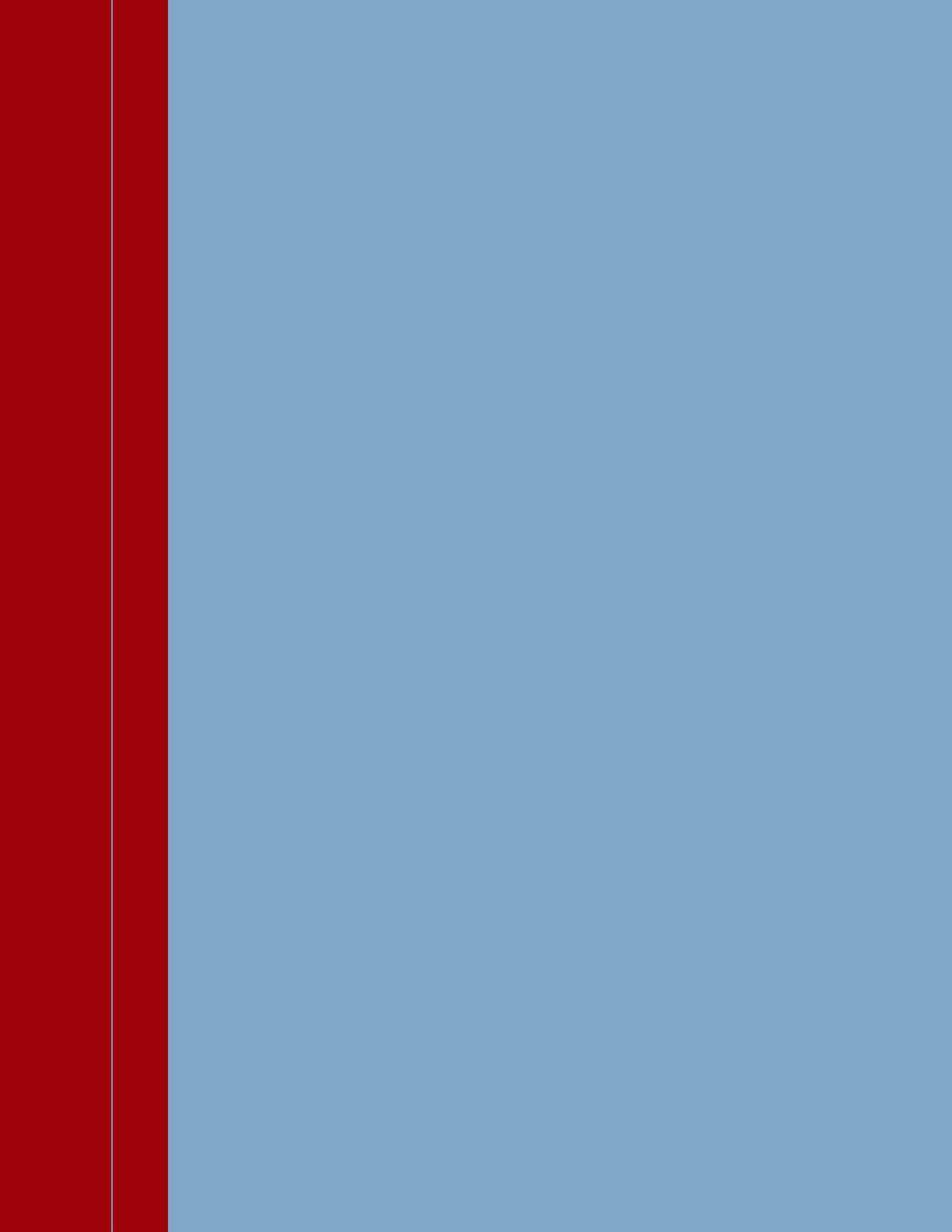# THE Colorado Index

POPULATION

ECONOMY

ENVIRONMENT

COMMUNITY

Understanding and Tracking Quality of Life

The Colorado Center for Healthy Communities (The Center) is the coordinating and policy arm of a statewide coalition of 15 local healthy community initiatives. The Center provides research, analysis and information on matters of community health and builds partnerships to foster healthier communities.

The Center and its partners across Colorado recognize that the health of a community is greatly influenced by many factors—economic, social, environmental, political, and population growth—as well as how we behave as individuals. Through a community development approach that is linked statewide, the Center involves local institutions, private citizens, businesses, community groups, and health professionals in efforts to improve the quality of life in Colorado. The Center is also part of an international effort of healthy cities and communities and is a member of the National Coalition of Healthy Cities and Communities.

The Roles of the Center:
- Acts as an information clearinghouse on healthy community issues
- Hosts statewide conferences and forums where groups can learn about other successful programs from peers and experts
- Provides professional facilitation services, policy analysis and development
- Promotes the value of healthy communities work to state and local leaders

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS

FORWARD

*Working together, we must address an issue of critical concern to every Coloradan –
how our state can continue to prosper and grow in a manner that protects our
quality of life*

—Governor Bill Owens
State of the State Address 2001

When this project was begun in 2000, Colorado was the third fastest growing state in the nation and the debate within the state was focused on keeping up with and managing the impacts associated with a growing population and economy. The tragic events of September 11, 2001 have dramatically altered peoples' perception of national security, economic opportunity, and outlook on the future. Colorado's economic outlook, in particular, has dramatically changed. In short order, a budget surplus has become a budget deficit and thousands of workers now find themselves unemployed. It is difficult to believe that our lives could change so quickly.

Although managing growth has given way to stimulating growth in the minds of many lawmakers and citizens, a critical concern of every Coloradan remains our quality of life. The devastation in New York City and Washington, DC, highlights how non-economic factors such as security, family, and friends (factors we often take for granted) are as important in shaping our quality of life as interest and unemployment rates.

What is quality of life?

Quality of life is one of those phrases that is intuitively understood by everyone despite having little definition to it. One thing is clear about the definition of quality of life – there is no one measure of it. Planners, citizen groups, social scientists, and politicians usually employ a combination of environment, economic and health-related indicators to explore the quality of life concept.

Several organizations routinely rate the quality of life in U.S. communities. *Money Magazine* annually rates the best places to retire based on "vitality, great quality of life, affordable housing and plenty to see and do."

Many health and social care organizations are also beginning to use the concept of quality of life as a focus of their interventions. They are seeing health as more than the absence of disease but also the quality of people's social networks, job opportunities, and natural environment.

Consequently, this first report of the Colorado Index Project contains over 30 economic, social, and environmental indicators. We believe these indicators, collectively, begin to illustrate the quality of life in Colorado. Although the indicators are a preliminary set of quality of life indicators, we believe they illustrate many of the challenges and opportunities facing the residents of the state.

Why a Quality of Life Index for Colorado?

*Indicators arise from values (we measure what we care about and), and they create
values (we care about what we measure).*   —Donella Meadows

Data and indicators describing the quality of life in Colorado are reported daily in the newspapers and television news. But does this information help us understand the factors and trends that affect our quality of life as a whole? Across the state, many different

groups and constituencies are saying no. The information in the paper and on television is too disjointed and isolated to have much meaning. Instead, many organizations are trying to present a more comprehensive picture of our health and wealth. They have held symposia and conducted focus groups to get at the interconnected nature of our quality of life.

Over the last few years, interest in using broad sets of indicators has grown at the community, regional, state, and national level. In Colorado, 15 local and regional healthy community initiatives have indicator projects with published reports detailing the challenges and opportunities facing their communities. The Mayor's 1999 Summit on Regional Collaboration has highlighted the value of agreed upon indicators to foster collaboration in the Denver Metro region. At the state level, the Colorado Association of Commerce and Industry's Millennium Blueprint Project illustrates how to use statewide indicators to detail the business community's long-term strategy for sustaining and strengthening the state's economy for the 21st Century.

In April 2000, the Colorado Center for Healthy Communities (the Center), a statewide coalition of 15 local healthy community initiatives, engaged the sponsors of these various indicator efforts as well as other interested partners across Colorado. At a workshop hosted by the Center, entitled "Managing Our Future: Measuring What We Value," a proposal was put forward to jointly identify and develop indicators that best track progress and catalyze action on quality of life issues. The workshop participants explored the increasing need to create information tools that can be used to manage and connect issues related to open space and natural resources, workforce and economic development, affordable housing, sprawl, transportation, revenue structure, telecommunications, and community health.

Since the workshop, the Center has coordinated a small advisory team to synthesize the lessons learned from the workshop and guide the development of a preliminary quality of life index for Colorado. This approach reflects our recognition that incremental steps are needed to develop this index so that it can be supported and used as a tool by community and state leaders to address quality of life issues.

From Indicators to Action

The Center hopes a statewide index can be used to track and, more importantly analyze various critical indicators of the state's quality of life. The Center also hopes that the index can be a tool to foster concrete actions (i.e., changes in public policy, corporate principles, community planning) to improve the state's quality of life. Without an eye toward implementation of the index will not reach its full potential.

Some examples of how a statewide quality of life index can be useful in fostering action to address a problem come from the local and regional level. They include:

>**Durango:** As part of an extensive community indicators project, the regional nonprofit Operation Healthy Communities (OHC), published information on a livable wage for the area in 1998. The information was compelling enough to convince two major banks in the community to raise their starting salaries from $7.50 to $9.00 per hour. As one bank vice-president said about OHC's indicator report, "their work enabled employers around town to see what they have to pay their employees if they want to stay."

Boulder County: The Boulder County Civic Forum's 1998 report on quality of life issues led to the development of a set of strategies for youth development and violence prevention entitled YouthNET. The YouthNET report has since become the focus of the YouthNET Grantmakers' Forum, a network of philanthropic organizations that has been seeking to coordinate their grantmaking efforts to implement the report's recommendations. So far, this group has provided funding to pilot after-school programs at middle schools in Longmont and Boulder.

Mesa County: The Mesa County Civic Forum's 1997 Picture of Health helped spark an effort to create a public transit system in Grand Junction. At the time, Grand Junction was one of the few cities with a population over 40,000 in the U.S without a public transit system. With the Civic Forum's help, the newly established transit system, Grand Valley Transit, has been serving the metro area since 2000.

Roaring Fork Valley (Garfield, Western Eagle, and Pitkin Counties): Healthy Mountain Communities' 1996 Healthy Community Indicators started the discussion that lead to the creation of a regional transportation authority in 2000. The authority is the first multi-county transportation authority in rural Colorado and supports the second largest transit system in the state. HMC's indicator efforts have also resulted in local governments adopting ordinances to foster affordable housing a well as a current effort to create a regional housing authority.

Yampa Valley (Routt and Moffat Counties): Yampa Valley Partners' Community Indicator Reports of 1997 and 1999 helped lay the foundation for a regional telecommunication partnership to address the of lack of infrastructure and capacity in rural northwest Colorado. This partnership has resulted in several telecommunication developments in Northwest Colorado including: 1) Moffat and Rio Blanco Counties leveraging $2.4 million so a private provider could install a fiber backbone on State Highway 13 from Craig to Rifle, CO; and 2) the City of Steamboat Springs participating as the lead agent for a $1.375 million dollar State Beanpole grant, which provides for last mile connectivity with five municipalities in a three county area.

Where do we go from here?

The Colorado Index Project is the first attempt of the Colorado Center for Healthy Communities to piece together a range of indicators that we believe paint a picture of quality of life in Colorado. This report builds on the numerous indicators throughout the U.S. and Colorado, but as a "pilot project", we understand and expect that this first effort will be incomplete. We hope you will comment on this initial effort and help us develop a more complete index of Colorado's quality of life.

With your comments, the Colorado Center of Healthy Communities plans to revise and expand the Colorado Index. We hope that it can become a decision-support tool for state and local issues.

Introduction

Purpose

The primary objective of the Colorado Index Pilot Project is to introduce relevant and informative indicators of trends that affect the quality of life in Colorado. Numerous local quality-of-life indicator efforts have been conducted throughout the state. The Colorado Index builds upon these efforts by adding a statewide level of analysis, while still portraying patterns at the local level in recognition of the diversity that exists in the state. Future versions of the Index will refine these indicators as the issues are better understood, data is refined, and the importance of issues are recognized and prioritized.

Community Development Concepts

Underlying this indicators project is a conceptual model of community development. The conceptual model influences the selection of the indicators, underlies the order in which the indicators are presented, and influences the way the patterns are analyzed. Because of the recent growth in Colorado and the projected growth in many areas of the state (despite the recent slowing of the economy), the protection and enhancement of Colorado's quality of life will be closely correlated with how effectively and efficiently its communities develop.

The starting point in community development is the economy, which can be broken down into three categories:

- Basic industries, which bring money into the state through exports, tourism, or other monetary infusions (e.g., Federal government spending, transfer payments to retirees, capital gains in the stock market paid to Colorado residents, etc.);
- Indirect basic industries, which provide goods and services to basic industries; and
- Local resident services, which provide goods and services to local residents.

The basic industries constitute the driving force of economic growth. As basic industries grow, indirect basic industries grow to support them and local resident services expand to meet the consumer needs of new residents. Thus, the direct basic sector has "multiplier" effects by stimulating the growth of secondary jobs. Without basic industries bringing "outside" money into the economy, income would "leak out" through taxes and spending on imported goods and the indirect basic and local resident services sectors could no longer be supported. Thus, basic industries are the backbone of any local (or statewide) economy.

Economic expansion, through the growth of basic industries, creates jobs, which, in turn, attracts new residents. These residents
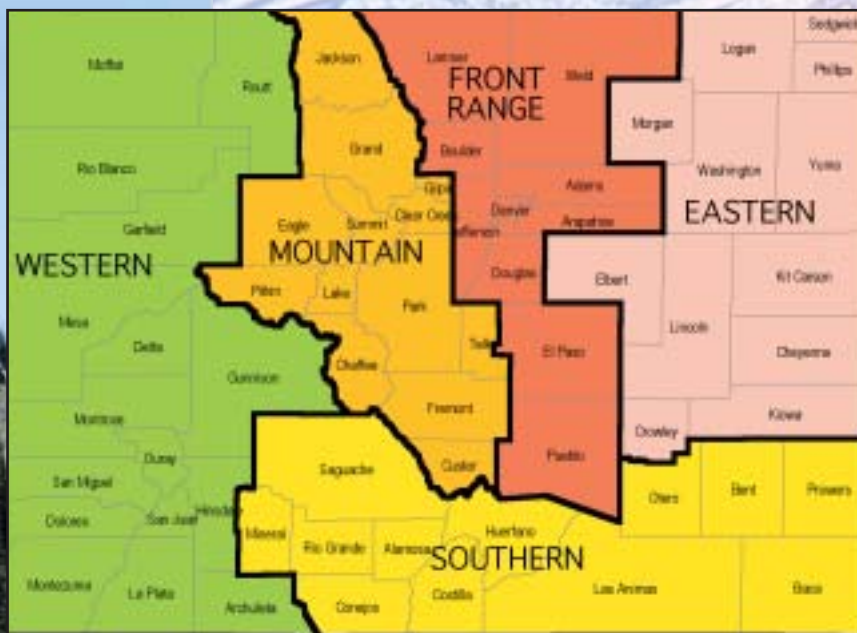
have basic physical and environmental infrastructure needs, such as housing, transportation systems, water, power, parks/open space, and a clean and healthy environment. Residents also require community services including, but not limited to, schools, health care, childcare, elderly care, public safety, arts & culture, and recreation.

