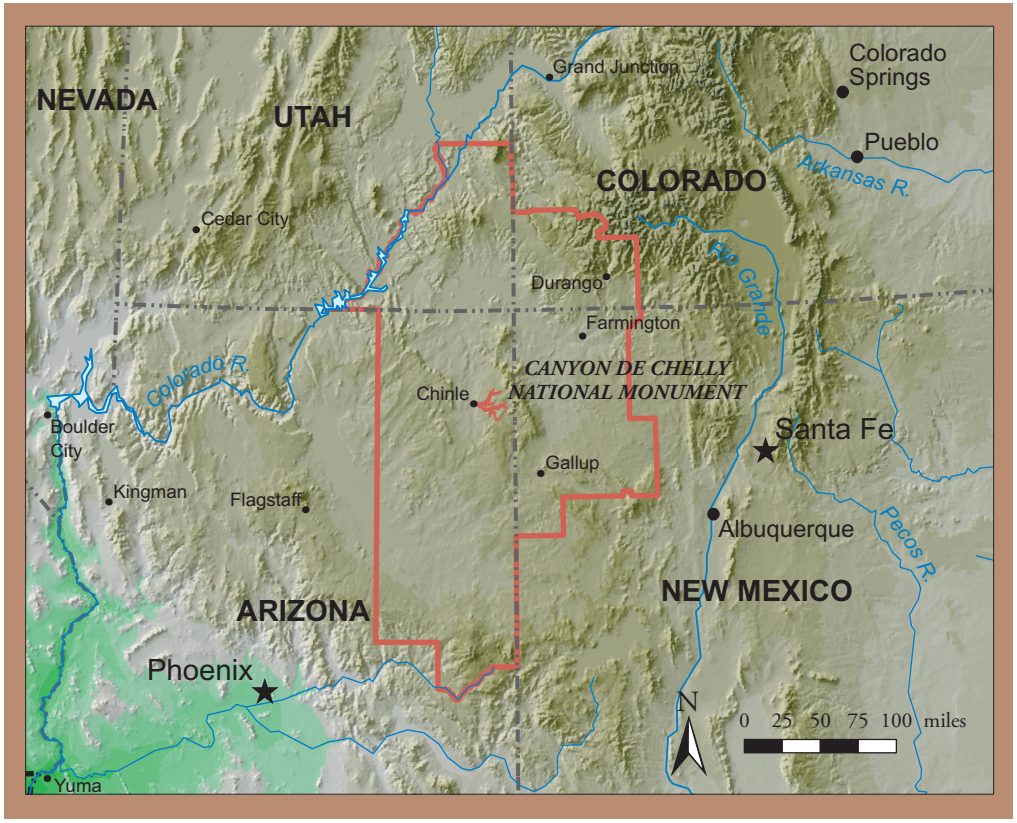
A Socioeconomic Atlas for



Canyon de Chelly National Monument and its Region

2004

A Socioeconomic Atlas for Canyon de Chelly National Monument and its Region

by

Jean E. McKendry

Cynthia A. Brewer

Joel M. Staub

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Acknowledgments

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About this Atlas

This atlas is one in a developing National Park Service atlas series. The purpose of the atlas series is to show socioeconomic trends for regions around individual national park units. Pilot atlases were completed for Harpers Ferry National Historical Park, Joshua Tree National Park, Mount Rainier National Park, and Wilson's Creek National Battlefield. The potential to link these atlases to park planning, e.g., updating the General Management Plan, is being explored with a second series of atlases that began with the Blue Ridge Parkway.

After NPS produced the Blue Ridge Parkway atlas, atlases in the second series have been created in collaboration with the Department of Geography at the Pennsylvania State University. Canyon de Chelly National Monument is one of the atlases in the second series. For more information about the atlas series, contact Jean McKendry, National Park Service, 1849 C Street NW (3130), Washington, DC 20240 (jean_mckendry@partner.nps.gov).

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Preface

Protection of the National Park System requires active and scientifically informed management. If park resources – both natural and cultural – are to be protected for future generations, the NPS must develop efficient ways to monitor the condition and trends of natural and human systems. Such monitoring must provide usable knowledge that managers can apply to the preservation of resources. And the NPS must share this information with surrounding communities, stakeholders, and partners to help them make important choices about their future.

Because of these reasons and more, the NPS has embarked on a significant initiative – the Natural Resource Challenge, an action plan for preserving natural resources and our country's natural heritage within the complexities of modern landscapes (http://www1.nature.nps.gov/challenge/index.htm).

This atlas is one component in that effort. It is a tool for park managers, planners, community leaders, and others to use in addressing the challenge of preserving the natural and cultural resources of Canyon de Chelly National Monument. Part of that challenge involves understanding conditions outside park boundaries – conditions which can have significant impacts on park resources. Systematic study and monitoring of regional conditions involves, to a large degree, investigation of human activities. This atlas focuses on such human activities, characterizing them in terms of standardized measures known as socioeconomic indicators.

The atlas can currently serve as an aid to management and planning, as a training tool, and as a means to facilitate public participation. It can be of long-term benefit by establishing baseline data for monitoring changing conditions and trends in the region. Through these and other potential uses, the atlas supports the critical goal of improving park management through a greater reliance on usable scientific knowledge, and contributes to meeting the Natural Resource Challenge.

Gary E. Machlis
Visiting Senior Scientist
National Park Service

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Introduction

The purpose of this atlas is to provide park managers, planners, community leaders, and others with a better understanding of changing human activities and socioeconomic conditions in the region surrounding Canyon de Chelly National Monument. These changes outside a park's boundaries can create complex park management challenges. Information about regional trends and conditions is needed in order to manage and conserve park resources – both natural and cultural – more effectively. This atlas provides such information in a series of maps, complemented by tables, other graphics, and explanatory text.

Maps are effective ways of conveying information. A map can highlight geographical patterns in data by showing the relationship between what is happening and where it is happening. For example, a map that shows a park's road network and also shows the locations of traffic accidents may indicate that certain sections of park roadway are particularly hazardous. Or a map that plots where park visitors come from might show that the park is popular with residents from a particular part of the region or the nation.

The maps in this atlas combine *contextual* information (such as boundary lines, roads, and key towns) with *thematic* information (such as demographic or economic statistics). This combination of contextual and thematic information helps the reader observe general trends inherent in the distribution of data. For example, a map that shows the population growth rate for each county in the park region may reveal that all of the highest growth rates are concentrated in counties south of the park.

Each map is designed to allow for easy comparison, so readers can see how conditions and trends in their own counties compare with those in other counties and relate to larger regional patterns. The consistent map design allows readers to make useful comparisons among two or more maps. For example, comparing maps of federal expenditures per person and poverty rates might reveal that federal expenditures tend to be higher in a region's poorer counties.

There are many potential uses for this atlas. For example, park managers can share the atlas with new park staff, regional staff, the media, or policy makers as a way of orienting them to the basic facts about the region. Planners can use the atlas to examine emerging trends outside the park and to prioritize actions to mitigate any anticipated adverse impacts on park resources. Local and regional leaders can consult the atlas to develop environmental policies that support park management goals while remaining responsive to local needs. Researchers can use the atlas to design studies that have practical benefit to park and ecosystem management. Additional uses are discussed in the atlas' concluding section, pages 76 - 77. Regardless of how it is used, the atlas can serve as a useful reference tool that adds to the body of usable scientific knowledge about Canyon de Chelly National Monument and its surrounding region.

Socioeconomic Indicators: Valuable Management Tools

The Relevance of Human Activities to Park Resource Management

The management of park resources always requires attention to human behavior and activities. Protection of a threatened archaeological site can mean educating visitors about the Antiquities Act. Controlling non-native plant species can require close collaboration with park neighbors and volunteers. Preservation of scenic values can depend upon the monitoring of emissions from electrical generation plants several states away.

While there is an on-going and healthy debate about how to address this "human factor" in park management, a consensus has emerged about three basic principles:

- people are part of park ecosystems, and their needs and activities must be considered in management plans;
- park managers should be concerned with short and long-term trends, as well as the local, regional, and national consequences of actions; and
- where appropriate, decisions about park resources should be made collaboratively, including federal agencies, local governments, and citizens in the process.

Managing parks in accordance with these principles requires careful planning, for people have many competing needs.

Careful planning requires an accurate and objective assessment of current conditions as well as on-going trends. Hence, understanding the social, cultural, and economic characteristics of the park region is crucial for successful park management.

The Value of Socioeconomic Indicators

One approach to understanding social, cultural, and economic conditions and trends is to use *socioeconomic indicators*. Socioeconomic indicators are regularly collected economic or social statistics that describe or predict changes and trends in the general state of society. For example, the consumer price index (CPI) keeps track of changes in the price of a typical group of consumer goods. The CPI is used to monitor inflation, to compare the cost-of-living in one region of the country to another, and to support economic policy-making. Socioeconomic indicators can address historical trends, present conditions, or future projections.

An integrated set of socioeconomic indicators can be effective in presenting the "basic facts" about the people of a region. Such basic facts are important to park management, and can be used in many ways: assessing the potential impact of government policies, developing sound resource management strategies, designing effective interpretive programs, increasing public involvement in the planning process, and so forth. Like measures of water quality or wildlife populations, socioeconomic indicators enable managers and citizens to make scientifically informed decisions concerning public resources.

The Integrated Set of Indicators

The indicators in this atlas are not simply a collection of various statistics displayed in maps, but an integrated set of indicators organized around broad areas of human activity that are of particular relevance to park management. The selection of a broad range of relevant indicators is important because the dynamics of human interaction on a regional scale are complex. For example, the growth of a new industry can influence a rise in immigration, which in turn can influence other human activities such as housing development. While industry, immigration, and housing are categorically different indicators, each one could be important for a park manager trying to anticipate growth issues that might impact park visitation or ecological systems.

The integrated set of indicators displayed in this atlas encompasses six general categories:

- *General population* indicators measure how many people live in a given area, where those people are concentrated, their ages, patterns of migration, and so forth. General population indicators provide a profile of the people who are neighbors to the park and potential partners in park management.

- *Economy and commerce* indicators measure the flow and distribution of money, materials, and labor. Economy and commerce indicators provide an overview of the interdependent economic relationships among people, businesses, industries, and government within the park region.

- *Social and cultural* indicators measure aspects of personal and group identity such as cultural origin, political and religious beliefs, health, and language. Social and cultural indicators provide insights into the varying perceptions and expectations that people bring with them when they go to their place of work, participate in a public meeting, or visit a park interpretive site.

- *Recreation and tourism* indicators measure activities specifically related to the provision of accommodations, entertainment, and personal services. Recreation and tourism indicators provide a way to analyze the economic role that travelers, vacationers, and other recreationists play in the region surrounding the park, which is itself closely linked to the recreation/tourism sector.

- *Administration and government* indicators measure the structure, resources, and actions of government organizations. Administration and government indicators provide an orientation to the role of government – local, state, and federal – in the park region.

- *Land use* indicators measure the interactions between people and terrestrial resources such as land, water supply, and vegetation. Land use indicators provide a way to gauge the impact of human activities such as farming, forestry, and urban development upon ecosystems within the park region.

Selecting Specific Indicators

Drawing from the six general categories of socioeconomic indicators described above, a menu of 67 socioeconomic indicators was developed. Each indicator was determined to be readily available and mappable at the county level. From this menu, 17 *core indicators* were selected that would be common to all atlases published in this series. The core indicators provide information useful to all park managers. Incorporating these core indicators throughout the series of atlases enables park managers to make comparisons among parks in different regions of the country. Canyon de Chelly National Monument staff chose additional indicators from the menu described above. Park staff selected these indicators to customize the atlas so that it would target information relevant to their particular management needs. Figure 1 shows the six general categories and the specific indicators included in this atlas; for each category, indicators are listed in the order they appear in the atlas.

The maps in this atlas are based on county-level data wherever possible. County-level data have several advantages. Good quality data are available at this scale, consistently collected at regular intervals, and comparable across all U.S. counties. Also, counties are stable geographic units for monitoring trends, as little change in county boundaries occurs over time. Finally, as administrative and political units, counties significantly influence environmental change and can be important partners in park management.

Technical Notes

Appendix 1 provides the data sources for the indicators presented in this atlas. Appendix 2 provides technical information on the design of the maps. Appendix 3 includes endnotes and text that provide additional information on the measurement of selected indicators.

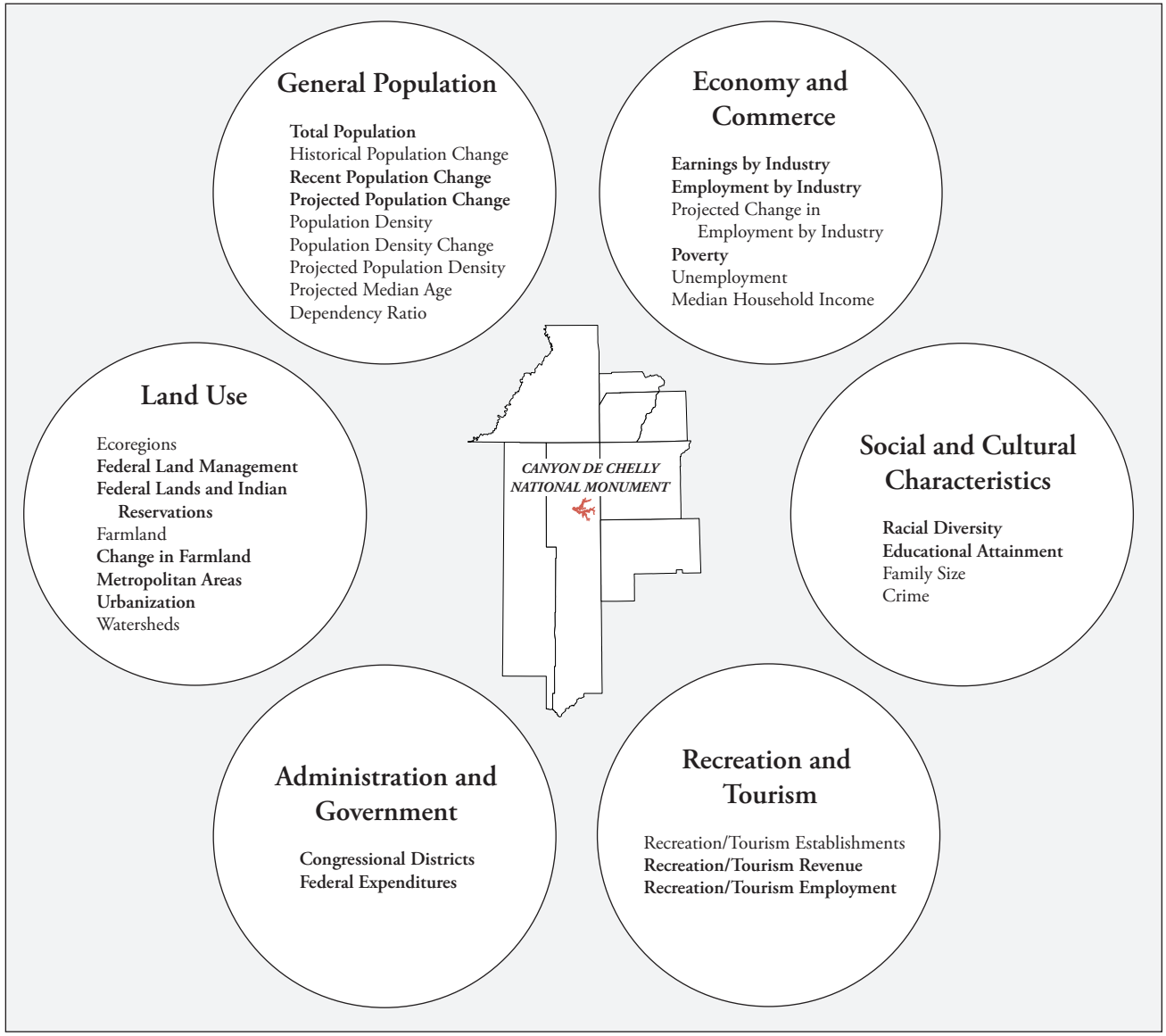


Figure 1. Indicators Included in this Atlas **core indicator** additional indicator

The Region

In selecting the boundaries of the region of interest covered by this atlas, Canyon de Chelly National Monument (NM) staff were asked to define the geographic area that has the most significant impact on the park's management. Because the atlas relies on county-level socioeconomic data, the region of interest was restricted to entire counties, rather than parts of counties. The region selected includes Apache and Navajo counties in Arizona; McKinley and San Juan counties in New Mexico; Dolores, La Plata, and Montezuma counties in Colorado; and San Juan county in Utah. The map on the facing page depicts the region in its larger context.

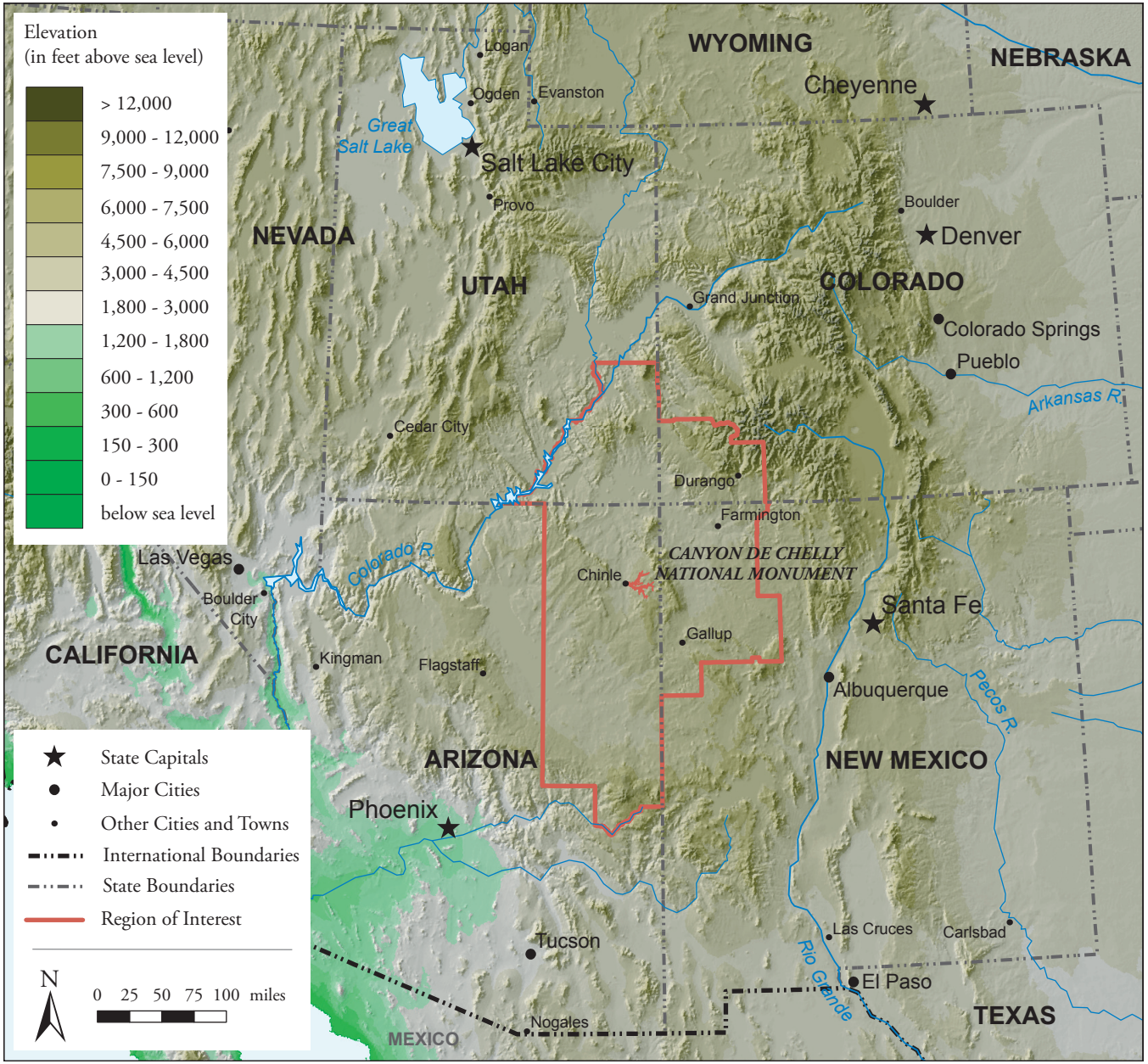
Canyon de Chelly NM is located in the four corners region of the Southwest. It is approximately 180 miles northeast of Flagstaff, Arizona, and 230 miles northwest of Albuquerque, New Mexico. This area is part of the Colorado Plateau, known for its spectacular layers of colored rock and consisting primarily of high desert with scattered mesas. Interesting geological formations, including deep canyons formed centuries ago, cut through parts of the region. Unique petrified forests are located here, as are extinct volcanoes and ancient lava fields. Lake Powell, created when the Glen Canyon of the Colorado River was dammed, is northwest of the national monument on the Utah-Arizona border.

The region has been home to Native American groups for centuries. It was home to the Archaic peoples as well as Anasazi (now commonly known as the Ancestral Puebloans). American Indians make up 52.9% of the present day population. The Navajo Nation occupies much of northeastern Arizona and northwestern New Mexico, extending into southern Utah. The Hopi Indian Reservation (AZ), Ute Mountain Ute Reservation (CO and NM), and Zuni Indian Reservation (NM) are also located in this region. The area is predominantly rural, with few large towns.

Per capita income in the counties of the region is lower than national and statewide averages, and unemployment percentages are relatively high. The largest employment sectors are services, government, and retail trade. Tourism is an increasingly important industry as the area provides a unique and beautiful natural environment and agreeable climate. The diverse cultures and deep history of the region attract visitors as well. Some irrigated farming and ranching takes place in selected areas. Mineral extraction, though not as important as in the past, continues to contribute to local economies.

In addition to Canyon de Chelly NM, the region contains all or part of several other national park units, including Aztec Ruins NM, Canyonlands National Park (NP), Chaco Culture National Historical Park (NHP), Glen Canyon National Recreation Area (NRA), Hovenweep NM, Hubbell Trading Post National Historic Site (NHS), Mesa Verde NP, Natural Bridges NM, Navajo NM, Petrified Forest NP, Rainbow Bridge NM, and Yucca House NM.

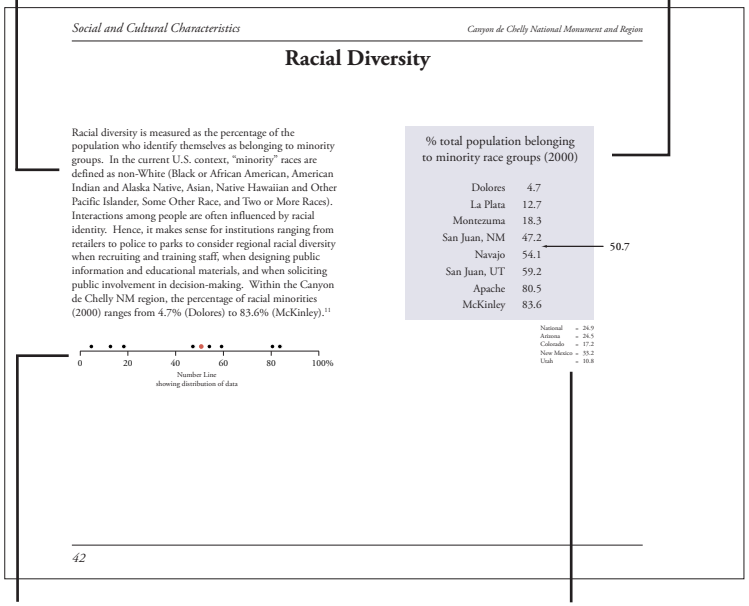
Canyon de Chelly National Monument and its Region



Using the Socioeconomic Indicators and Maps

The socioeconomic indicators for the Canyon de Chelly National Monument region of interest are presented in a series of maps. The best available county-level data are presented for each indicator. The following information is provided for each indicator:

- a brief description of the socioeconomic indicator and an observation about the spatial variation in the data as displayed on the map.
- a table that shows the data and relative rank for each county. The median value is shown with an arrow and bold type. The table allows the reader to look up and compare specific indicator values for each county.
- a map legend describing how the indicator is measured, the year that the data were gathered, and the range of values for each quartile grouping.
- the name of the general category to which this particular indicator belongs (such as general population or land use). Maps in the same general category share similar sets of color symbols.



