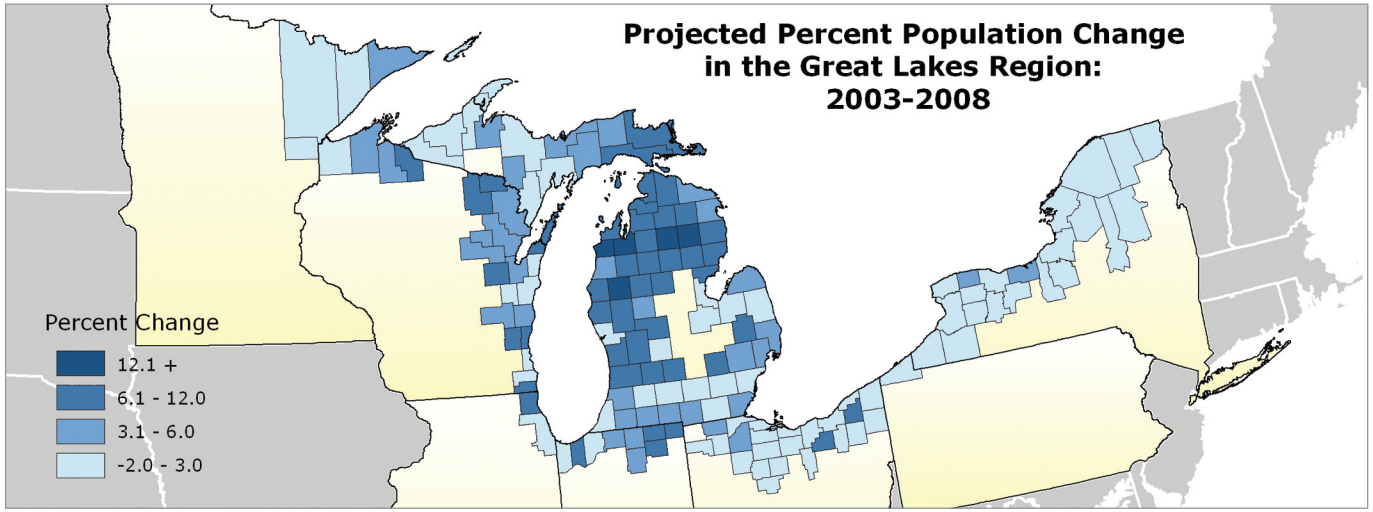


FIGURE 19. Projected percent population change in the Great Lakes Region: 2003-2008

Source: U.S. Census Bureau and W&PE, Inc.

Population by Coastal Watershed

Watersheds are geographic areas defined by natural hydrology and provide a sensible foundation from which water and coastal resources can be managed. In an attempt to provide population information in geographic units that are useful to coastal managers and planners, NOAA has produced population estimates for coastal watersheds (Estuarine Drainage Areas (EDAs) and Coastal Drainage Areas (CDAs)) of the contiguous United States. Population estimates for coastal watersheds for 1980 were created by determining the Census tract centroids (and their associated population estimates) that fell within each watershed.[5] The same method was applied to 1990 and 2000 population data with the use of Census block groups (National Ocean Service/NOAA, 2000). The land area covered by coastal watersheds and their total population in 2000 are smaller than that of coastal counties by almost 145,000 square miles and 21 million people (not including Alaska and Hawaii).

The total population of coastal watersheds in 2000 was approximately 127 million people or 45 percent of the national population. This is a growth of 24 million people since 1980. The 10 most populated coastal watersheds in 2000 along with their population densities are shown in Figure 20.

Ventura County, CA;©Rich Reid / Colors of Nature.com

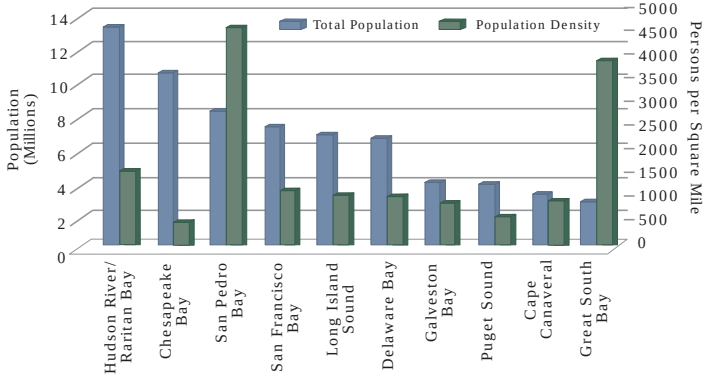


FIGURE 20. Ten most populated coastal watersheds with their associated population density for 2000.

Source: National Ocean Service/NOAA, and U.S. Census Bureau

Five of the 10 most populated watersheds are located from southern Virginia to New England. The Hudson River/Raritan Bay and Chesapeake Bay watersheds were the most populated overall, with over 13 million and 10 million people, respectively. However, San Pedro Bay was the most densely populated coastal watershed with 4,634 persons per square mile.

Population change from 1980 to 2000 was greatest in the Chesapeake Bay, which grew by over two million. It was closely followed by San Francisco Bay, which grew by 1.8 million, and San Pedro Bay, which grew by 1.7 million. Areas of the country where growth was heaviest during this period are shown in Figure 21. Of the 10 most populated coastal watersheds, the greatest percent population changes are found in the Southeast and Pacific regions. The populations in St. Johns River, FL, Cape Canaveral, FL, and Santa Ana, CA, all grew by over 70 percent.