Many of the problems associated with growth in Colorado – e.g. traffic congestion, high housing prices, loss of open space, loss of a sense of community, etc. – stem from infrastructure and community services failing to keep pace with the rate of job growth. In addition, growth is occurring in a context of limited resources; there is limited land, limited natural resources, limited environmental amenities (e.g. clean air and water), limited finances, etc. If our infrastructure and community services needs do not keep up with the rate of growth and if our limited resources are not used carefully, quality of life suffers. To close the loop, a declining quality of life can negatively affect future prospects for economic development, as

businesses depend on and are attracted to healthy, well-functioning communities.

The challenges of growth are best addressed through planning. Effective planning needs to be comprehensive, taking into account all of the demands that growth places on the local infrastructure, community services, finacial assets and environmental resources. Additionally, planning needs to incorporate the desires of the local community, embodying their preferences regarding tradeoffs in the use of scarce resources. The most effective planning reduces negative impacts, creates positive value, and minimizes the need for tradeoffs through solutions that advance multiple goals.

It should be recognized that some parts of the state are experiencing economic stagnation or decline. In many of these regions, the desire for economic expansion is of prime concern. An understanding of these regions' basic industries, including their strengths and the opportunities to improve their future prospects, and the identification and recruitment of new industries for which the areas can offer meaningful advantages are important components of their economic development strategies.

Outline and Approach

The underlying concept of the Colorado Index Project is that quality of life is closely associated with good community development. Good community development, in turn, involves providing the comprehensive set of infrastructure and community services needed by people in balance with judicious use of our scarce resources (environmental, capital, etc.). To the extent possible, each indicator is summarized at the regional (see map) and statewide level to both recognize the varying conditions throughout the state and the interdependence of regional communities in achieving their quality of life goals.

As discussed above, changes in the economy result in population changes and different infrastructure needs. The ability of a community to provide adequate infrastructure and support a high quality of life, in turn, affects its future economic development potential. Therefore, the first set of indicators evaluated in this report relate to the economy, in recognition of its role as a primary catalyst of community growth and change; the second section reviews population/demographics, including population trends and selected demographic measures; and the third and most diverse section analyzes several of the state's physical (housing, transportation systems, water, power, etc.), social (education), and environmental (clean air, water resources, etc.) infrastructure systems.

The indicators presented in this report are by no means comprehensive. Many elements important for a high quality of life and good community development are not covered (e.g., health, recreation, libraries, government administration, etc.), primarily due to space and time limitations. Moreover, the indicators covered in this report only tell part of the story for the trend or pattern that each indicator is intended to illustrate. This report is, however, a good starting point for understanding trends and patterns affecting the state. By compiling multiple trends in one place and discussing interrelationships between those trends and among regions, this report is an initial attempt to identify and prioritize issues that are important for ensuring and maintaining a high quality of life in Colorado.

Many of the problems associated with growth in Colorado … stem from infrastructure and community services failing to keep pace with the rate of job growth.

Colorado's Rankings in Selected National Indicator Studies

Introduction

There are many ways to assess Colorado's "quality of life." Indicators can be examined at the statewide level to assess how well Colorado is doing relative to its past performance. Indicators can also be measured at the regional level and compared to the state as a whole or to other regions. This chapter compares Colorado's ratings on various quality of life indicators to those of the other states.

Methodology

As part of the research for the Colorado Index, we evaluated over 20 studies comparing state-by-state rankings on more than 300 indicators. The studies evaluated such issues as children, crime, economy, education, environment, and health. While most of the studies are explicit attempts to rank the states relative to some issue such as the economy or environment, sometimes with a political agenda, some are simply summaries of data compiled by the federal government or attempts to show which states are the most "livable." In compiling the studies, we placed all the rankings on the same scale, where a value of "1" is the best rank for that indicator. If an indicator measures a negative phenomenon such as teen births, a rank of "1" would mean that that state has the lowest percent of teen births of all fifty states. As a caution, some of the rankings may be dated as many of the indicators rely on data that was generated as long as five years ago. Also, because these studies compare states with each other rather than against an absolute or ideal attainment value, high rankings can be misleading when a vast majority of the states fall below a desired attainment level.

Analysis

Colorado Ranked in Top Five

Comparing Colorado to other states can highlight those areas in which Colorado excels. Of the studies evaluated, several ranked Colorado among the top five states overall. Following is a discussion of six of these studies, including three which focus on the economy, one on "livability," one on women's health, and one on open space protection programs.

With respect to the economy, the Progressive Policy Institute's "State New Economy Index" ranked Colorado third out of all the states based on Colorado's ability to adapt to the new technological and knowledge-based economy. This study examined 17 economic indicators intended to measure the extent to which ideas, innovation, and technology are embedded in all sectors of the economy. States with the ability to spur technological innovation, entrepreneurship, education, specialized skills, and the reorganization of businesses from bureaucratic hierarchies to learning networks are expected to be the most economically successful in the future. Table 1 shows the

top 4 states and Colorado's ranking overall and for each of the five groups of indicators measured. In this table, *Knowledge Jobs* indicators measure the percent of the workforce working in offices; jobs held by managers, professionals, and technicians; and the education level of the workforce. *Globalization* indicators measure the extent to which manufactured goods are produced for export and the share of the workforce employed by foreign-owned companies. *Economic Dynamism and Competition* indicators measure the

Table 1. State New Economy Index indicator groups: top four states plus Colorado.

Rank	Overall	Knowledge Jobs	Globalization	Economic Dynamism & Competition	Transformation to a Digital Economy	Technological Innovation Capacity
1	Massachusetts	Massachusetts	Alaska	Nevada	Alaska	Massachusetts
2	California	Connecticut	Hawaii	California	Washington	California
3	**Colorado**	**Colorado**	South Carolina	**Colorado**	Utah	Deleware
4	Washington	Deleware	Connecticut	Arizona	**Colorado**	**Colorado**
Colorado	3	3	27	3	4	4

number of jobs in companies with at least 20 percent sales growth over the last four years, the rate of new business start-ups and existing business failures, and the value of initial public stock offerings. *Transformation to a Digital Economy* indicators measure the percent of adults online, the number of commercial internet domain name registrations, technology in schools, and the use of digital technologies in state government. Finally, *Technological Innovation Capacity* indicators measure the number of high-tech jobs, scientists and engineers in the workforce, patents issued, industry investment in research and development, and venture capital activity. In general, the study found that states that did well in the old, natural resource and manufacturing-based economies (West Virginia, Wyoming, and Missouri) have been slow to adapt to the New Economy, whereas states that industrialized later (California, Colorado, Utah, and Arizona) have high New Economy indicator scores. The study concluded that the top ten scoring regions tend to have abundant high-tech firms, a high concentration of workers in jobs requiring at least a two-year degree, manufacturers geared toward global markets, individuals and businesses embracing the digital economy, infrastructure that supports and fosters technological innovation, abundant in-migration of highly skilled knowledge workers, and the ability to adapt to changing markets.

The Institute for Southern Studies performed a more traditional evaluation of the existing economic performance of states. This study, titled "Gold and Green 2000," ranked Colorado fifth in the economy based on 20 "Gold" indicators, including such factors as: annual pay, job opportunities, business start-ups, unemployment rates, and workplace injury rates. The same study also analyzed 20 "Green" environmental indicators, ranging from toxic emissions and pesticide use to energy consumption and urban sprawl, to evaluate whether strong environmental standards were linked to weak economies. Table 2 shows the top five ranking states for overall economic performance and their corresponding environmental rankings. Table 3 lists the top five states for each economic and environmental indicator on which Colorado ranked fifth or higher. The study found that Colorado was one of seven states that ranked in the top 15 for both economic and

environmental health. Conversely, ten states, mostly in the South, ranked among the worst 15 on both lists. The general conclusion was that states with the best environmental records also offer the best job opportunities and climate for long-term economic development.

Table 2. Green and Gold 2000: top five economic states

State	Economic Rank	Environmental Rank
New Hampshire	1	16
Minnesota	2	6
Vermont	3	1
Massachusetts	4	18
Colorado	5	14

Table 3. Indicators for which Colorado ranked in the top 5

Rank	Employment Growth	Women in Top Jobs	Unemployment Rate	Workers in Toxic Industries	Emissions-to-Job Ratio	Toxic Chemical Discharges
1	Nevada	Maryland	Iowa	Hawaii	Vermont	Hawaii
2	Arizona	Colorado	New Hampshire	Alaska	Massachusetts	Vermont
3	Utah	Minnesota	Virginia	Florida	California	Massachusetts
4	Colorado	Massachusetts	Minnesota	Colorado	Colorado	Colorado
5	Georgia	Connecticut	Colorado	Montana	New Hampshire	California

Regarding Colorado's future economic development potential, the Corporation for Enterprise Development gave Colorado letter grades of "A" on its "2000 Development Report Card" for the seventh year in a row. This study analyzed 73 data measures grouped into three index categories: performance, business vitality, and development capacity. The performance index measures how well states provide opportunities for employment, income, and an improving quality of life; the business vitality index measures the health and diversity of the businesses located within a state; and the development capacity index examines the quality and availability of the building blocks of successful economies. Other states receiving straight A's for these three categories include Massachusetts and Utah, followed by Connecticut and Washington with a mix of A's and B's. The study concluded that Colorado's high grades result from its holistic approach to economic development, where the state encourages quality and sustainable development, not just quantity. Colorado is also a leader in the percent of state and local funding for higher education. Plus, with its high quality of life, Colorado has attracted many highly educated

people from other states, making Colorado the leader in head of households holding college degrees. Finally, customized job training programs, workforce centers, and a school-to-career program have all helped to give Colorado, and its workforce, an edge.

In terms of overall "livability," Morgan Quitno Press ranked Colorado third based upon evaluation of 43 positive and negative statistical indicators related to the cost of living, street safety, employment opportunities, quality of education, and economic health. The indicators are not intended to reflect which states are "the most fun or the best place for everyone to live," but rather those states that "offer the kind of lifestyle that most Americans agree is positive." Minnesota and Iowa were ranked "1" and "2," with Utah and Nevada following Colorado at "4" and "5," respectively. The study concluded that Minnesota's primary advantage was attributed to the state's well educated, healthy, and involved population as indicated by the state's high percentage of high school and college graduates, low percent of persons not covered by health insurance, and high voter participation. Colorado, in comparison, shares Minnesota's well educated and involved population, but lags in the percent of population not covered by health insurance, percent of low birth weight babies, per capita state funding of art agencies, state cost of living index, and homeownership rate.

Regarding women's health issues, the National Women's Law Center ranked Colorado fifth based on the state's attentiveness to women's health needs and availability of services. Hawaii, Vermont, Massachusetts, and Minnesota were ranked first through fourth, respectively. This study measured 32 status indicators reflecting women's access to health care services, the degree to which women receive preventive health care and engage in health-promoting activities, the occurrence of key women's health conditions, and the extent to which the communities in which women live enhance their health and well-being. Thirty-two policy indicators, based on state statutes, regulations, policies, and women's health programs, were also analyzed. The study found that, of the 25 status indicators with benchmarks for attainment specified by the U.S. Department of Health and Human Services, 10 of the benchmarks were missed by every state, including women without health insurance, first trimester prenatal care, and wage gaps. Based on the benchmark analysis, states were also rated as satisfactory, unsatisfactory, or failing to meet women's health care needs. No state was found to be satisfactory in this goal, indicating that even the top ranked states have much room for improvement on women's health issues.

Finally, the Sierra Club ranked Colorado fifth in its evaluation of the presence and effectiveness of state open space protection programs. Maryland, New Jersey, Illinois, and Oregon ranked first through fourth, respectively. The report, titled "Solving Sprawl: The Sierra Club Rates the States," was designed to evaluate and rank the statutes, programs, and policies that states have adopted to manage sprawl, including those for open space protection. Three main open space criteria were evaluated: (1) the existence of initiatives to prevent the loss of open space, (2) the presence of state agricultural protection programs to preserve farmlands, and (3) state management of floodplain sprawl. In general, those states with open space purchase programs, agricultural protection zoning, transfer of development right programs, and minimal wetland and floodplain development ranked highest. While the study recognized that state protection programs are useless without effective implementation and strong enforcement, a few states with poor enforcement, but big promises, including Georgia, Florida, Washington, and California, still tended to rate high. Colorado was found to excel at containing floodplain sprawl and acquiring agricultural conservation easements. Also, the presence of agricultural protection zoning and transfer of

development right programs were evaluated as somewhat effective. However, implementation of these, and other, programs were rated as being rather weak and ineffective. While Colorado rated well in relation to the other states, only two states, Maryland and New Jersey, received at least half of the possible points in this category, indicating that at least 48 states have open space protection programs that are far from ideal.

Colorado Ranked in Bottom Five

The above discussion shows that, although a state may rank well against other states for a specific indicator, top ranked states may or may not excel in relation to an ideal attainment value for that indicator. However, it is fairly safe to assume that states that rank near the bottom when compared to other states could stand some improvement in the subject category. Based on the studies evaluated, Colorado ranks among the bottom five states in low birth weight babies, per capita water usage, ratio of loans to deposits, and per capita state funding of art agencies. Interesting observations are that, although Colorado has the largest percent of residents with college degrees of any state, Colorado ranks in the lower half of states for the percent of students that graduate high school. In Education Week's Quality Counts 2000 report, Colorado received primarily C's and D's for public school funding equity, quality and availability of educational resources, teacher quality, and school climates conducive to learning. When Colorado's high rank of "3" for net in-migrated residents is also considered, this indicates that the majority of Colorado's college educated workforce has relocated from other states. Also, despite Colorado's high standing for women's health services and ranking of "12" from Morgan Quitno Press for overall access to affordable health care, Colorado ranked a mediocre "29" for the percent of population not covered by health insurance, "39" for child immunization rates, and "42" for the number of community hospital beds per

100,000 population. Finally, despite Colorado's favorable rank of "5" from the Sierra Club for open space programs, the same study ranked Colorado 29th in land-use planning and 45th in community revitalization programs based on the type, variety, and effectiveness of tools adopted by the state government to manage growth and promote effective smart-growth solutions.

Conclusion

Figure A summarizes the number of indicators for which Colorado ranks among the ten best and the ten worst states, as compiled from the studies analyzed. Colorado ranks relatively high on the economy, future economic development potential, and overall "livability." However, despite Colorado's high rank compared to other states on women's health issues and open space protection programs, closer analysis finds that almost all states in these categories have unacceptable performance when related to defined attainment values. These examples show that caution should be taken when interpreting high comparative rankings.