Social and Cultural Characteristics *Canyon de Chelly National Monument and Region*

Racial Diversity

Racial diversity is measured as the percentage of the population who identify themselves as belonging to minority groups. In the current U.S. context, "minority" races are defined as non-White (Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, and Two or More Races). Interactions among people are often influenced by racial identity. Hence, it makes sense for institutions ranging from retailers to police to parks to consider regional racial diversity when recruiting and training staff, when designing public information and educational materials, and when soliciting public involvement in decision-making. Within the Canyon de Chelly NM region, the percentage of racial minorities (2000) ranges from 4.7% (Dolores) to 83.6% (McKinley).[11]

% total population belonging to minority race groups (2000)

Dolores	4.7
La Plata	12.7
Montezuma	18.3
San Juan, NM	47.2
Navajo	54.1
San Juan, UT	59.2
Apache	80.5
McKinley	83.6

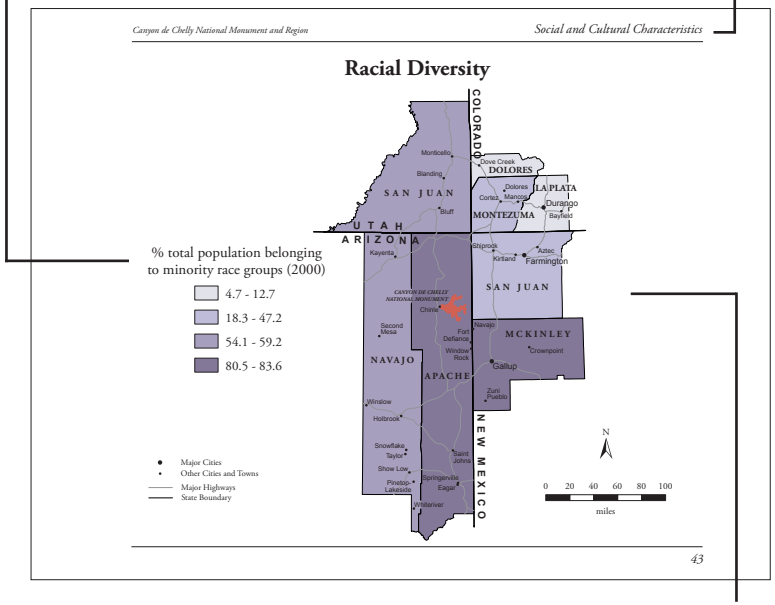
50.7

National	= 24.9
Arizona	= 24.5
Colorado	= 17.2
New Mexico	= 55.2
Utah	= 10.8

0 20 40 60 80 100%

Number Line showing distribution of data

42



Canyon de Chelly National Monument and Region *Social and Cultural Characteristics*

Racial Diversity

% total population belonging to minority race groups (2000)

- 4.7 - 12.7
- 18.3 - 47.2
- 54.1 - 59.2
- 80.5 - 83.6

Major Cities
Other Cities and Towns
Major Highways
State Boundary

COLORADO
UTAH
ARIZONA
NEW MEXICO
DOLORES
LA PLATA
MONTEZUMA
SAN JUAN
MCKINLEY
NAVAJO
APACHE
CANYON DE CHELLY NATIONAL MONUMENT
Monticello
Blanding
Bluff
Dove Creek
Dolores
Cortez
Mancos
Durango
Bayfield
Shiprock
Kirtland
Aztec
Farmington
Kayenta
Chinle
Second Mesa
Fort Defiance
Window Rock
Navajo
Crownpoint
Gallup
Zuni Pueblo
Winslow
Holbrook
Snowflake
Taylor
Show Low
Pinetop-Lakeside
Springerville
Eagar
Saint Johns
Whiteriver

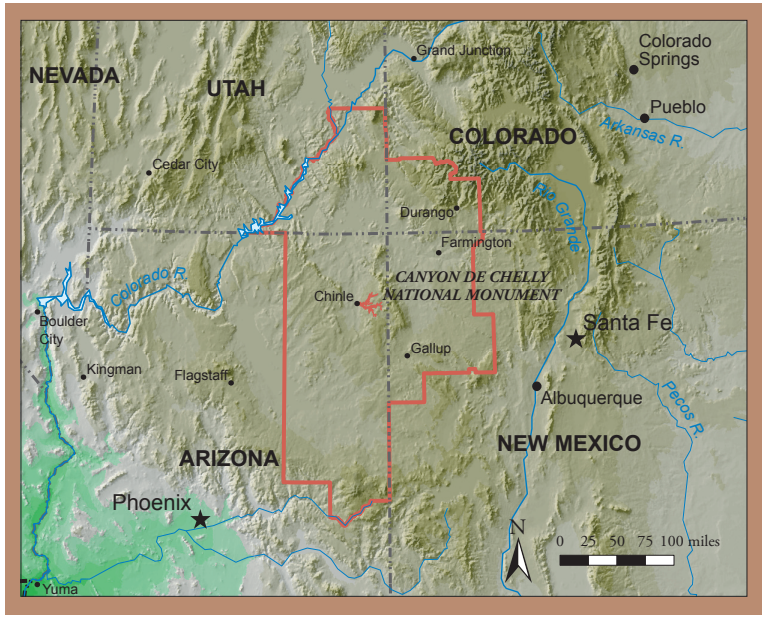
N

0 20 40 60 80 100
miles

43

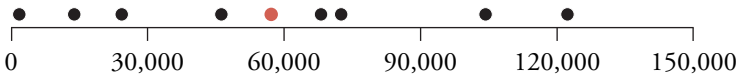
- a number line that shows the distribution of values for the indicator, useful in understanding patterns in the data. The median value is represented by a **red** dot.
- a section displaying national and state data that can be compared with regional county data.
- a map that displays general patterns inherent in the data. For most indicators, counties are grouped into four classes that correspond to four sub-ranges of data values. These groups are called quartiles. The highest-ranked quartile receives the darkest shading. For more information on quartile classification, see Appendix 2, page 83.

The Socioeconomic Indicators



Total Population

Population size is one of the most important influences on the character of human activities in a place and a key influence on resource use. People bring labor, knowledge, and economic activity to a place. At the same time, they generate demand for natural resources, goods, and services ranging from food to recreational opportunities. Within the Canyon de Chelly NM region, county population (2003) ranges from 1,825 (Dolores) to 122,272 (San Juan, NM).[1]



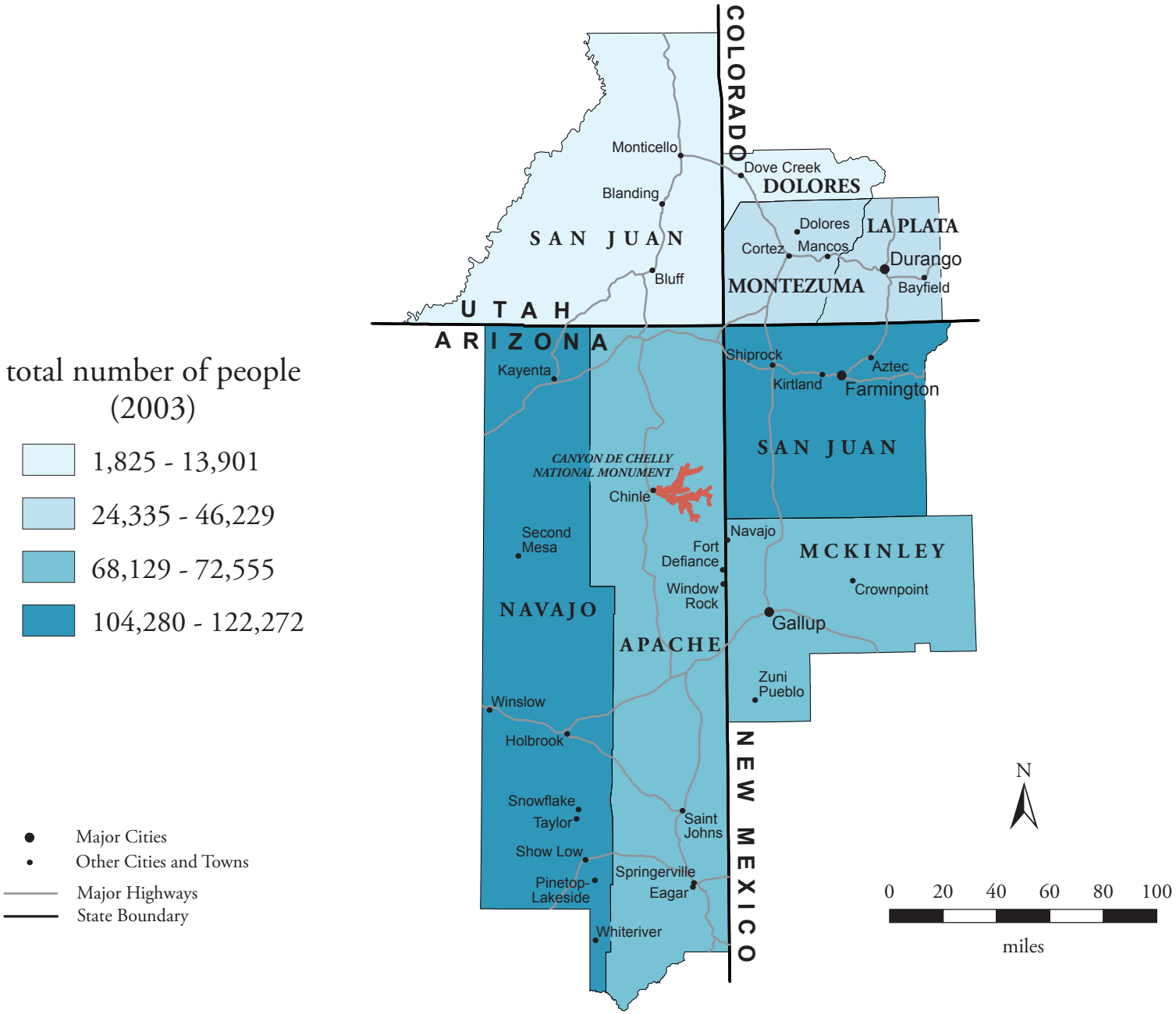
Number Line
showing distribution of data

total number of people (2003)	
Dolores	1,825
San Juan, UT	13,901
Montezuma	24,335
La Plata	46,229
Apache	68,129
McKinley	72,555
Navajo	104,280
San Juan, NM	122,272

57,179

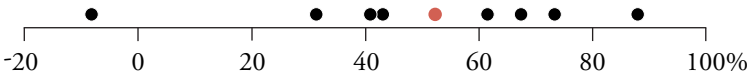
National = 290,809,777
Arizona = 5,580,811
Colorado = 4,550,688
New Mexico = 1,874,614
Utah = 2,351,467

Total Population



Historical Population Change

Population change is due to birth, death, and migration. Trends in historical population change (1970 - 1990) provide a context from which to view recent population change (1990 - 2000). The direction and rate of population change are important socioeconomic trends. For example, population growth increases the size of the economy and can generate changes in land use that affect natural ecosystems. Within the Canyon de Chelly NM region, county growth rates (1970 - 1990) ranged from a decrease of 8.1% (Dolores) to an increase of 87.9% (Apache).



Number Line
showing distribution of data

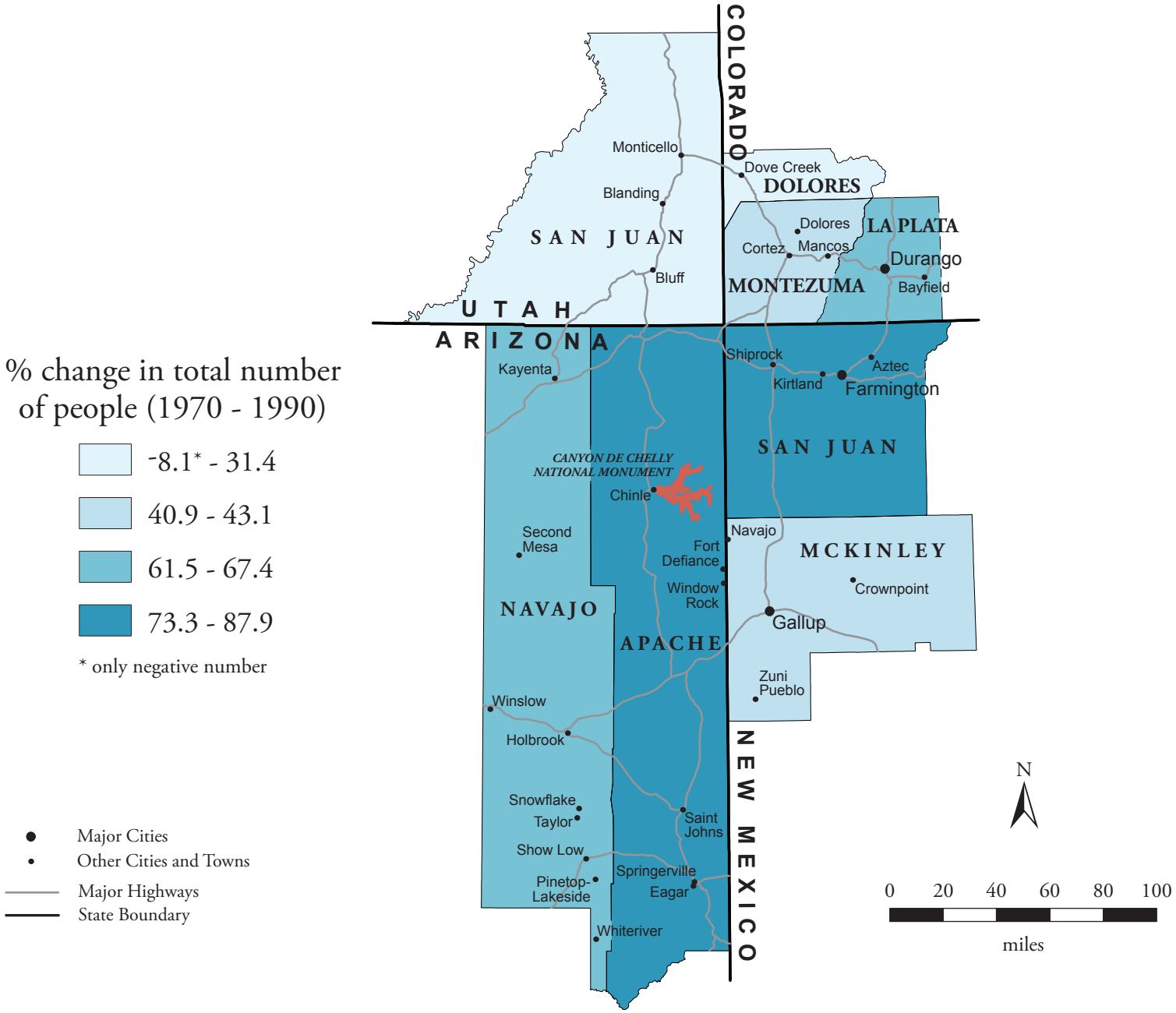
% change in total number of people (1970 - 1990)

Dolores	-8.1
San Juan, UT	31.4
McKinley	40.9
Montezuma	43.1
Navajo	61.5
La Plata	67.4
San Juan, NM	73.3
Apache	87.9

52.3

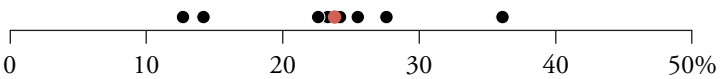
National = 22.3
Arizona = 104.5
Colorado = 48.3
New Mexico = 48.4
Utah = 62.0

Historical Population Change



Recent Population Change

Measuring recent population change provides an indication of the extent to which population change is influencing current local or regional priorities. For example, population growth changes the tax base, adds new voters, and can increase demand for services ranging from schools to transportation to outdoor recreation. Within the Canyon de Chelly NM region, the recent increase in county population (1990 - 2000) ranges from 12.7% (Apache) to 36.1% (La Plata).



Number Line
showing distribution of data

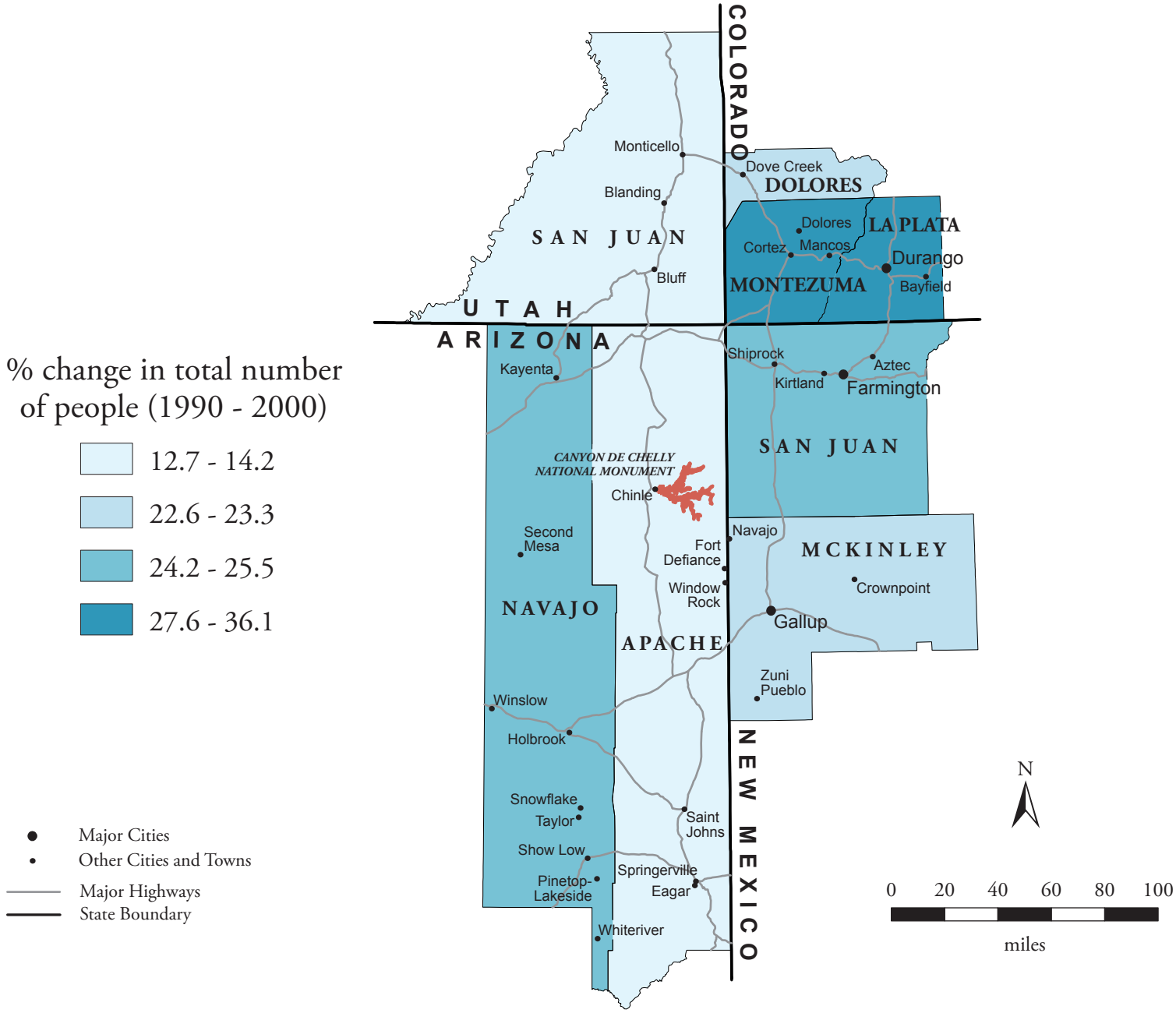
% change in total number of people (1990 - 2000)

Apache	12.7
San Juan, UT	14.2
Dolores	22.6
McKinley	23.3
San Juan, NM	24.2
Navajo	25.5
Montezuma	27.6
La Plata	36.1

23.8

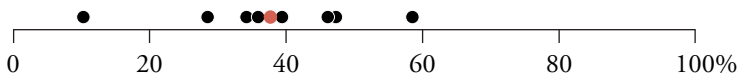
National = 13.2
Arizona = 13.7
Colorado = 30.6
New Mexico = 20.1
Utah = 29.6

Recent Population Change



Projected Population Change

Population projections can be made with some accuracy for short and mid-range time spans. Projections can help planners anticipate potential impacts on park resources. For example, population growth can generate changes in land use and transportation, growth of new and existing communities, and increases in the demand for park experiences. Within the Canyon de Chelly NM region, the projected increase in county population by the year 2020 ranges from 10.3% (Dolores) to 58.5% (Navajo).[2]



Number Line
showing distribution of data

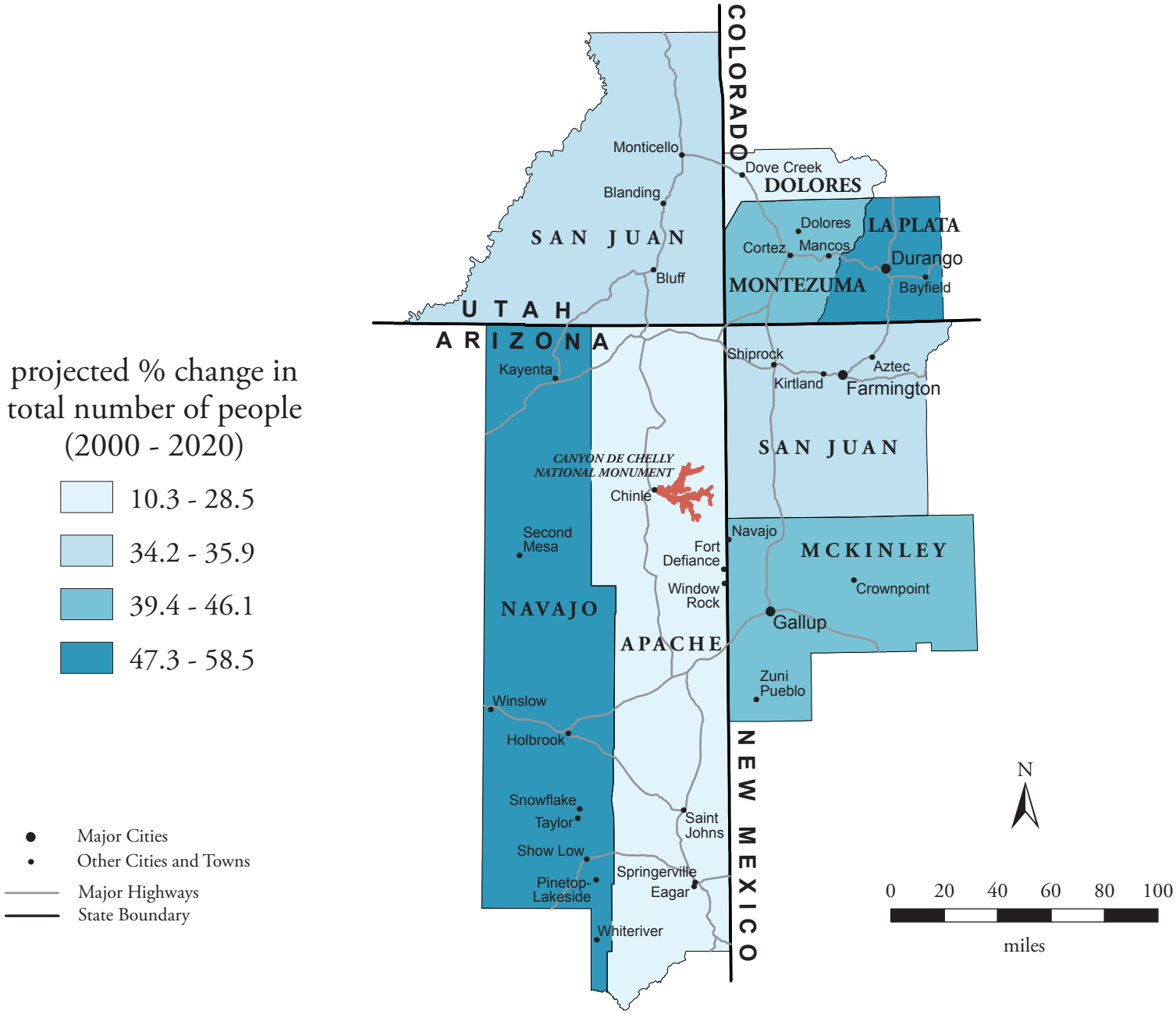
projected % change in total number of people (2000 - 2020)

Dolores	10.3
Apache	28.5
San Juan, UT	34.2
San Juan, NM	35.9
McKinley	39.4
Montezuma	46.1
La Plata	47.3
Navajo	58.5

37.7

National = 21.1
Arizona = 48.4
Colorado = 34.4
New Mexico = 31.2
Utah = 46.3

Projected Population Change



Population Density

Population density is a measure of population in terms of persons per square mile. Higher concentrations of people tend to support more business activities and can generate greater demand for public goods ranging from roads to open space. Thus, monitoring differences in population density can be an important way to detect potential stresses and impacts on natural resources in the park region. Within the Canyon de Chelly NM region, county population density (2000) ranges from 1.7 people per square mile (Dolores) to 26.0 people per square mile (La Plata).[3]

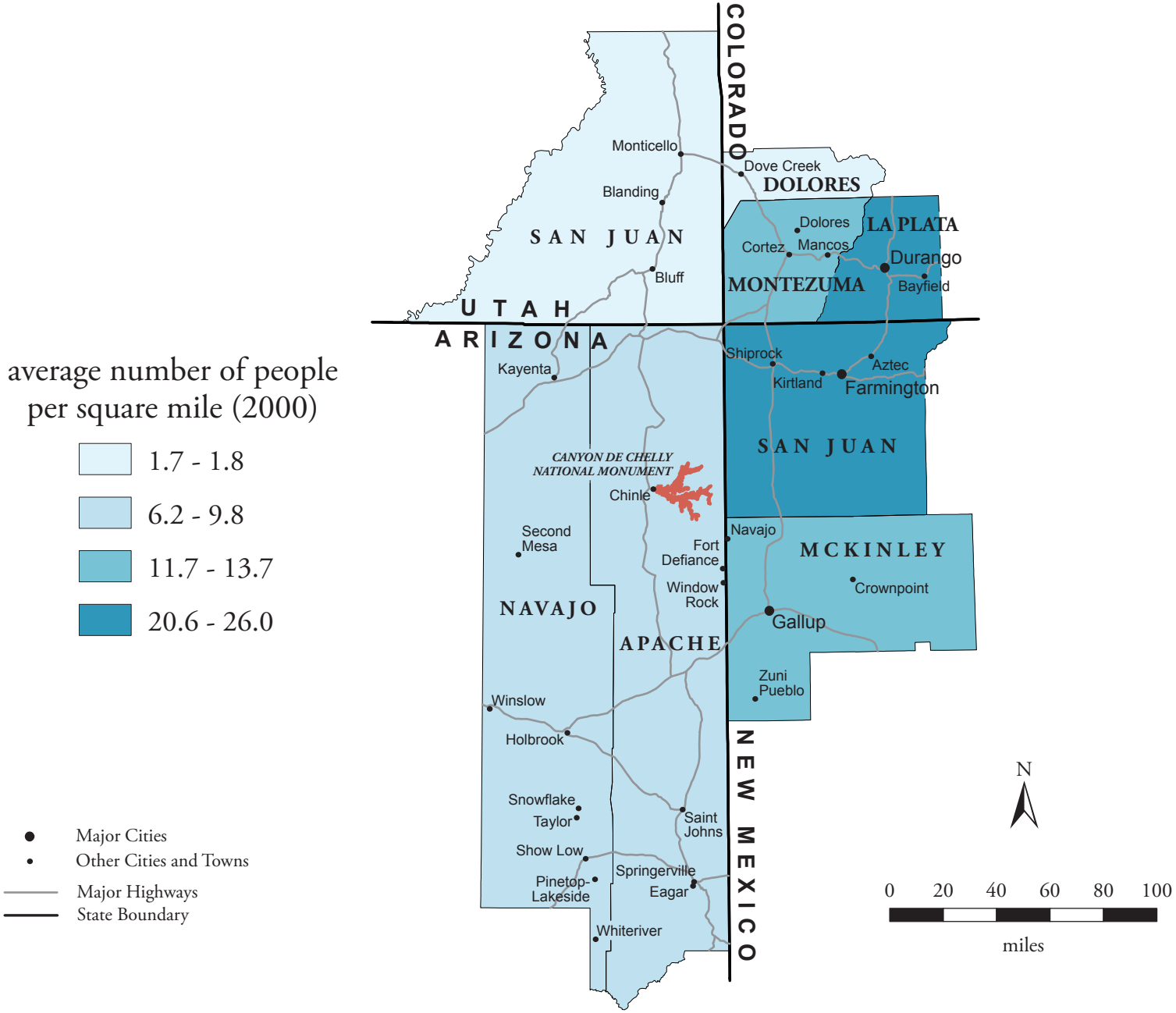
Number Line
showing distribution of data

average number of people per square mile (2000)	
Dolores	1.7
San Juan, UT	1.8
Apache	6.2
Navajo	9.8
Montezuma	11.7
McKinley	13.7
San Juan, NM	20.6
La Plata	26.0