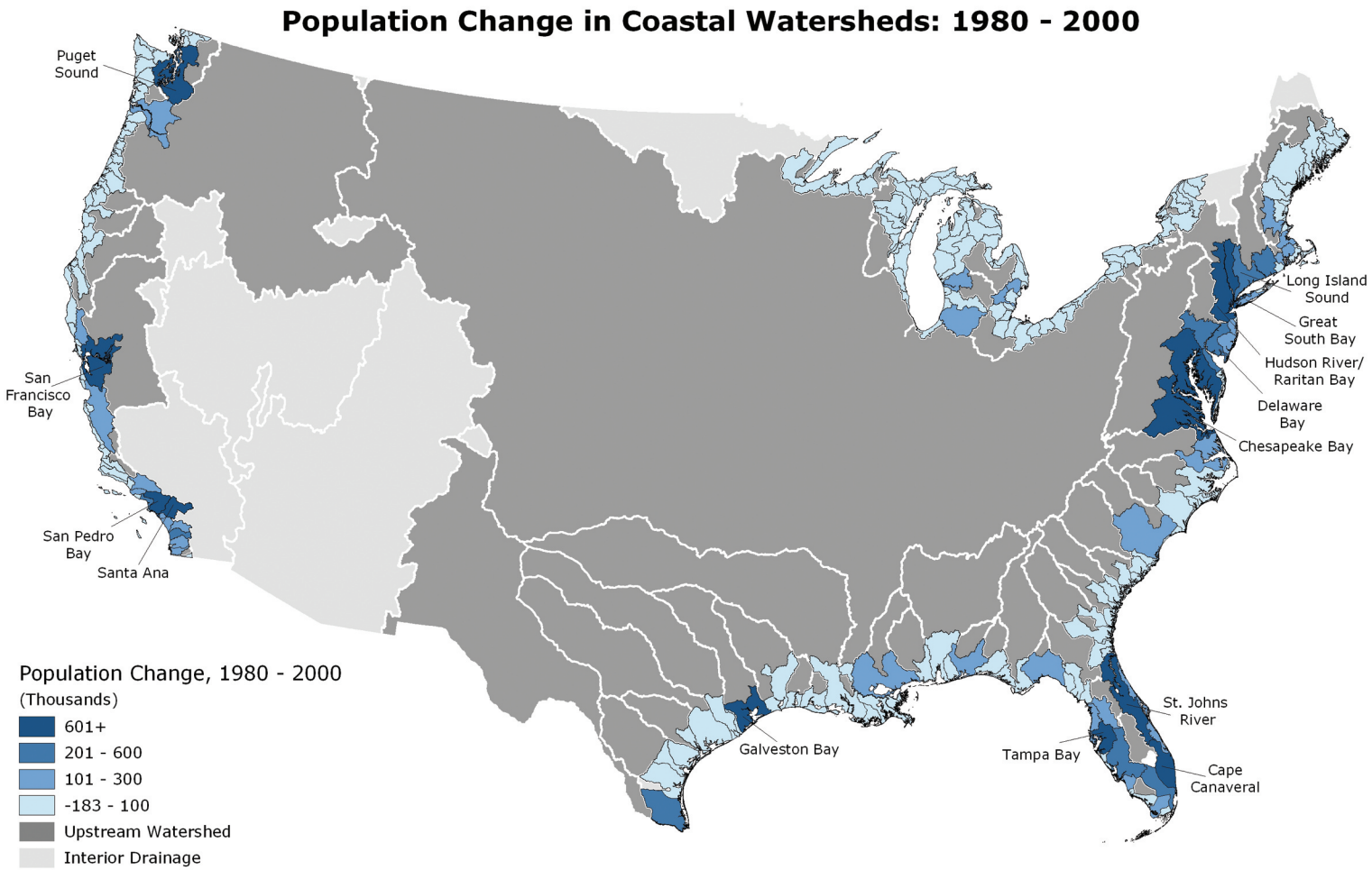


FIGURE 21. Population change in the coastal watersheds: 1980-2000

Source: National Ocean Service/NOAA, and U.S. Census Bureau

Conclusion

Although population increase and coastal development give rise to numerous economic benefits, they also may result in the loss of critical habitat, green space, and biodiversity. Public policymakers and coastal managers are confronted with the daily task of finding a balance between benefiting from economic growth while mitigating the effects of this growth on coastal environments. This task is becoming ever more challenging as the coastal population continues to grow in a limited space.

Population estimates and projections should be used cautiously as uncertainty and limitations are inherent to the data. However, these data provide critical information for coastal decision makers about recent and projected demographic trends along the coast. Characteristics such as age and income data provide information about who is living on the coast and why. Planning for and managing increased demands on infrastructure and resources are becoming increasingly complex and require analyses of demographic data.