As shown in Figure A, the total number of indicators for which Colorado ranks in the bottom ten states is much less than the top ten. Also, the bottom ten is not dominated by any one category, but contains an assortment of indicators from all categories. By grouping indicators from each category, however, patterns can be found that identify areas where Colorado may need improvement. For example, two of the lower economic indicators, commercial and industrial loans to total loans (rank "41") and loans to deposits (rank "49"), indicate that local banks may not be as aggressive in serving Colorado businesses as they could be. Not all of these comparisons and relationships have been evaluated in this report. However, the studies analyzed in this report are located on the World Wide Web at the addresses specified in the attached bibliography. These reports provide the opportunity for further analysis and discussion.

Figure A: Colorado's Ranking Relative to the 50 States on 300+ Indicators

Number of Indicators (x-axis): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18

Colorado Rank Relative to 50 States (1 = Best) (y-axis): 1–10, 40–50

COLORADO #1 RANKINGS
Workforce education
College attainment
Quantitative literacy
Prose literacy
Document literacy

COLORADO #2 RANKINGS
Online population
High tech jobs
Average annual pay growth
Technology companies
SBIR grants
Women in top jobs
Change in per capita personal income, 97 - 98
College entrance exams
State Medicaid managed care enrollment
Heart disease

COLORADO #3 RANKINGS
Aggregated Knowledge Jobs Scores
Aggregated Economic Dynamism Scores
Job churning (# new start-ups and business failures, combined, as share of all companies)
Venture capital
Poverty rate
New companies
Venture capital investments
Households with computers
% women in labor force
Risk for heart disease
Cancer cases
Net migration

COLORADO #40 - 42 RANKINGS
% teens who are high school drop outs
% people under 18 in poverty
Nonfarm employment-% manufacturing
Solid waste generated
Comm and ind loans to total loans
Royalties and licenses
Young adult enrollment (18-24 years old)
Suicide rate
Change in new companies
Persons below poverty level

COLORADO #43 - #49 RANKINGS
Students returning at 2-year colleges
Pupil-teacher ratio, public schools
State government general revenue per capita
Voter turnout African American (1996)
% change in # of crimes 1997 - 98
Community revitalization
Low birth weight babies
Total water use per capita
Per capita state art agencies' legislative appropriation
Loans to deposits

Legend:
- Children
- Crime
- Economy
- Education
- Environment
- Health
- "Livability"

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Summary of Colorado Indicators

Chapter 3 contains a summary table of the quality of life indicators presented in this report. The table presents desired conditions for each indicator section to provide a frame of reference for the actual trends observed in Colorado. It also includes a column containing "links" (direct or indirect) between indicators. It is important to note that connections between every indicator in this report can be established (e.g., the water supply affects the ability of some businesses to locate in an area, which can affect the unemployment rate and wages) depending on the complexity of the analysis.

Economic Indicators

	Economic Base	**Desired Condition: Diverse and vibrant local economies that minimize the impact of cyclical downturns and changing market conditions.**	**Linked to Indicator #:**
1	Share of jobs and income by basic industry sector	Colorado Condition: The economic base of Colorado's counties varies significantly by region. The Front Range has the most diverse economic basse, with significant employment in regional center/national services, manufacturing, and government. Most other regions are more specializied in one or two industries, specifically agriculture in Eastern and Souther Colorado, and tourism in the Mountains and Western Colorado. Retiree income is significant in all regions, indicating the importance of retirees' finacial security.	Affected by: 1, 4-8, 11-13, 15, 19, 21, 22, 29, 30 Affects: 2, 3, 5-8, 10-15, 18, 23, 25-34
	Employment	**Desired Condition: Widespread and abundant job opportunities.**	
2	Unemployment rate	Colorado condition: Colorado's unemployment rate in recent years has fluctuated with the ups and downs of the economy. From a peak of 6.0% in the recession year of 1992, unemployment steadily dropped through the boom years of the 1990s, hitting a low of 2.6% in 2000. Unemployment then rose again in 2001 as recessionary conditions hit the nation, reaching 4.7% in November 2001, the most recent available data at the time of this report. Throughout the fluctuations over the past ten years, Colorado's unemployment rate has consistently remained below the national unemployment rate.	Affected by: 1, 6, 7, 8, 19, 20 Affects: 3, 5, 6, 7, 10, 11, 14
	Income	**Desired Condition: Local wages ensure prosperity for all residents.**	**Linked to Indicator #:**
3	Poverty Rate	Colorado Condition: Between 1993 and 1998, the statewide poverty rate dropped from 11.7% to 9.8%. Each major region in Colorado experienced a drop in its poverty rate over this period, with the Front Range experiencing the greatest decline. The Mountain region had the lowest poverty rate in 1998 (8.5%), followed by the Front Range (9.1%), Western Colorado (12.2%), Eastern Colorado (12.3%), and Southern Colorado (22.4%). The poverty rate is based on uniform national standards and does not reflect the local cost of living, which is higher in much of Colorado than the national average.	Affected by: 1, 2, 4, 5, 12, 21, 22 Affects: 3, 5, 6, 7, 10, 11, 15
4	Family needs budget	Colorado Condition: In each Colorado region and for each household type, the basic family needs budget far exceeds the comparable federal poverty line (almost three times higher in some cases). The proportion of households in Colorado that are likely to have difficulty meeting basic needs is thus higher than suggested by the poverty rate (Indicator 3). There are significant differences in the cost of living in different portions of the state, primarily due to differences in the cost of housing and childcare. The cost of living in some of the more expensive regions is offset by higher wage rates (Indicator 5).	Affected by: 1, 7, 12-16, 18, 23, 28, 29-32 Affects: 3, 5-8, 10, 11, 14, 25, 27, 28, 34
5	Cost of living vs. wages	Colorado Condition: The cost of living grew more rapidly than the average annual wage between 1993 and 1997 in all regions of the state, meaning that life in Colorado became relatively less affordable for residents over this period. Wages caught up slightly from 1997 to 1999, but not enough to bring affordability to 1993 levels. The Front Range has the second highest cost of living (behind the Mountain region), yet is comparatively more affordable for local residents than all other regions of the state due to higher average wages. These results illustrate the challenge of maintaining affordability during periods of growth.	Affected by: 1, 2, 7, 12-16, 18, 23, 28, 29-32 Affects: 1, 3, 7, 11, 14, 17, 23, 25, 27, 28, 34
	Public Finance	**Desired Condition: Tax base does not lag population growth and ensures sufficient funding for public services.**	
6	Local tax base	Colorado condition: From 1990 to 2000, inflation-adjusted per capita state taxable sales increased by 28.8% in the state as a whole, with with increases in the Front Range (33.5%), Western Colorado (17.2%) and Southern Colorado (3.7%), but declines in the Mountain region (-2.3%) and Eastern Colorado (-13.6%). Total inflation-adjusted assessed valuation per capita, influenced by the constraints for the Gallagher Amendment, declined by 14.3% statewide between 1990 and 2000, with an increase in the Mountain region (3.5%), but declines in Western Colorado (-0.3 percent), the Front Range (-18.7 percent), Southern Colorado (-21.2 percent), and Eastern Colorado (-28.7 percent).	Affected by: potentially all Affects: all

Population Indicators

Population	Desired Condition: Population changes at rates consistent with maintaining community vitality and sustainability.	
7 Population growth	Colorado Condition: Colorado's population grew 30.6% between 1990 and 2000. Only Nevada (66.3%) and Arizona (40.0%) grew faster in this period. The most rapid growth occurred in the Mountain region (54.2%), followed by the Western (32.2%), Front Range (29.6%), Eastern (25.9%), and Southern regions (11.2%). Colorado's strong economy and quality of life are often cited as the leading reasons for this growth. Nearly every other "quality of life" indicator has been affected by this rapid growth.	Affected by: all Affects: all
Demographics	Desired Condition: Diverse communities that foster multi-cultural and multi-generational education, experiences, and development.	
8 Age	Colorado Condition: While the population of each age group in Colorado increased in absolute terms between 1990 and 2000, proportional shifts occurred. The state and each region had a small proportional decline in children aged 14 and under, a small increase in 15 – 24 year olds, a decline in 25 – 44 year olds, an increase in 45 – 64 year olds, and a decline in seniors over 65. The Southern region had the highest proportion of residents over 65 in 2000 (15.0%), while the Mountain region had the lowest (8.4%).	Affected by: 1, 4, 5, 7, 11-15 Affects: 1, 2, 10, 14
9 Race/ethnicity	Colorado Condition: Colorado and each of its regions has become more racially / ethnically diverse over the 1990 – 2000 period. The proportion of people who are Hispanic (of any race) increased from 12.9 percent of the Colorado population in 1990 to 17.1 percent in 2000, with increases observed in every region. The proportion who are not Hispanic and not white (or are white in combination with one or more other races in 2000) increased from 6.4 percent in 1990 to 8.4 percent in 2000, with increases again noted in all regions. In contrast, the proportion who are non-Hispanic whites (white alone in 2000) decreased from 80.7 percent in 1990 to 74.5 percent in 2000, with decreases noted in every region.	Affected by: undetermined Affects: undetermined

Human and Natural Infrastructure

Public Opinion	Desired Condition: Residents are aware of and care about current community conditions; citizens actively participate in their communities.	
10 Most important problem facing the state of Colorado (poll results)	Colorado Condition: The public's assessment of problems facing the state has changed over time. In 1992, the "economy/unemployment" (28%) and "education/higher education" (24%) were the two dominant issues. By 2000, "growth/sprawl/too many people" (27%), "other" (20%), and "transportation issues/maintenance" (16%) were predominant. The indicators herein tend to support these concerns, where economic and population indicators show growth through the 1990's, with consequent "undesirable" changes in land, natural resource, traffic, housing, and cost of living indicators.	Affected by: all Affects: potentially all, depending on community concerns and actions.
Housing	Desired Condition: Safe and affordable housing is available to all citizens.	Linked to Indicator #:
11 Percentage of renters unable to afford 40th percentile rental units	Colorado Condition: Statewide, 40th percentile one-, two-, and three-bedroom rentals are "unaffordable" to about 34%, 44%, and 59% of renters, respectively. These ratios are fairly consistent for all regions of the state, with Southern Colorado experiencing the greatest rental affordability gap. This indicates that a significant proportion of renters have limited low-rent choices in the rental market, forcing many into unaffordable units.	Affected by: 1, 2, 3, 4, 5, 7,12-15 Affects: 1, 3, 4, 6, 9, 10, 14, 15, 23, 25-28,34
12 Change in homeowner costs vs. change in wages	Colorado Condition: From 1993 to 1999, state average wages increased by 32.7%, while homeowner costs increased by 88.9%. Housing was, therefore, significantly less affordable to home purchasers earning average wages in 1999 than in 1993.	Affected by: 1, 7, 14, 15, 23 Affects: 1, 4-7, 9-11, 13-15, 17, 23, 25-28, 34
13 Number of average-wage jobs required to purchase single-family home	Colorado Condition: In Colorado, it takes about 1.5, 1.7, and 2.2 average-wage jobs to afford a 1300, 1500, and 2000 square foot single-family home, respectively. The Mountain region has the highest home prices relative to prevailing wages, followed by Western Colorado. Eastern Colorado and the Front Range have affordability ratios similar to the statewide average, while homes in Southern Colorado are more affordable than the statewide average. This indicates that households earning one wage or below-average wages have limited choices in the single-family home market or may be shut out of the market altogether.	Affected by: 1, 3-5, 12, 14-15, 23 Affects: 1, 4-7, 9-11, 14, 15, 17, 23, 25, 27-28, 34
14 Housing construction by unit type	Colorado Condition: The proportion of newly built housing units that are multifamily units in Colorado ranged from a low of 8.1% in 1991 to a high of 29.9% in 2000. Additionally, the total number of new units built per year grew over fourfold, from 11,897 units in 1990 to 53,749 units in 2000. Across the entire 1990 – 2000 period, a total of 23.3% of new units built statewide were multifamily units. To the extent that multifamily housing construction mitigates the effects of sprawl through increased residential density and housing affordability, compact land use patterns, and improved public transit feasibility, the increase in multifamily housing can be seen as a positive trend. However, to the extent that increased multifamily housing construction is driven by a rising number of residents being "priced out" of single-family homes, the trend may reflect a decrease in the affordability of housing.	Affected by: potentially 1-16, 18, 23 Affects: 4, 5, 9-13, 15-18, 23, 25-28, 29-34
15 Growth in housing units vs. growth in jobs	Colorado Condition: Between 1990 and 1999, the number of jobs increased by 37.9%, total housing units by 20.6%, and occupied housing units by 25.4% in Colorado. All regions of the state, except Eastern Colorado, experienced more rapid growth in jobs than in occupied housing units. This imbalance may be a significant factor underlying increased housing prices, as more jobholders are forced to compete for limited housing.	Affected by: potentially all except perhaps 34 (waste generation) Affects: potentially all; depends on jobs/ housing balance

Transportation	Desired Condition: Residents are offered and take advantage of a variety of safe, efficient, and reliable transportation alternatives.	Linked to Indicator #:
16 Vehicle miles traveled	Colorado Condition: Statewide, average daily VMT increased about 36 percent between 1991 and 1998. During this same period, VMT per person increased about 12 percent. VMT increases are primarily attributed to an increase in population, the number of trips made and trip length, and reduced vehicle occupancy.	Affected by: 1, 7, 12, 15, 17, 23 Affects: 4-6, 10, 17, 18, 28-33
17 Public transit passenger trips	Colorado Condition: Between 1996 and 2000, public transit passenger trips increased 11.8% statewide, while the state's population increased 10.2%. The Front Range urban centers and Mountain resort areas have the most heavily used public transit systems. A 1999 "Transit Benefits and Needs" study commissioned by the Colorado Department of Transportation estimated that 44% of the state's transit demand was being met, while 56% of demand was not being serviced.	Affected by: 1, 3-8, 10-11, 14, 16, 18, 29-31 Affects: 6, 10, 14, 16, 18, 23, 28-25
18 Traffic congestion	Colorado Condition: Traffic congestion in the Denver, Colorado Springs, and Boulder-Longmont Metropolitan Statistical Areas increased significantly between 1982 and 1999. In 1982, rush hour trips took 7 percent longer in Denver, 1 percent longer in Colorado Springs, and 1 percent longer in Boulder, than the same trip during uncongested times due to heavy traffic. By 1999, rush hour trips took 34 percent, 15 percent, and 5 percent longer than uncongested times in the respective areas.	Affected by: 1, 2, 3, 4-7, 8, 10, 15-17, 23 Affects: 4-6, 10, 16, 17, 23, 28-33
Education	Desired Condition: Quality education is available to and reaches all members of the community.	
19 Percent proficient or advanced on CSAP test vs. percent qualified for school lunch programs	Colorado condition: Results of the 1999/00 CSAP exams show that students in schools of low socioeconomic status (as measured by the proportion of students qualified for school lunch programs) consistently score lower than students in schools of high socioeconomic status. The differential is apparent across all grades and subject areas. This suggests a strong correlation between school socioeconomic status and test results, and implies that socioeconomic considerations need to be taken into account when developing strategies for improving student performance.	Affected by: 2-6, 9, 11-13, 15, 20 Affects: 6, 7-10, 21
20 Percent of schools by Academic Performance Rating	Colorado Condition: For the initial 2000/01 school year, based on student proficiency on CSAP tests, a pre-set 8 percent of schools at each of the elementary, middle, and high school levels were assigned a rating of "excellent," 25 percent were assigned a rating of "high," 40 percent were assigned a rating of "average," 25 percent were assigned a rating of "low," and 2 percent were assigned a rating of "unsatisfactory." If schools were rated on a straight standard in 2000/01, 56% of the schools would fall below average because they currently do not meet the target that 80% of their students are proficient or above in reading, writing and mathematics.	Affected by: 5, 6, 10, 19 Affects: 6, 10, 19, 21
21 High school graduation rate	Colorado Condition: Based on trends from 1981 through 1999, Colorado's high school graduation rates have generally tracked with the United States as a whole, yet are higher overall. According to the Colorado Department of Education, Colorado had a high school graduation rate of 80.9% in 2000. Colorado's high school attainment rate was higher, at 89.7% (US Census), indicating that Colorado may be importing some of its educated workforce. Overall, Colorado's graduation rate remained fairly constant from 1996 through 2000.	Affected by: 2-6, 20 Affects: 6-8, 10
22 College graduation rate	Colorado Condition: Cumulatively more students graduate over six years than four or five in Colorado. According to the Colorado Commission on Higher Education, just under half of Colorado's 4-year institutions met or exceeded their benchmark 4-, 5-, and 6-year graduation rates in 1999. UC-Boulder had the highest 6-year graduation rate of 63.7% in 1999. Comparisons to 1999 freshmen retention rates indicate that the majority of institutions with the highest freshmen retention rates also met or exceeded their benchmark graduation rates. Additionally, higher graduation rates are generally correlated with higher institutional support expenditures per full-time equivalent student.	Affected by: 2-5, 20 Affects: 1-3, 5-8, 10