10.8

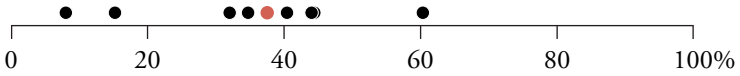
National = 79.6
Arizona = 45.1
Colorado = 41.5
New Mexico = 15.0
Utah = 27.2

Population Density



Population Density Change

Population density change is an alternate means to describe population growth, stability, or decline. Steady or decelerating growth over a 20-year time period suggests that government and institutions can anticipate and plan for needs in advance. Accelerating population growth may be placing stress on government and institutions to respond rapidly to changes in civic life, industry, infrastructure, and the use of land and resources. Within the Canyon de Chelly NM region, the change in county population density (1980 - 2000) ranges from 8.0% (Dolores) to 60.3% (La Plata).[4]



Number Line
showing distribution of data

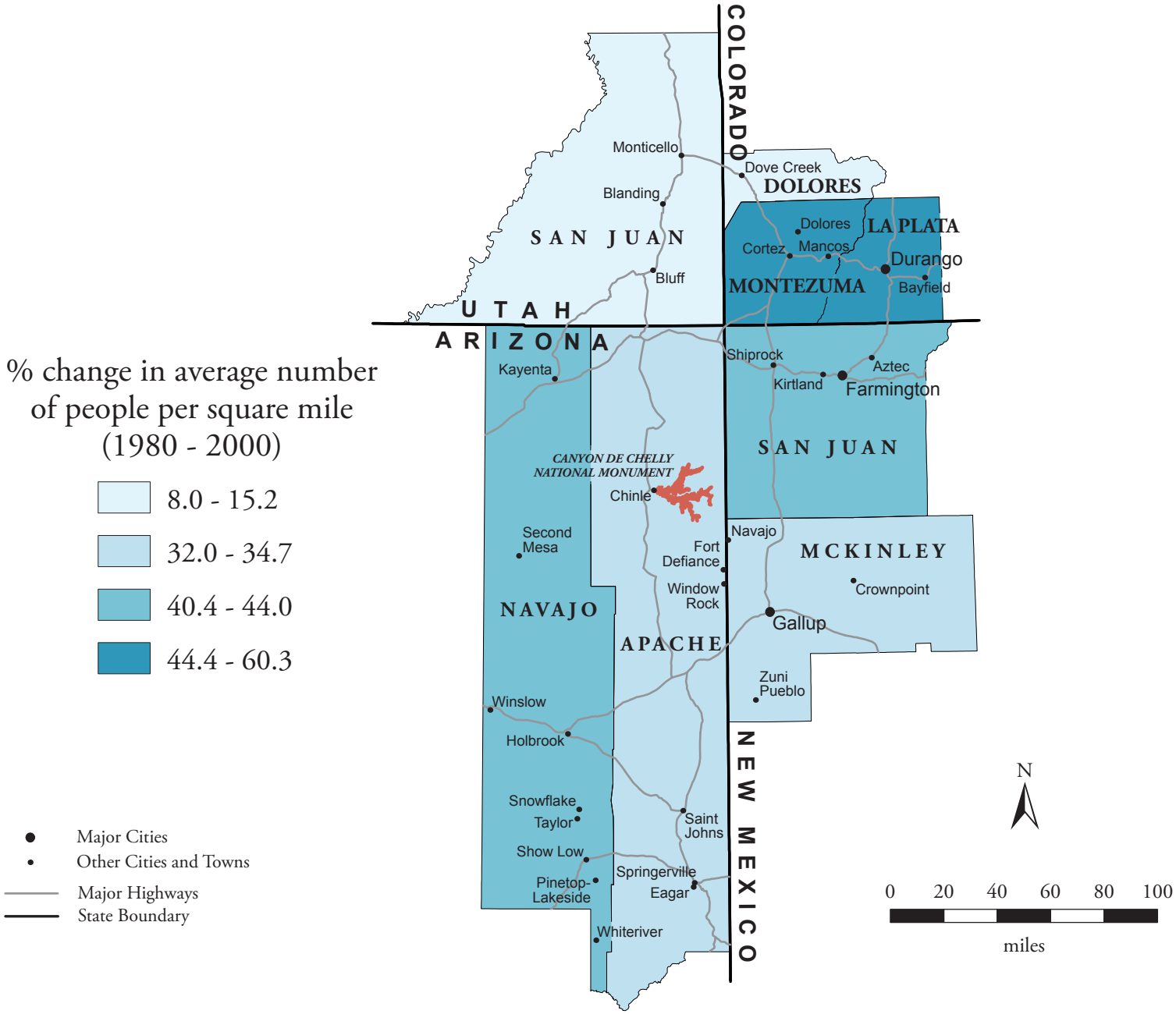
% change in average number of people per square mile (1980 - 2000)

Dolores	8.0
San Juan, UT	15.2
McKinley	32.0
Apache	34.7
San Juan, NM	40.4
Navajo	44.0
Montezuma	44.4
La Plata	60.3

37.5

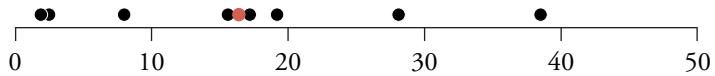
National = 24.3
Arizona = 88.9
Colorado = 48.6
New Mexico = 40.1
Utah = 52.7

Population Density Change



Projected Population Density

Population density projections are based on population projections. Future regional variations in county population density suggest variations in how counties will approach decisions about natural resource-related issues such as transportation, zoning, and water supply. Significantly increased population density can generate rising land costs as well as increased demand for open space to be used for recreation or conservation. Within the Canyon de Chelly NM region, projected county population density for the year 2020 ranges from 1.9 people per square mile (Dolores) to 38.5 people per square mile (La Plata).[5]



Number Line
showing distribution of data

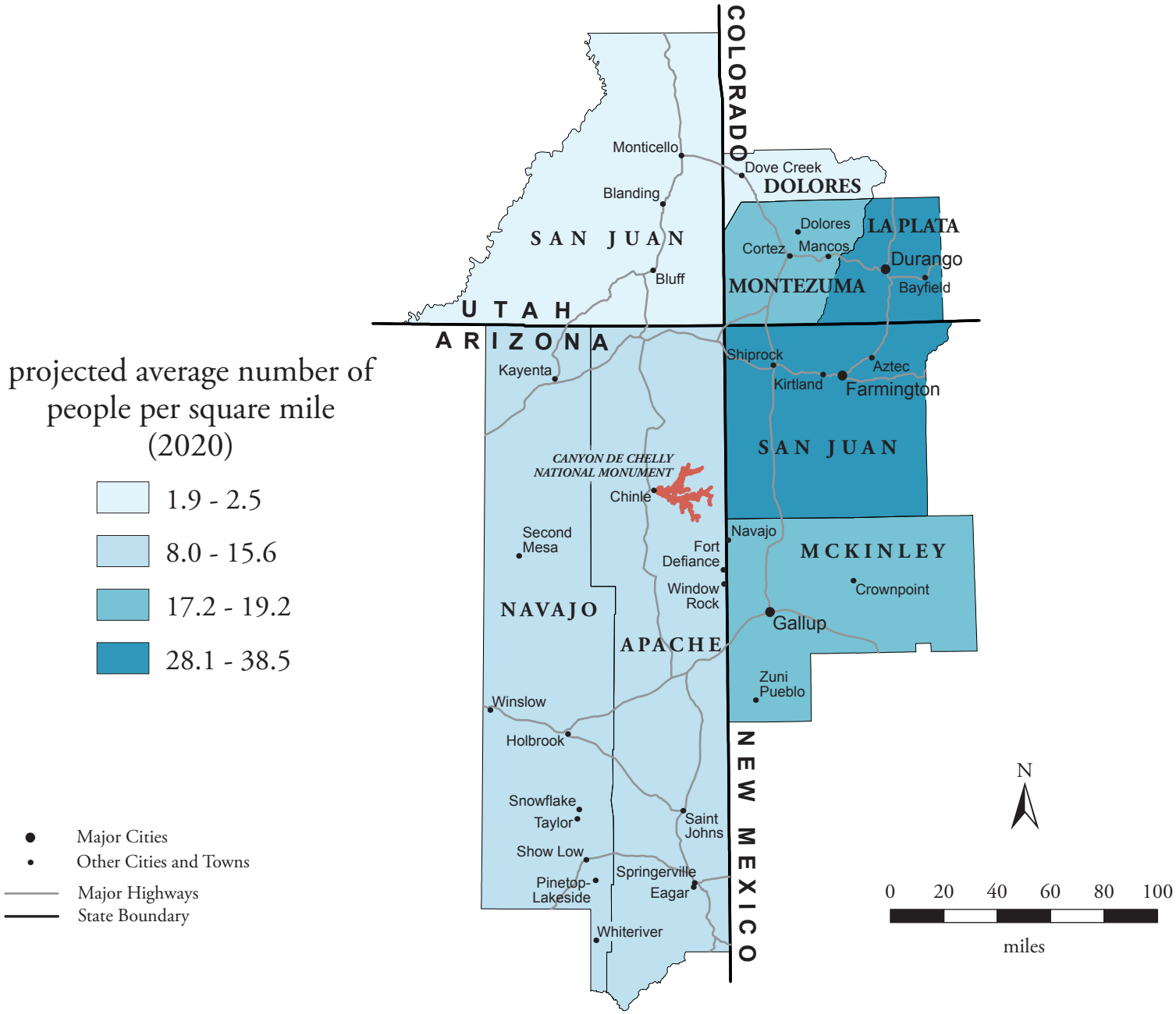
projected average number of people per square mile (2020)

Dolores	1.9
San Juan, UT	2.5
Apache	8.0
Navajo	15.6
Montezuma	17.2
McKinley	19.2
San Juan, NM	28.1
La Plata	38.5

16.4

National = 96.6
Arizona = 67.5
Colorado = 56.0
New Mexico = 19.7
Utah = 39.9

Projected Population Density



Projected Median Age

Median age expresses the age of a "typical" county resident for whom half the population is older and half is younger. Just as age is an important influence on individual behavior, the median age of a county's population can influence its character in many ways. For example, a relatively young county population might place a higher priority on schools, while a relatively old county population might place a higher priority on health care. Within the Canyon de Chelly NM region, projections for median age in the year 2020 range from 28.9 (San Juan, UT) to 45.1 (Dolores).

projected median age of total population (2020)

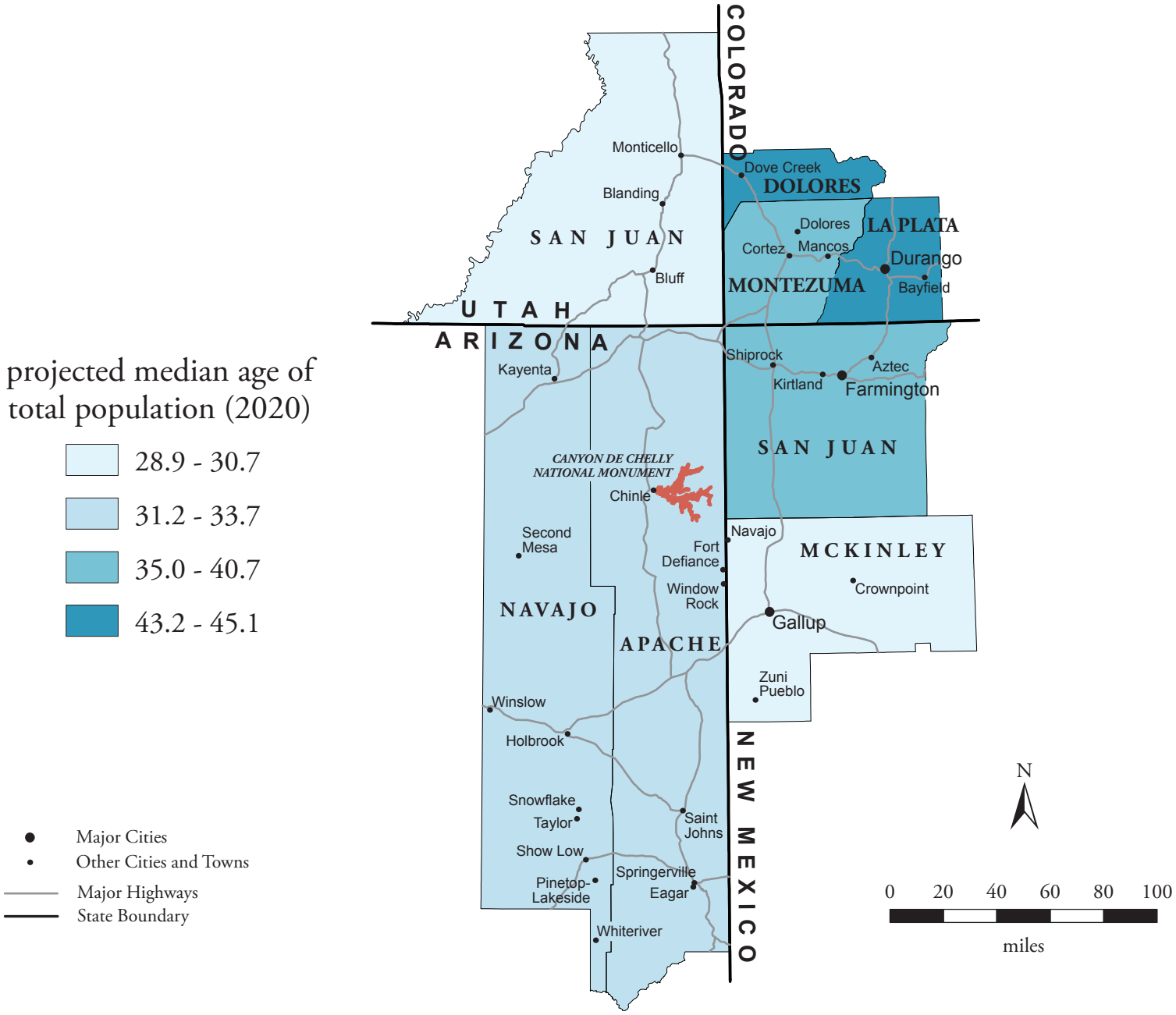
San Juan, UT	28.9
McKinley	30.7
Apache	31.2
Navajo	33.7
San Juan, NM	35.0
Montezuma	40.7
La Plata	43.2
Dolores	45.1

34.4

National = 37.1
Arizona = 35.7
Colorado = 36.4
New Mexico = 36.4
Utah = 30.5

Number Line
showing distribution of data

Projected Median Age



Dependency Ratio

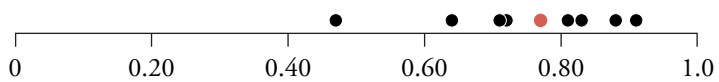
The dependency ratio generally compares the non-working age population (youths and elderly) to the working age population. A dependency ratio of 0.6, for example, means that there are 6 dependents for every 10 working-age people. A high dependency ratio may indicate the need for social infrastructure ranging from schools and teachers to health care facilities. At the same time, a high dependency ratio may point to an age structure that constrains a tax base needed to support such infrastructure. Interestingly, counties with a high dependency ratio may have populations on both ends of the age spectrum with significant time and flexibility to visit a park during off-peak periods, such as during the week and after school. Within the Canyon de Chelly NM region, the dependency ratio (2000) ranges from 0.47 (La Plata) to 0.91 (San Juan, UT).

ratio of population <18 or >64 to 18 - 64 years old (2000)

La Plata	0.47
Dolores	0.64
Montezuma	0.71
San Juan, NM	0.72
McKinley	0.81
Navajo	0.83
Apache	0.88
San Juan, UT	0.91

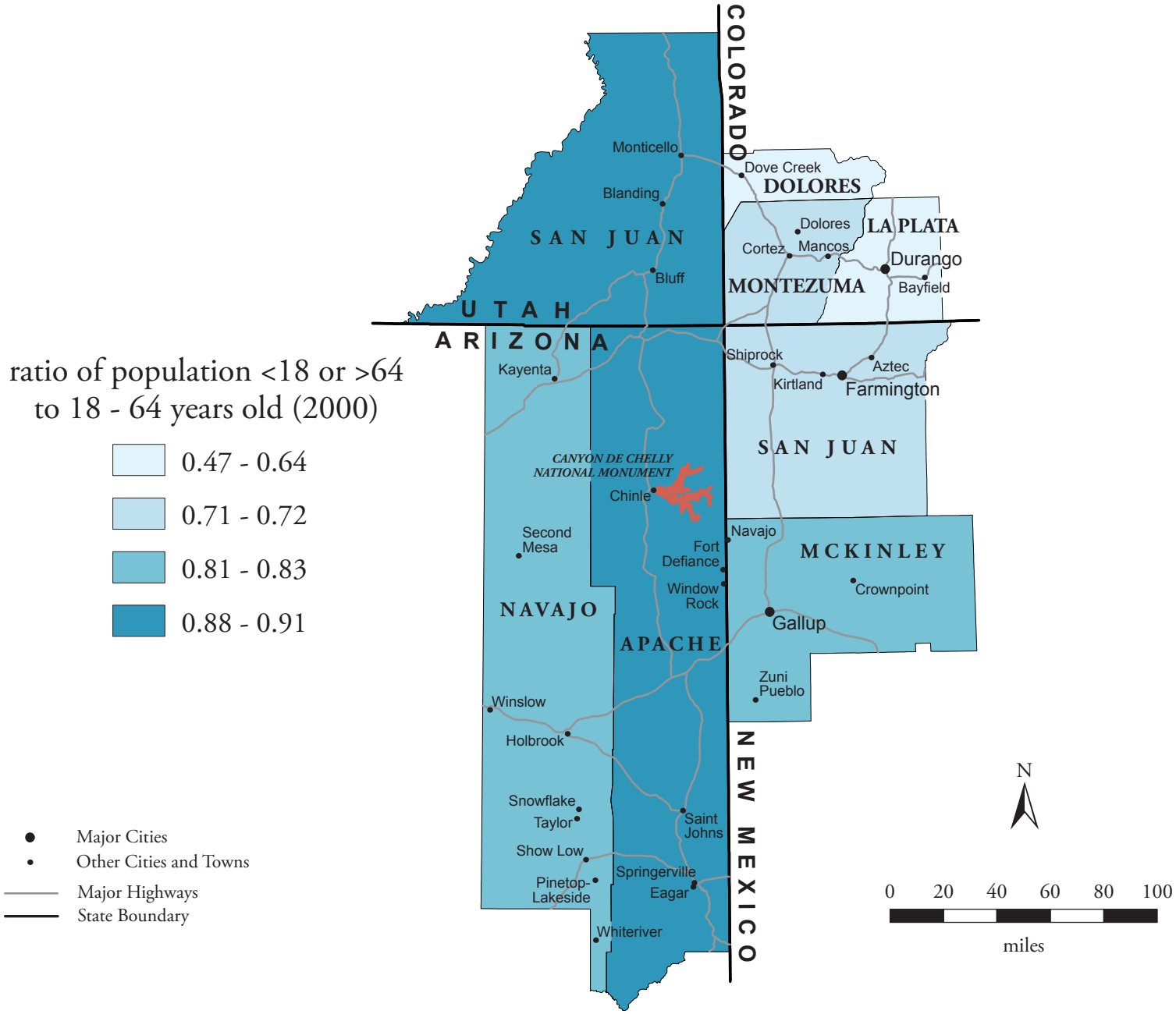
0.77

National = 0.62
Arizona = 0.66
Colorado = 0.54
New Mexico = 0.66
Utah = 0.69



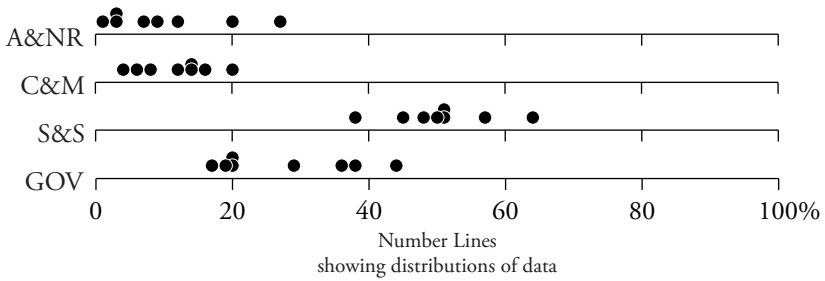
Number Line
showing distribution of data

Dependency Ratio



Earnings by Industry

Earnings by industry are indicative of the overall size of a local economy as well as the relative importance of each major industrial sector within that economy. The diversity of economic activities in the region presents an array of challenges to park management. For example, relatively mobile industries such as light manufacturing or financial services may be concerned with land costs and tax rates, whereas natural resource dependent industries such as farming or mining may be concerned with land use regulations and other environmental policies. Within the Canyon de Chelly NM region (1999), the leading sector of earnings in all 8 counties is sales and services. The second-ranking sector is most frequently government.[6]



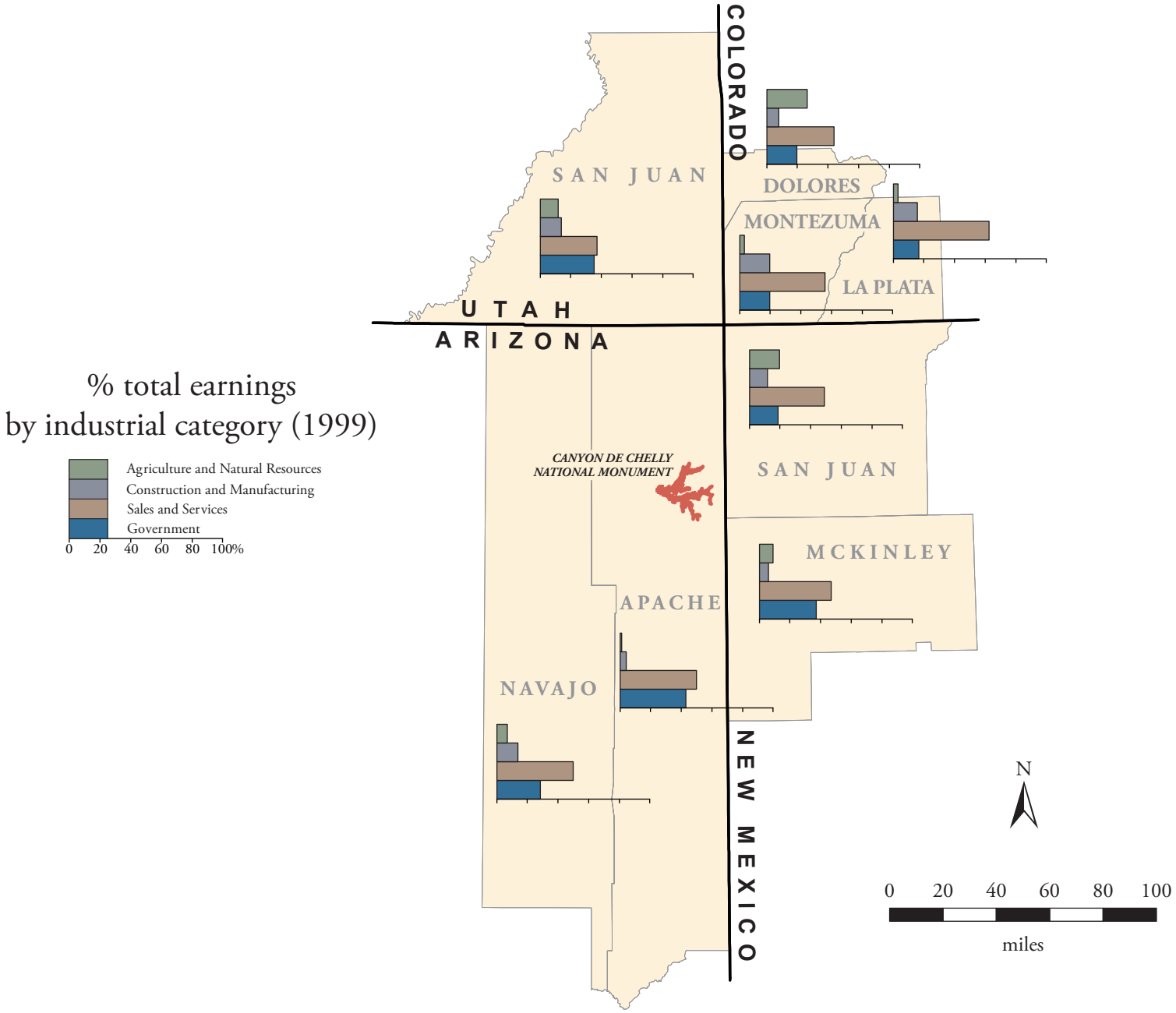
A&NR = Agriculture and Natural Resources
C&M = Construction and Manufacturing
S&S = Sales and Services
GOV = Government

Percentages may not add to one hundred due to rounding.