As the coastal population continues to grow (at the same rate as the rest of the nation), attention is brought to the methods by which the coastal environment is managed and studied. A change in paradigm is taking place, moving away from management based on political boundaries and toward an ecosystem-based management approach to population growth, urban sprawl, and their interactions with the sensitive coastal environment. Recently, the U.S. Commission on Ocean Policy (2004) highlighted the need to manage coastal resources in the framework of the watersheds that affect them, ultimately recognizing the crucial connection between coastal and upland areas and the effects of a growing population.

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Endnotes

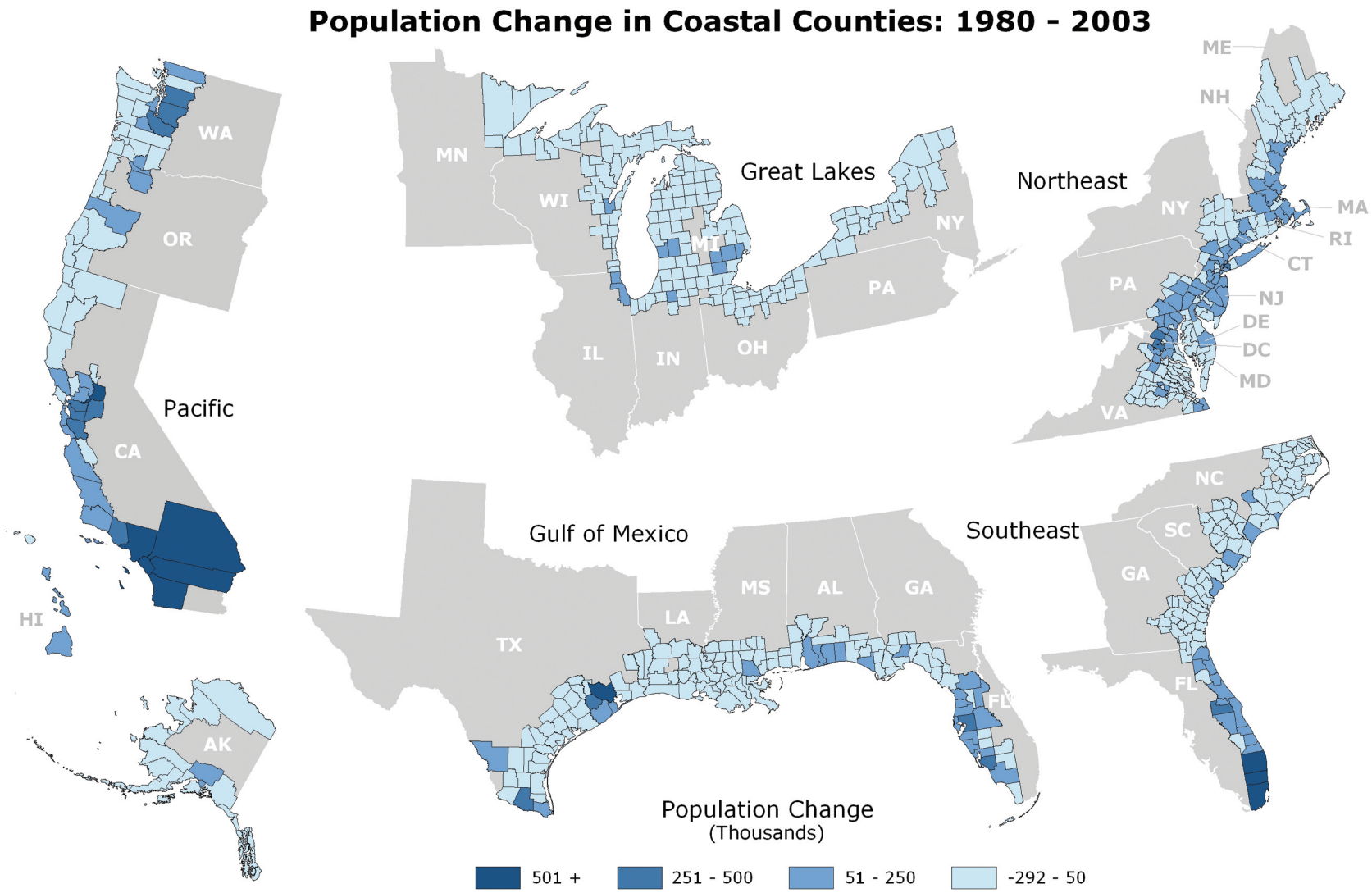
[1] Hydrologic units are classified at four levels: regions, sub-regions, accounting units, and cataloging units. Cataloging units are the smallest hydrologic unit in this hierarchy (U.S. Geologic Survey, 1987). There are 2,150 cataloging units in the United States, with an average cataloging unit size of 703 square miles (Virginia Department of Conservation and Recreation, 2003).

[2] Principal ports are defined by the U.S. Army Corps of Engineers (2002). The five-year period of study was 1998 to 2002.

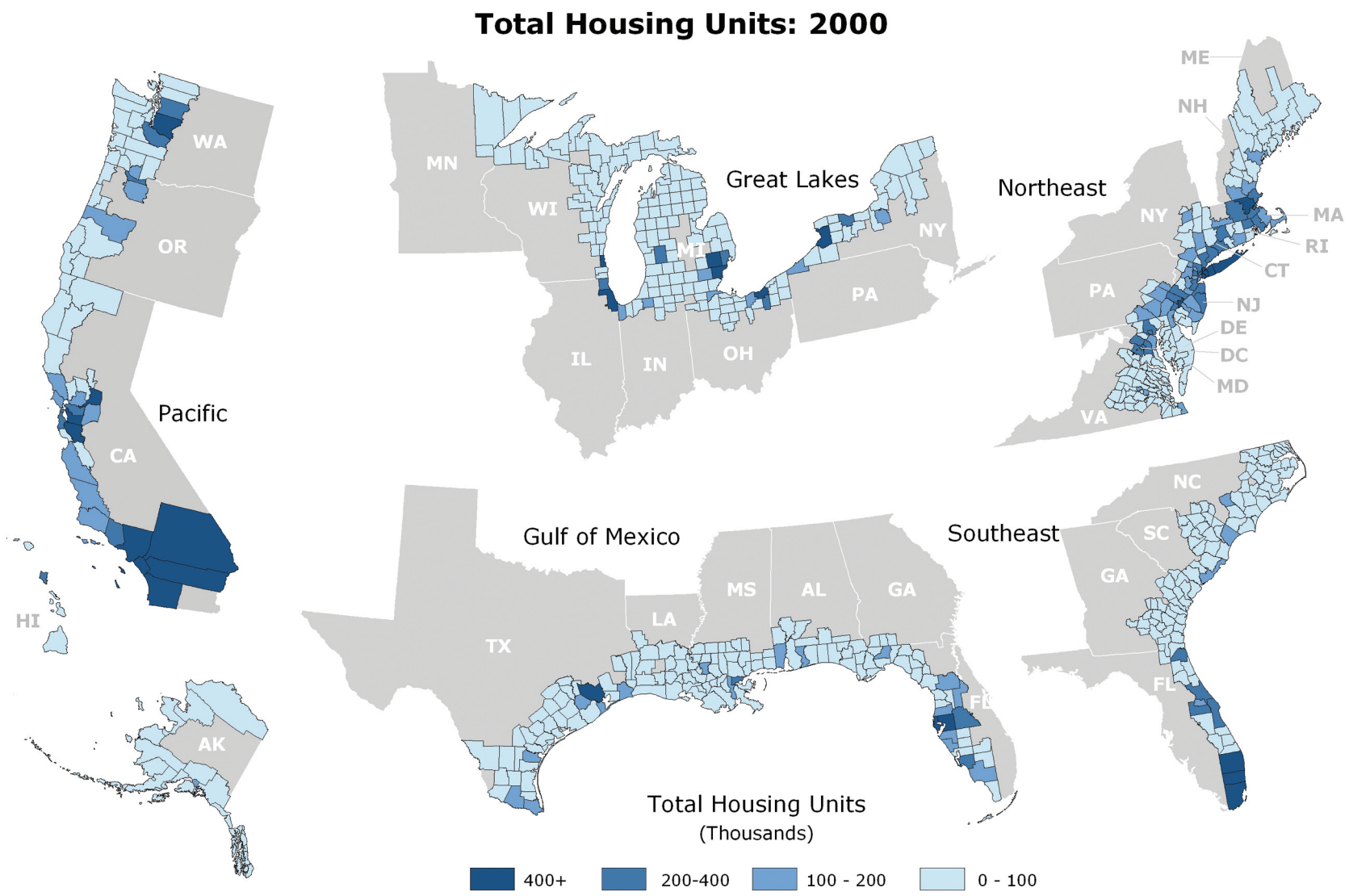
[3] Water consumption represents "that part of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment" (U.S. Census Bureau, 2001).