Land Use	Desired Condition: Efficient land development patterns that are in balance with local natural systems and support vibrant, sustainable communities.	Linked to Indicator #:
23 Land development patterns	Colorado Condition: Developed land in Colorado increased by 33.5% (649 square miles) between 1982 and 1997, equating to about 3 acres per hour. Population grew at a slower rate of 27.0% during this same period. This means that new development has been using an increasing amount of land per person, an indicator of "sprawl."	Affected by: potentially all Affects: 4-6, 7, 10-15, 16-18, 24-34
24 Land protected through local and regional land trusts	Colorado Condition: The number of non-profit local and regional land trusts with an interest in Colorado lands has increased from 16 in 1990 to 35 in 2000. In this same period, the amount of land conserved through land trusts has increased over 1,200%, from 25,000 acres to about 340,000 acres. Comparatively, land trust conserved acreage in the U.S. increased about 240%.	Affected by: 3, 4, 6-8,10, 21-23, 32-33 Affects: 10, 12, 23, 32, 33
Water Supply and Usage	**Desired Condition: Water consumption does not exceed renewable supply, ensuring long-term sustainable use and drought resistance.**	
25 Freshwater consumption as a percentage of local average annual precipitation	Colorado Condition: Colorado was already using over 75% of its annual precipitation throughout much of the state, and over 100% in some areas of the state, as of 1990. This is similar to the rates of use throughout the southwest and central-west states.	Affected by: 1, 5, 7, 14, 23, 26, 27, 34 Affects: 7, 23, 26, 27, 32, 33
26 Water diversions by source	Colorado Condition: In 1995, Coloradans used an average of 3,690 gallons of water per capita for all purposes (irrigation, municipal, etc.). Approximately 38% of this water was consumed (i.e. evaporated, transpired, incorporated into products or crops, or otherwise removed from the immediate environment), while 62% was returned to the hydrologic cycle. Groundwater accounted for approximately 16% of total water withdrawals in 1995, with surface water accounting for 84%.	See "water diversions by use," below
27 Water diversions by use	Colorado Condition: In 1995, 92% of freshwater diversions in Colorado went toward irrigation, 5.1% toward public supply, and 2.9% for other uses. Between 1994 and 2000, Colorado's diversions for irrigation, industrial, and commercial uses decreased, whereas municipal and livestock diversions increased (similar to U.S. trends). The USGS attributed U.S. decreases in irrigation to the loss of agricultural land to development, more efficient irrigation systems, dry land farming, and sale of irrigation water rights to public water suppliers; decreases in commercial and industrial uses to conservation measures; and increases in public supply and livestock diversions to population growth.	Affected by: 1, 5, 7, 14, 16, 23, 25, 28, 34 Affects: 1, 7, 10, 14, 15, 23, 26, 32, 33
Energy Supply and Consumption	**Desired Condition: Energy efficiency and clean, renewable technologies are promoted to maintain economic vibrancy; decrease air, water, and land pollution; and provide long-term, sustainable sources of energy.**	
28 Per capita energy consumption by use and type of energy	Colorado Condition: In 1999, approximately 98% of Colorado's energy needs were met by fossil fuels, specifically petroleum (38%), coal (32%), and natural gas (28%). Transportation accounted for the largest share of energy consumption (32%), followed by industrial (24%), residential (23%), and commercial (22%) uses. Coloradans consumed 284.9 million BTUs per capita in 1999, a 6.4 percent increase from 1983. Colorado had the twelfth lowest per capita energy usage of all states in 1999, behind leaders Hawaii (203.7 million BTUs/capita), New York (235.4 million BTUs/capita), and California (252.7 million BTUs/capita).	Affected by: 1, 3-5, 7, 11-18, 23, 34 Affects: 1, 3-5, 10, 14, 16-18, 23, 26, 27, 29-33

Environment	Desired Condition: Clean air, pure water, and unpolluted land protect and maintain the health of all residents (human and non-human); individuals, communities, and businesses actively conserve natural resources and minimize waste.	Linked to Indicator #:
29 Percent of days when air quality is good, moderate, unhealthy	Colorado Condition: Over 80% of all days in Colorado had "good" air quality from 1995 through 2000, with the majority of remaining days classified as "moderate." The Denver Metro area had a lower share of "good" days over the period (62 – 70% depending on the year) than the other regions of the state.	Affected by: 1, 7, 14-18, 23, 28, 31, 34 Affects: 1, 6, 7, 10, 14-17, 23, 28, 30-33
30 Visibility Standard Index	Colorado Condition: Denver has been in compliance with the Colorado Visibility Standard for between 35% and 61% of monitoring days over the 1991 – 2000 period, with a long-term average of approximately 47% of monitoring days in compliance (53% of days in violation). Fort Collins has been in compliance with the Visibility Standard for between 47% to 79% of monitoring days annually over the 1994 – 2000 period, with a long-term average of 62% of monitoring days in compliance (38% of days in violation).	See Indicator 29 above
31 Greenhouse gas emissions per capita	Colorado Condition: In 1990, carbon dioxide dominated Colorado greenhouse gas emissions, followed by methane, CFCs (to be phased out by 2015), and nitrous oxide. 78% of greenhouse gas emissions were attributed to fossil fuel combustion, where 47.5% of fossil fuel combustion came from electric utilities (which are dominated by coal-fired power plants) and 27.7% came from transportation sectors. Overall, Colorado had higher per capita output of carbon dioxide and CFCs, about the same amount of methane, and much lower nitrous oxide emissions than the U.S. average.	See Indicator 29 above
32 EPA watershed quality ratings	Colorado Condition: Based on data collected between 1990 and 1999 for 65 of Colorado's 94 watersheds, 37 watersheds were defined as having "better water quality," 16 as having "less serious problems," and 12 as having "more serious problems." Of the watersheds showing "less serious" and "more serious" water quality problems, the most frequently identified pollutants are metals, and the leading sources of pollution are mining and agriculture. In a separate measurement, all 65 watersheds were deemed to have "low vulnerability" to future impairment from surrounding uses.	Affected by: 1, 7, 16-18, 23-31, 33, 34 Affects: 1, 4-7, 10, 23, 25-27, 33
33 Threatened and endangered species	Colorado Condition: The number of threatened and endangered species listed under the Endangered Species Act has increased from 9 in 1973 to 31 as of December 2000. A total of 13 plant species and 18 animal species are threatened or endangered in Colorado, with an additional 11 candidate species (one of which, the Mountain Plover, has been proposed for listing as threatened).	Affected by: potentially all Affects: 1, 6, 10, 14, 15, 23, 24, 26-28 (eventually all)
34 Pounds per capita of municipal solid waste (MSW) produced, recycled	Colorado Condition: From 1997 to 2000, total solid waste discarded into Colorado landfills increased, as did total waste per capita. In 1998, BioCycle Magazine estimates show Colorado's MSW generation rate per capita to be almost twice the U.S. average. The same source estimates Colorado recycled 17% of MSW in 1997, which is well below the 27.4% average for the United States. The U.S. experienced increased MSW generation from 1990 through 2000 with a concurrent decrease in per capita MSW generation. The US EPA cites the strong economic growth in the 1990's to be the primary reason for the former and on-site yard waste composting, use of mulching mowers, and other source reduction activities for the latter. Evaluating Colorado's economy from 1990 through 2000 and trends in waste generation by category (e.g., glass containers, yard trimmings) could help identify factors involved in Colorado's high rate of waste generation.	Affected by: 1, 5, 7, 11-15, 16, 17, 23 Affects: 1, 6, 23, 25-28, 29-33

CHAPTER 4

Economic Indicators

This chapter presents a series of indicators that move from general economic analysis to the specific challenge working families making ends meet in an increasingly expensive state. Unfortunately, the rapid changes to the state's economic fortunes have made making ends meet a challenge for a larger portion of the state's workforce.

ECONOMIC BASE

Desired Community Condition: diverse and vibrant local economies that minimize the impact of cyclical downturns and changing market conditions.

1. Share of Jobs and Income by Basic Industry Sector

Indicator definition: Basic economic activities are those sectors of a local economy that bring outside dollars into the economy, generally through exports of products and services, spending by visitors, and payments to local residents from outside of the region (e.g., social security payments and capital gains in the

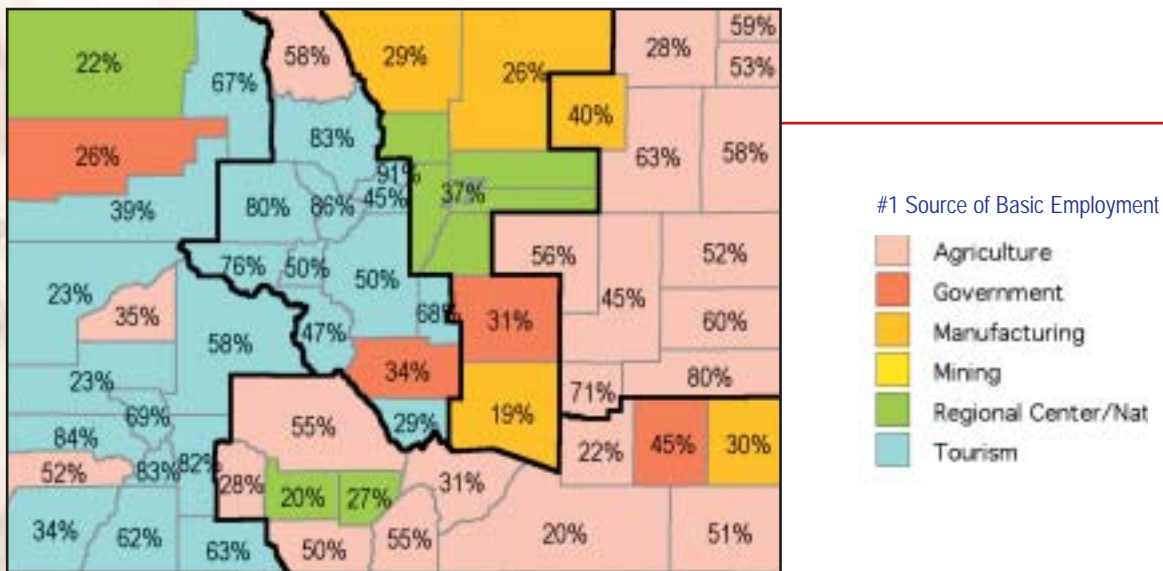**Figure 1A: Top sector of basic industry employment, by county, 1999**

#1 Source of Basic Employment

- Agriculture
- Government
- Manufacturing
- Mining
- Regional Center/Nat
- Tourism

Figure 1B: Top sector of basic industry income, by county, 1999

#1 Source of Basic Income

- Agriculture
- Government
- Manufacturing
- Mining
- Regional Center/Nat
- Tourism
- Retirees
- Other (incl. commut
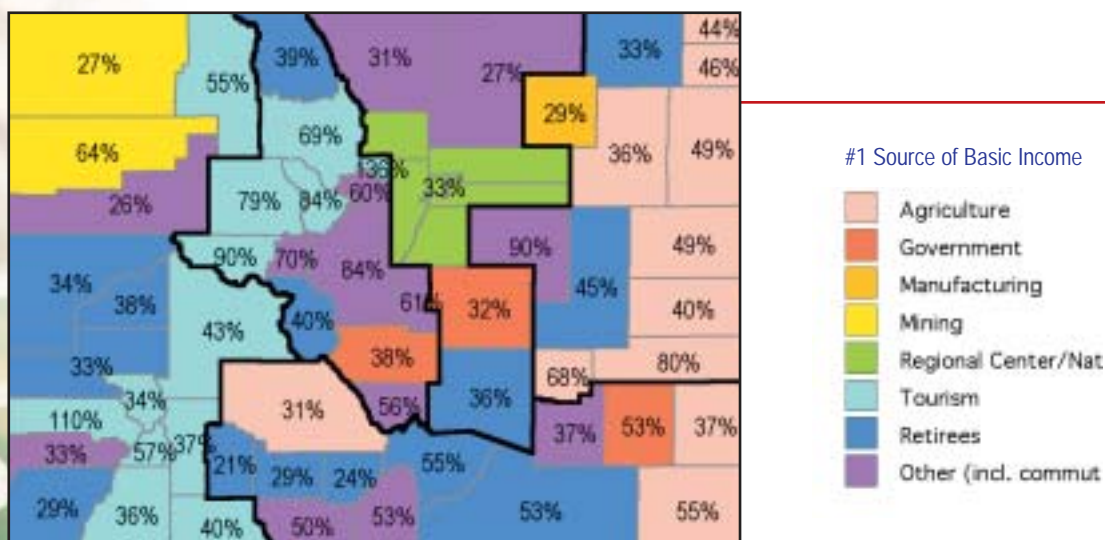
stock market). Basic economic activities are thus the engine of a local economy, constituting the primary cause of local economic growth or decline.

This indicator identifies the primary basic industry sectors for each county in Colorado as measured by total employment (Figure 1A) and income generated (Figure 1B). The 6-county Denver Metro area is presented as a single entity, reflecting the economic integration of the area.

Why this measure is important: An increase in basic industry activity promotes growth in employment and population, generating increased demand on a community's infrastructure and services (e.g., housing, transportation, clean water, public facilities, etc.). As a result, communities that are concerned about growth need to be aware of the role of basic industries as the cause of growth. Additionally, the basic industry composition of a region and the future prospects of those industries affect several components of a community including, but not limited to, economic development, labor force training and education, transportation planning, land use planning, open space preservation, and local government finance.