% total earnings
by industrial category (1999)

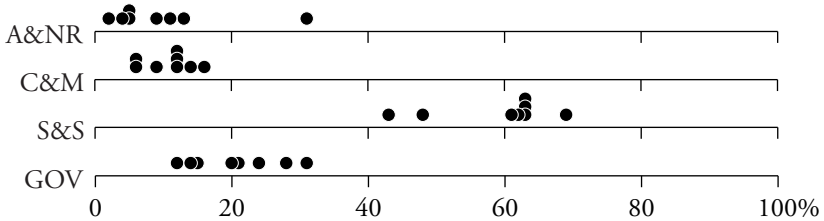
	A&NR	C&M	S&S	GOV
Apache	1	4	51	44
Dolores	27	8	45	20
La Plata	3	16	64	17
McKinley	9	6	48	38
Montezuma	3	20	57	20
Navajo	7	14	51	29
San Juan, UT	12	14	38	36
San Juan, NM	20	12	50	19
National	2	22	60	16
Arizona	3	20	61	16
Colorado	3	18	64	15
New Mexico	6	13	54	27
Utah	2	21	59	18

Earnings by Industry



Employment by Industry

One indicator of the way a particular county's job market is structured is the percentage of workers employed in each of the four major industrial sectors. This employment distribution is indicative of the kinds of skills, knowledge, and concerns that are most prevalent among workers. Occupational patterns can influence people's priorities and actions with regard to parks and resource protection. For example, construction workers might welcome the prospect of rapid growth, whereas government workers such as teachers and police might worry that rapid growth would stress existing government resources. Within the Canyon de Chelly NM region (1999), the leading sector of employment in all 8 counties is sales and services. The second-ranking sector is most frequently government.[7]



Number Lines
showing distributions of data

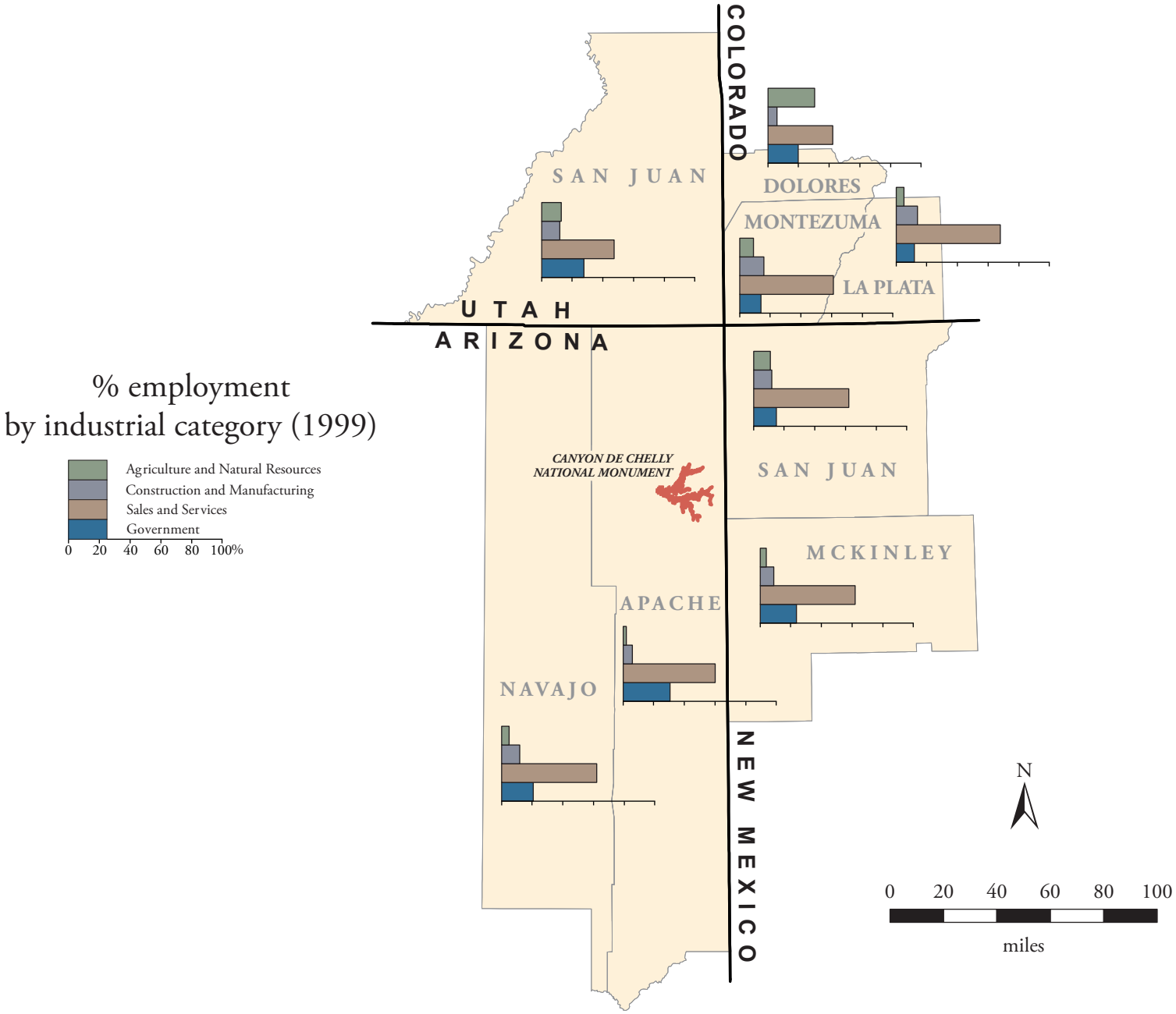
A&NR = Agriculture and Natural Resources
C&M = Construction and Manufacturing
S&S = Sales and Services
GOV = Government

Percentages may not add to one hundred due to rounding.

% employment
by industrial category (1999)

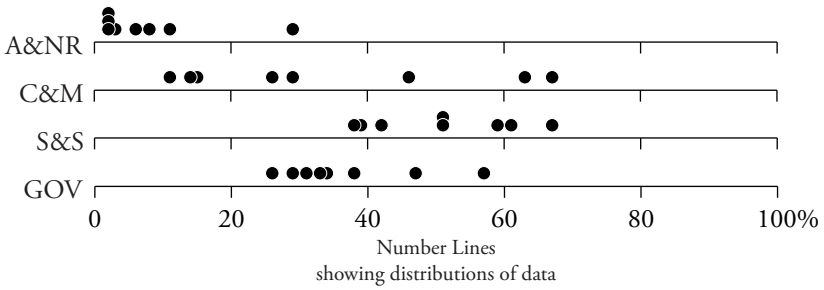
	A&NR	C&M	S&S	GOV
Apache	2	6	61	31
Dolores	31	6	43	20
La Plata	5	14	69	12
McKinley	4	9	63	24
Montezuma	9	16	62	14
Navajo	5	12	63	21
San Juan, UT	13	12	48	28
San Juan, NM	11	12	63	15
National	4	17	65	14
Arizona	3	15	69	13
Colorado	4	15	68	13
New Mexico	5	11	63	20
Utah	3	17	65	14

Employment by Industry



Projected Change in Employment by Industry

Jobs in the four industrial sectors are in a constant state of flux. A projected decline or increase in a certain industrial sector may show which skills could be in demand at a future date. This could lead to a change in migration patterns in the counties around the park as new people arrive to take advantage of the new employment opportunities. Within the Canyon de Chelly NM region (2000 - 2020), 6 counties show the greatest projected increase in employment in sales and services.[8]

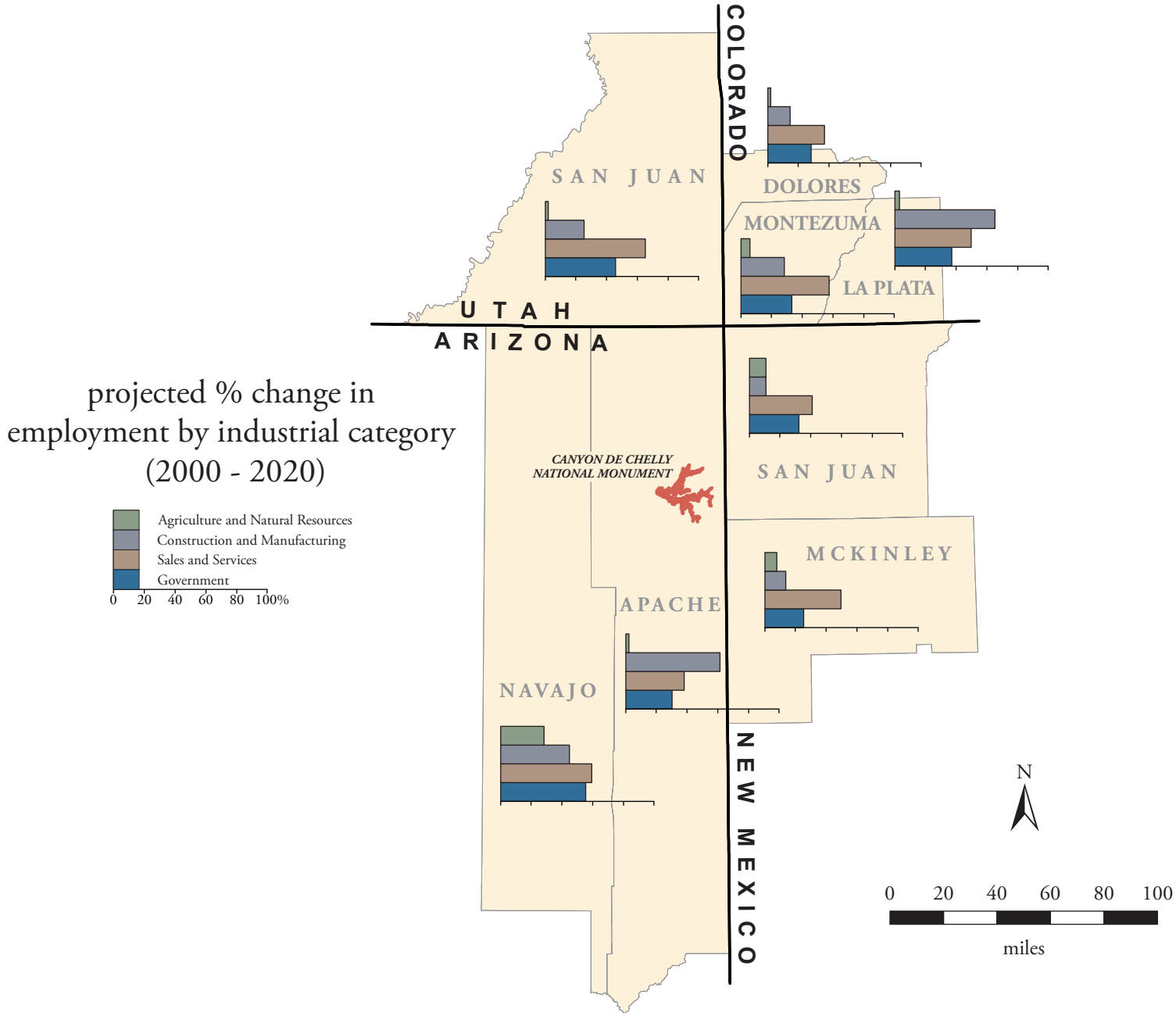


projected % change in employment by industrial category (2000 - 2020)

	A&NR	C&M	S&S	GOV
Apache	2	63	39	31
Dolores	2	15	38	29
La Plata	3	67	51	38
McKinley	8	14	51	26
Montezuma	6	29	59	34
Navajo	29	46	61	57
San Juan, UT	2	26	67	47
San Juan, NM	11	11	42	33
National	8	10	33	23
Arizona	22	26	62	43
Colorado	16	33	42	27
New Mexico	12	24	40	28
Utah	11	36	59	32

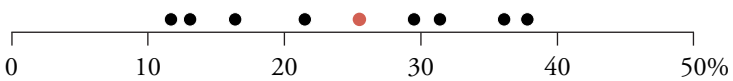
A&NR = Agriculture and Natural Resources
C&M = Construction and Manufacturing
S&S = Sales and Services
GOV = Government

Projected Change in Employment by Industry



Poverty

Poverty is officially defined as the condition of living in a household with income below the federally-determined poverty threshold ($17,029 in 1999 for a family of four people). The extent of poverty can be measured as the percentage of the total population living below that threshold. Those living in poverty can face such difficulties as finding adequate housing and health care, getting enough food, and reaching job sites and government services, including parks. The level of poverty in the park region necessarily becomes significant to park management decisions and priorities. Within the Canyon de Chelly NM region, the incidence of poverty (1999) ranges from 11.7% (La Plata) to 37.8% (Apache).[9]



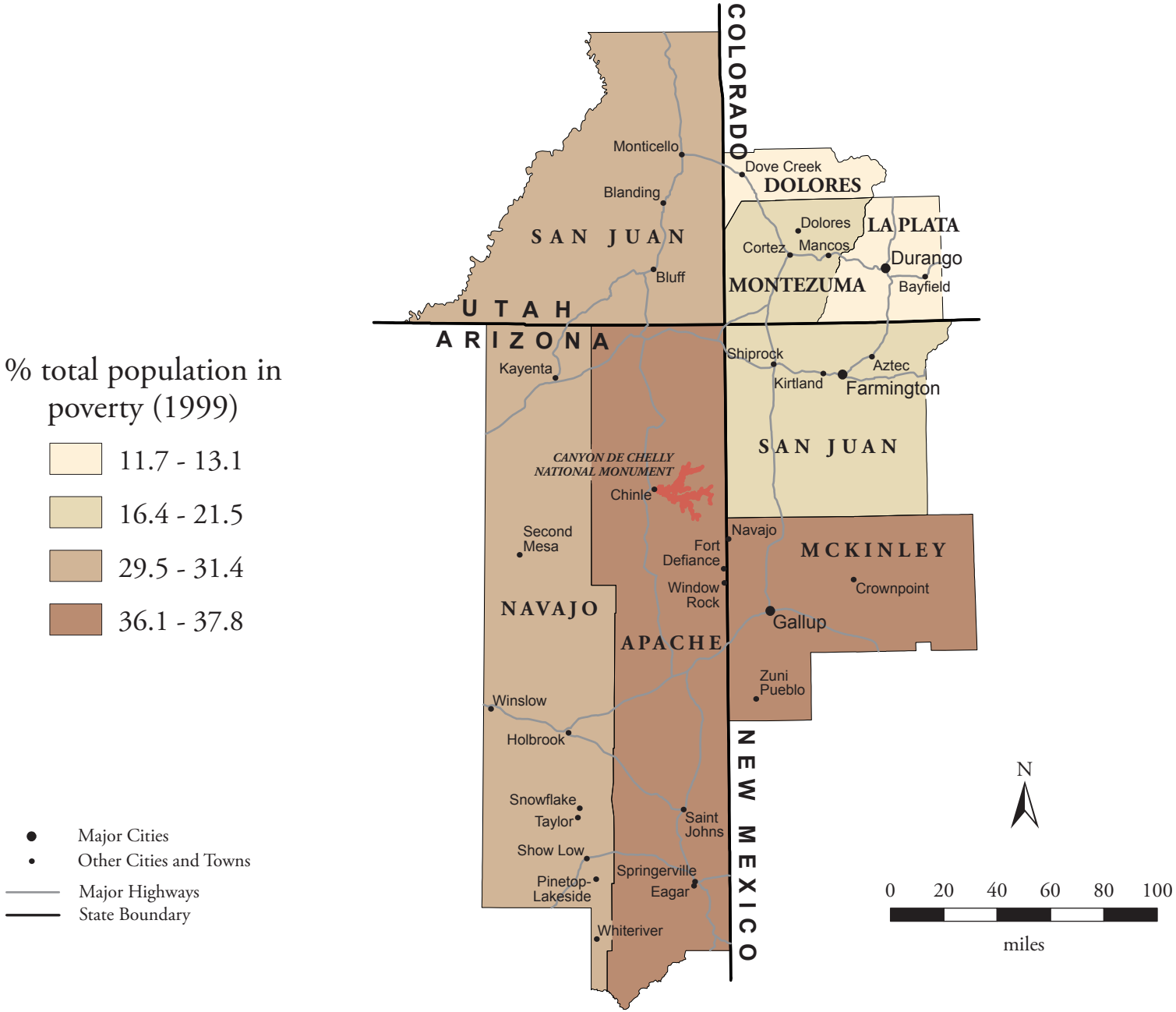
Number Line
showing distribution of data

% total population in poverty (1999)	
La Plata	11.7
Dolores	13.1
Montezuma	16.4
San Juan, NM	21.5
Navajo	29.5
San Juan, UT	31.4
McKinley	36.1
Apache	37.8

25.5

National = 12.4
Arizona = 13.9
Colorado = 9.3
New Mexico = 18.4
Utah = 9.4

Poverty


% total population in poverty (1999)
11.7 - 13.1
16.4 - 21.5
29.5 - 31.4
36.1 - 37.8
Major Cities
Other Cities and Towns
Major Highways
State Boundary
COLORADO
UTAH
ARIZONA
NEW MEXICO
SAN JUAN
DOLORES
LA PLATA
MONTEZUMA
SAN JUAN
MCKINLEY
NAVAJO
APACHE
CANYON DE CHELLY NATIONAL MONUMENT
Monticello
Blanding
Bluff
Dove Creek
Dolores
Cortez
Mancos
Durango
Bayfield
Shiprock
Aztec
Kirtland
Farmington
Kayenta
Chinle
Second Mesa
Navajo
Fort Defiance
Window Rock
Crownpoint
Gallup
Zuni Pueblo
Winslow
Holbrook
Snowflake
Taylor
Saint Johns
Show Low
Springerville
Pinetop-Lakeside
Eagar
Whiteriver
N
0 20 40 60 80 100
miles

Unemployment

The unemployment rate is one measure of participation in the civilian labor force. Jobs are of critical importance to individuals, families, and communities. Low unemployment rates indicate that the supply of jobs is sufficient to meet demand. Higher employment rates suggest that local economies may be too weak to support demand, or that the skills required for available jobs do not match those of the labor force, and local economies may be undergoing some transformation. A situation of high unemployment may generate stress within households and communities. Local and regional political decisions, including those that impact park management goals, often place priority on protecting existing jobs or attracting new employment opportunities. Within the Canyon de Chelly NM region, unemployment (1999) ranges from 5.7% (La Plata) to 21.8% (Apache).[10]

Number Line
showing distribution of data

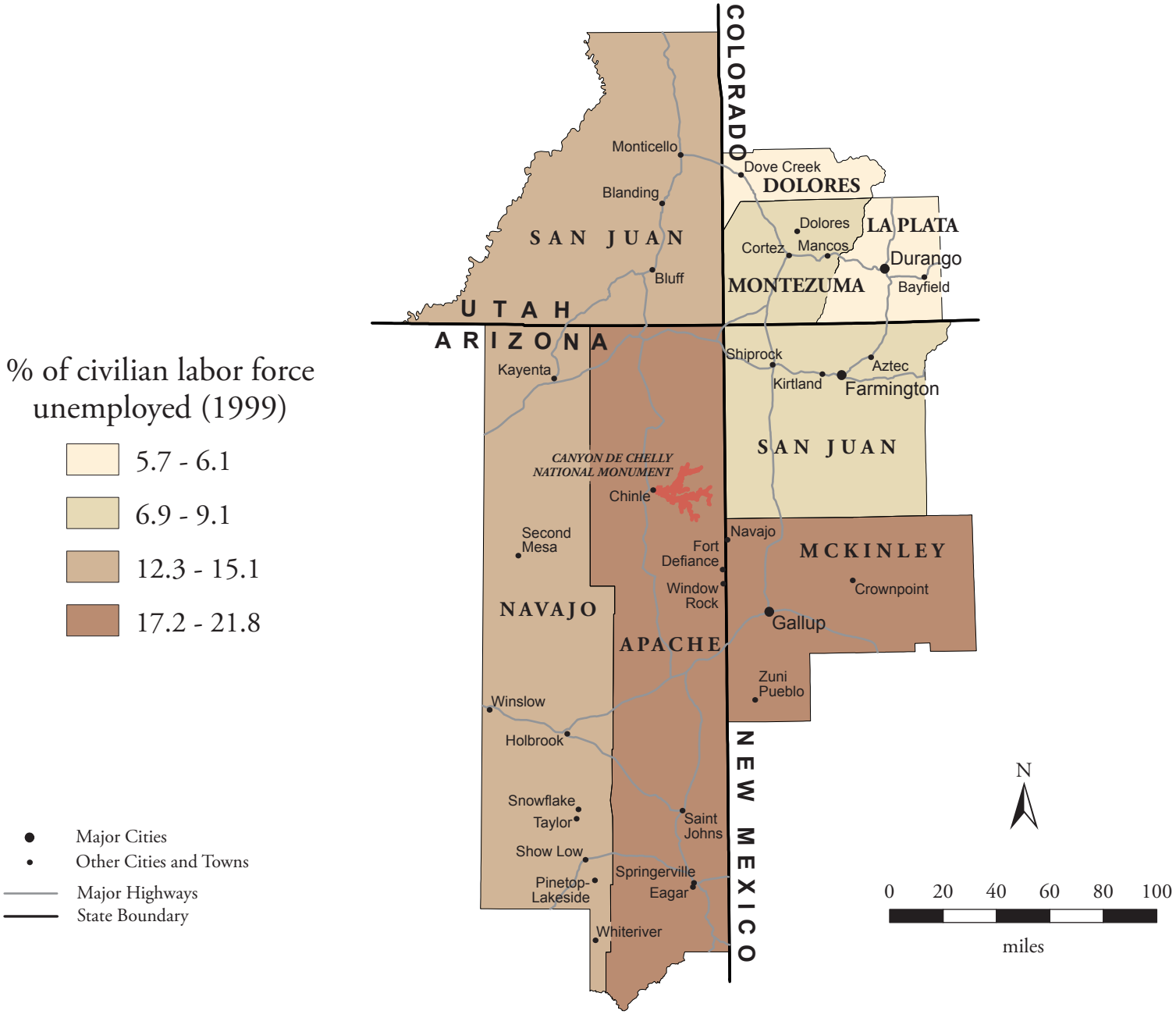
% of civilian labor force unemployed (1999)

La Plata	5.7
Dolores	6.1
Montezuma	6.9
San Juan, NM	9.1
Navajo	12.3
San Juan, UT	15.1
McKinley	17.2
Apache	21.8

10.7

National = 5.8
Arizona = 5.6
Colorado = 4.3
New Mexico = 7.3
Utah = 5.0

Unemployment



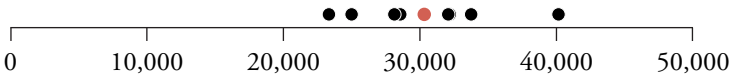
Median Household Income

Median household income is indicative of the general level of income among households in a county. The median value is the central value in a ranked dataset, with an equal number of observations both above and below the median. General income measures can provide insights into the opportunities and time available for recreation in the park region. Within the Canyon de Chelly NM region, median household income (1999) ranges from $23,344 (Apache) to $40,159 (La Plata).

median household income ($) (1999)	
Apache	23,344
McKinley	25,005
San Juan, UT	28,137
Navajo	28,569
Montezuma	32,083
Dolores	32,196
San Juan, NM	33,762
La Plata	40,159

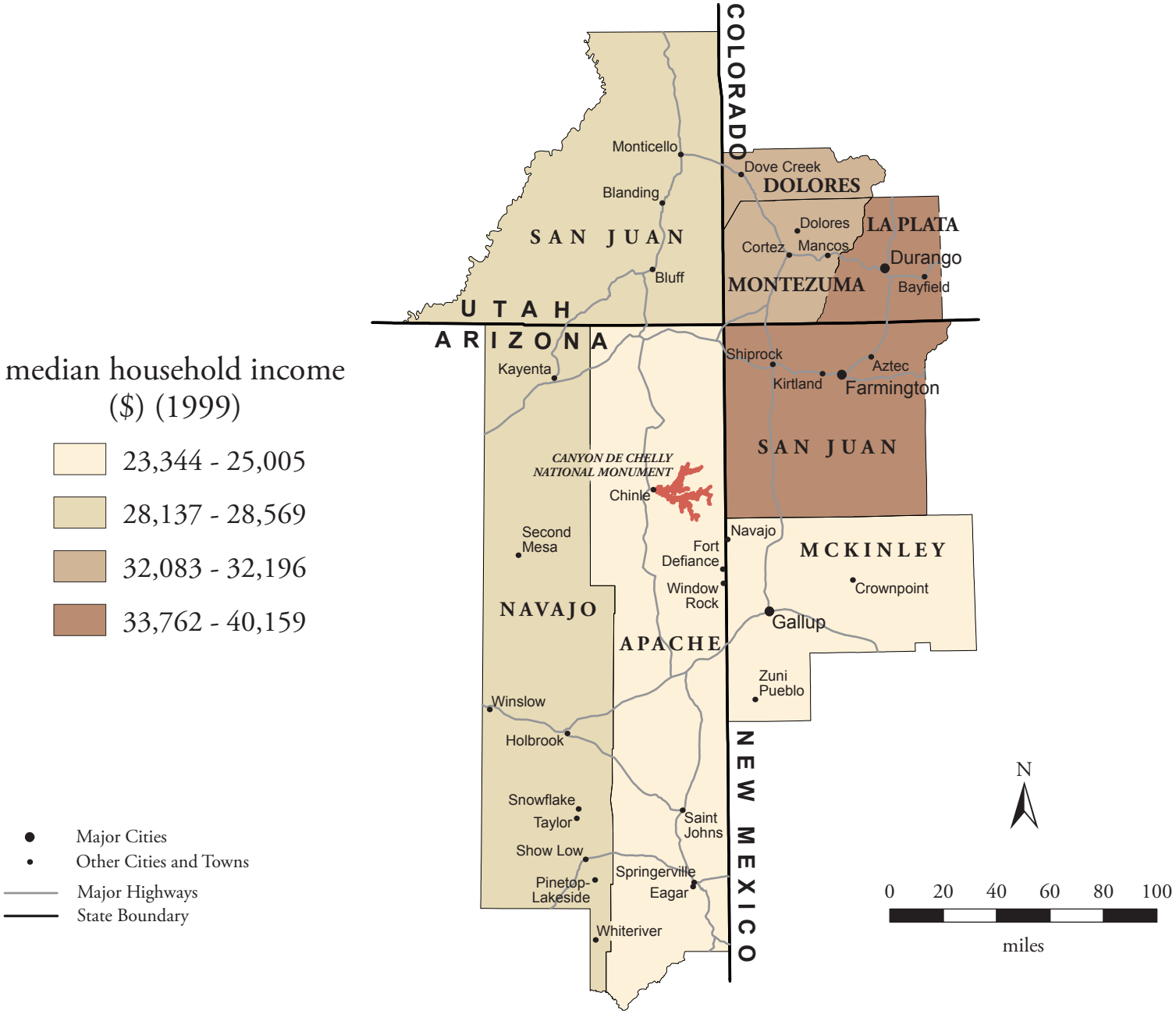
30,326

National = 41,994
Arizona = 40,558
Colorado = 47,203
New Mexico = 34,133
Utah = 45,726