[4] Total number of vehicles for coastal counties was quantified using the "1-car per household," " 2-car per household," and "3-car per household" fields in the 2000 Census. Numbers of households were multiplied by the number of cars they contained and totaled (households with more than three cars were not used in this calculation).

[5] A Census Tract is a statistical subdivision of a county or county equivalent area containing between 1,500 and 8,000 persons. A Census block group is an aggregation of Census blocks (the smallest Census geographic unit) containing between 600 and 3,000 persons. In the standard hierarchy of Census geographic entities, block groups lie just below Census tracts (U.S. Census Bureau, 2000). For further information on Census geographies, visit http://www.census.gov/geo/www/reference.html.

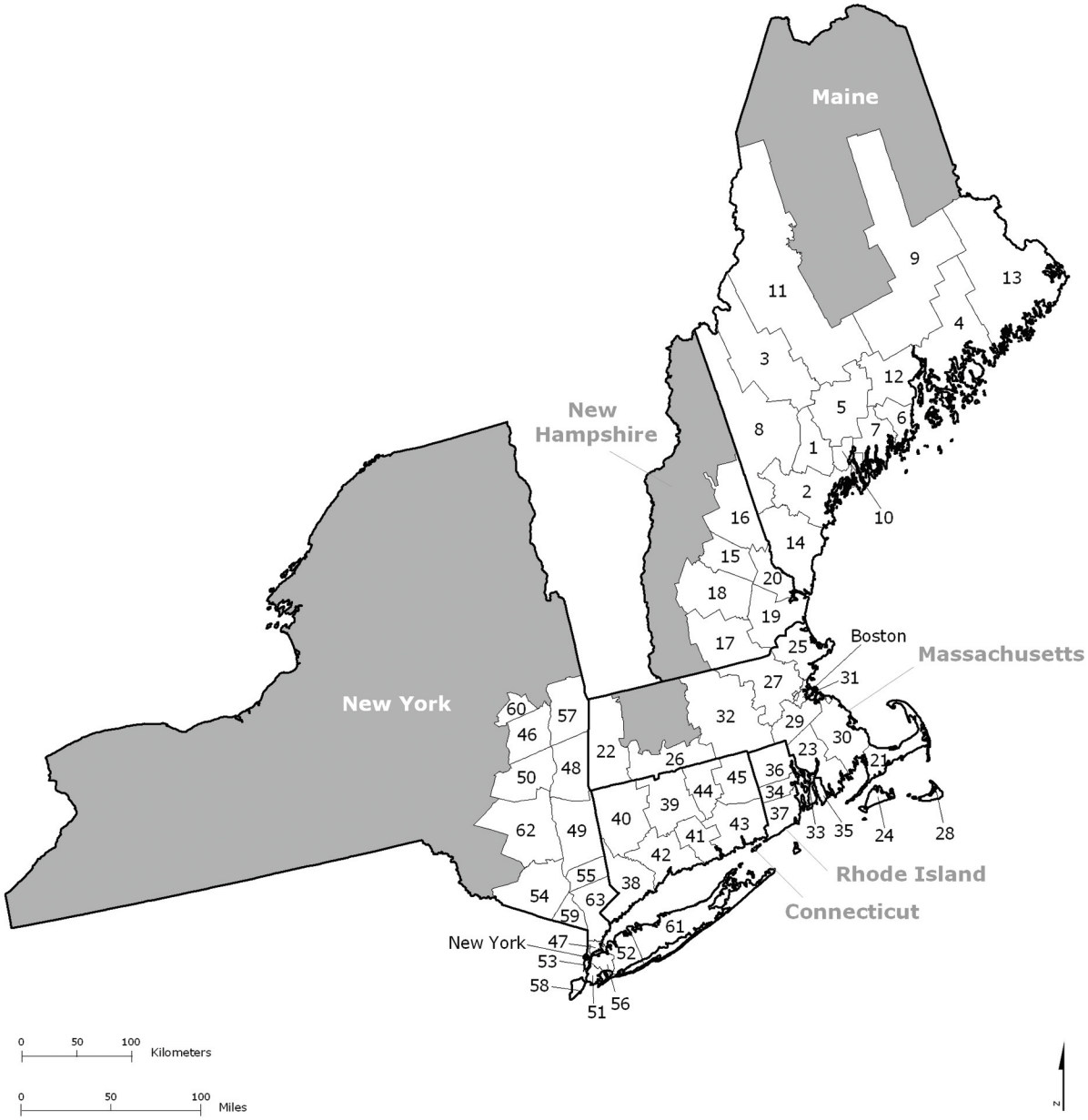


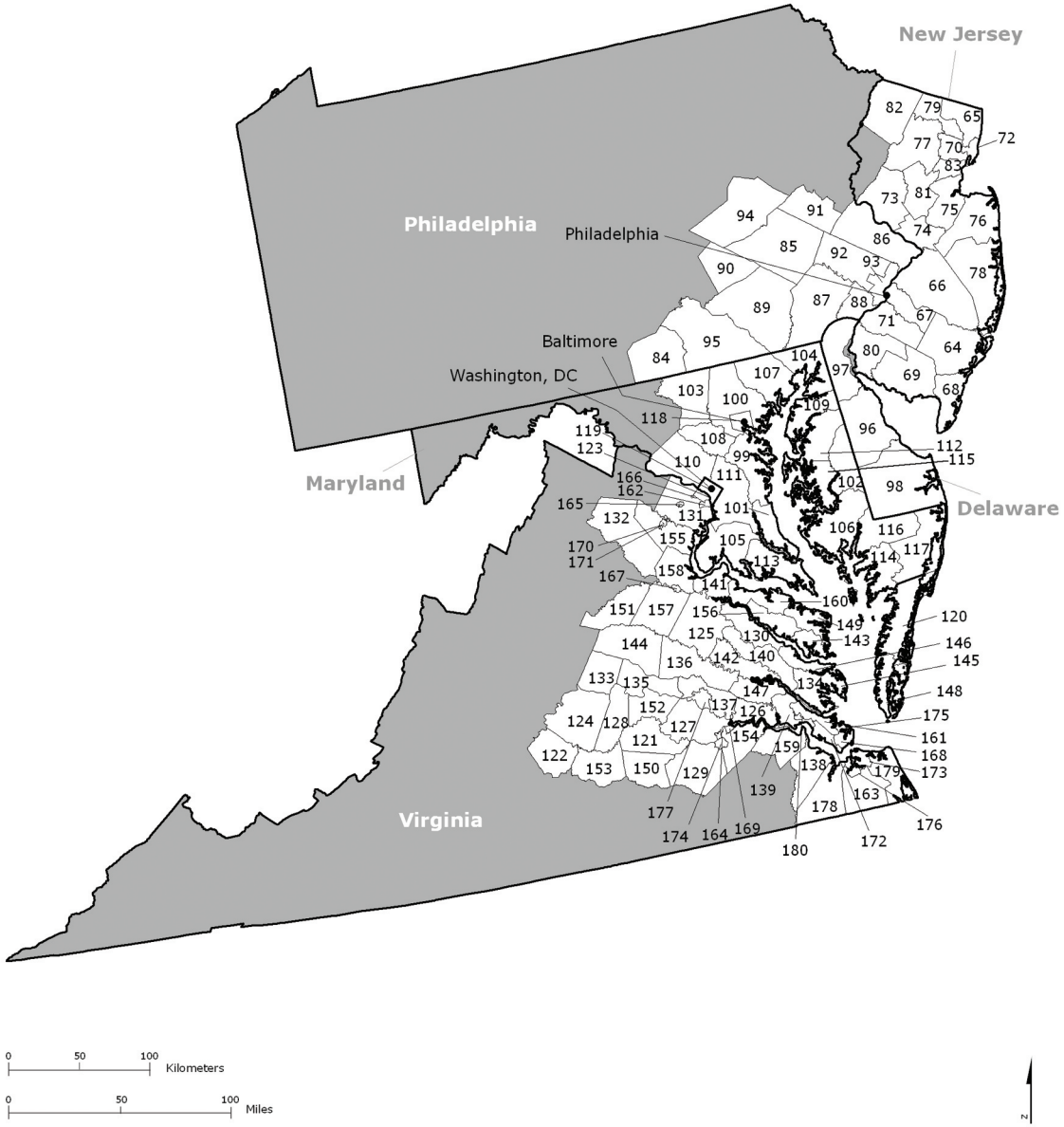
Source: U.S. Census Bureau



Source: U.S. Census Bureau

Appendix C: Northeast




New Jersey
Philadelphia
Philadelphia
Baltimore
Washington, DC
Maryland
Delaware
Virginia
Kilometers
Miles

Coastal Counties

	Maine		*Rhode Island*		*New Jersey*		*Delaware*	127	Chesterfield	164	Colonial Heights
1	Androscoggin	33	Bristol	64	Atlantic	96	Kent	128	Cumberland	165	Fairfax
2	Cumberland	34	Kent	65	Bergen	97	New Castle	129	Dinwiddie	166	Falls Church
3	Franklin	35	Newport	66	Burlington	98	Sussex	130	Essex	167	Fredericksburg
4	Hancock	36	Providence	67	Camden			131	Fairfax	168	Hampton
5	Kennebec	37	Washington	68	Cape May		*Maryland*	132	Fauquier	169	Hopewell
6	Knox			69	Cumberland	99	Anne Arundel	133	Fluvanna	170	Manassas
7	Lincoln		*Connecticut*	70	Essex	100	Baltimore	134	Gloucester	171	Manassas Park
8	Oxford	38	Fairfield	71	Gloucester	101	Calvert	135	Goochland	172	Newport News
9	Penobscot	39	Hartford	72	Hudson	102	Caroline	136	Hanover	173	Norfolk
10	Sagadahoc	40	Litchfield	73	Hunterdon	103	Carroll	137	Henrico	174	Petersburg
11	Somerset	41	Middlesex	74	Mercer	104	Cecil	138	Isle of Wight	175	Poquoson
12	Waldo	42	New Haven	75	Middlesex	105	Charles	139	James City	176	Portsmouth
13	Washington	43	New London	76	Monmouth	106	Dorchester	140	King and Queen	177	Richmond
14	York	44	Tolland	77	Morris	107	Harford	141	King George	178	Suffolk
		45	Windham	78	Ocean	108	Howard	142	King William	179	Virginia Beach
	New Hampshire			79	Passaic	109	Kent	143	Lancaster	180	Williamsburg
15	Belknap		*New York*	80	Salem	110	Montgomery	144	Louisa		
16	Carroll	46	Albany	81	Somerset	111	Prince George's	145	Mathews		
17	Hillsborough	47	Bronx	82	Sussex	112	Queen Anne's	146	Middlesex		
18	Merrimack	48	Columbia	83	Union	113	St. Mary's	147	New Kent		
19	Rockingham	49	Dutchess			114	Somerset	148	Northampton		
20	Strafford	50	Greene		*Pennsylvania*	115	Talbot	149	Northumberland		
		51	Kings	84	Adams	116	Wicomico	150	Nottoway		
	Massachusetts	52	Nassau	85	Berks	117	Worcester	151	Orange		
21	Barnstable	53	New York	86	Bucks	118	Baltimore	152	Powhatan		
22	Berkshire	54	Orange	87	Chester			153	Prince Edward		
23	Bristol	55	Putnam	88	Delaware	119	*District of Columbia*	154	Prince George		
24	Dukes	56	Queens	89	Lancaster			155	Prince William		
25	Essex	57	Rensselaer	90	Lebanon			156	Richmond		
26	Hampden	58	Richmond	91	Lehigh		*Virginia*	157	Spotsylvania		
27	Middlesex	59	Rockland	92	Montgomery	120	Accomack	158	Stafford		
28	Nantucket	60	Schenectady	93	Philadelphia	121	Amelia	159	Surry		
29	Norfolk	61	Suffolk	94	Schuylkill	122	Appomattox	160	Westmoreland		
30	Plymouth	62	Ulster	95	York	123	Arlington	161	York		
31	Suffolk	63	Westchester			124	Buckingham	162	Alexandria		
32	Worcester					125	Caroline	163	Chesapeake		
						126	Charles City				