What the data show: The basic industry structure of Colorado's counties and regions varies significantly. In Eastern and Southern Colorado, agriculture dominates the employment sector (Figure 1A), whereas agriculture and retirees share the income sector fairly equally (Figure 1B). In the Western and Mountain regions, the employment sector is dominated by tourism, whereas tourism and retirees define the primary basic sources of income. Finally, regional center/national services, manufacturing, and government share the employment sector along the Front Range, whereas regional center/national services and "other" (e.g.,

commuters, other income) are leading income sources.

While many counties within each region share similar patterns with respect to jobs, some counties have a local basic industry structure that is different from their neighbors. This may result from a county having a major government installation (e.g., prison), mining operation, or manufacturer, or from much of the county's direct basic income being derived from Colorado resident commuters. Also, many counties, fortunately, have two or more important basic industries, which help diversify the local economy. Finally, in many counties, payments to retirees (in the form of Social Security, Medicare, pensions, dividends, interest, rent, capital gains, etc.) are one of the largest sources of direct basic income, indicating that the financial security of retirees can be very important to a region's overall economic health.

Data sources:
• Colorado Department of Local Affairs – Demography Section.
  "Base Industry Analysis"
  www.dlg.oem2.state.co.us/demog/
 economics/leifanav.htm.

EMPLOYMENT

Desired Community Condition: widespread and abundant job opportunities.

2. Unemployment rate

Indicator definition: The unemployment rate represents the fraction of the labor force that is unemployed. It is obtained by dividing the number of unemployed persons by the number of persons in the labor force. The unemployment rate rises and falls in response to changes in economic conditions.

Figure 2: Unemployment rate in Colorado by region: 1991 to 2001.
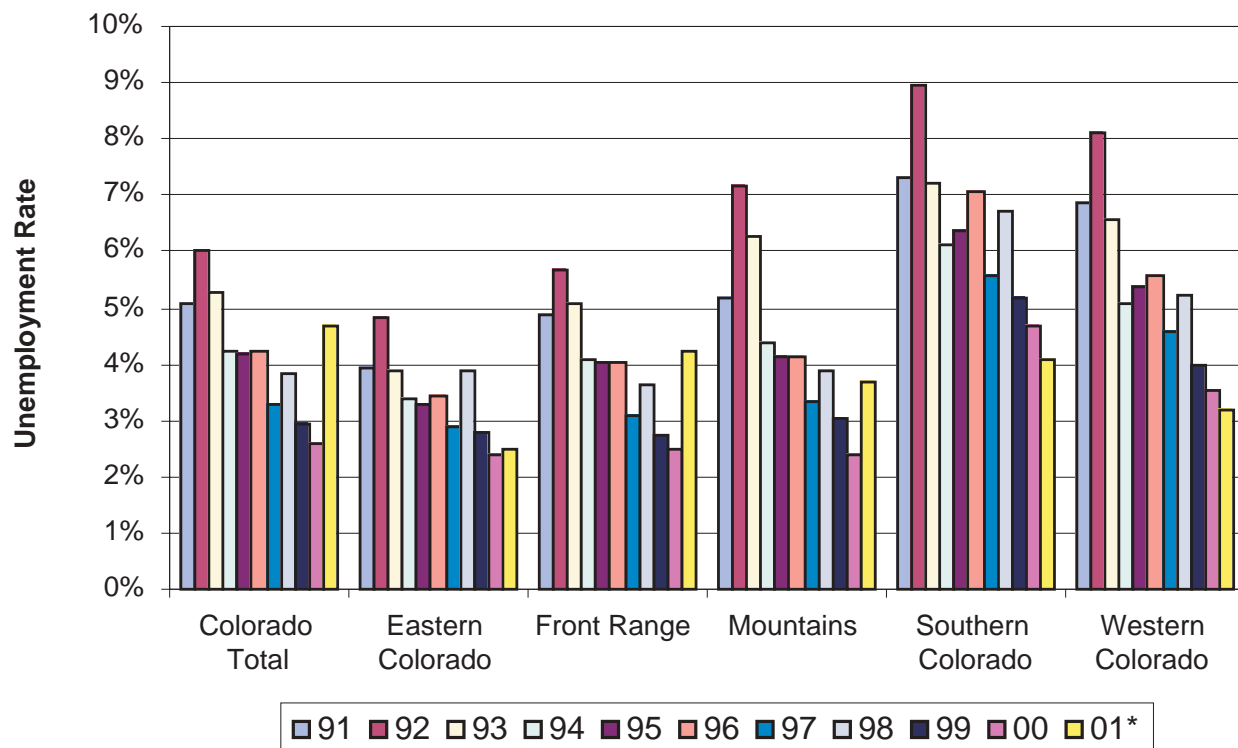
*Note: 2001 date is for October 2001 in the individual regions and November 2001 statewide. (The statewide unemployment rate in October 2001 was 4.2%.) The regional data is not seasonally adjusted, while the statewide data is seasonally adjusted.

Why this measure is important: The unemployment rate is a fundamental measure of the economic health of a community. Employment allows workers to provide for themselves and their dependents, while also offering intrinsic benefits of self-worth and satisfaction. Unemployment, on the other hand, is frequently associated with a higher incidence of individual and community stresses and problems, including financial hardship, increased physical and mental health problems, increased demands on welfare systems, increased crime, and an overall decline in quality of life.

What the data show: Colorado's unemployment rate has fluctuated in conjunction with ups and downs of the business cycle. Unemployment increased from 1991 to a peak of 6.0% in 1992 as an economic downturn hit the state. Unemployment then dropped steadily to a low of 2.6% in 2000, as the state's economy enjoyed a prolonged boom. Unemployment then rose again in 2001 as recessionary conditions hit the nation, reaching 4.7% in November 2001, the most recent available data at the time of this report. Throughout the fluctuations, Colorado's unemployment rate has consistently remained below the national unemployment rate since before 1991.

All five regions of Colorado experienced an increase in unemployment between 1991 and 1992, and all five also experienced a decline in unemployment over the 1992 – 2000 period. This indicates that all of the state's regions have participated in the fluctuations in the state's economy over the past decade. It is a little early to tell how the 2001 slowdown is affecting all parts of the state, but October 2001 data suggests that the Mountain and Front Range regions at least are participating in the current slowdown.

Data sources:
• U.S. Department of Labor. Local Area Unemployment Statistics.
   www.bls.gov/lau/home.htm

INCOME

Desired Community Condition: local wages ensure prosperity for all residents.

3. Poverty Rate

Indicator definition: The poverty rate is a measure of the proportion of the population with a household income below minimally adequate levels. Poverty thresholds were first developed in the early 1960s by the U.S. Social Security Administration to reflect the cash income needed to maintain a minimally adequate standard of living, and are updated annually for inflation based on the Consumer Price Index. Poverty thresholds vary by the number of persons in the household and the number of related children under 18 years. In 2000, the poverty threshold for a family of four with two related children under 18 was $17,463.

Why this measure is important: The poverty rate measures the proportion of persons with incomes under the federal poverty thresholds and thus provides an indicator of the population that is at risk of not being able to meet basic needs. Additionally, poverty guidelines (or in some cases a fixed multiple of the guidelines) are used in setting eligibility criteria for many federal programs, such as Head Start, Food Stamps, the National School Lunch and School Breakfast programs, and others.

One limitation to the federal poverty thresholds is that they are the same throughout the U.S. and, therefore, do not reflect local variations in the cost of living. Indicator #4 (Family Needs Budget) describes a study that developed estimates of how much income is required to adequately meet basic needs in each Colorado county, as an alternative to the federal poverty thresholds. The study found that the cost of basic needs throughout the state far exceeds the federal poverty thresholds, suggesting that the federal poverty

rate understates the proportion of households that are likely to be experiencing financial hardship.

What the data show: Between 1993 and 1998, the statewide poverty rate dropped from 11.7% to 9.8%, a positive trend. Each major region in Colorado experienced a drop in its poverty rate over this period. Colorado had a lower poverty rate in 1998 (9.8%) than the nation as a whole (12.7%).

Persistent differences in poverty rates are apparent around the state. Southern Colorado has a poverty rate in excess of twice the statewide average and Eastern and Western Colorado have poverty rates that are approximately 25% higher than the statewide average.

Data sources:
- Institute for Research on Poverty. "Frequently Asked Questions." www.ssc.wisc.edu/irp.

- U.S. Census Bureau. "Poverty in the United States: 2000." www.census.gov/hhes/www/poverty00.html

- U.S. Census Bureau. Small Area Income and Poverty Estimates. www.census.gov/hhes/www/saipe/stcty/estimate.html; www.census.gov.

Figure 3: Poverty rate in Colorado by region: 1989 to 1998.
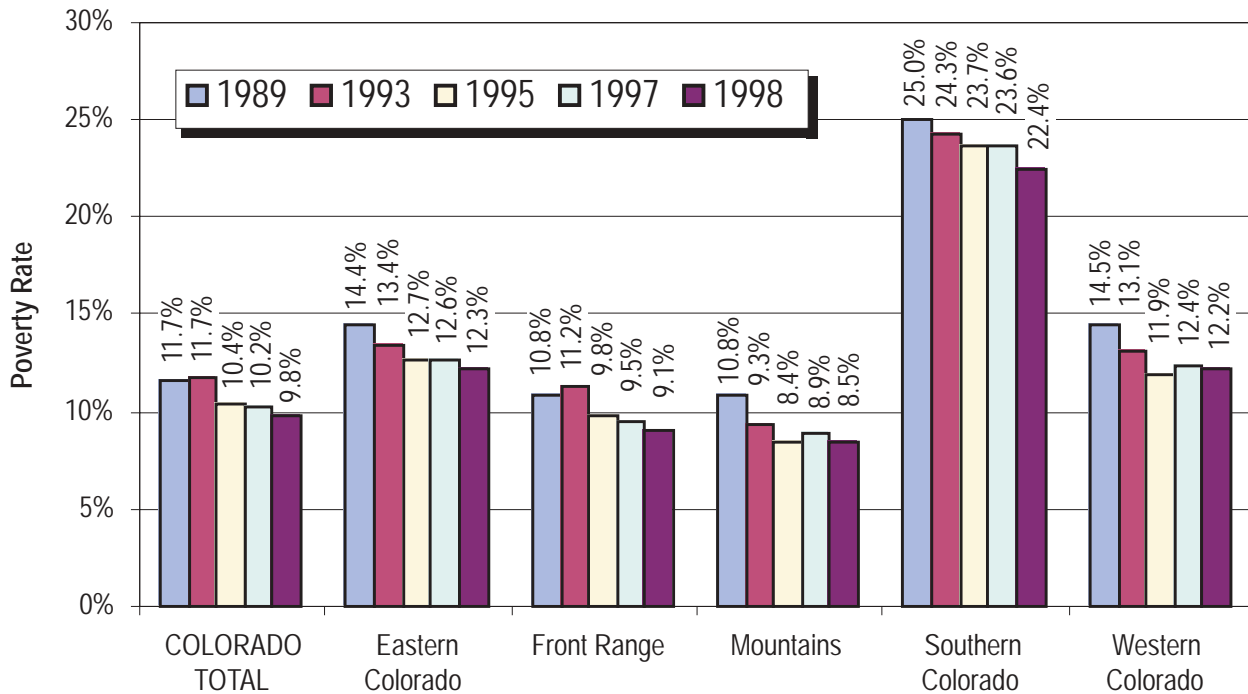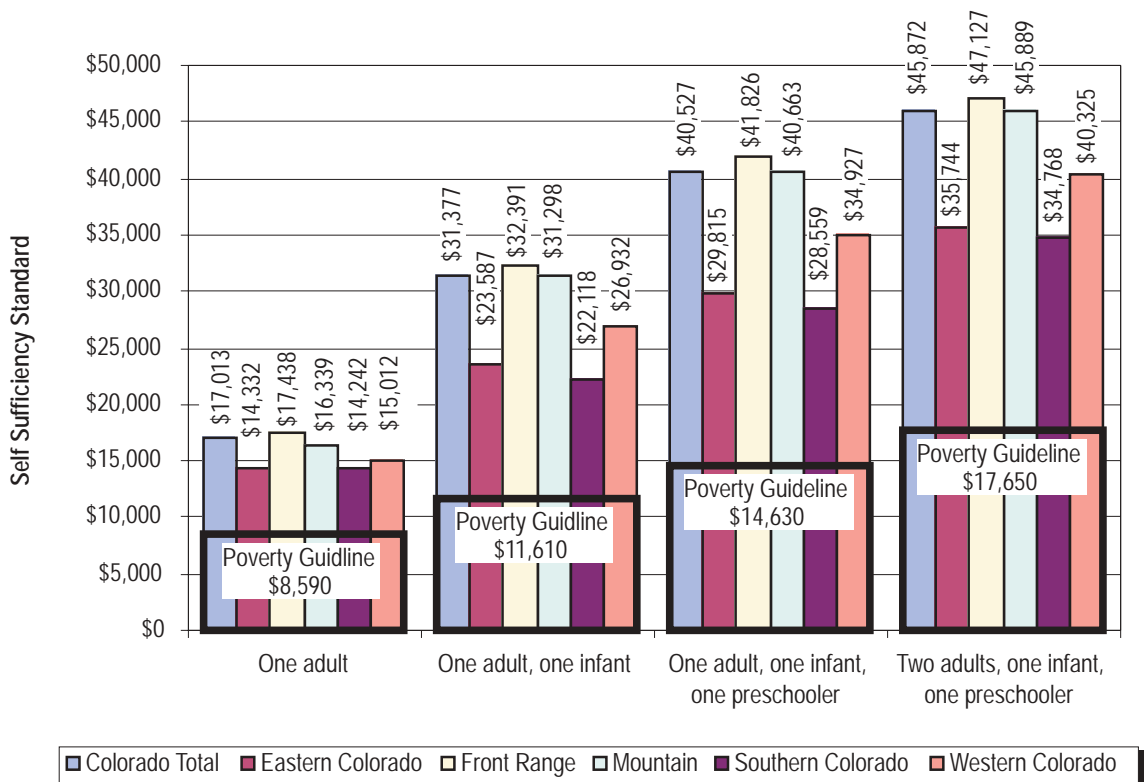
4. Family Needs Budget

Indicator definition: The Family Needs Budget aims to show the level of income required by working families to meet their basic needs without public or private assistance, taking into account family composition and location of residence. Developed in a study commissioned by the Colorado Fiscal Policy Institute, the Family Needs Budget is based on county-level costs of housing, food, childcare, transportation, health care, miscellaneous items, and state and federal taxes. Although the data is published at the county level, for purposes of this Indicator, we have taken the liberty of aggregating the counties into regions, after weighting by the number of households in each county.

It should be noted that other efforts have been made to define locally realistic cost of living estimates, including the Colorado Legislative Council / School District Cost of Living studies (see Indicator 5); Boulder / Boulder County Civic Forum; and Durango / Operation Healthy Communities.