Number Line
showing distribution of data

Median Household Income



Racial Diversity

Racial diversity is measured as the percentage of the population belonging to minority groups. In the current U.S. context, "minority" races are defined as non-White (Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, and Two or More Races). Interactions among people are often influenced by racial identity. Hence, it makes sense for institutions ranging from retailers to police to parks to consider regional racial diversity when recruiting and training staff, when designing public information and educational materials, and when soliciting public involvement in decision-making. Within the Canyon de Chelly NM region, the percentage of racial minorities (2000) ranges from 4.7% (Dolores) to 83.6% (McKinley).[11]

Number Line
showing distribution of data

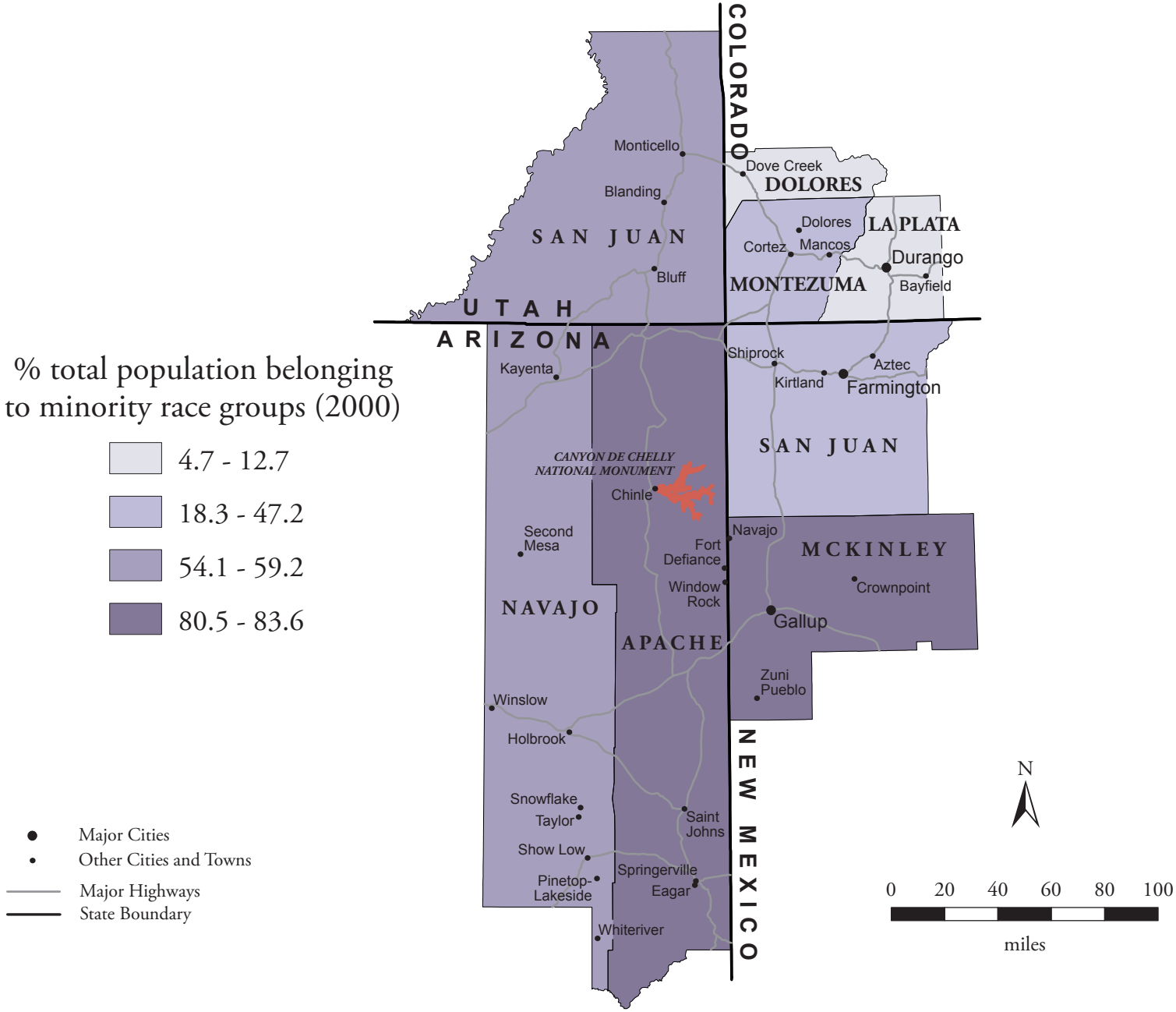
% total population belonging to minority race groups (2000)

Dolores	4.7
La Plata	12.7
Montezuma	18.3
San Juan, NM	47.2
Navajo	54.1
San Juan, UT	59.2
Apache	80.5
McKinley	83.6

50.7

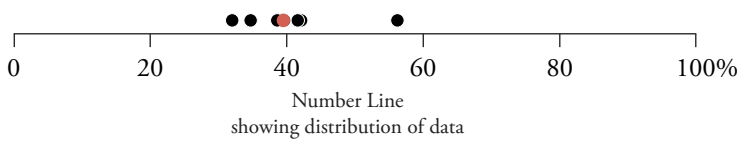
National = 24.9
Arizona = 24.5
Colorado = 17.2
New Mexico = 33.2
Utah = 10.8

Racial Diversity



Educational Attainment

Educational attainment indicators measure the average amount of formal education that a county's residents have received. One indicator of educational attainment is the percentage of adults who have attended or graduated from college. Educational attainment influences many aspects of life, such as how much money people earn, what they do for recreation, where they get their information, and how they participate in civic life. With regard to park management, the educational attainment of the general public is an important consideration in activities, such as marketing, public participation processes, and the design of interpretive programs. Within the Canyon de Chelly NM region, the percentage of adults with some college education (2000) ranges from 32.0% (McKinley) to 56.2% (La Plata).[12]



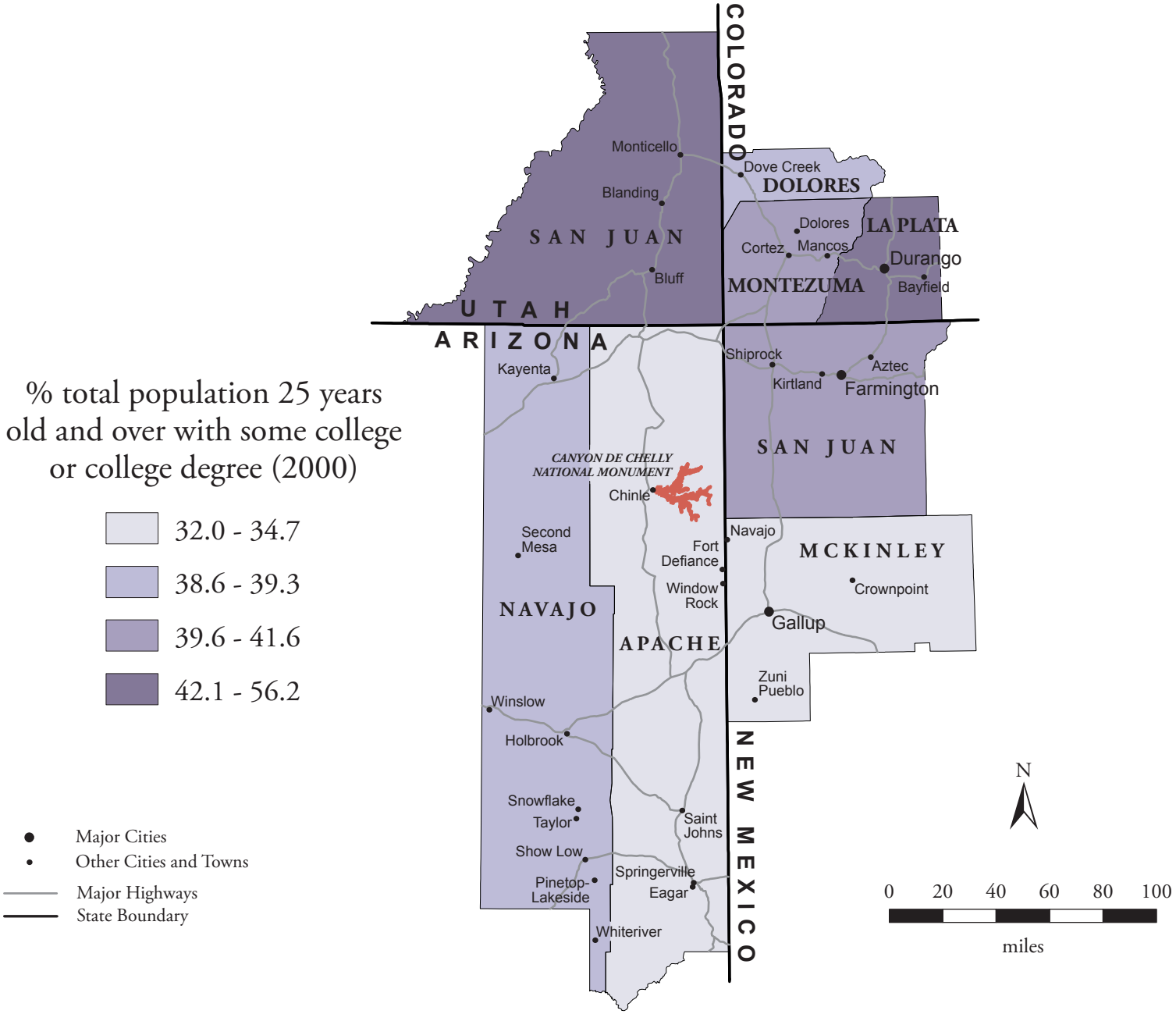
% total population 25 years old and over with some college or college degree (2000)

McKinley	32.0
Apache	34.7
Navajo	38.6
Dolores	39.3
Montezuma	39.6
San Juan, NM	41.6
San Juan, UT	42.1
La Plata	56.2

39.5

National = 42.9
Arizona = 48.3
Colorado = 52.6
New Mexico = 42.4
Utah = 54.9

Educational Attainment



Family Size

Family size is a measure of the average number of people in a family. A family is a group of two or more people who reside together and who are related by birth, marriage, or adoption. Families with a large number of people may include children and relatives of any age. With regard to park management, family size may affect patterns of use within the park and demands on services. It can also be an important consideration in such activities as marketing and the design of interpretive programs. Within the Canyon de Chelly NM region, the average number of persons per family (2000) ranges from 2.8 (Dolores) to 4.0 in 3 counties.

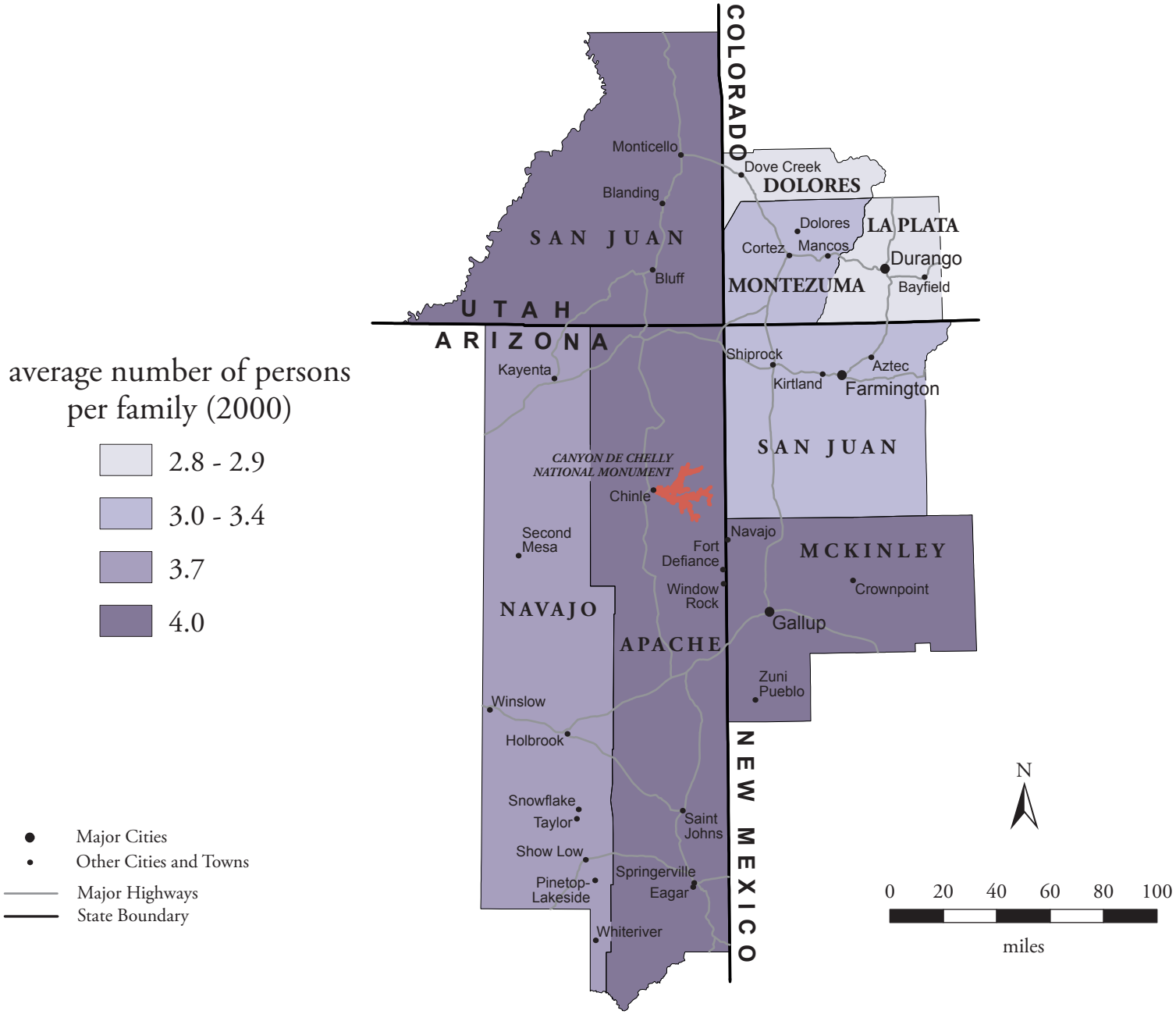
average number of persons per family (2000)	
Dolores	2.8
La Plata	2.9
Montezuma	3.0
San Juan, NM	3.4
Navajo	3.7
San Juan, UT	4.0
Apache	4.0
McKinley	4.0

3.6

National = 3.1
Arizona = 3.2
Colorado = 3.1
New Mexico = 3.2
Utah = 3.6

Number Line
showing distribution of data

Family Size


average number of persons per family (2000)
2.8 - 2.9
3.0 - 3.4
3.7
4.0
Major Cities
Other Cities and Towns
Major Highways
State Boundary
COLORADO
UTAH
ARIZONA
NEW MEXICO
SAN JUAN
DOLORES
LA PLATA
MONTEZUMA
SAN JUAN
MCKINLEY
NAVAJO
APACHE
Monticello
Blanding
Bluff
Dove Creek
Dolores
Cortez
Mancos
Durango
Bayfield
Shiprock
Aztec
Kirtland
Farmington
Kayenta
CANYON DE CHELLY NATIONAL MONUMENT
Chinle
Second Mesa
Navajo
Fort Defiance
Window Rock
Crownpoint
Gallup
Zuni Pueblo
Winslow
Holbrook
Snowflake
Taylor
Saint Johns
Show Low
Springerville
Pinetop-Lakeside
Eagar
Whiteriver
N
0 20 40 60 80 100
miles

Crime

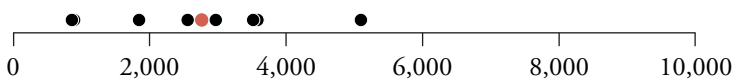
Crime indicators measure the frequency of various types of lawbreaking. One commonly used crime indicator is the number of serious crimes reported per 100,000 people. Serious crimes refer to murder and non-negligent manslaughter, forcible rape, robbery, aggravated assault, burglary, larceny-theft, arson, and motor vehicle theft. A high crime rate has many impacts on the general population, such as higher insurance rates and a reduced sense of security. Crime also affects government by increasing the demand for police, court services, and prisons. Crime presents direct challenges to park management, as the protection of visitors, park property, and resources becomes a greater priority. Within the Canyon de Chelly NM region, the number of serious crimes reported per 100,000 people (2000) ranges from 860 (San Juan, UT) to 5,094 (McKinley).

number of serious crimes per 100,000 people (2000)

San Juan, UT	860
Apache	893
Dolores	1,844
Montezuma	2,556
Navajo	2,968
San Juan, NM	3,515
La Plata	3,578
McKinley	5,094

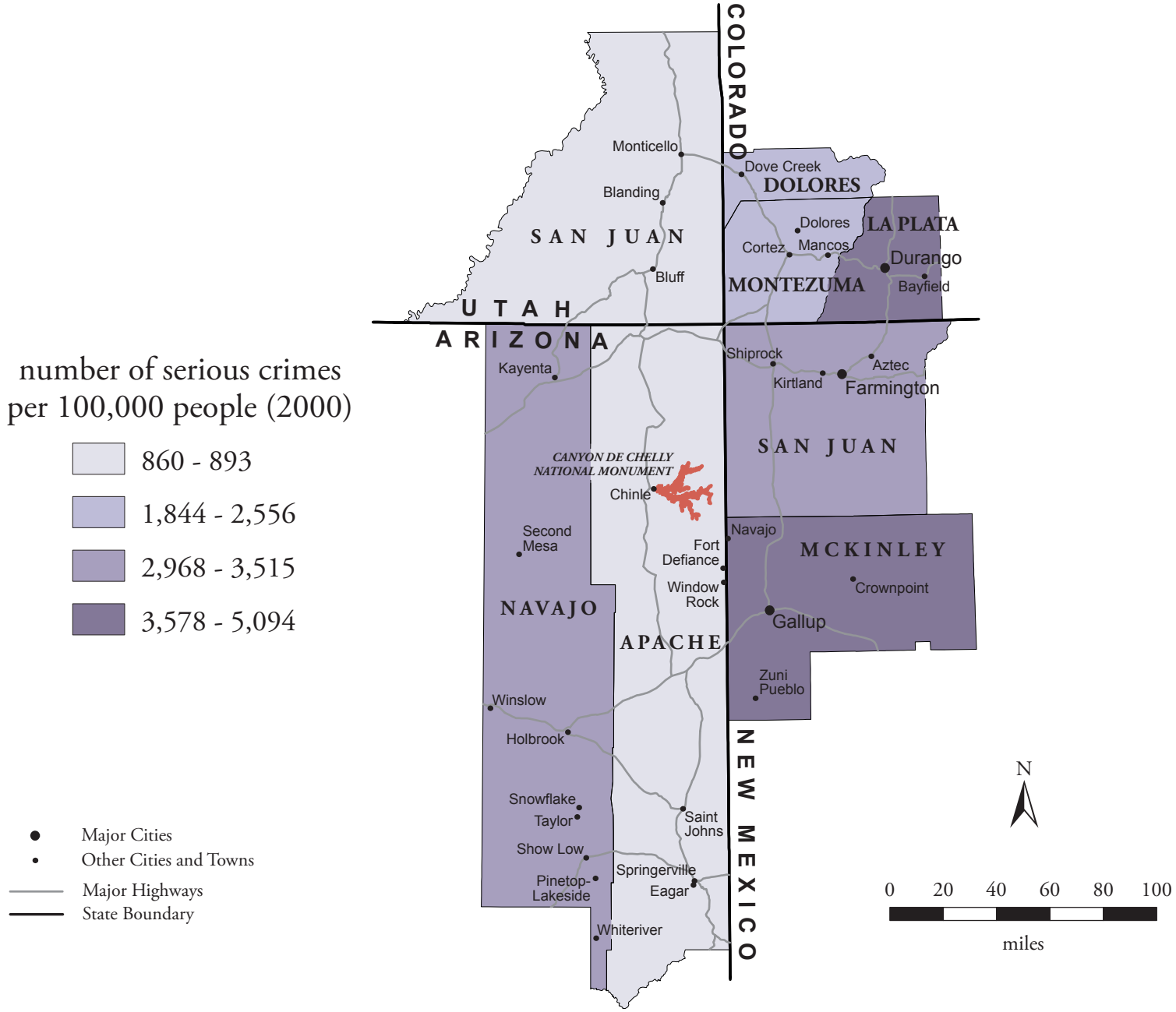
2,762

National = N/A
Arizona = 5,854
Colorado = 3,795
New Mexico = 5,172
Utah = 4,501



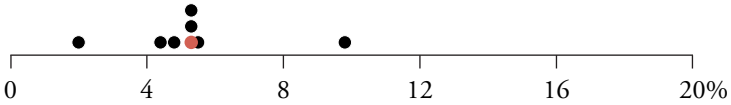
Number Line
showing distribution of data

Crime


number of serious crimes per 100,000 people (2000)
860 - 893
1,844 - 2,556
2,968 - 3,515
3,578 - 5,094
Major Cities
Other Cities and Towns
Major Highways
State Boundary
COLORADO
UTAH
ARIZONA
NEW MEXICO
SAN JUAN
DOLORES
LA PLATA
MONTEZUMA
SAN JUAN
MCKINLEY
NAVAJO
APACHE
CANYON DE CHELLY NATIONAL MONUMENT
Monticello
Blanding
Bluff
Dove Creek
Dolores
Cortez
Mancos
Durango
Bayfield
Shiprock
Aztec
Kirtland
Farmington
Kayenta
Chinle
Second Mesa
Fort Defiance
Window Rock
Navajo
Crownpoint
Gallup
Zuni Pueblo
Winslow
Holbrook
Snowflake
Taylor
Show Low
Pinetop-Lakeside
Whiteriver
Saint Johns
Springerville
Eagar
N
0 20 40 60 80 100
miles

Recreation/Tourism Establishments

The recreation and tourism industry is measured using two categories: the arts, entertainment and recreation sector (ranging from museums and concerts, to sporting events and amusement parks) and the accommodation subsector of the accommodation and food services sector (ranging from hotels to campsites). The size of these sectors is a broad indicator of a county's economic reliance on recreation and tourism relative to the other sectors of the economy. Recreation and tourism establishments can be proponents of actions that enhance their area's attractiveness as a visitor destination (such as transportation improvements, protection of scenic or cultural landmarks, or marketing campaigns). Recreation and tourism establishments also can be vulnerable to, and thus wary of, actions, policies, or chance events that could affect business, such as visitor use restrictions, fires, or economic downturns. Within the Canyon de Chelly NM region, the percentage of total establishments in arts, entertainment, recreation, and accommodation (2001) ranges from 2.0% (San Juan, NM) to 9.8% (San Juan, UT).[13]



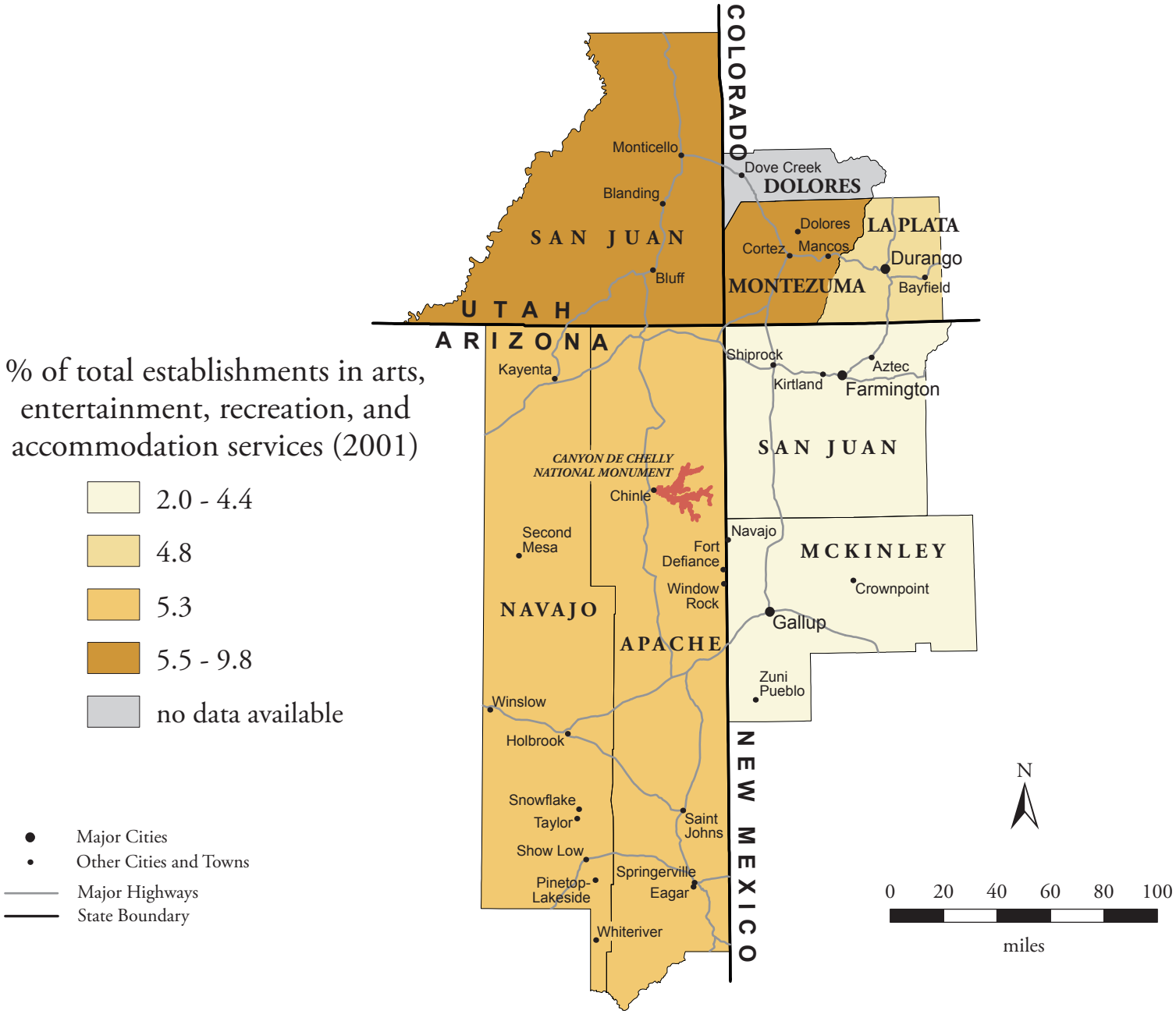
Number Line
showing distribution of data