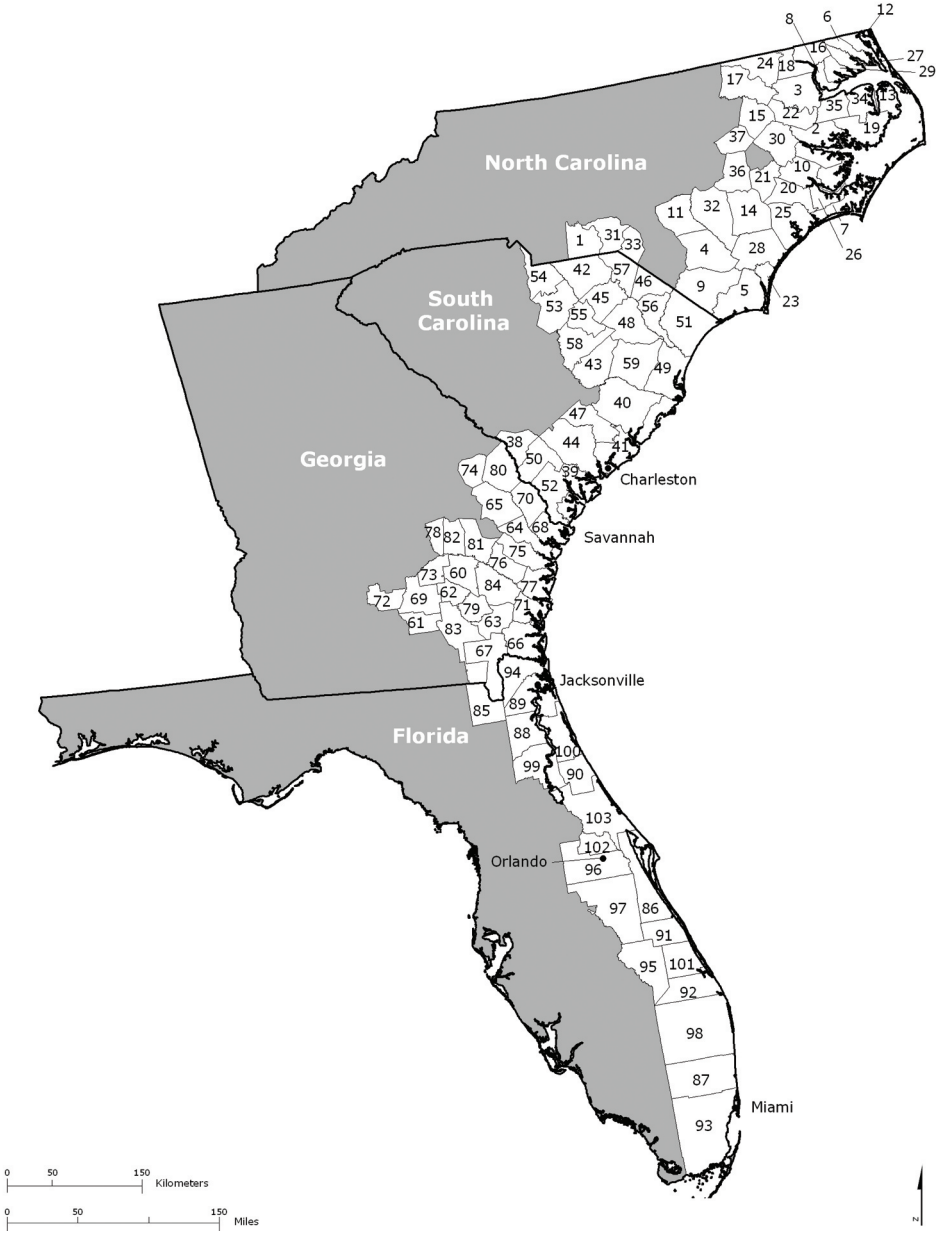
Northeast Population, 1980-2008

STATE	Land Area (Sq. Mi.)	1980 Absolute*	1980 Density**	1990 Absolute	1990 Density	2000 Absolute	2000 Density	2003 Absolute	2003 Density	2008 Absolute	2008 Density
MAINE	30,862	1,125	36	1,228	40	1,275	41	1,306	42	1,332	43
Coastal	20,226	1,016	50	1,122	55	1,184	59	1,215	60	1,244	62
Coastal Percent	66	90		91		93		93		93	
NEW HAMPSHIRE	8,968	921	103	1,109	124	1,236	138	1,288	144	1,356	151
Coastal	4,209	721	171	891	212	1,007	239	1,053	250	1,114	265
Coastal Percent	47	78		80		81		82		82	
MASSACHUSETTS	7,840	5,737	732	6,016	767	6,349	810	6,433	821	6,598	842
Coastal	6,610	5,534	837	5,800	877	6,125	927	6,206	939	6,364	963
Coastal Percent	84	96		96		96		96		96	
RHODE ISLAND	1,045	947	906	1,003	960	1,048	1,003	1,076	1,030	1,094	1,047
Coastal	1,045	947	906	1,003	960	1,048	1,003	1,076	1,030	1,094	1,047
Coastal Percent	100	100		100		100		100		100	
CONNECTICUT	4,845	3,108	641	3,287	678	3,406	703	3,483	719	3,520	727
Coastal	4,845	3,108	641	3,287	678	3,406	703	3,483	719	3,520	727
Coastal Percent	100	100		100		100		100		100	
NEW YORK	47,214	17,558	372	17,990	381	18,976	402	19,190	406	19,590	415
Coastal	7,751	12,232	1,578	12,593	1,625	13,572	1,751	13,773	1,777	14,136	1,824
Coastal Percent	16	70		70		72		72		72	
NEW JERSEY	7,417	7,365	993	7,730	1,042	8,414	1,134	8,638	1,165	8,916	1,202
Coastal	7,059	7,280	1,031	7,639	1,082	8,312	1,177	8,529	1,208	8,802	1,247
Coastal Percent	95	99		99		99		99		99	
PENNSYLVANIA	44,817	11,864	265	11,882	265	12,281	274	12,365	276	12,572	281
Coastal	6,884	5,280	767	5,464	794	5,750	835	5,826	846	5,941	863
Coastal Percent	15	45		46		47		47		47	
DELAWARE	1,954	594	304	666	341	784	401	817	418	857	439
Coastal	1,954	594	304	666	341	784	401	817	418	857	439
Coastal Percent	100	100		100		100		100		100	
MARYLAND	9,774	4,217	431	4,781	489	5,296	542	5,509	564	5,786	592
Coastal	7,578	3,882	512	4,407	582	4,865	642	5,055	667	5,301	700
Coastal Percent	78	92		92		92		92		92	
DC	61	638	10,464	607	9,949	572	9,378	563	9,236	560	9,187
Coastal	61	638	10,464	607	9,949	572	9,378	563	9,236	560	9,187
Coastal Percent	100	100		100		100		100		100	
VIRGINIA	39,594	5,347	135	6,187	156	7,079	179	7,386	187	7,809	197
Coastal	13,902	3,396	244	4,152	299	4,794	345	5,024	361	5,362	385
Coastal Percent	35	64		67		68		68		69	
TOTAL	204,391	59,420	291	62,488	306	66,716	326	68,056	333	69,991	342
Coastal	82,124	44,629	543	47,630	580	51,417	626	52,620	641	54,295	661
Coastal Percent	40	75		76		77		77		78	

*Thousand Persons **Persons per square mile

Source: U.S. Census Bureau and W&PE, Inc.

Appendix D: Southeast



Coastal Counties

	North Carolina	28	Pender	54	Lancaster	80	Screven
1	Anson	29	Perquimans	55	Lee	81	Tattnall
2	Beaufort	30	Pitt	56	Marion	82	Toombs
3	Bertie	31	Richmond	57	Marlboro	83	Ware
4	Bladen	32	Sampson	58	Sumter	84	Wayne
5	Brunswick	33	Scotland	59	Williamsburg		
6	Camden	34	Tyrrell				*Florida*
7	Carteret	35	Washington		*Georgia*	85	Baker
8	Chowan	36	Wayne	60	Appling	86	Brevard
9	Columbus	37	Wilson	61	Atkinson	87	Broward
10	Craven			62	Bacon	88	Clay
11	Cumberland		*South Carolina*	63	Brantley	89	Duval
12	Currituck	38	Allendale	64	Bryan	90	Flagler
13	Dare	39	Beaufort	65	Bulloch	91	Indian River
14	Duplin	40	Berkeley	66	Camden	92	Martin
15	Edgecombe	41	Charleston	67	Charlton	93	Miami-Dade
16	Gates	42	Chesterfield	68	Chatham	94	Nassau
17	Halifax	43	Clarendon	69	Coffee	95	Okeechobee
18	Hertford	44	Colleton	70	Effingham	96	Orange
19	Hyde	45	Darlington	71	Glynn	97	Osceola
20	Jones	46	Dillon	72	Irwin	98	Palm Beach
21	Lenoir	47	Dorchester	73	Jeff Davis	99	Putnam
22	Martin	48	Florence	74	Jenkins	100	St. Johns
23	New Hanover	49	Georgetown	75	Liberty	101	St. Lucie
24	Northampton	50	Hampton	76	Long	102	Seminole
25	Onslow	51	Horry	77	McIntosh	103	Volusia
26	Pamlico	52	Jasper	78	Montgomery		
27	Pasquotank	53	Kershaw	79	Pierce		