Why this measure is important: The Family Needs Budget attempts to provide a comprehensive and geographically specific measure of the income needed to meet basic family needs. As such, it provides a measure of the threshold level of income below which households are forced (or at risk of being forced) to make tradeoffs between basic needs. This information provides a potential benchmark for public and private efforts that are aimed at assisting families with specific needs such as housing and childcare. It can also inform decisions about policies and programs related to taxation, education and training, business wage decisions, and other issues.

What the data show: Figure 4 shows the Family Needs Budget for four illustrative households: single adults (no children), one-parent families with one infant, one-parent

Figure 4: Annual Family Needs Budget vs. Federal Poverty Guidelines, 2001.

families with one infant and one preschooler, and two-parent families with one infant and one preschooler.

Figure 4 illustrates that, in each region and for each household type, the typical Family Needs Budget in 2001 far exceeds the comparable Federal Poverty Guideline. For single adults, the Family Needs Budget varies from 166% to 203% of the Federal Poverty Guideline, depending on the region. For the various illustrated households with kids, the Family Needs Budget varies from 191% to 286% of the respective Federal Poverty Guidelines, depending on the household type and region.
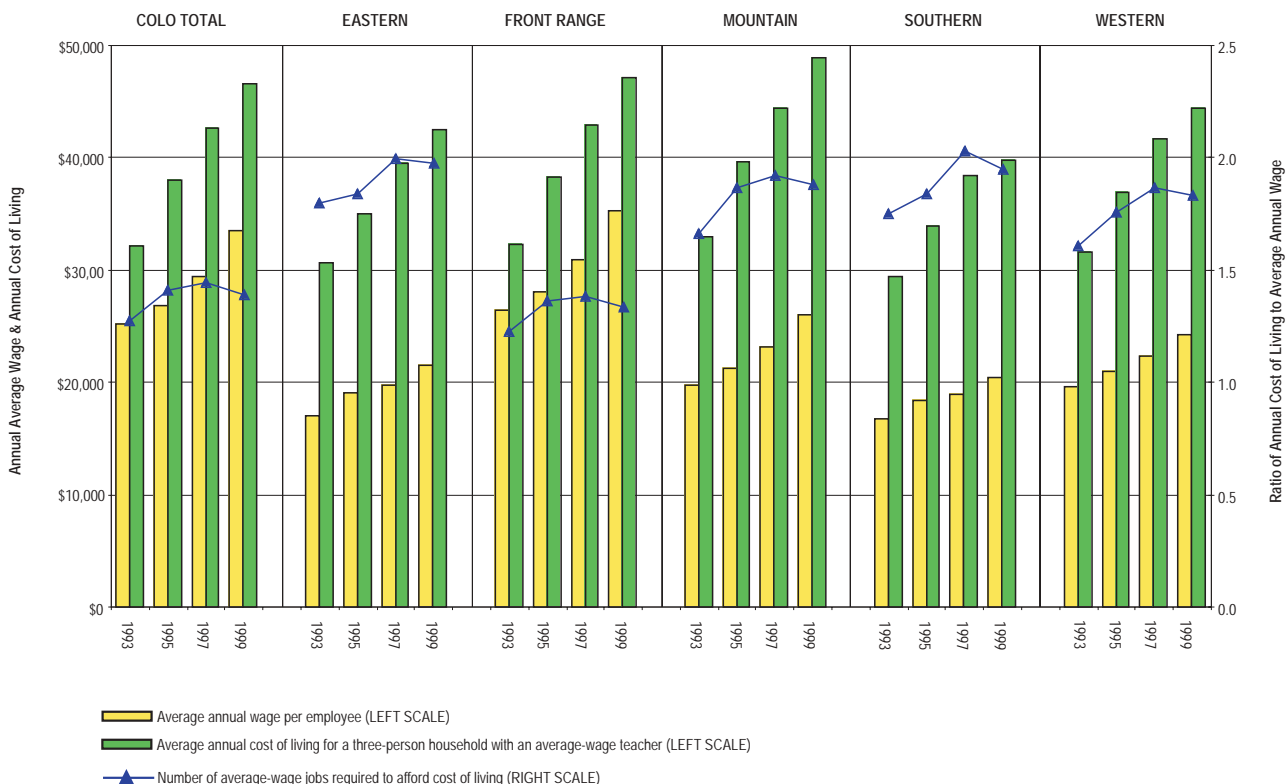
The results clearly indicate that there are significant differences in the cost of living in different portions of the state. Variations in the costs of housing and childcare are the primary cause of these differences, according to the study. The higher costs in some of the more expensive regions are in some cases offset by higher average wage rates (see Indicator 5, below). However, households employed in lower-paying occupations are likely to have difficulty meeting the basic needs thresholds in any area of the state.

Data sources:
- Pearce, Diana, with Brooks, Jennifer. "The Self Sufficiency Standard for Colorado: A Family Needs Budget," August 2001. Prepared for the Colorado Fiscal Policy Institute. Published online by the Colorado Center on Law and Policy. http://www.cclponline.org/cfpi/fullreport.pdf
- U.S. Department of Health and Human Services. "The 2001 HHS Poverty Thresholds." http://aspe.hhs.gov/poverty/01poverty.htm

Note: Counties were weighted on the basis of 2000 Census households and aggregated into regions for purposes of this analysis.

Figure 5: Annual cost of living versus average annual wage, 1993 to 1999.

Average annual wage per employee (LEFT SCALE)
Average annual cost of living for a three-person household with an average-wage teacher (LEFT SCALE)
Number of average-wage jobs required to afford cost of living (RIGHT SCALE)

5. Cost of Living vs. Wages

Indicator definition: This indicator compares average annual wage to average cost of living and is intended to show the relative affordability of different regions in Colorado.

Why this measure is important: When employees cannot afford to live in the region where they work, communities encounter problems such as increased traffic and congestion, increased infrastructure costs, decreased ability to fill employment positions, and difficulty attracting new businesses due to the small local worker base. Bedroom communities for employment centers can encounter problems with public funding when residential development far outpaces commercial and industrial revenue. In general, the less affordable a region is to the average worker that is needed to maintain the local community, the more the general quality of life in that community suffers.

What the data show: Both wages and the cost of living have grown rapidly in Colorado since 1993. The above graph shows that the cost of living grew more rapidly than the average annual wage between 1993 and 1997 statewide and in all regions of the state, meaning that life in Colorado became relatively less affordable for residents over this period. This is reflected by the increase in the number of average wage jobs required to afford the cost of living in the respective regions. Between 1997 and 1999, however, average wages grew somewhat faster than the cost of living, resulting in an increase in affordability, although affordability did not return to the levels of 1993. These results illustrate the challenge of maintaining affordability during periods of growth, such as that during 1993 through 1999.

Figure 5 also shows that the Front Range is comparatively more affordable for local residents than other regions of the state. Average wages tend to be considerably higher in the Front Range than elsewhere in the state, while the cost of living differential between the Front Range and other regions is less than the differential in wages.

Data sources:
- Colorado Legislative Council. "School District Cost of Living Study," 1993 – 99 editions. www.state.co.us/gov_dir/leg_dir/lcsstaff/schfin/1999cola.PDF (1999 edition)
- U.S. Bureau of Labor Statistics. Covered Employment and Wages. www.bls.gov/cew/home.htm.
- U.S. Census Bureau. School District Population Estimates. www.census.gov/hhes/www/saipe/schooltoc.html.

Note: School district cost of living data was weighted on the basis of 1997 school district population and aggregated into regions for purposes of this analysis.

PUBLIC FINANCE

Desired Community Condition: tax base does not lag population growth and ensures sufficient funding for public services.

6. Local Tax Base

Indicator definition: In Colorado, sales and property taxes comprise the primary tax bases of local governments. Figures 6A and 6B illustrate state taxable sales per capita and assessed valuation per capita, respectively, in inflation-adjusted 2000 dollars.

Why this measure is important: The capacity of local governments to provide public services depends, in large part, on the local tax base. Measuring taxable sales and assessed valuation per capita identifies whether a community's tax base is keeping pace with (or lagging behind) population change. If taxable sales and assessed valuation per capita decline, so does a community's capacity to provide needed services to the ocal population.

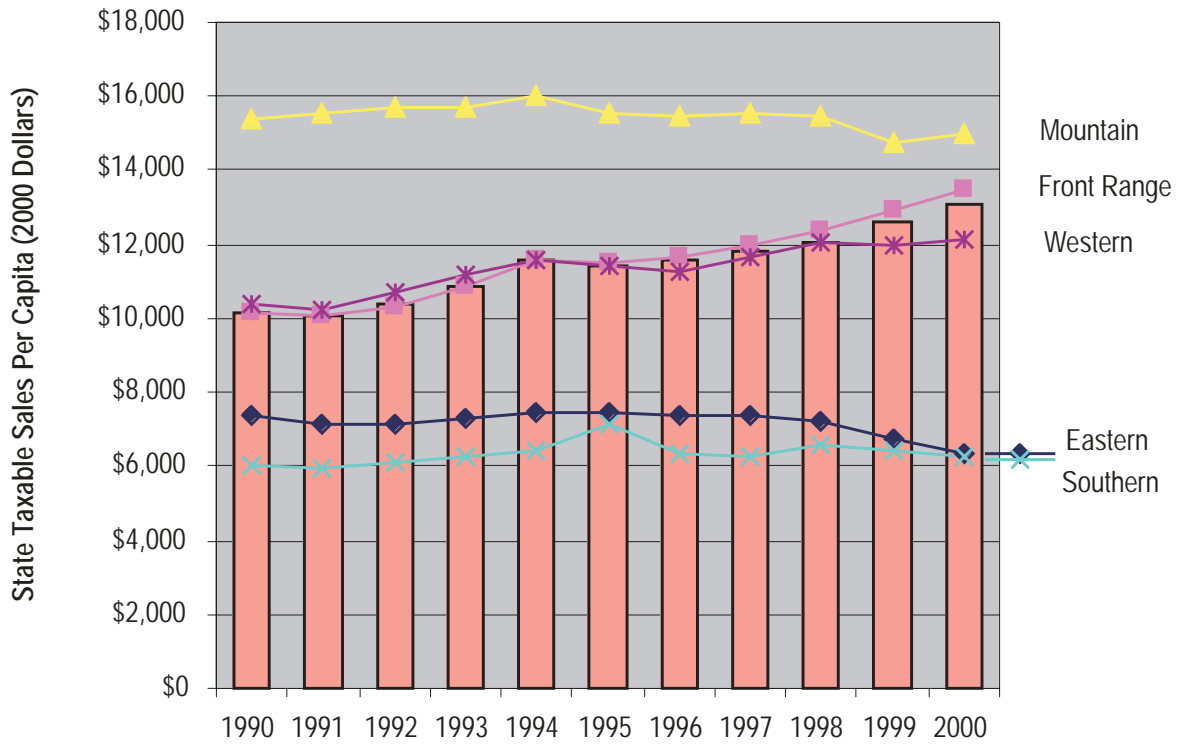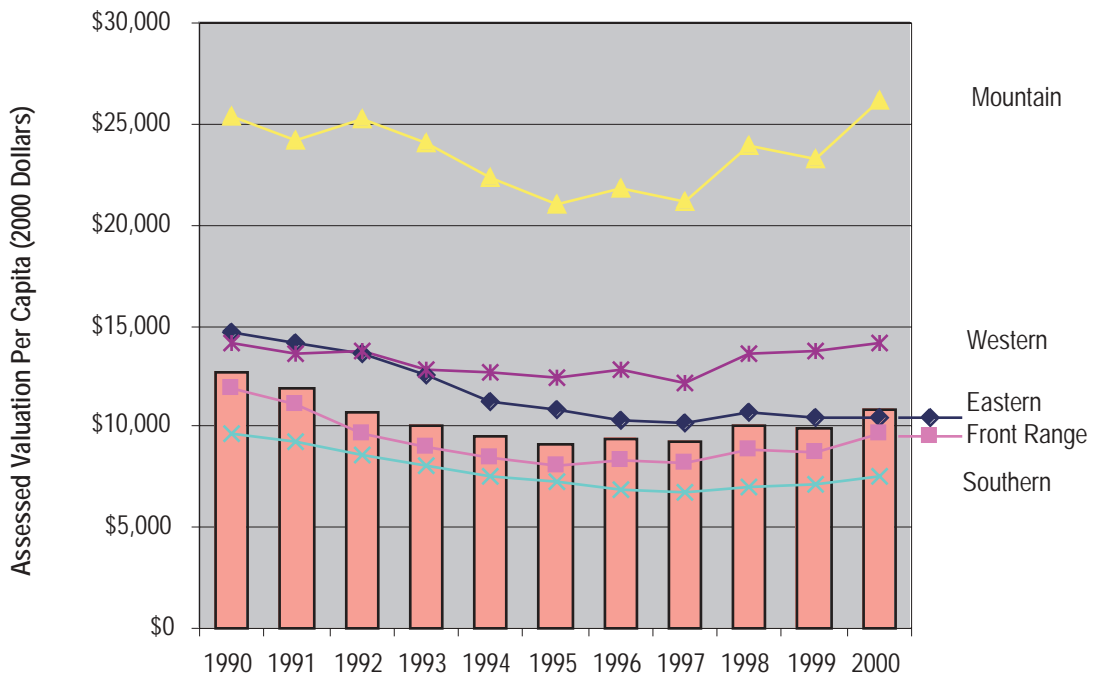**Figure 6A: State taxable sales per capita (inflation-adjusted to 2000 dollars), 1990 to 2000.**

Figure 6B: Assessed valuation per capita (inflation-adjusted to 2000 dollars), 1990 to 2000.

> *While wages in Colorado increased rapidly during the 1990s, so did the cost of living. The net result is the state is less affordable today than it was a decade ago.*

What the data show: Figure 6A shows that, from 1990 to 2000, inflation-adjusted per capita state taxable sales increased by 28.8% in the state as a whole, with wide disparities apparent by region. The Front Range experienced the largest increase over this period (33.5%), followed by Western Colorado (17.2%) and Southern Colorado (3.7%). However, real per capita taxable sales declined during the period in the Mountain region (-2.3%) and the Eastern region (-13.6%). Overall, the 2000 state taxable sales base was substantially larger on a per-capita basis in the Mountains ($14,998), Front Range ($13,509), and Western Colorado ($12,161) than in Eastern Colorado ($6,365) and Southern Colorado ($6,250).

Figure 6B shows that total inflation-adjusted assessed valuation per capita declined by 14.3% statewide between 1990 and 2000. The Mountain region was the only region to experience a real per capita gain in valuation (up 3.5%). All other regions declined, including Western Colorado (-0.3 percent), the Front Range (-18.7 percent), Southern Colorado (-21.2 percent), and Eastern Colorado (-28.7 percent). Per capita assessed valuation statewide dropped by 27.6 percent over the 1990 – 95 period, before rebounding 18.4 percent in the 1995 – 2000 period, with most regions exhibiting a similar down/up cycle. Among the regions, the Mountains have the highest assessed valuation per capita ($26,219 in 2000), followed by Western Colorado ($14,132), Eastern Colorado ($10,432), the Front Range ($9,650), and Southern Colorado ($7,580). Trends in assessed valuation are affected by the Gallagher Amendment, which holds the ratio of commercial to residential assessed valuation constant. Since the market value of residential property has generally increased more rapidly than the market value of commercial property, the value of commercial property has been the limiting factor in the overall change in assessed valuation.