% of total establishments in arts, entertainment, recreation, and accommodation services (2001)

San Juan, NM	2.0
McKinley	4.4
La Plata	4.8
Apache	**5.3**
Navajo	**5.3**
Montezuma	5.5
San Juan, UT	9.8
Dolores	N/A

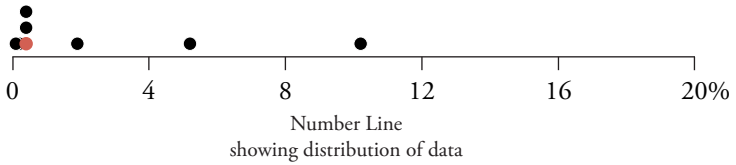
National = 2.3
Arizona = 2.3
Colorado = 2.6
New Mexico = 3.2
Utah = 2.2

Recreation/Tourism Establishments



Recreation/Tourism Revenue

Recreation and tourism revenue is a key indicator of the economic importance of recreation and tourism to a county. Recreation and tourism revenue can be expressed as a percentage of total sales and service receipts. Recreation and tourism establishments can occupy an important position within a county economy because they attract visitor dollars from elsewhere. Secondary economic benefits are realized when these dollars are re-spent within the local economy or deposited in banks, where they provide capital to other businesses. Within the Canyon de Chelly NM region, the percentage of total sales from arts, entertainment, recreation, and accommodation services (1997) ranges from 0.1% (San Juan, UT) to 10.2% (Apache).[14]

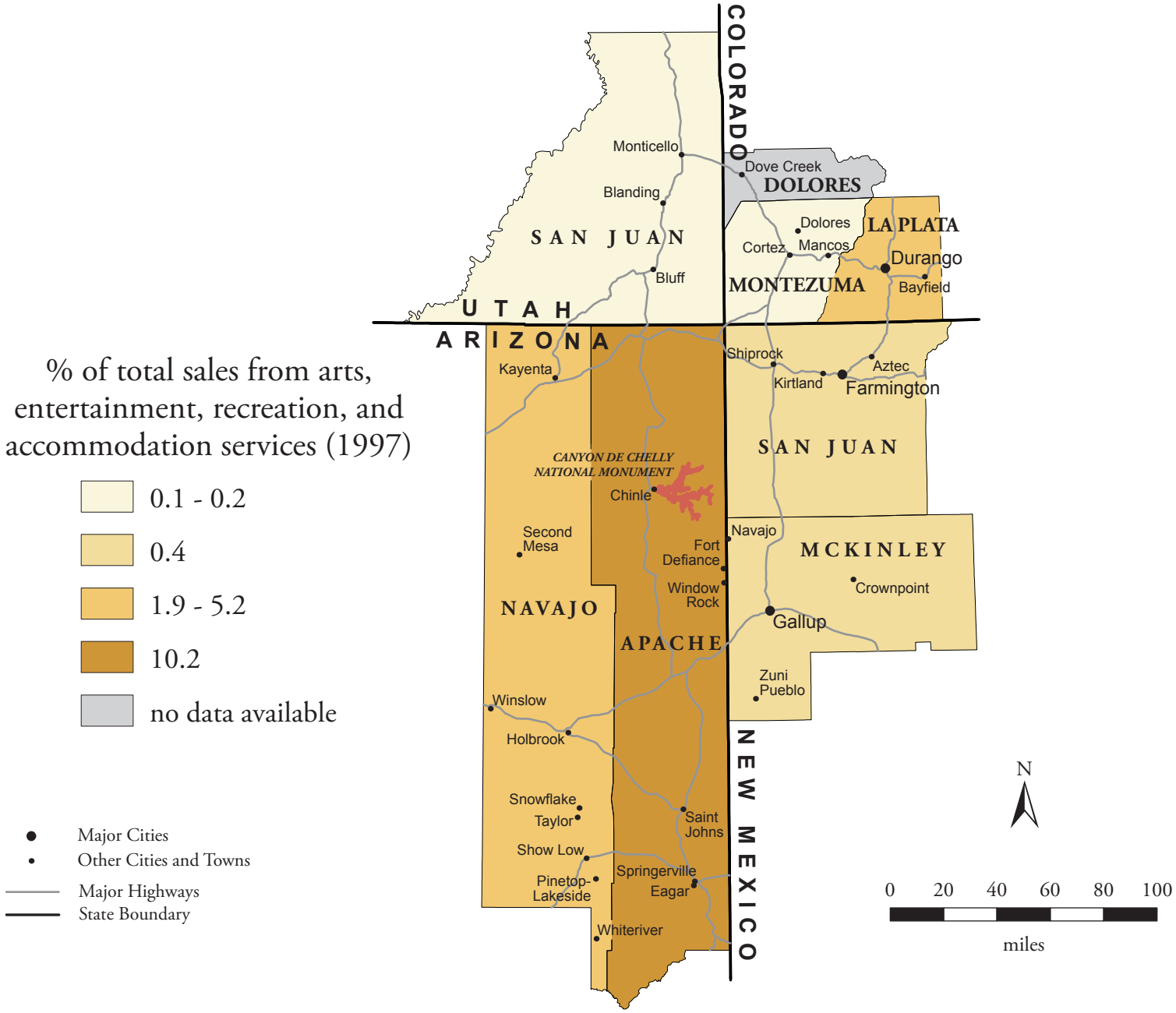


% of total sales from arts, entertainment, recreation, and accommodation services (1997)

San Juan, UT	0.1
Montezuma	0.2
San Juan, NM	**0.4**
McKinley	**0.4**
La Plata	1.9
Navajo	5.2
Apache	10.2
Dolores	N/A

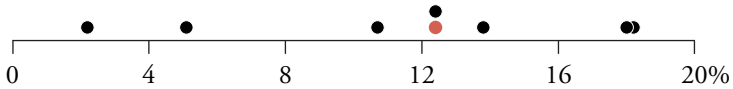
National = 1.1
Arizona = 2.1
Colorado = 1.8
New Mexico = 1.6
Utah = 1.1

Recreation/Tourism Revenue



Recreation/Tourism Employment

The significance of the recreation/tourism industry to a county economy can be indicated by the percentage of county workers that it employs. Workers counted as recreation and tourism employees include country club managers, blackjack dealers, campground employees, fishing guides, motel attendants, and other providers of recreation services. A high level of recreation/tourism employment may mean that residents have more disposable income or that the area attracts visitors or vacationers. Within the Canyon de Chelly NM region, the percentage of total paid employees in arts, entertainment, recreation, and accommodation services (2001) ranges from 2.2% (San Juan, NM) to 18.2% (McKinley).[15]



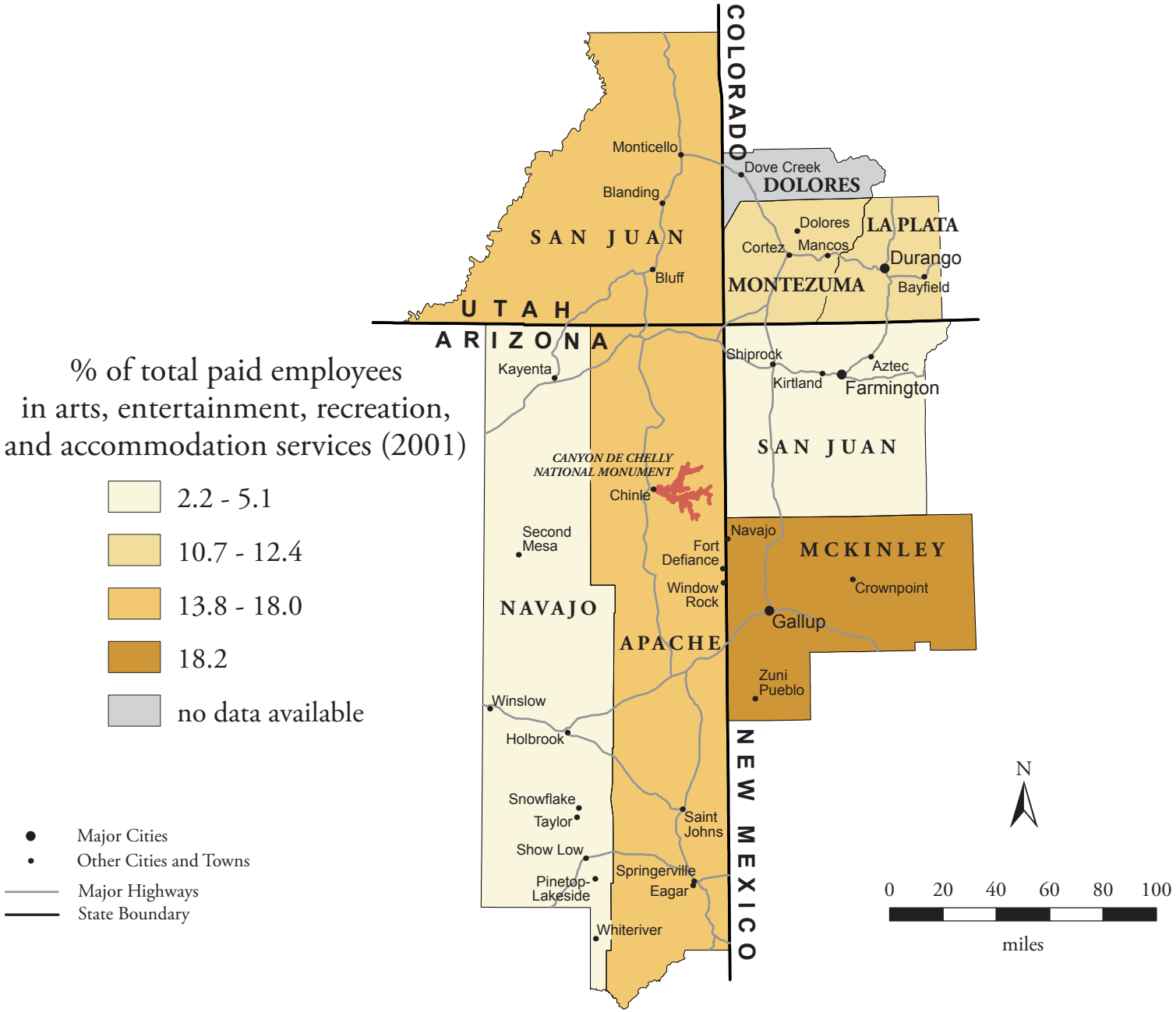
Number Line
showing distribution of data

% of total paid employees in arts, entertainment, recreation, and accommodation services (2001)

San Juan, NM	2.2
Navajo	5.1
Montezuma	10.7
La Plata	**12.4**
San Juan, UT	13.8
Apache	18.0
McKinley	18.2
Dolores	N/A

National = 3.1
Arizona = 4.1
Colorado = 4.1
New Mexico = 4.9
Utah = 3.4

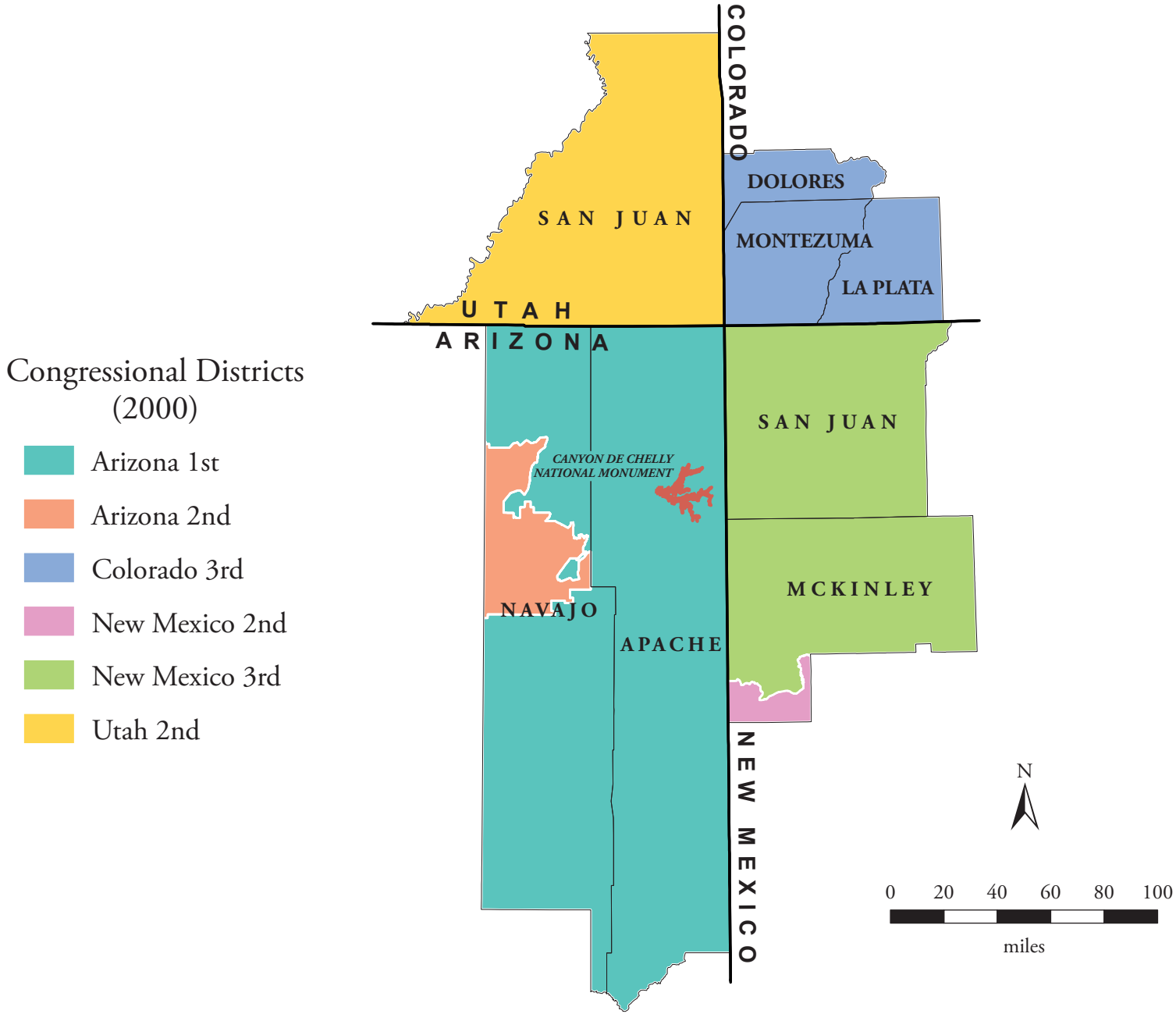
Recreation/Tourism Employment



Congressional Districts

Congressional districts form a key layer in the political structure of a region of interest for a park. These districts, roughly equivalent in population, are defined by state legislatures based on the national census and redrawn every ten years. Members of Congress are key points of access for citizens seeking to influence federal-level policies and programs, including those related to federal lands such as national parks and national forests. The Canyon de Chelly NM region includes parts of 6 Congressional districts. These districts are based on Census 2000.

Congressional Districts



Federal Expenditures

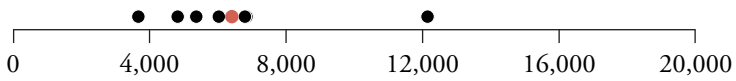
The importance of the federal government to a county economy can be indicated by the amount of federal expenditures per person. These expenditures can be a key source of dollars flowing into the county economy (in contrast, taxes and fees are an outflow of dollars). Federal spending can influence the park region through such wide-ranging initiatives as agricultural subsidies, social programs, military bases, and national parks. Within the Canyon de Chelly NM region, federal expenditures per person (2002) range from $3,672 (La Plata) to $12,144 (Apache).[16]

federal expenditures per capita ($) (2002)

La Plata	3,672
San Juan, NM	4,824
Montezuma	5,369
Dolores	6,029
Navajo	6,794
San Juan, UT	6,839
McKinley	6,849
Apache	12,144

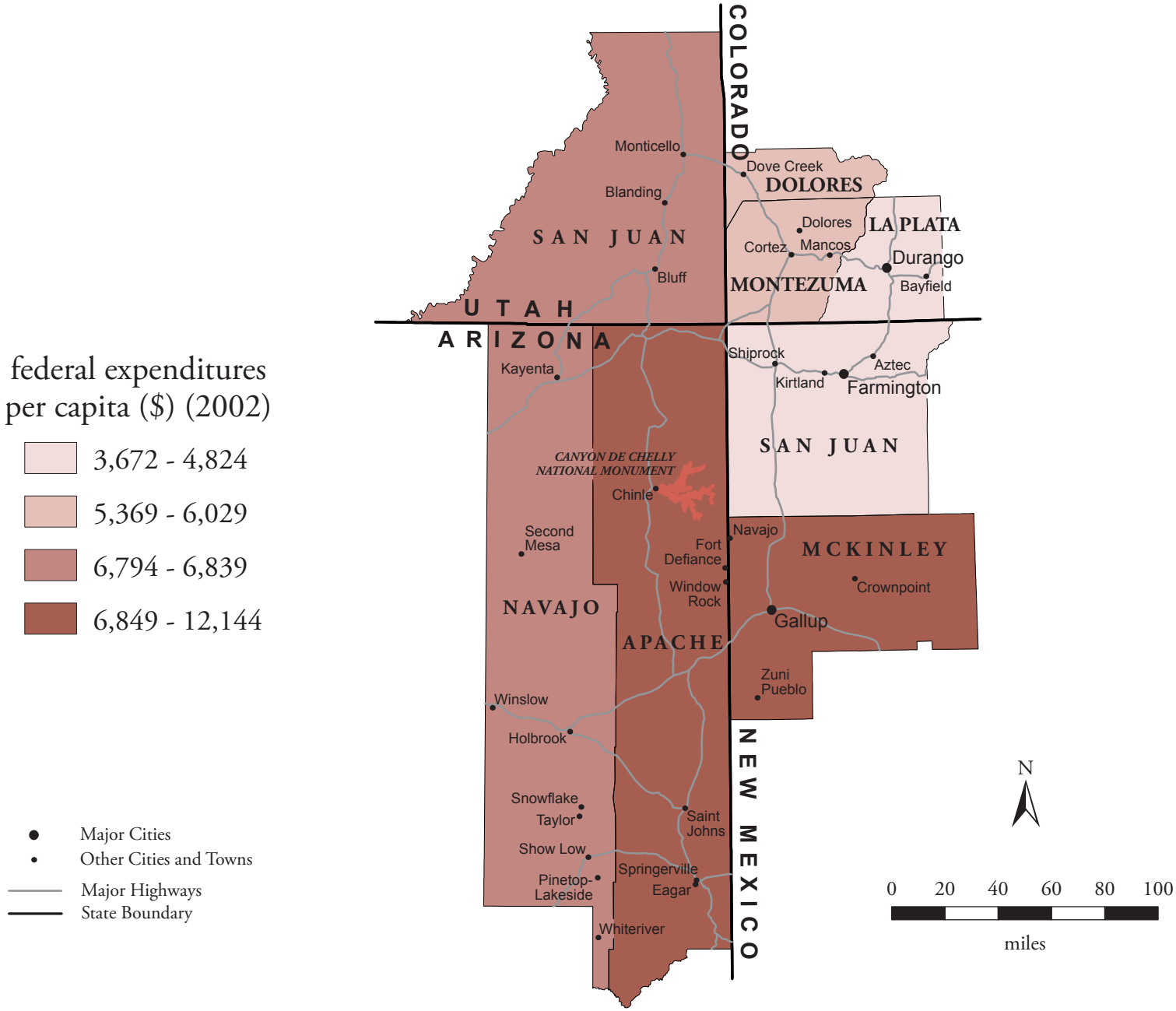
6,412

National = 6,650
Arizona = 6,371
Colorado = 5,820
New Mexico = 9,422
Utah = 5,311



Number Line
showing distribution of data

Federal Expenditures



Ecoregions

Ecoregions are areas in which similar climate, landforms, and soil exist and support similar communities of vegetation and animals. People affect natural systems within an ecoregion through such activities as agriculture, recreation, development, the creation of protected areas, hunting, and the introduction of non-native species. Natural resource protection efforts throughout an ecoregion may share many of the same approaches and techniques, since these efforts often focus on maintaining or restoring similar communities of indigenous animals and plants. Hence, many challenges of resource protection can be addressed effectively at the ecoregion level.

The Canyon de Chelly NM region includes parts of four ecoregion divisions described below. The majority of the region is classified as Tropical/Subtropical Steppe.

Bailey's Ecoregions[17]

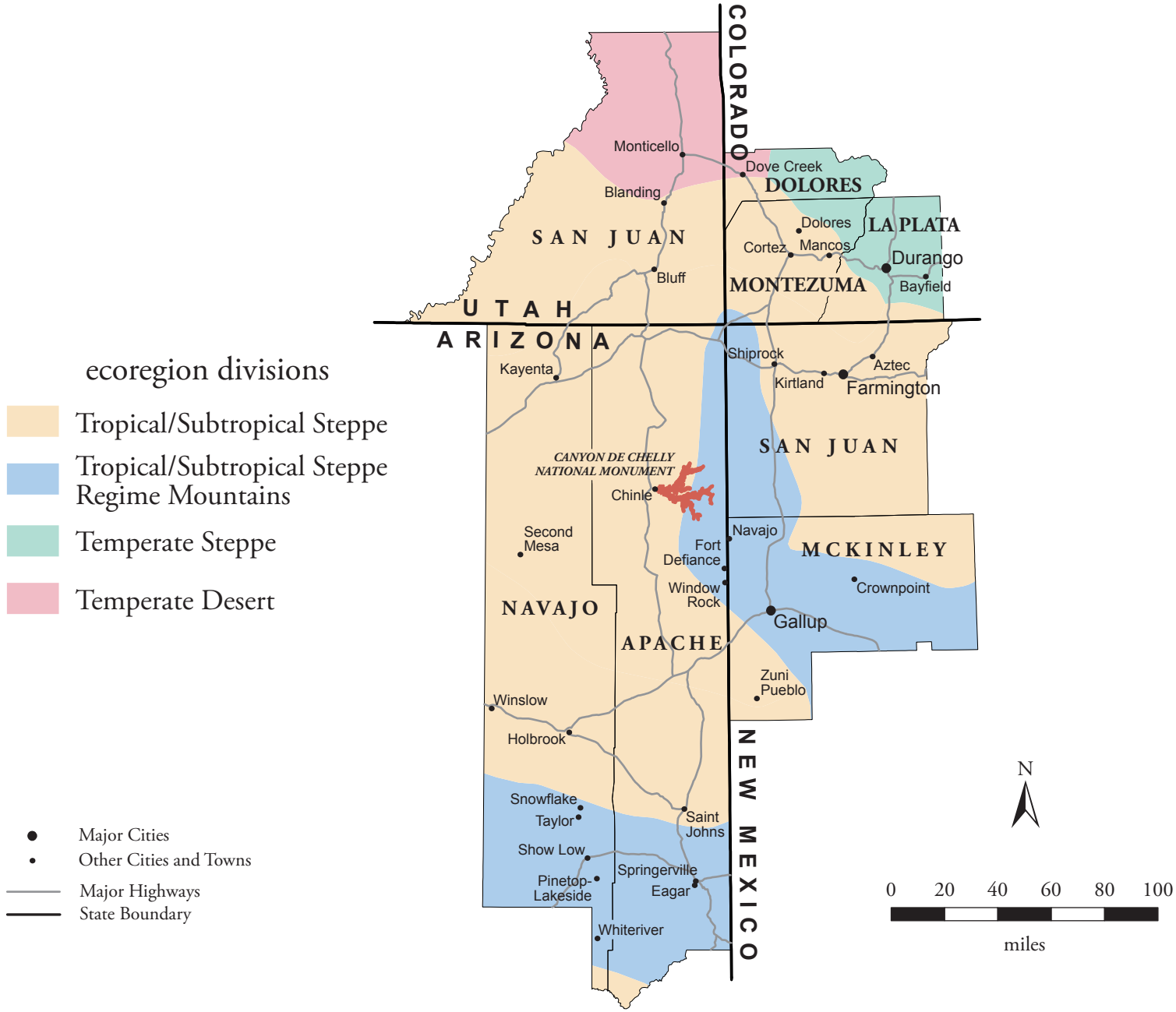
Tropical/Subtropical Steppe – climate is hot and semi-arid, and potential evaporation is greater than precipitation. The presence of plateaus and high plains and associated, localized variation in altitude produces a semi-arid steppe climate. Steppes are grasslands with short grasses, herbs, and locally developed shrub and woodland. Limited grazing can be supported, but crop cultivation requires irrigation.

Tropical/Subtropical Steppe Regime Mountains – climate is affected by variation in elevation with higher temperatures in the foothills and lower temperatures on the upper mountain slopes. Average annual precipitation increases with elevation. Precipitation occurs during the summer, fall, and winter. In the mountains, precipitation falls as snow. Vegetation also varies with altitudinal zone. At lower elevations, vegetation is characterized by mixed grasses, chaparral brush, oak-juniper woodland, and pinyon-juniper woodland. With increasing elevation, open forests of ponderosa pine are found. At even higher elevations, Douglas-fir grows on northfacing slopes and aspen is common. Engelmann spruce and corkbark fir can be found at the highest elevations.

Temperate Steppe – climate is characterized as semi-arid continental, where evaporation is usually greater than precipitation. Summers are warm to hot, and winters are cold. The vegetation is steppe and semi-desert. Typical steppe vegetation includes short grasses that grow in dispersed bunches, shrubs, and low trees. Buffalo grass, sunflower, and locoweed are typical. Semi-desert vegetation includes xerophytic shrubs, such as sagebrush.

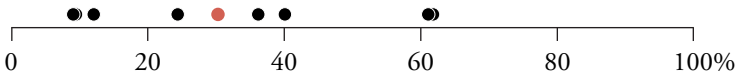
Temperate Desert – climate is characterized by strong temperature differences between summer and winter and low rainfall. Most precipitation occurs in the winter. Unlike deserts at lower latitudes, these deserts have a greater annual temperature range and part of the precipitation is in the form of snow. Xerophytic shrub vegetation is found in these areas.