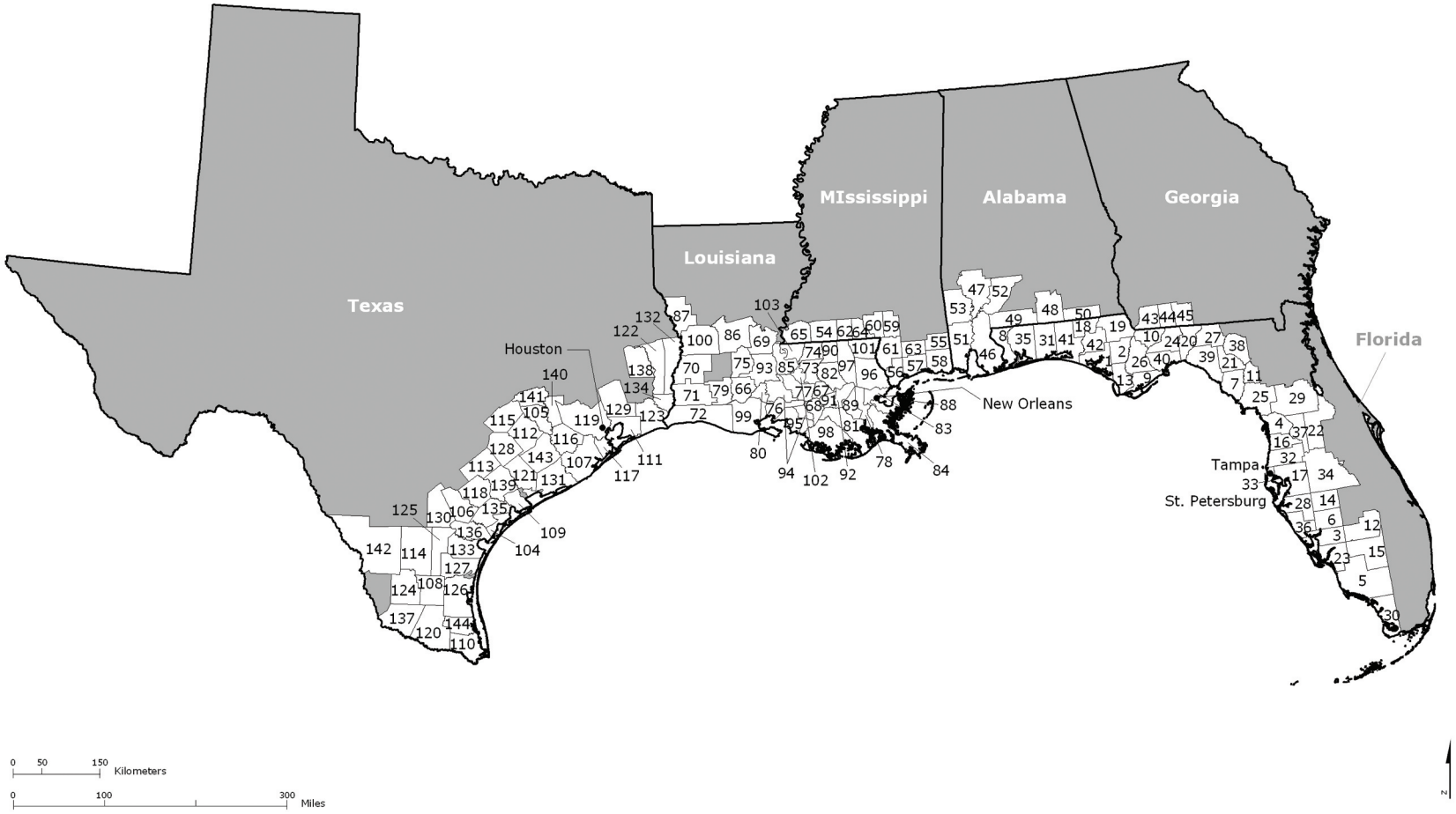
Southeast Population, 1980-2008

		1980		1990		2000		2003		2008	
STATE	Land Area (Sq. Mi.)	Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
NORTH CAROLINA	48,711	5,882	121	6,629	136	8,049	165	8,407	173	9,003	185
Coastal	19,591	1,598	82	1,756	90	1,985	101	2,017	103	2,138	109
Coastal Percent	40	27		26		25		24		24	
SOUTH CAROLINA	30,110	3,122	104	3,487	116	4,012	133	4,147	138	4,416	147
Coastal	15,233	1,288	85	1,455	96	1,653	109	1,713	112	1,820	120
Coastal Percent	51	41		42		41		41		41	
GEORGIA	57,906	5,463	94	6,478	112	8,186	141	8,685	150	9,202	159
Coastal	12,076	620	51	705	58	821	68	844	70	889	74
Coastal Percent	21	11		11		10		10		10	
FLORIDA	53,927	9,746	181	12,938	240	15,982	296	17,019	316	18,397	341
Coastal	16,616	5,483	330	7,288	439	9,072	546	9,664	582	10,468	630
Coastal Percent	31	56		56		57		57		57	
TOTAL	190,654	24,213	127	29,531	155	36,230	190	38,258	201	41,019	215
Coastal	63,516	8,989	142	11,205	176	13,532	213	14,238	224	15,315	241
Coastal Percent	33	37		38		37		37		37	

*Thousand Persons **Persons per square mile

Source: U.S. Census Bureau and W&PE, Inc.

Appendix E: Gulf of Mexico



Coastal Counties

	Florida	36	Sarasota		*Louisiana*	101	Washington	135	Refugio
1	Bay	37	Sumter	66	Acadia	102	West Baton Rouge	136	San Patricio
2	Calhoun	38	Suwannee	67	Ascension	103	West Feliciana	137	Starr
3	Charlotte	39	Taylor	68	Assumption			138	Tyler
4	Citrus	40	Wakulla	69	Avoyelles		*Texas*	139	Victoria
5	Collier	41	Walton	70	Beauregard	104	Aransas	140	Waller
6	DeSoto	42	Washington	71	Calcasieu	105	Austin	141	Washington
7	Dixie			72	Cameron	106	Bee	142	Webb
8	Escambia		*Georgia*	73	East Baton Rouge	107	Brazoria	143	Wharton
9	Franklin	43	Decatur	74	East Feliciana	108	Brooks	144	Willacy
10	Gadsden	44	Grady	75	Evangeline	109	Calhoun		
11	Gilchrist	45	Thomas	76	Iberia	110	Cameron		
12	Glades			77	Iberville	111	Chambers		
13	Gulf		Alabama	78	Jefferson	112	Colorado		
14	Hardee	46	Baldwin	79	Jefferson Davis	113	DeWitt		
15	Hendry	47	Clarke	80	Lafayette	114	Duval		
16	Hernando	48	Covington	81	Lafourche	115	Fayette		
17	Hillsborough	49	Escambia	82	Livingston	116	Fort Bend		
18	Holmes	50	Geneva	83	Orleans	117	Galveston		
19	Jackson	51	Mobile	84	Plaquemines	118	Goliad		
20	Jefferson	52	Monroe	85	Pointe Coupee	119	Harris		
21	Lafayette	53	Washington	86	Rapides	120	Hidalgo		
22	Lake			87	Sabine	121	Jackson		
23	Lee		*Mississippi*	88	St. Bernard	122	Jasper		
24	Leon	54	Amite	89	St. Charles	123	Jefferson		
25	Levy	55	George	90	St. Helena	124	Jim Hogg		
26	Liberty	56	Hancock	91	St. James	125	Jim Wells		
27	Madison	57	Harrison	92	St. John the Baptist	126	Kenedy		
28	Manatee	58	Jackson	93	St. Landry	127	Kleberg		
29	Marion	59	Lamar	94	St. Martin	128	Lavaca		
30	Monroe	60	Marion	95	St. Mary	129	Liberty		
31	Okaloosa	61	Pearl River	96	St. Tammany	130	Live Oak		
32	Pasco	62	Pike	97	Tangipahoa	131	Matagorda		
33	Pinellas	63	Stone	98	Terrebonne	132	Newton		
34	Polk	64	Walthall	99	Vermilion	133	Nueces		
35	Santa Rosa	65	Wilkinson	100	Vernon	134	Orange		

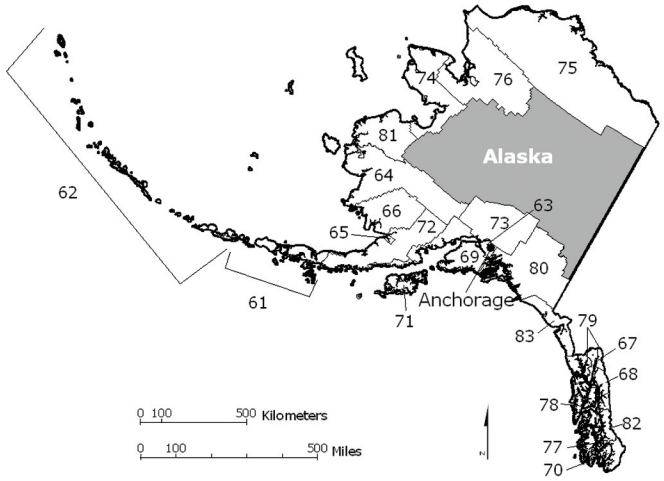
Gulf of Mexico Population, 1980-2008

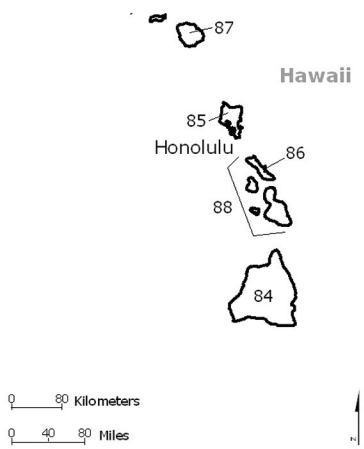
		1980		1990		2000		2003		2008	
STATE	Land Area (Sq. Mi.)	Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
FLORIDA	53,927	9,746	181	12,938	240	15,982	296	17,019	316	18,397	341
Coastal	33,565	3,990	119	5,313	158	6,495	194	6,926	206	7,474	223
Coastal Percent	62	41		41		41		41		41	
GEORGIA	57,906	5,463	94	6,478	112	8,186	141	8,685	150	9,202	159
Coastal	1,603	83	52	85	53	95	59	96	60	100	62
Coastal Percent	3	2		1		1		1		1	
ALABAMA	50,744	3,894	77	4,041	80	4,447	88	4,501	89	4,730	93
Coastal	8,731	610	70	640	73	712	82	721	83	768	88
Coastal Percent	17	16		16		16		16		16	
MISSISSIPPI	46,907	2,521	54	2,573	55	2,845	61	2,881	61	3,022	64
Coastal	6,778	482	71	509	75	588	87	599	88	638	94
Coastal Percent	14	19		20		21		21		21	
LOUISIANA	43,562	4,206	97	4,220	97	4,469	103	4,496	103	4,662	107
Coastal	25,733	3,253	126	3,292	128	3,510	136	3,539	138	3,683	143
Coastal Percent	59	77		78		79		79		79	
TEXAS	261,797	14,229	54	16,987	65	20,852	80	22,119	84	23,766	91
Coastal	40,234	4,806	119	5,582	139	6,850	170	7,277	181	7,743	192
Coastal Percent	15	34		33		33		33		32	
TOTAL	514,843	40,059	78	47,236	92	56,781	110	59,701	116	63,778	124
Coastal	116,644	13,225	113	15,421	132	18,250	156	19,159	164	20,406	175
Coastal Percent	23	33		33		32		32		32	