In summary, the data paint a mixed picture, with per capita taxable sales and assessed valuation increasing in some areas of the state and decreasing in others. In addition, wide differences in tax bases are apparent between regions, raising issues regarding the equitable capacity to deliver services.

Data sources:
- Colorado State Demographer. Colorado Economic and Demographic Information System website. www.dola.state.co.us/is/cedishom.htm.

CHAPTER 5

Population Indicators

This chapter summarizes the explosive population increase in Colorado over the last decade. The state's popularity has increased both the scale and complexity of the quality of life challenges currently facing the state.
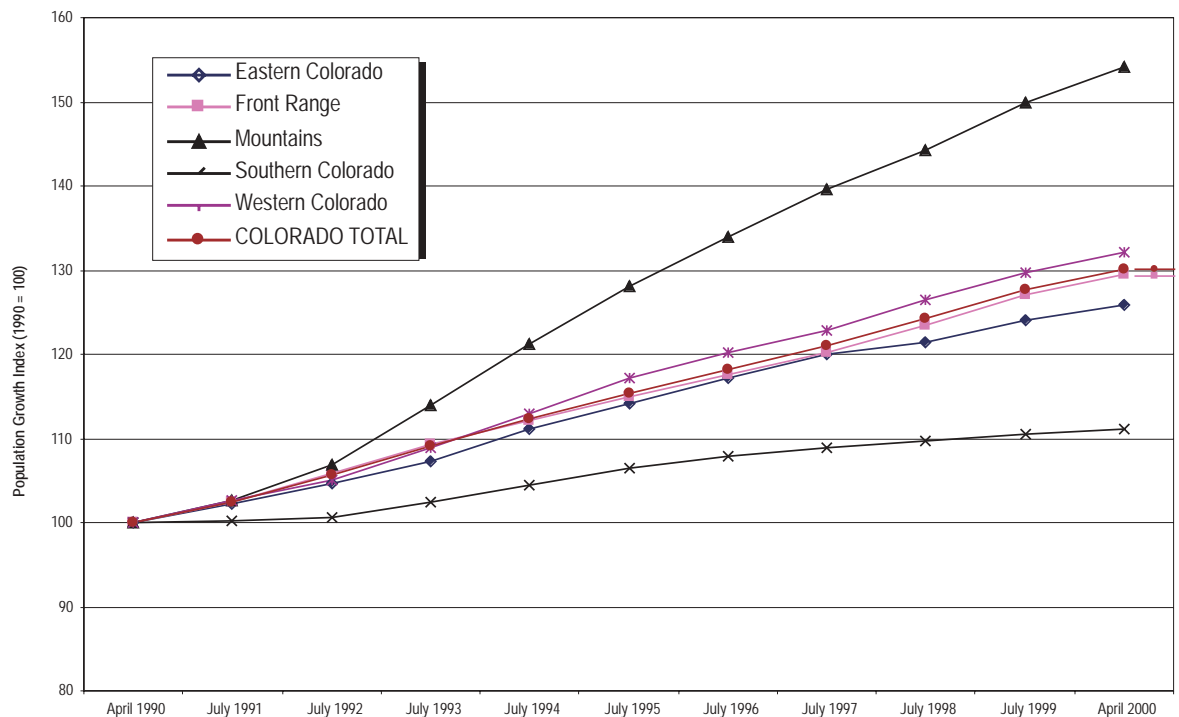
Population Indicators

POPULATION

Desired Community Condition: population changes at rates consistent with maintaining community vitality and sustainability.

Figure 7: Index of population growth by region, 1990 to 2000.

7. Population Growth

Indicator definition: Resident population is defined by the U.S. Census as all persons who are "usually resident" in the state, including such special groups as military personnel, prisoners, and undocumented immigrants, but excluding U.S. Armed Forces stationed overseas and U.S. citizens whose usual place of residence is outside of the U.S. "Usual residence" is further defined as "the place where the person lives and sleeps most of the time."

Why this measure is important: Population growth or decline can bring significant changes to the character of a community. Many of the challenges and opportunities faced by local communities in Colorado are directly or indirectly associated with underlying changes in population. By the same token, virtually every indicator in this report is affected by changes in population.

What the data show: Colorado's population grew 30.6 percent, from 3.3 million to

4.3 million, between 1990 and 2000. Only two other states grew faster during this period: Nevada (66.3 percent) and Arizona (40.0 percent). The U.S. as a whole grew by 13.2 percent. Colorado's strong economy and quality of life are commonly cited as the leading reasons for its rapid growth.

All regions of the state exhibited significant growth over the past decade, with the most rapid growth occurring in the Mountain region (54.2 percent), followed by Western Colorado (32.2 percent), the Front Range (29.6 percent), Eastern Colorado (25.9 percent), and Southern Colorado (11.2 percent).

Data sources:
- U.S. Census Bureau (1990 & 2000 data). www.census.gov
- Colorado State Demographer. 1991 – 99 Population Estimates. www.dlg.oem2.state.co.us/demog/Estimates.htm.

DEMOGRAPHICS

Desired Community Condition: diverse communities that foster multi-cultural and multi-generational education, experiences, and development.

Figure 8: Percent of population by age, 1990 vs. 2000.
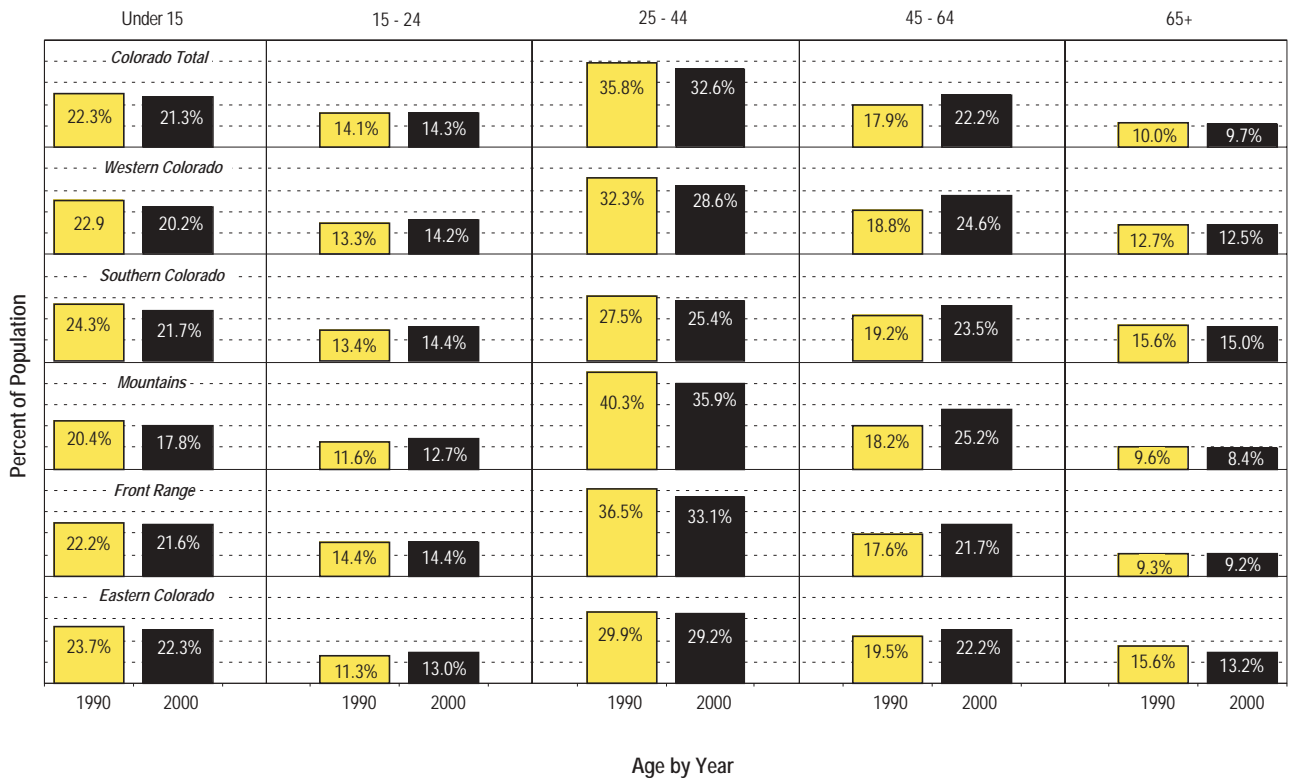
8. Age

Indicator definition: This indicator compares the proportion of Colorado residents in selected age groups in 1990 and 2000.

Why this measure is important: An understanding of the age structure of the population is important for planning appropriate community services. For example, changes in the youth population determine the demand for K-12 education, while changes in the elderly population have a significant impact on the demand for health services.

What the data show: Interestingly, the age structure of Colorado's population shows mostly minor shifts over the past ten years. The largest shifts were a decline in the proportion of 25 – 44 year olds and an increase in 45 – 64 year olds. This shift is associated with the aging of the large baby boomer cohort (aged 37 – 55 in 2001). Further, the proportion of children under 15 and seniors aged 65+ dropped slightly over the decade, while the proportion of 15 – 24 year olds increased slightly. Overall, the median age of Colorado residents increased from 32.5 in 1990 to 34.5 in 2000.

Each Colorado region experienced age shifts similar to the statewide total. Each had a small decline in the proportion of children aged 14 and under, a small percentage increase in 15 – 24 year olds, a decline in 25 – 44 year olds, an increase in 45 – 64 year olds, and a decline in seniors aged 65 and older.

Data source:
• U.S. Census Bureau. www.census.gov

Figure 9: Percent of population by race / Hispanic origin, 1990 vs. 2000.
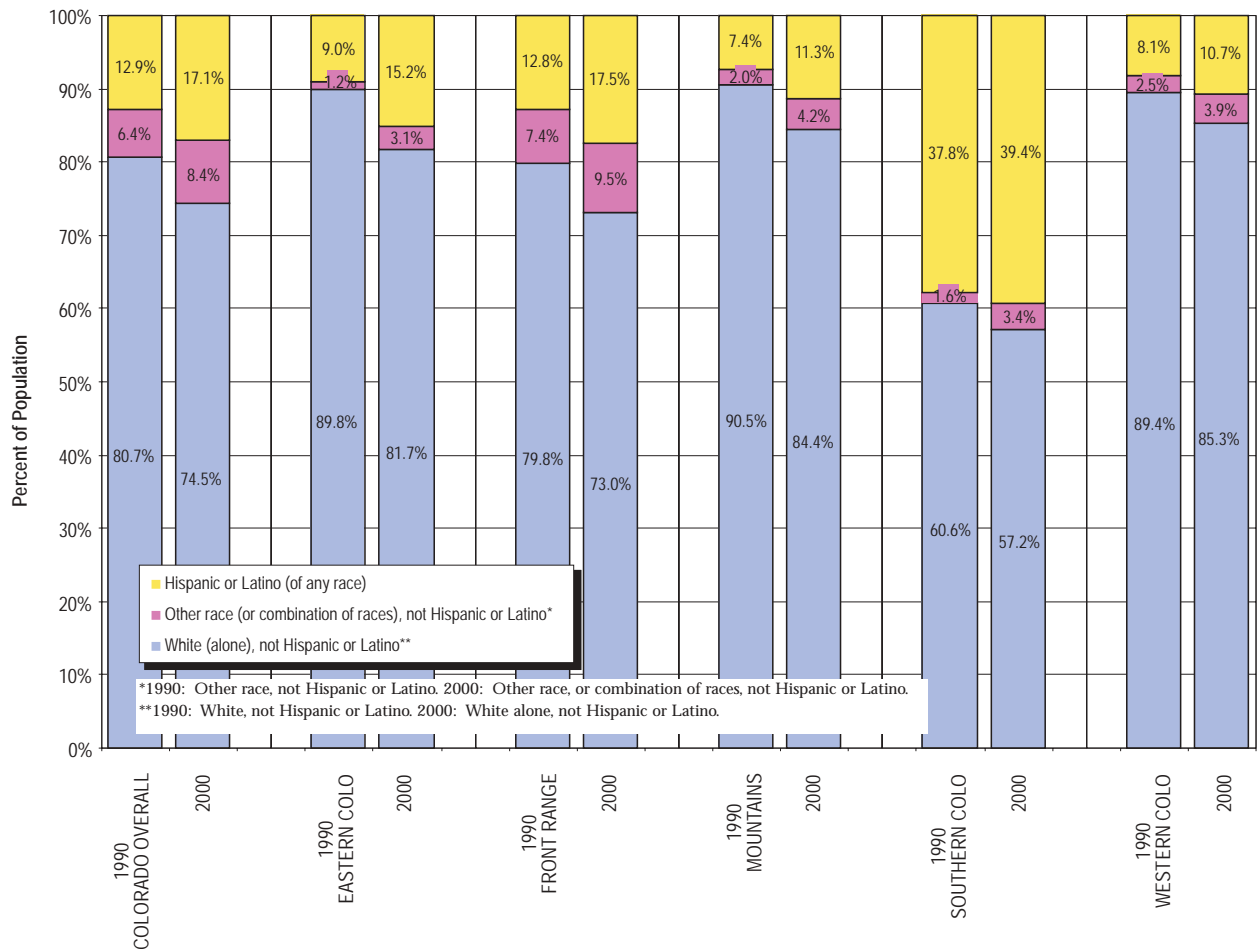
9. Race / Ethnicity

Indicator definition: This indicator provides a simplified measure of the ethnic / racial makeup of Colorado residents, based on 1990 and 2000 Census results regarding race and Hispanic origin. The concept of race as used by the Census Bureau reflects self-identification by people according to the race or races with which they most closely identify. The Census notes that racial categories are "sociopolitical constructs and should not be interpreted as being scientific or anthropological in nature." In the 1990 Census, respondents could only check off one racial category; in the 2000 Census, respondents could check off more than one racial category. Because of this difference in question structure, the race results in the 1990 and 2000 Census are not fully comparable; the asterisked notes above in relation to the graph highlight the differences.

People who identify their origin as Spanish, Hispanic, or Latino may be of any race. Origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States.

Why this measure is important: Race / ethnicity continues to be an important consideration in many public policy issues, due to concerns about discrimination, socioeconomic inequities, language issues, and other concerns.

What the data show: Although some caution is necessary due to the changes in the Census questionnaire, the results suggest that Colorado and each of its regions have become more racially / ethnically diverse over the 1990 – 2000 period. The proportion of people who are Hispanic (of any race) increased from 12.9 percent of the Colorado population in 1990 to 17.1 percent in 2000, with increases observed in every region. Additionally, the proportion of people who are not Hispanic and identify their race as other than white (or white in combination with one or more other races in 2000) increased from 6.4 percent in 1990 to 8.4 percent in 2000, with increases again noted in all regions. In contrast, the proportion of people who are non-Hispanic whites (white alone in 2000) decreased from 80.7 percent in 1990 to 74.5 percent in 2000, with decreases noted in every region.