Ecoregions


ecoregion divisions
Tropical/Subtropical Steppe
Tropical/Subtropical Steppe Regime Mountains
Temperate Steppe
Temperate Desert
Major Cities
Other Cities and Towns
Major Highways
State Boundary
COLORADO
UTAH
ARIZONA
NEW MEXICO
SAN JUAN
DOLORES
LA PLATA
MONTEZUMA
SAN JUAN
MCKINLEY
NAVAJO
APACHE
Monticello
Blanding
Bluff
Dove Creek
Dolores
Cortez
Mancos
Durango
Bayfield
Kayenta
Shiprock
Kirtland
Aztec
Farmington
CANYON DE CHELLY NATIONAL MONUMENT
Chinle
Second Mesa
Navajo
Fort Defiance
Window Rock
Crownpoint
Gallup
Zuni Pueblo
Winslow
Holbrook
Snowflake
Taylor
Saint Johns
Show Low
Springerville
Pinetop-Lakeside
Eagar
Whiteriver
N
0 20 40 60 80 100
miles

Federal Land Management

One indicator of the federal government's role in regional resource management is the amount of land under federal management. This amount can be measured as a percentage of the total land area in each county. Stewardship of private land is carried out through a combination of regulation, market forces, education, and voluntary action. In contrast, stewardship of public land is carried out through direct implementation of agency policies. Thus the variation in public versus private land ownership across the park region can significantly influence the design and implementation of resource protection strategies. Within the Canyon de Chelly NM region, land under federal management (2004) ranges from 9.1% (Apache) to 61.8% (Dolores).[18]



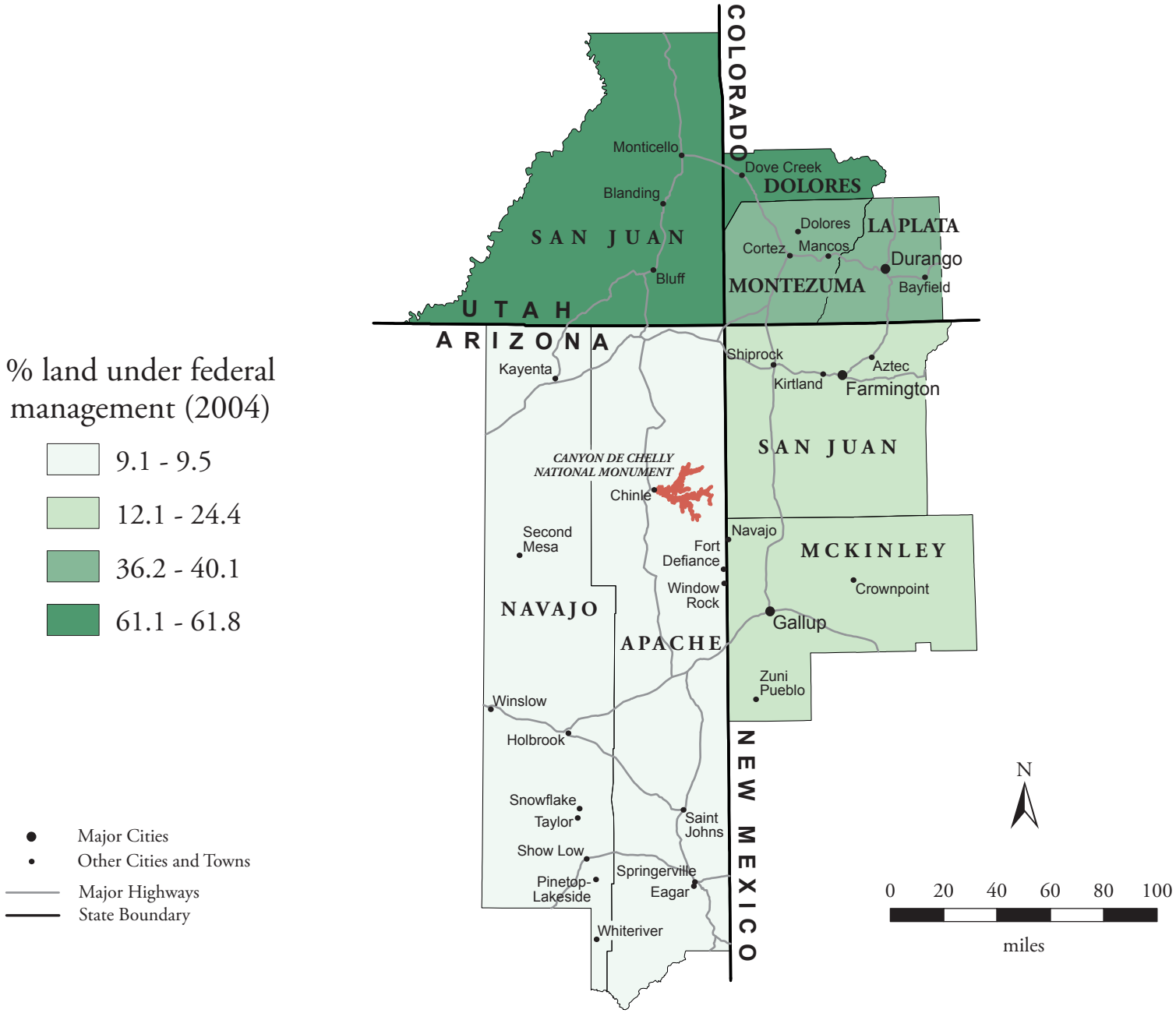
Number Line
showing distribution of data

% land under federal management (2004)	
Apache	9.1
Navajo	9.5
McKinley	12.1
San Juan, NM	24.4
Montezuma	36.2
La Plata	40.1
San Juan, UT	61.1
Dolores	61.8

30.3

National = 27.2
Arizona = 38.3
Colorado = 35.6
New Mexico = 29.1
Utah = 62.4

Federal Land Management



Federal Lands and Indian Reservations

National park units, administered by the National Park Service, are part of a larger system of public lands. Other federal agencies that administer public lands include the Bureau of Land Management, Bureau of Reclamation, Department of Defense, U.S. Fish and Wildlife Service, and U.S. Forest Service. Indian reservations are also an important part of the landscape. Public land managed by one federal agency may share boundaries with land managed by a different federal agency or with an Indian reservation. Understanding the location and pattern of federal lands (by agency) and Indian reservations can help park managers and others in the region cooperate on resource protection and planning issues.[19]

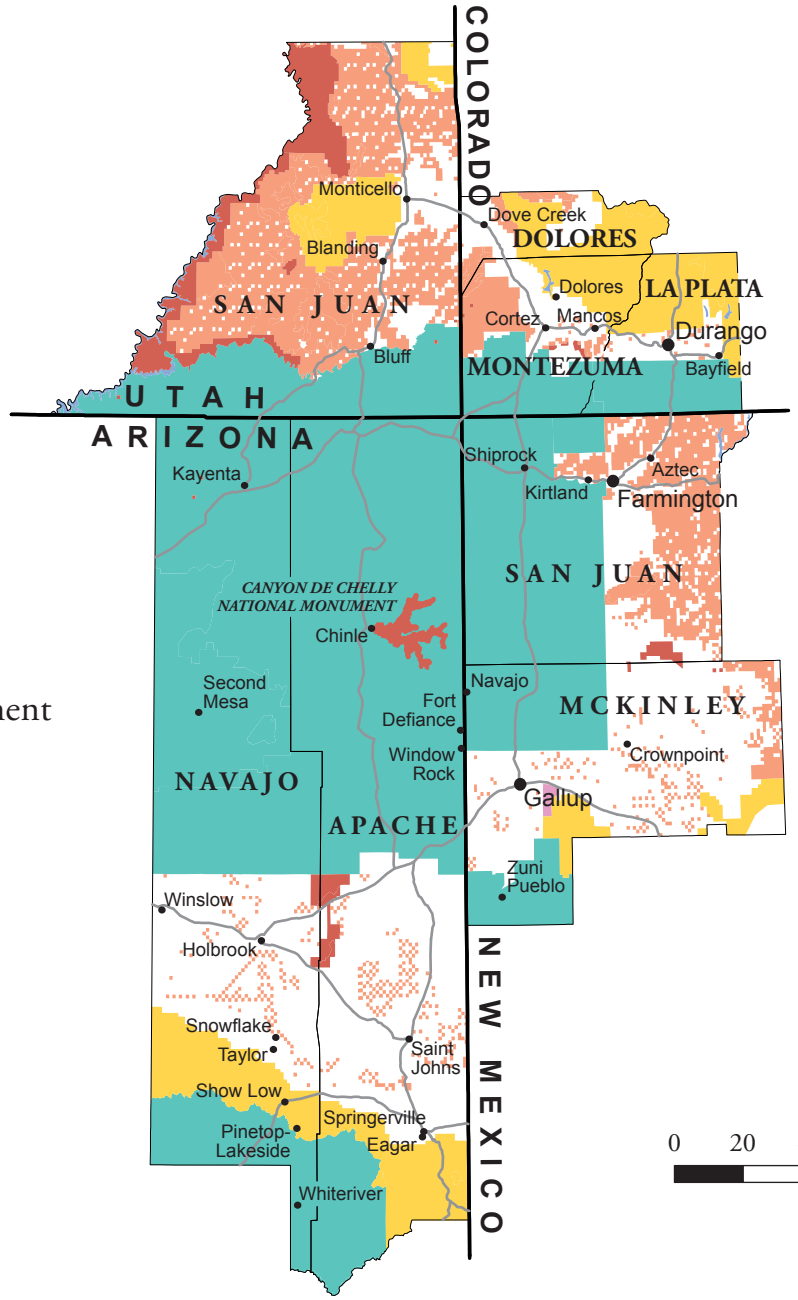
Canyon de Chelly NM, though a unit of the National Park System, consists entirely of tribal trust land.

Federal Lands and Indian Reservations

federal lands and Indian reservations (2000)

- Indian Reservations
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense
- U.S. Forest Service
- National Park Service

- Major Cities
- Other Cities and Towns
- Major Highways
- State Boundary



Farmland

The relative importance of farming within a county can be indicated by the percentage of the county's total land area that is classified as farmland. Farming includes crop cultivation as well as pasturing and grazing of livestock. Because damaged or degraded natural resources present a long-term threat to the health and profitability of farming, farm operators are potentially key partners in local and regional resource protection issues. Park management can require close coordination with area farmers on many issues, such as control of non-native species, species reintroduction, preservation of scenic values, allocation of scarce water supplies, or management of agricultural runoff. Within the Canyon de Chelly NM region, the percentage of total county land area classified as farmland (1997) ranges from 22.8% (Dolores) to 90.5% (McKinley).[20]

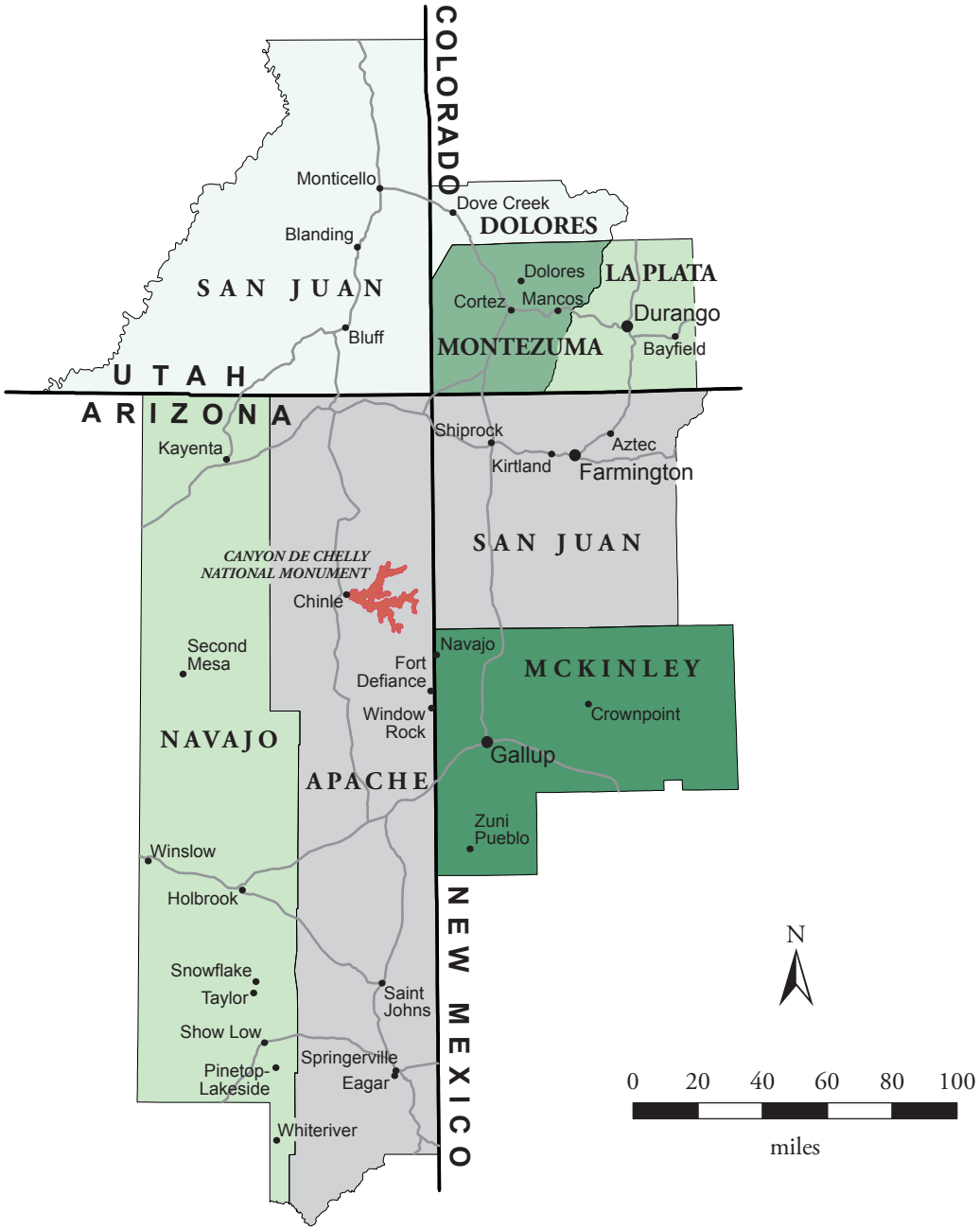
Number Line
showing distribution of data

% land classified as farmland (1997)	
Dolores	22.8
San Juan, UT	33.4
La Plata	53.6
Navajo	61.3
Montezuma	71.8
McKinley	90.5
Apache	N/A
San Juan, NM	N/A

57.4

National = 41.2
Arizona = 36.9
Colorado = 49.2
New Mexico = 58.9
Utah = 22.9

Farmland



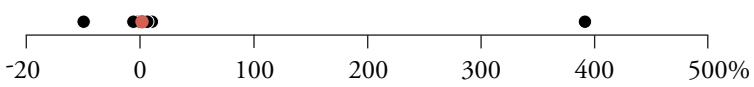
% land classified as farmland (1997)

- 22.8 - 33.4
- 53.6 - 61.3
- 71.8
- 90.5
- no data available

- Major Cities
- Other Cities and Towns
- Major Highways
- State Boundary

Change in Farmland

Changes in the amount of farmland provide an indication of economic and land use trends among counties in the park region. Land can be converted to farming because of increased demand for agricultural products or because new technology, business practices, or government programs make farming profitable. Land can be taken out of farming due to soil depletion, competition from growers elsewhere, loss of labor, or conversion of land to other (often urban) uses. Within the Canyon de Chelly NM region (1987 - 1997), the change ranged from a decrease of 49.2% (Navajo) to an increase of 391.4% (San Juan, UT).[21]



Number Line
showing distribution of data

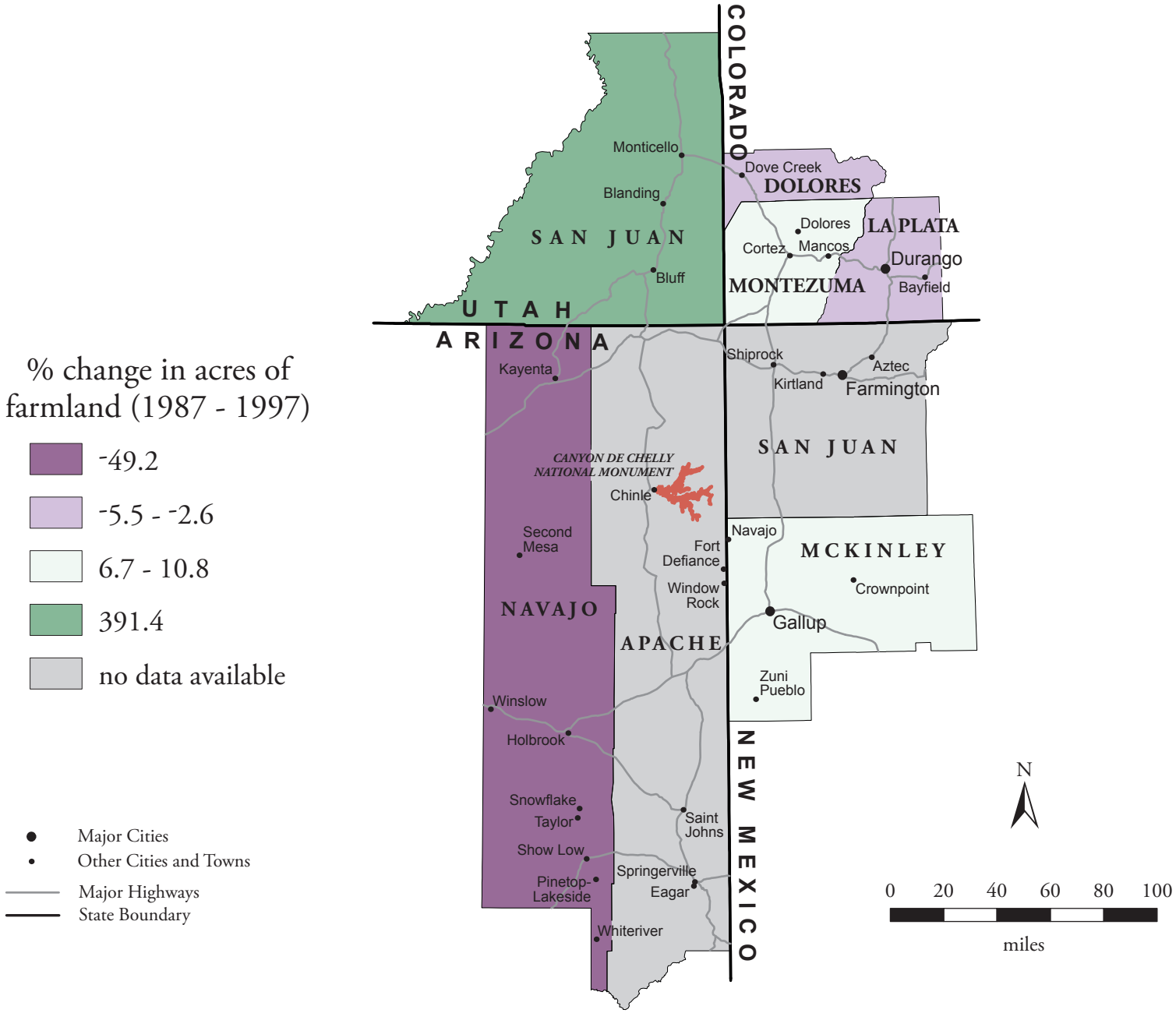
% change in acres of farmland (1987 - 1997)

Navajo	-49.2
La Plata	-5.5
Dolores	-2.6
McKinley	6.7
Montezuma	10.8
San Juan, UT	391.4
Apache	N/A
San Juan, NM	N/A

2.1

National = -3.4
Arizona = -26.0
Colorado = -4.2
New Mexico = -0.5
Utah = 20.4

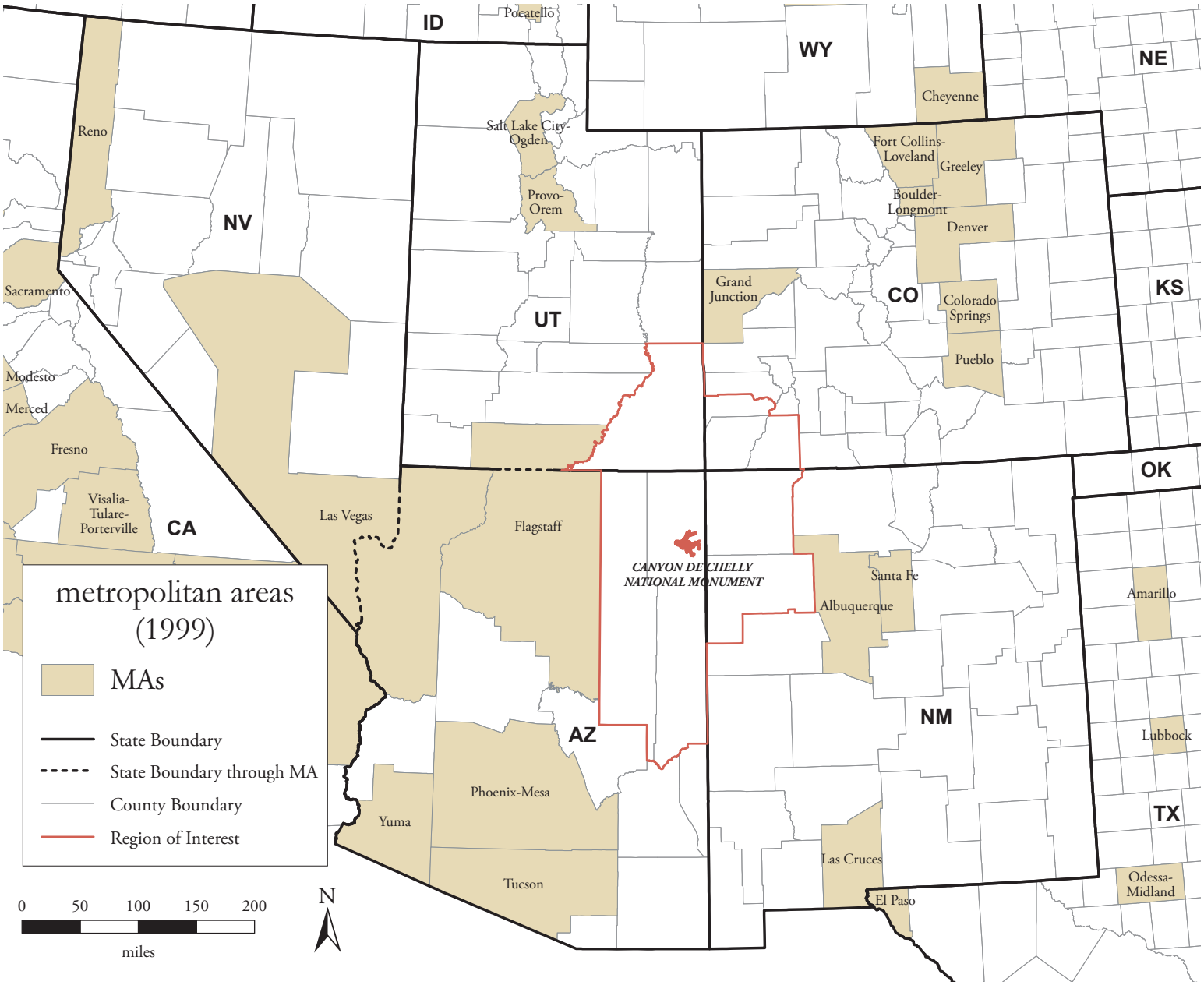
Change in Farmland



Metropolitan Areas

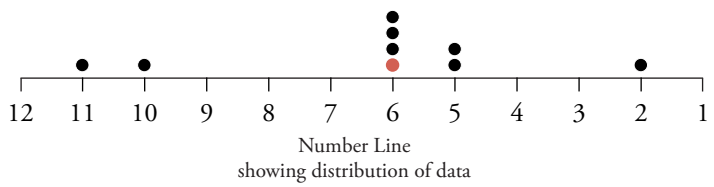
Maps of metropolitan areas show park managers densely populated urban areas that are near national park units. The Census Bureau defines a metropolitan area (MA) as having a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that nucleus. MAs are single counties or aggregations of counties. Most counties in MAs include both urban and rural land uses. For this map, a larger region around Canyon de Chelly NM is provided to show the extent of nearby MAs, though there are no MAs in the park region.[22]