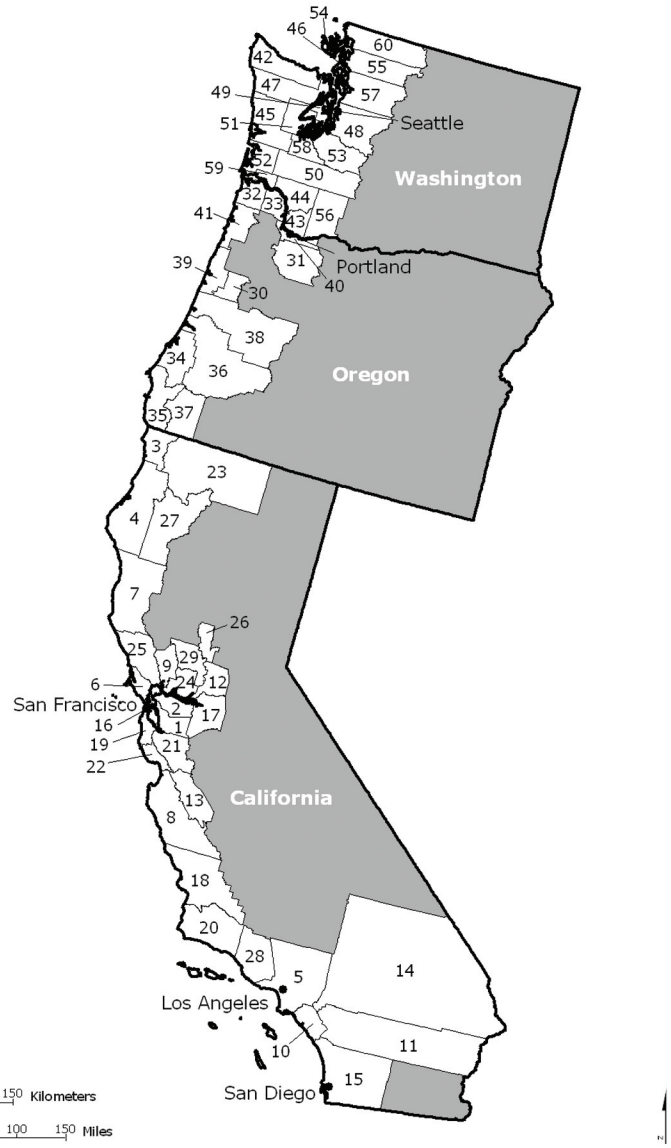
*Thousand Persons **Persons per square mile

Source: U.S. Census Bureau and W&PE, Inc.

Appendix F: Pacific







Coastal Counties

	California	25	Sonoma	46	Island	69	Kenai Peninsula
1	Alameda	26	Sutter	47	Jefferson	70	Ketchikan Gateway
2	Contra Costa	27	Trinity	48	King	71	Kodiak Island
3	Del Norte	28	Ventura	49	Kitsap	72	Lake and Peninsula
4	Humboldt	29	Yolo	50	Lewis	73	Matanuska-Susitna
5	Los Angeles			51	Mason	74	Nome
6	Marin		*Oregon*	52	Pacific	75	North Slope
7	Mendocino	30	Benton	53	Pierce	76	Northwest Arctic
8	Monterey	31	Clackamas	54	San Juan	77	Prince of Wales-Outer Ketchikan
9	Napa	32	Clatsop	55	Skagit	78	Sitka
10	Orange	33	Columbia	56	Skamania	79	Skagway-Hoonah-Angoon
11	Riverside	34	Coos	57	Snohomish	80	Valdez-Cordova
12	Sacramento	35	Curry	58	Thurston	81	Wade Hampton
13	San Benito	36	Douglas	59	Wahkiakum	82	Wrangell-Petersburg
14	San Bernardino	37	Josephine	60	Whatcom	83	Yakutat
15	San Diego	38	Lane				
16	San Francisco	39	Lincoln		*Alaska*		*Hawaii*
17	San Joaquin	40	Multnomah	61	Aleutians East	84	Hawaii
18	San Luis Obispo	41	Tillamook	62	Aleutians West	85	Honolulu
19	San Mateo			63	Anchorage	86	Kalawao
20	Santa Barbara		*Washington*	64	Bethel	87	Kauai
21	Santa Clara	42	Clallam	65	Bristol Bay	88	Maui
22	Santa Cruz	43	Clark	66	Dillingham		
23	Siskiyou	44	Cowlitz	67	Haines		
24	Solano	45	Grays Harbor	68	Juneau		

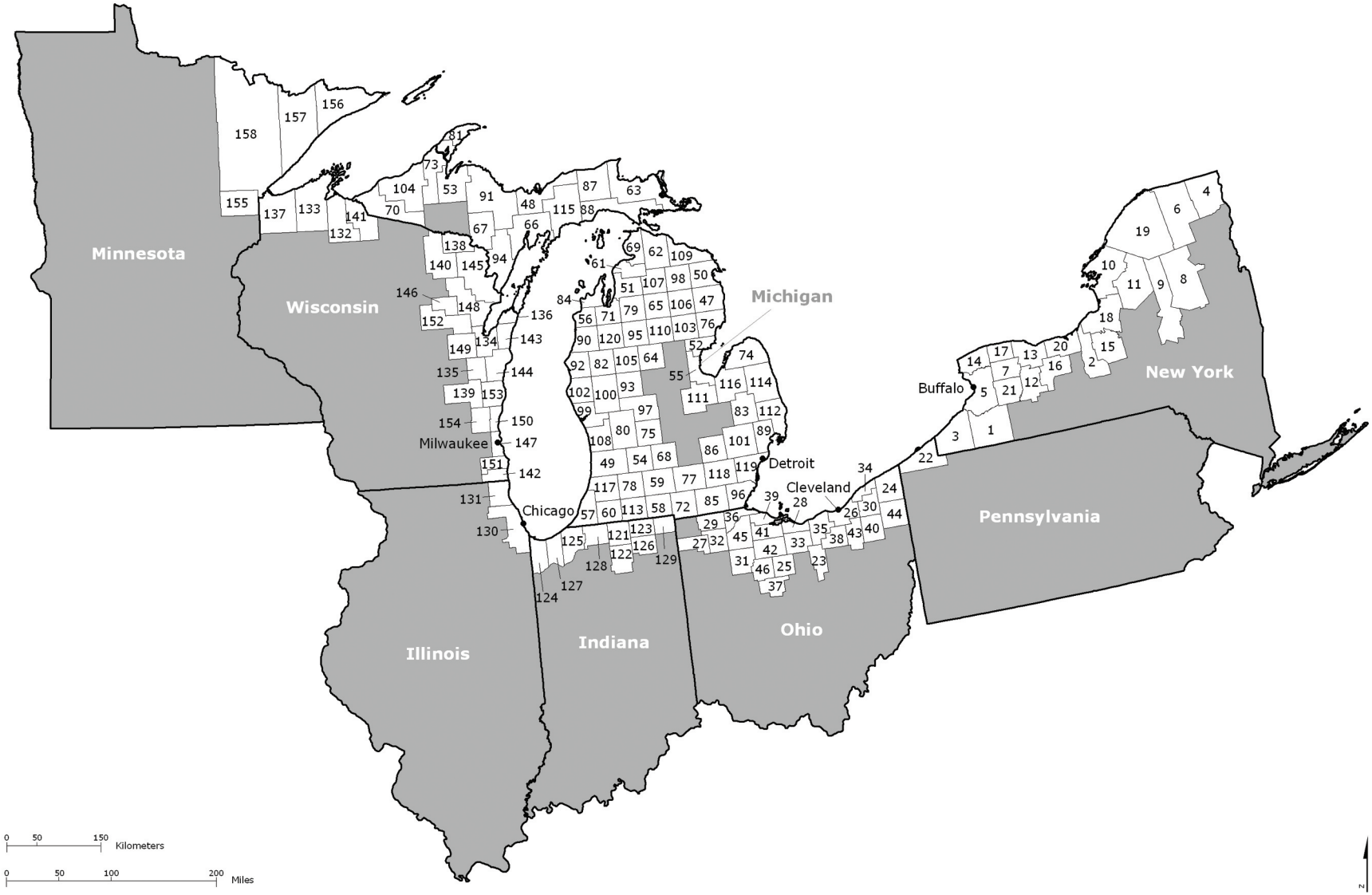
Pacific Population, 1980-2008

STATE	Land Area (Sq. Mi.)	1980 Absolute*	1980 Density**	1990 Absolute	1990 Density	2000 Absolute	2000 Density	2003 Absolute	2003 Density	2008 Absolute	2008 Density
CALIFORNIA	155,959	23,668	152	29,760	191	33,872	217	35,484	228	37,430	240
Coastal	77,812	21,038	270	26,269	338	29,660	381	30,952	398	32,585	419
Coastal Percent	50	89		88		88		87		87	
OREGON	95,997	2,633	27	2,842	30	3,421	36	3,560	37	3,832	40
Coastal	21,003	1,506	72	1,585	75	1,808	86	1,863	89	1,972	94
Coastal Percent	22	57		56		53		52		51	
WASHINGTON	66,544	4,132	62	4,867	73	5,894	89	6,131	92	6,591	99
Coastal	24,714	3,109	126	3,777	153	4,587	186	4,778	193	5,160	209
Coastal Percent	37	75		78		78		78		78	
ALASKA	571,951	406	1	552	1	627	1	649	1	685	1
Coastal	381,121	336	1	458	1	529	1	549	1	582	2
Coastal Percent	67	83		83		84		85		85	
HAWAII	6,423	965	150	1,108	173	1,212	189	1,258	196	1,286	200
Coastal	6,423	965	150	1,108	173	1,212	189	1,258	196	1,286	200
Coastal Percent	100	100		100		100		100		100	
TOTAL	896,874	31,804	35	39,130	44	45,026	50	47,082	52	49,825	56
Coastal	511,073	26,954	53	33,197	65	37,796	74	39,399	77	41,585	81
Coastal Percent	57	85		85		84		84		83	

*Thousand Persons **Persons per square mile

Source: U.S. Census Bureau and W&PE, Inc.

Appendix G: Great Lakes



Coastal Counties

	New York	32	Henry	66	Delta	102	Oceana		*Wisconsin*
1	Cattaraugus	33	Huron	67	Dickinson	103	Ogemaw	132	Ashland
2	Cayuga	34	Lake	68	Eaton	104	Ontonagon	133	Bayfield
3	Chautauqua	35	Lorain	69	Emmet	105	Osceola	134	Brown
4	Clinton	36	Lucas	70	Gogebic	106	Oscoda	135	Calumet
5	Erie	37	Marion	71	Grand Traverse	107	Otsego	136	Door
6	Franklin	38	Medina	72	Hillsdale	108	Ottawa	137	Douglas
7	Genesee	39	Ottawa	73	Houghton	109	Presque Isle	138	Florence
8	Hamilton	40	Portage	74	Huron	110	Roscommon	139	Fond du Lac
9	Herkimer	41	Sandusky	75	Ionia	111	Saginaw	140	Forest
10	Jefferson	42	Seneca	76	Iosco	112	St. Clair	141	Iron
11	Lewis	43	Summit	77	Jackson	113	St. Joseph	142	Kenosha
12	Livingston	44	Trumbull	78	Kalamazoo	114	Sanilac	143	Kewaunee
13	Monroe	45	Wood	79	Kalkaska	115	Schoolcraft	144	Manitowoc
14	Niagara	46	Wyandot	80	Kent	116	Tuscola	145	Marinette
15	Onondaga			81	Keweenaw	117	Van Buren	146	Menominee
16	Ontario		*Michigan*	82	Lake	118	Washtenaw	147	Milwaukee
17	Orleans	47	Alcona	83	Lapeer	119	Wayne	148	Oconto
18	Oswego	48	Alger	84	Leelanau	120	Wexford	149	Outagamie
19	St. Lawrence	49	Allegan	85	Lenawee			150	Ozaukee
20	Wayne	50	Alpena	86	Livingston		*Indiana*	151	Racine
21	Wyoming	51	Antrim	87	Luce	121	Elkhart	152	Shawano
		52	Arenac	88	Mackinac	122	Kosciusko	153	Sheboygan
	Pennsylvania	53	Baraga	89	Macomb	123	LaGrange	154	Washington
22	Erie	54	Barry	90	Manistee	124	Lake		
		55	Bay	91	Marquette	125	LaPorte		*Minnesota*
	Ohio	56	Benzie	92	Mason	126	Noble	155	Carlton
23	Ashland	57	Berrien	93	Mecosta	127	Porter	156	Cook
24	Ashtabula	58	Branch	94	Menominee	128	St. Joseph	157	Lake
25	Crawford	59	Calhoun	95	Missaukee	129	Steuben	158	St. Louis
26	Cuyahoga	60	Cass	96	Monroe				
27	Defiance	61	Charlevoix	97	Montcalm		*Illinois*		
28	Erie	62	Cheboygan	98	Montmorency	130	Cook		
29	Fulton	63	Chippewa	99	Muskegon	131	Lake		
30	Geauga	64	Clare	100	Newaygo				
31	Hancock	65	Crawford	101	Oakland				

Great Lakes Population, 1980-2008

		1980		1990		2000		2003		2008	
STATE	Land Area (Sq. Mi.)	Absolute*	Density**	Absolute	Density	Absolute	Density	Absolute	Density	Absolute	Density
NEW YORK	47,214	17,558	372	17,990	381	18,976	402	19,190	406	19,590	415
Coastal	21,416	3,629	169	3,647	170	3,650	170	3,645	170	3,673	171
Coastal Percent	45	21		20		19		19		19	
PENNSYLVANIA	44,817	11,864	265	11,882	265	12,281	274	12,365	276	12,572	281
Coastal	802	280	349	276	344	281	350	280	349	283	353
Coastal Percent	2	2		2		2		2		2	
OHIO	40,948	10,798	264	10,847	265	11,353	277	11,436	279	11,727	286
Coastal	10,550	4,416	419	4,312	409	4,418	419	4,416	419	4,463	423
Coastal Percent	26	41		40		39		39		38	
MICHIGAN	56,804	9,262	163	9,295	164	9,938	175	10,080	177	10,412	183
Coastal	51,155	8,207	160	8,251	161	8,859	173	8,984	176	9,297	182
Coastal Percent	90	89		89		89		89		89	
INDIANA	35,867	5,490	153	5,544	155	6,080	170	6,196	173	6,466	180
Coastal	4,072	1,276	313	1,275	313	1,378	338	1,397	343	1,455	357
Coastal Percent	11	23		23		23		23		23	
ILLINOIS	55,584	11,427	206	11,431	206	12,419	223	12,654	228	13,038	235
Coastal	1,394	5,694	4,085	5,621	4, 033	6,021	4,319	6,037	4,330	6,168	4,425
Coastal Percent	3	50		49		48		48		47	
WISCONSIN	54,310	4,706	87	4,892	90	5,364	99	5,472	101	5,712	105
Coastal	15,394	2,268	147	2,322	151	2,469	160	2,499	162	2,563	166
Coastal Percent	28	48		47		46		46		45	
MINNESOTA	79,610	4,076	51	4,375	55	4,919	62	5,059	64	5,360	67
Coastal	10,635	269	25	242	23	248	23	248	23	252	24
Coastal Percent	13	7		6		5		5		5	
TOTAL	415,154	75,180	181	76,256	184	81,332	196	82,452	199	84,877	204
Coastal	115,418	26,039	226	25,946	225	27,324	237	27,506	238	28,153	244
Coastal Percent	28	35		34		34		33		33	

*Thousand Persons **Persons per square mile

Source: U.S. Census Bureau and W&PE, Inc.

NOAA