Metropolitan Areas



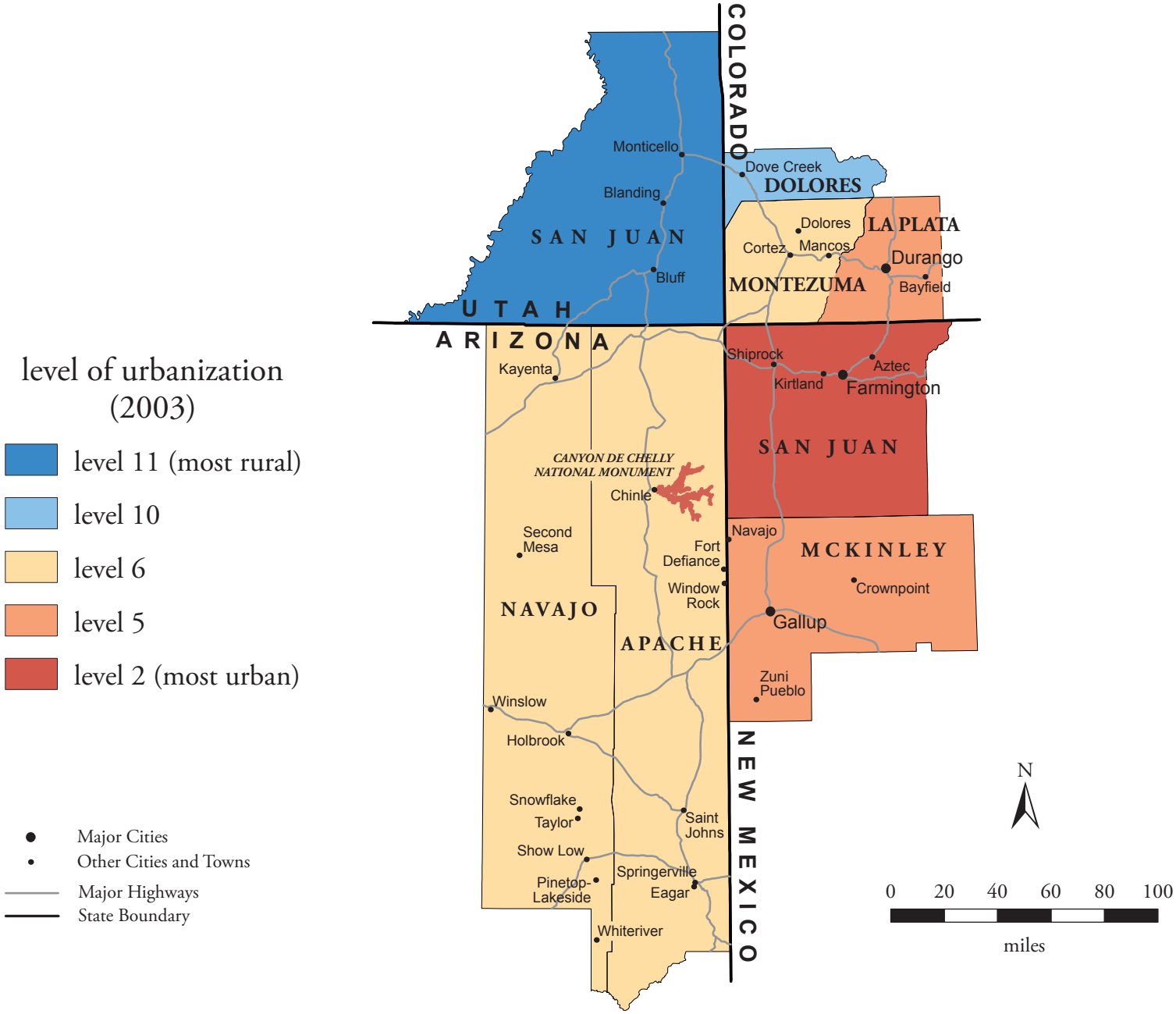
Urbanization

Urbanization is a measure of the degree to which counties are associated with metropolitan areas based on population and commuting patterns. The political and economic priorities of more urbanized counties tend to differ from those of less urbanized counties. The concentration of people in towns, cities, and large metropolitan areas creates opportunities for cooperative efforts (such as municipal water systems, public transportation, and a host of non-governmental organizations) but also can increase the incidence of problems such as congestion, air pollution, and habitat fragmentation. The Economic Research Service classifies counties' degree of urbanization along a continuum ranging from completely rural (not near metro area and small population size) to large metropolitan. Within the Canyon de Chelly NM region (2003), 7 of the 8 counties are classified as nonmetropolitan.[23]



level of urbanization (2003)	
San Juan, UT	11
Dolores	10
Apache	**6**
Montezuma	**6**
Navajo	**6**
La Plata	5
McKinley	5
San Juan, NM	2

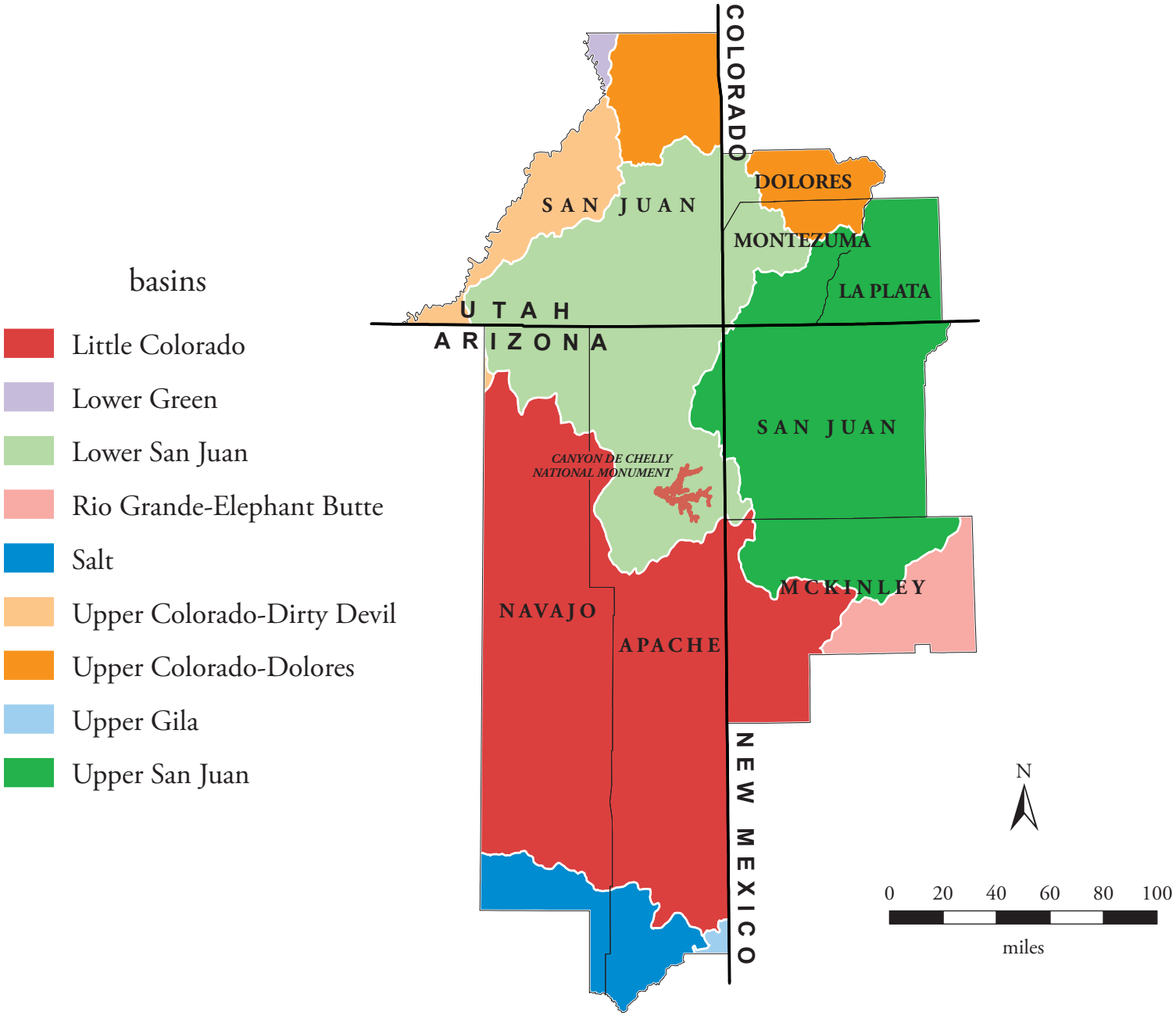
Urbanization



Watersheds

Watersheds are delineated by the U.S. Geological Survey using a nationwide system based on surface hydrological features. Watersheds are increasingly serving as the geographical units within which governments, institutions, and citizens organize to carry out initiatives for environmental protection and restoration. Familiarity with watershed boundaries is fundamental in developing educational programs and in mobilizing constituencies to protect water quality throughout the park region. The Canyon de Chelly NM region includes all or portions of nine basins.[24]

Watersheds


basins
Little Colorado
Lower Green
Lower San Juan
Rio Grande-Elephant Butte
Salt
Upper Colorado-Dirty Devil
Upper Colorado-Dolores
Upper Gila
Upper San Juan
COLORADO
DOLORES
SAN JUAN
MONTEZUMA
LA PLATA
UTAH
ARIZONA
SAN JUAN
CANYON DE CHELLY NATIONAL MONUMENT
MCKINLEY
NAVAJO
APACHE
NEW MEXICO
N
0 20 40 60 80 100
miles

Conclusion: Using This Atlas for Park Management

A national park functions as part of a regional human ecosystem. A natural ecosystem can be understood in terms of factors such as flora, fauna, rainfall, temperature, elevation, and soil. Similarly, a human ecosystem can be understood in terms of factors such as population, commerce, social and cultural practices, politics, and land-use patterns.

The regional human ecosystem, like the natural ecosystem, strongly influences the long-term health of the park's natural and cultural resources. Just as a park may be concerned with upstream activities outside its boundaries yet inside its watershed, parks are also concerned with human activities taking place outside their boundaries yet inside their region. Thus, knowledge of natural and human conditions external to a park is as essential to park management as knowledge of internal natural and cultural conditions.

This atlas focuses on human activities and features in the region surrounding Canyon de Chelly National Monument. Five primary applications for this atlas as a tool for park management are:

- monitoring activities and analyzing trends that could have short- or long-term impacts on the park;
- making comparative studies, both within the region and between regions;
- assessing potential social impacts of management decisions;
- supporting collaborative decision-making and public participation; and
- educating park staff and other stakeholders about regional socioeconomic trends.

Monitoring activities and analyzing trends. The standardized data sources and presentation format of this atlas allow it to serve as a baseline for long-term monitoring of human conditions and trends that impact the park, such as immigration or economic shifts. These human conditions and trends can have significant implications for park planning and management. For example, the atlas can be consulted to determine trends in educational attainment among regional residents. This information could be helpful in designing interpretive and public participation programs and materials that can increase access to and understanding of the role of the park in the region. The atlas can be used to gain knowledge about the overall structure of and local variations in the regional economy. This information could be important to developing a strong collaborative working relationship with regional business leaders. The atlas can be examined to recognize trends in land use. This information could support proactive planning to mitigate potential impacts of development such as habitat fragmentation, degradation of air or water quality, or intrusions upon historic settings and/or scenic values.

Comparative studies. This atlas can support comparative studies of two kinds. First, the atlas can be used to compare counties within the region. By displaying the range of values for a particular indicator or a set of indicators, the atlas can help identify specific counties where it may be desirable to take (or avoid taking) certain management actions because of the potential impact on the human ecosystem. Second, the atlas can be used to make comparisons with other park regions. Potential management actions can be evaluated in terms of how effective they have been for another park unit where similar regional socioeconomic factors are involved.

Social impact assessment. Federal law and NPS planning directives require that park managers evaluate the social impacts of potential management actions. The socioeconomic indicators displayed in this atlas can make an important contribution to such social impact assessments. For example, the maps displayed here could be used to help understand the impacts of various park management plans and provide context for assessments at smaller scales, such as local communities.

Collaborative decision making. In developing general management plans, park staff are directed to "consider the park holistically … as part of the surrounding region" and to conduct planning "as part of cooperative regional planning whenever possible" (Director's Order 1998-2, par. 3.3.1.2). Tools such as this atlas can support the goal of applying a regional perspective to park planning and management. Distribution of this atlas to citizens, elected officials, educators, business and service groups, resource managers, and others can strengthen their ability to effectively participate in park management activities and decision-making. Maps that present facts in a standardized format can be particularly helpful for establishing common ground on which to decide upon management priorities, especially for decisions that affect both the park and the adjacent region.

Education and orientation. The atlas can be used to orient new park staff, as well as central office staff, to some of the basic facts about human activities in the park's region of interest. It can also serve as a tool for sharing information about socioeconomic trends with the public, gateway communities, media, and Congress.

In conclusion, effective park management requires a clear understanding of human activities in the surrounding region that can impact park resources and operations. By providing the "basic facts" about such activities, this atlas can help managers, citizens, and others better provide for the preservation and enjoyment of Canyon de Chelly National Monument.

Appendices

Appendix 1: Data Sources for Indicators

The data sources used to obtain the measures for the socioeconomic indicators are listed below. The indicators listed on the left correspond to the titles of the maps in the atlas. The measure corresponds to captions for the legends used in the maps and the ranked data tables.

INDICATOR	MEASURE	DATA SOURCE
General Population		
*Total Population	total number of people (2003)	U.S. Department of Commerce, Census Bureau, http://eire.census.gov/popest/estimates_dataset.php
Historical Population Change	% change in total number of people (1970 - 1990)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
*Recent Population Change	% change in total number of people (1990 - 2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/population/cen2000/atlas/all_00.xls
*Projected Population Change	projected % change in total number of people (2000 - 2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Population Density	average number of people per square mile (2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/population/cen2000/atlas/all_00.xls
Population Density Change	% change in average number of people per square mile (1980 - 2000)	1) U.S. Department of Commerce, Census Bureau. USA Counties 1998, http://censtats.census.gov/cgi-bin/usac/usasel.pl *(1980 population density)* 2) U.S. Department of Commerce, Census Bureau, http://www.census.gov/population/cen2000/atlas/all_00.xls *(2000 population density)*

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
Projected Population Density	projected average number of people per square mile (2020)	1) U.S. Department of Commerce, Census Bureau, http://www.census.gov/population/cen2000/atlas/all_00.xls *(county square mile data)* 2) Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com *(2020 projected population)*
Projected Median Age	projected median age of total population (2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Dependency Ratio	ratio of population <18 or >64 to 18 - 64 years old (2000)	U.S. Department of Commerce, Census Bureau http://factfinder.census.gov – Census 2000 Summary File 1 (SF1) 100% Data, Table P12
Economy and Commerce		
*Earnings by Industry	% total earnings by industrial category (1999)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
*Employment by Industry	% employment by industrial category (1999)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
Projected Change in Employment by Industry	projected % change in employment by industrial category (2000 - 2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
*Poverty	% total population in poverty (1999)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/hhes/poverty/2000census/poppvstat00.html
Unemployment	% of civilian labor force unemployed (1999)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov – Census 2000 Summary File 3 (SF3) Sample Data, Table PCT35
Median Household Income	median household income ($) (1999)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov – Census 2000 Summary File 3 (SF3) Sample Data, Table P53
Social and Cultural Characteristics		
*Racial Diversity	% total population belonging to minority race groups (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov – Census 2000 Summary File 1 (SF1) 100% Data, Table P7
*Educational Attainment	% total population 25 years old and over with some college or college degree (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov – Census 2000 Summary File 3 (SF3) Sample Data, Table P37
Family Size	average number of persons per family (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov – Census 2000 Summary File 1 (SF1) 100% Data, Table P33
Crime	number of serious crimes per 100,000 people (2000)	U.S. Department of the Interior, U.S. Geological Survey, http://nationalatlas.gov/crimesm.html

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
Recreation and Tourism		
Recreation/Tourism Establishments	% of total establishments in arts, entertainment, recreation, and accommodation services (2001)	U.S. Department of Commerce, Census Bureau, http://censtats.census.gov/cbpnaic/cbpnaic.shtml
*Recreation/Tourism Revenue	% of total sales from arts, entertainment, recreation, and accommodation services (1997)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/epcd/www/econ97.html
*Recreation/Tourism Employment	% of total paid employees in arts, entertainment, recreation, and accommodation services (2001)	U.S. Department of Commerce, Census Bureau, http://censtats.census.gov/cbpnaic/cbpnaic.shtml
Administration and Government		
*Congressional Districts	Congressional Districts (2000)	U.S. Department of the Interior, U.S. Geological Survey, http://nationalatlas.gov/cgd108m.html
*Federal Expenditures	federal expenditures per capita ($) (2002)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/prod/www/abs/cffr.html
Land Use		
Ecoregions	ecoregion divisions	1) USDA Forest Service, Inventory and Monitoring Institute, http://www.fs.fed.us/institute/ecoregions/eco_download.html 2) Bailey, Robert G. (1995). *Description of the Ecoregions of the United States* (2nd ed.). Misc. Pub. No. 1391, USDA Forest Service, 108 pp.
*Federal Land Management	% land under federal management (2004)	1) U.S. Department of the Interior, Bureau of Land Management. Payment in Lieu of Taxes, Fiscal Year 2004. Washington, DC. http://www.blm.gov/pilt/search.html *(federal land in acres)* 2) U.S. Department of Commerce, Census Bureau http://www.census.gov/population/cen2000/atlas/all_00.xls *(county square mile data to convert into acres)*

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
*Federal Lands and Indian Reservations	federal lands and Indian reservations (2000)	U.S. Department of the Interior, U.S. Geological Survey, http://nationalatlas.gov/atlasftp.html
Farmland	% land classified as farmland (1997)	U.S. Department of Agriculture, National Agricultural Statistics Service, http://www.nass.usda.gov/census/
*Change in Farmland	% change in acres of farmland (1987 - 1997)	U.S. Department of Agriculture, National Agricultural Statistics Service, http://www.nass.usda.gov/census/
*Metropolitan Areas	metropolitan areas (1999)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/geo/www/cob/ma1999.html#shp
*Urbanization	level of urbanization (2003)	U.S. Department of Agriculture, Economic Research Service, http://www.ers.usda.gov/Data/UrbanInfluenceCodes/
Watersheds	basins	U.S. Department of the Interior, U.S. Geological Survey, http://www.nationalatlas.gov/hucsm.html

** Denotes a core indicator, common to all atlases in this series. Additional indicators were selected by park managers to include information specific to their particular management needs.*

Appendix 2: Technical Notes on Map Design

Selection of Base Map Data – The regional base map used to map socioeconomic indicators in this atlas includes state and county boundaries, some of the major roads, major cities, and a few other selected cities and towns. The roads, cities, and towns are included to provide readers with a few familiar points of reference. It should be emphasized that this is not a general purpose atlas of the region, for it focuses only on socioeconomic indicators.

Choropleth Mapping – For most of the maps, data are grouped by quartiles which vary in shading from light to dark (for low to high values). This shading technique, known as choropleth mapping, is usually applied to ratio data; population density, infant deaths per 1,000 live births, and median income are examples. Maps that display total amounts (such as total population) often use other approaches, such as proportional symbols. For clarity, ease of use, and consistent design, choropleth mapping is used for most of the social indicator data.

Quartile Classification – The choice of a *quartile* classification of the data means that for most maps, counties were divided into four classes. Rather than focusing on the actual numerical value of the indicator for each county, the quartile approach emphasizes the rankings of data values among counties. The legend accompanying the map allows the reader to see the range of values among counties within a class. Quartiles make it easy for the reader to make intuitive comparisons among counties; the darkest shaded counties are in the "top quarter," the lightest shaded counties are in the "bottom quarter," and so forth. Quartiles also facilitate comparisons between maps in the atlas ("this county ranks in the bottom quartile on all three of these indicators").

Two notes: (1) Whenever the number of counties cannot be evenly divided by four, the convention for this atlas series is to reduce the size of the highest quartile first, then the next quartile if needed, then the third quartile if needed. Hence eleven counties would be divided into groups of 3, 3, 3, and 2, with the last group of 2 having the highest data values/darkest shading. (2) Counties with identical data values are grouped in the same quartile, even if this results in quartiles of unequal size.

Note on Political Boundaries – The regional base map depicts the formally defined political boundaries of states and counties.

Map Sources – The regional map on the cover and at the beginning of the atlas was generated from the North American HYDRO1k dataset (http://edcdaac.usgs.gov/gtopo30/hydro/) developed at the U.S. Geological Survey's EROS Data Center. The standard region of interest map used throughout the atlas was generated from U.S. Geological Survey shapefiles. Contextual information (roads and cities) was also obtained from the U.S. Geological Survey (http://www.nationalatlas.gov).

Production – Indicator data for the atlas were compiled in Microsoft Excel 2000. These were linked to U.S. Geological Survey shapefiles using ESRI ArcMap GIS 8.3. The GIS files were imported into Adobe Illustrator 10.0 for final map

design. Text was prepared in Microsoft Word 2000. The final atlas layout (text, maps, graphics) was completed using Adobe InDesign 2.0.

Text Sources – Additional web resources used to prepare park and regional descriptions are:

- Southeast Utah; http://www.southeastutah.com
- The American Southwest; http://www.americansouthwest.net
- Explore the Navajo Nation; http://www.americanwest.com/pages/navajo2.htm
- American Factfinder; http://factfinder.census.gov/home/saff/main.html?_lang=en
- Four Corners Regional Study – Economies and Issues; http://www.fortlewis.edu/shared/content_objects/san_juan_forum/4corners_regional_study.pdf

Appendix 3: Technical Notes on Measurement of Selected Indicators

[1] Persons enumerated in the census were counted as inhabitants of their usual place of residence, which generally means the place where a person lives and sleeps most of the time. This place is not necessarily the same as the legal residence, voting residence, or domicile. In the vast majority of cases, however, the use of these different bases of classification would produce substantially the same statistics, although appreciable differences may exist for a few areas.

[2] For an explanation of Woods & Poole's projection methods see page 11 in the Woods and Poole Technical Documentation manual.

[3] **Population density** is measured as the average number of people per square mile. This number is calculated by dividing the total number of people by the total area per county. In counties with federal lands, excluding these areas from the calculation of population density would result in a higher population density.

[4] See note above on **population density**.

[5] See note above on **population density**.

[6] Economic activity is categorized as belonging to one of four **industry categories**: agriculture/natural resources, construction/manufacturing, sales/services, and government. Individual workers, regardless of their specific job responsibilities, are classified according to the category their

overall company or organization belongs to. Thus, while accounting is considered a "service" activity, an accountant for a mining company would be counted as working in "agriculture/natural resources." "Government" includes all federal government workers and all state/local employees, such as teachers, police, firefighters, etc. Even though government jobs may involve construction, natural resource management, or provision of services, they are still counted as belonging to the "government" category.

[7] See note above on **industry categories**.

[8] See note above on **industry categories**.

[9] **Poverty** is measured as the percentage of the total population living below the poverty level. The poverty level is defined as earnings of $17,029 or less for a family of four persons (1999). Poverty thresholds are applied on a national basis and are not adjusted for regional, state, or local variations in the cost of living.

[10] **Unemployed** persons include civilians 16 years old and over who had no employment during the reference week, made specific efforts to find a job within the previous 4 weeks, were available for work during that week, except for temporary illness. Persons laid off and expecting recall to a job also are classified as unemployed. All other civilian persons, 16 years old and over, are "not in the labor force." The reference week is the full calendar week (Sunday through Saturday) preceeding the date each respondent completed their Census 2000 questionnaire. This calendar week is not the same for all people since the enumeration was not completed in one week.

[11] **Racial diversity** is defined for this measure as the percentage of the population classified as being non-White. Diversity by this definition does not necessarily measure the degree of "variety" in the population. For example, a hypothetical county with a 90% Asian population would be considered more "diverse" than a county in which each of the six major race groups constituted 10% of the population (in the latter case, diversity would be measured as 60%). The Hispanic or Latino origin category was not included in this measure because persons of Hispanic or Latino origin may be of any race (including White).

[12] For Census 2000, persons are classified according to the highest level of school completed or the highest degree received.

[13] **Recreation and Tourism** is composed of the arts, entertainment, and recreation sector and the accommodation subsector, both a part of the North American Industry Classification System (NAICS). The arts, entertainment, and recreation sector includes museums, historical sites, gambling and recreation industries, golf courses and country clubs, fitness and recreational sports centers, and all other amusement industries. The accommodation subsector is comprised of establishments including hotels, motels, bed and breakfasts, RV parks, recreational camps, and vacation camps. For a complete definition of these NAICS categories please consult http://www.census.gov/epcd/www/naics.html.

[14] See note above on **recreation/tourism**.

[15] See note above on **recreation/tourism**.

[16] **Federal expenditures** include expenditures, or obligation for, direct payments for individuals, procurement, grants, salaries and wages, direct loans, and guaranteed loans and insurance. Grant awards are reported by county of the initial recipient; thus if the initial recipient is the state government, the county in which the state capital is located is reported as having "received" that "pass-through" grant, even though the monies are subsequently distributed to other local governments.

[17] **Ecoregions** are ecosystems of regional extent, differentiated according to a hierarchical scheme that uses climate and vegetation as indicators of the extent of each unit. Robert Bailey of the U.S. Forest Service, U.S. Department of Agriculture, developed the system of ecoregional classifications used in this atlas (Bailey, R.G. 1995. *Description of the Ecoregions of the United States,* 2nd edition, Misc. Pub. No. 1391).

[18] **Federal lands** include all tax-exempt federal lands administered by the Bureau of Land Management (BLM), the National Park Service, the U.S. Fish and Wildlife Service, the U.S. Forest Service, federal water projects, and some military installations (tribal lands are not included). The BLM calculates the amount of federal land within counties in order to administer the federal government's payments-in-lieu-of-taxes (PILT) program.

[19] The U.S. Geological Survey produces the **federal lands and Indian reservations** map layer. This map layer does not include any federally and Indian held land that has an areal extent smaller than 640 acres. For more information and metadata, consult http://www.nationalatlas.gov/fedlandsm.html.

[20] **Farmland** consists primarily of agricultural land used for crops, pasture, or grazing. Also included are woodland and wasteland not actually under cultivation or used for pasture or grazing, provided it was part of the farm operator's total operation. Farmland includes acres in the Conservation Reserve, Wetlands Reserve Programs, or other governmental programs. Farmland includes land owned and operated as well as land rented from others. Land used rent-free is included as land rented from others. All grazing land, except land used under government permits on a per-head basis, is included as farmland provided it is part of a farm or ranch. Land under the exclusive use of a grazing association is reported by the grazing association and included as farmland. All land in American Indian reservations used for growing crops or grazing livestock is included as farmland. Land in reservations not reported by individual American Indians or non-Native Americans is reported in the name of the cooperative group that used the land.

[21] See note above on **farmland**.

[22] Certain **Metropolitan Areas** (MAs) are defined around two or more nuclei. Each MA must contain either a place with a minimum population of 50,000 or a U.S. Census Bureau-defined urbanized area and a total MA population

of at least 100,000. For a complete definition, consult http://www.census.gov/geo/www/cob/ma_metadata.html.

[23] The Economic Research Service classifies counties according to their level of **urbanization**. The classification consists of twelve mutually-exclusive codes:

METROPOLITAN COUNTIES

1) In large metro area of greater than 1 million residents
2) In small metro area of less than 1 million residents

NONMETROPOLITAN COUNTIES

3) Micropolitan adjacent to large metro
4) Noncore adjacent to large metro
5) Micropolitan adjacent to small metro
6) Noncore adjacent to small metro with own town
7) Noncore adjacent to small metro, no own town
8) Micropolitan not adjacent to a metro area
9) Noncore adjacent to micro with own town
10) Noncore adjacent to micro with no own town
11) Noncore not adjacent to metro or micro with own town
12) Noncore not adjacent to metro or micro with no own town

[24] **Watersheds** are delineated by the U.S. Geological Survey using a nationwide system based on surface hydrologic features and published in 1998. This system divides the country into 21 regions, 222 subregions, 352 accounting units, and 2,262 cataloging units. A hierarchical hydrologic code (HUC) consisting of 2 digits for each level in the hydrologic unit system is used to identify any hydrologic area. The 6-digit accounting units and 8-digit cataloging units are generally referred to as basins and sub-basin watersheds. This atlas maps the 6-digit cataloging units (see http://water.usgs.gov/GIS/huc.html).

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