Data source:
- U.S. Census Bureau. 1990 Summary Tape File 1 (STF-1). http://factfinder.census.gov/home/en/decennialdata.html

Colorado's population grew by 30.6%, from 3.3 million to 4.3 million, between 1990 and 2000. Only two other states grew faster during this period: Nevada (66.3%) and Arizona (40.0%).

CHAPTER 6

Human and Natural Infrastructure

This chapter includes a series of indicators on the many natural and human services that make Colorado's communities vibrant and livable places. Each of the indicators in this chapter are impacted by the indicators in the previous chapters (economy and population). Since there there is significant work already available on the more traditional health indicators in the state, we have focused on indicators relating to housing, transportation, education, land use, and environment.

Human and Natural Infrastructure

PUBLIC OPINION

Desired Community Condition: residents are aware of and care about current community conditions; citizens actively participate in their communities.

Figure 10: Most important problem facing the state of Colorado (poll results), 1992 to 2000.
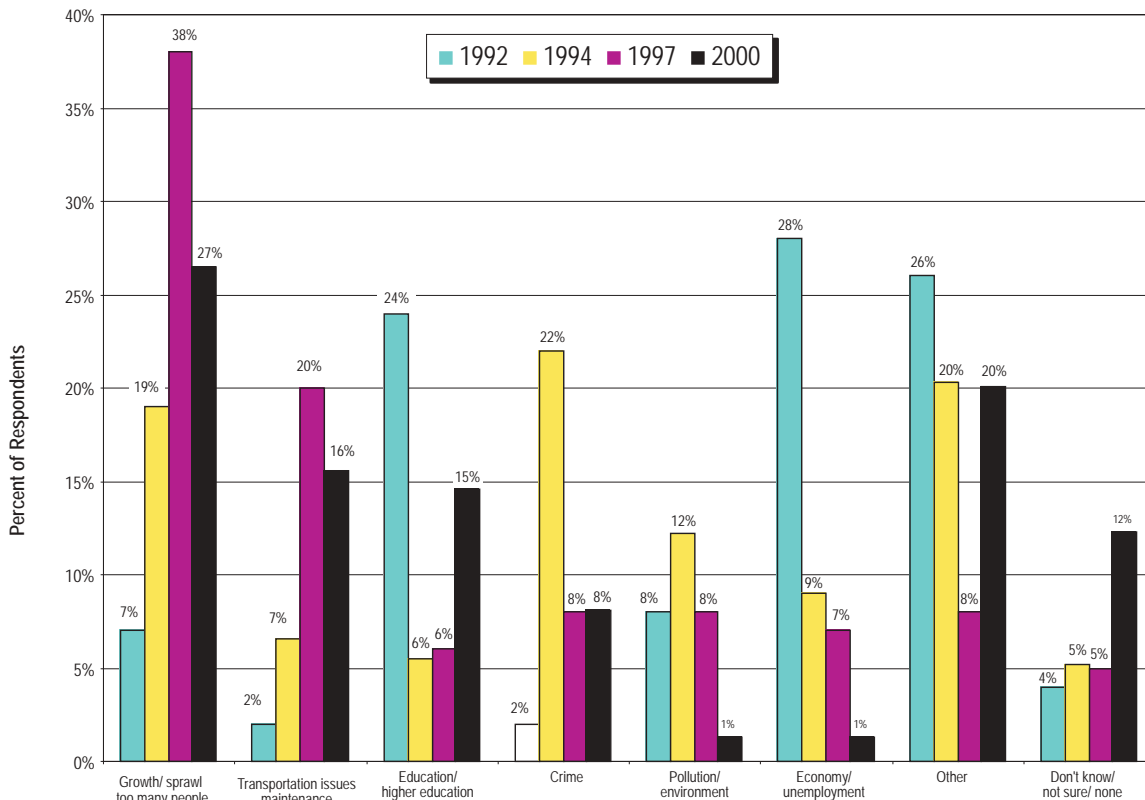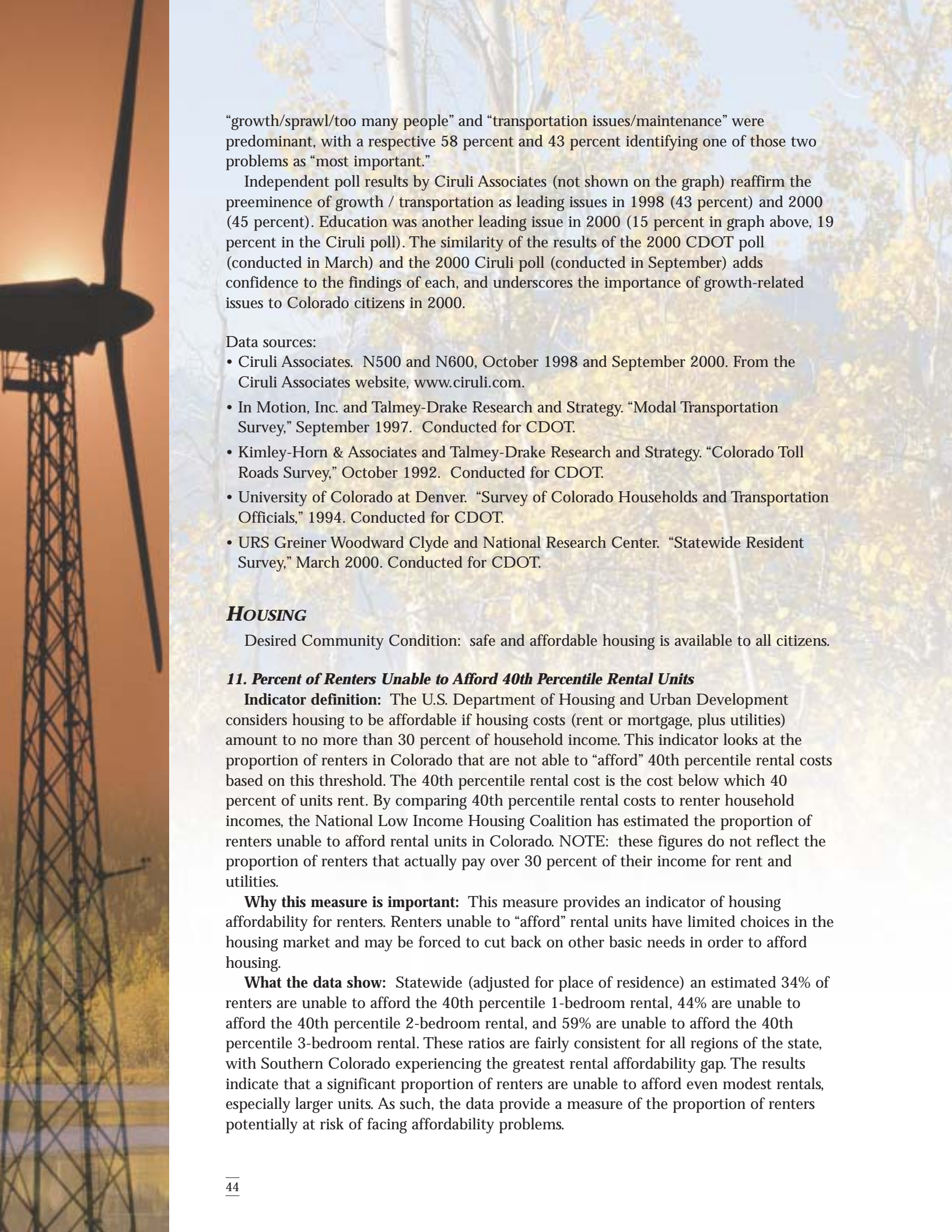

10. Most Important Problem Facing the State of Colorado (Poll Results)

Indicator definition: In a series of scientific public opinion polls commissioned by the Colorado Department of Transportation (CDOT), Colorado residents were asked to identify the "most important problem facing the state of Colorado." The graph above illustrates the results for surveys conducted in 1992, 1994, 1997, and 2000.

Why this measure is important: Given our democratic system of government, public opinion should be given great weight in setting the public policy agenda. Aside from elections, scientific public opinion surveys are the most widely accepted means of reliably gauging public opinion.

What the data show: The polling results in Figure 10 show shifts in the public's assessment of problems facing the state. In 1992, the "economy/unemployment" (28 percent) and "education/higher education" (24 percent) were the two dominant issues on people's minds. In 1994, "crime" was most commonly identified as the leading problem (22 percent), followed by "growth/sprawl/too many people" (19 percent) and "pollution/environment" (12 percent). In 1997 and 2000, the related problems of

"growth/sprawl/too many people" and "transportation issues/maintenance" were predominant, with a respective 58 percent and 43 percent identifying one of those two problems as "most important."

Independent poll results by Ciruli Associates (not shown on the graph) reaffirm the preeminence of growth / transportation as leading issues in 1998 (43 percent) and 2000 (45 percent). Education was another leading issue in 2000 (15 percent in graph above, 19 percent in the Ciruli poll). The similarity of the results of the 2000 CDOT poll (conducted in March) and the 2000 Ciruli poll (conducted in September) adds confidence to the findings of each, and underscores the importance of growth-related issues to Colorado citizens in 2000.

Data sources:
- Ciruli Associates. N500 and N600, October 1998 and September 2000. From the Ciruli Associates website, www.ciruli.com.
- In Motion, Inc. and Talmey-Drake Research and Strategy. "Modal Transportation Survey," September 1997. Conducted for CDOT.
- Kimley-Horn & Associates and Talmey-Drake Research and Strategy. "Colorado Toll Roads Survey," October 1992. Conducted for CDOT.
- University of Colorado at Denver. "Survey of Colorado Households and Transportation Officials," 1994. Conducted for CDOT.
- URS Greiner Woodward Clyde and National Research Center. "Statewide Resident Survey," March 2000. Conducted for CDOT.

HOUSING

Desired Community Condition: safe and affordable housing is available to all citizens.

11. Percent of Renters Unable to Afford 40th Percentile Rental Units

Indicator definition: The U.S. Department of Housing and Urban Development considers housing to be affordable if housing costs (rent or mortgage, plus utilities) amount to no more than 30 percent of household income. This indicator looks at the proportion of renters in Colorado that are not able to "afford" 40th percentile rental costs based on this threshold. The 40th percentile rental cost is the cost below which 40 percent of units rent. By comparing 40th percentile rental costs to renter household incomes, the National Low Income Housing Coalition has estimated the proportion of renters unable to afford rental units in Colorado. NOTE: these figures do not reflect the proportion of renters that actually pay over 30 percent of their income for rent and utilities.

Why this measure is important: This measure provides an indicator of housing affordability for renters. Renters unable to "afford" rental units have limited choices in the housing market and may be forced to cut back on other basic needs in order to afford housing.

What the data show: Statewide (adjusted for place of residence) an estimated 34% of renters are unable to afford the 40th percentile 1-bedroom rental, 44% are unable to afford the 40th percentile 2-bedroom rental, and 59% are unable to afford the 40th percentile 3-bedroom rental. These ratios are fairly consistent for all regions of the state, with Southern Colorado experiencing the greatest rental affordability gap. The results indicate that a significant proportion of renters are unable to afford even modest rentals, especially larger units. As such, the data provide a measure of the proportion of renters potentially at risk of facing affordability problems.

Figure 11: Percent of renters unable to afford 40th percentile rent, 1999.

Legend:
- Percent unable to afford 1 bedroom 40th percentile rent
- Percent unable to afford 2 bedroom 40th percentile rent
- Percent unable to afford 3 bedroom 40th percentile rent

Region	1 bedroom	2 bedroom	3 bedroom
Colorado Total	34%	44%	59%
Eastern	33%	41%	55%
Front Range	34%	45%	60%
Mountain	29%	37%	49%
Southern	45%	55%	69%
Western	35%	44%	57%
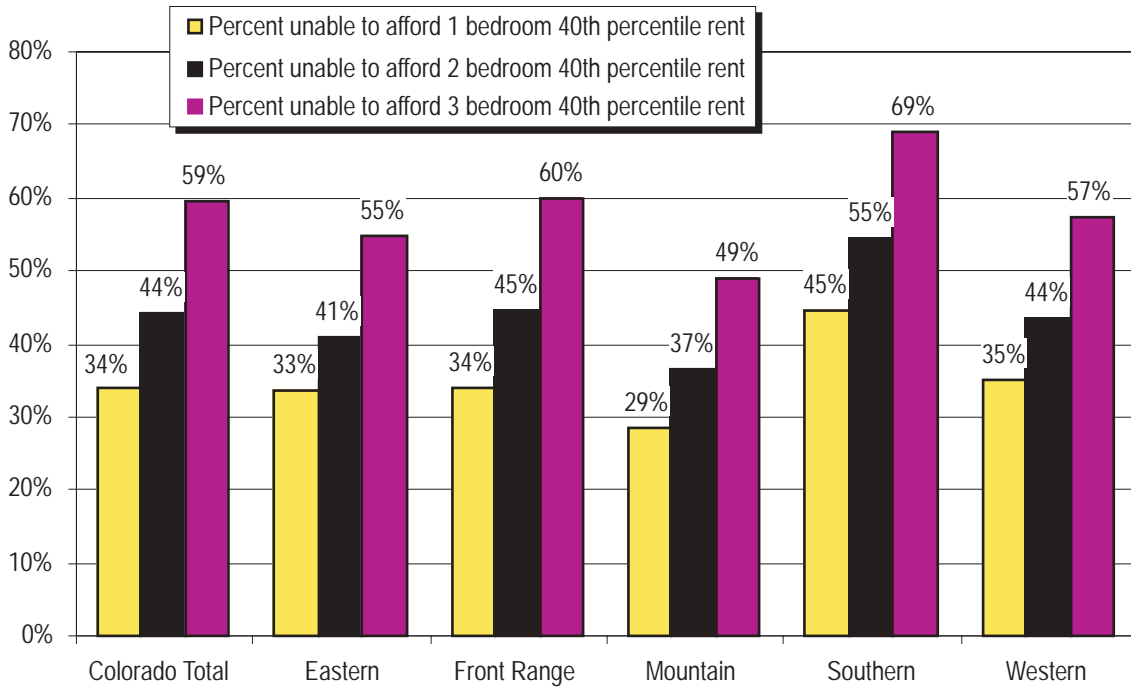
Figure 12: Percentage change in homeowner housing costs versus percentage change in wages, 1993 to 1999.

Percent Change in Wages and Owner Housing Costs, 1993 - 99

Region	Percent Change in Average Annual Wage, 1993 - 99	Percent Change in Homeowner Housing Costs, 1993 - 99
COLORADO TOTAL	32.7%	88.9%
Eastern	26.3%	64.5%
Front Range	33.7%	91.8%
Mountain	31.1%	92.8%
Southern	22.0%	57.7%
Western	23.4%	71.9%
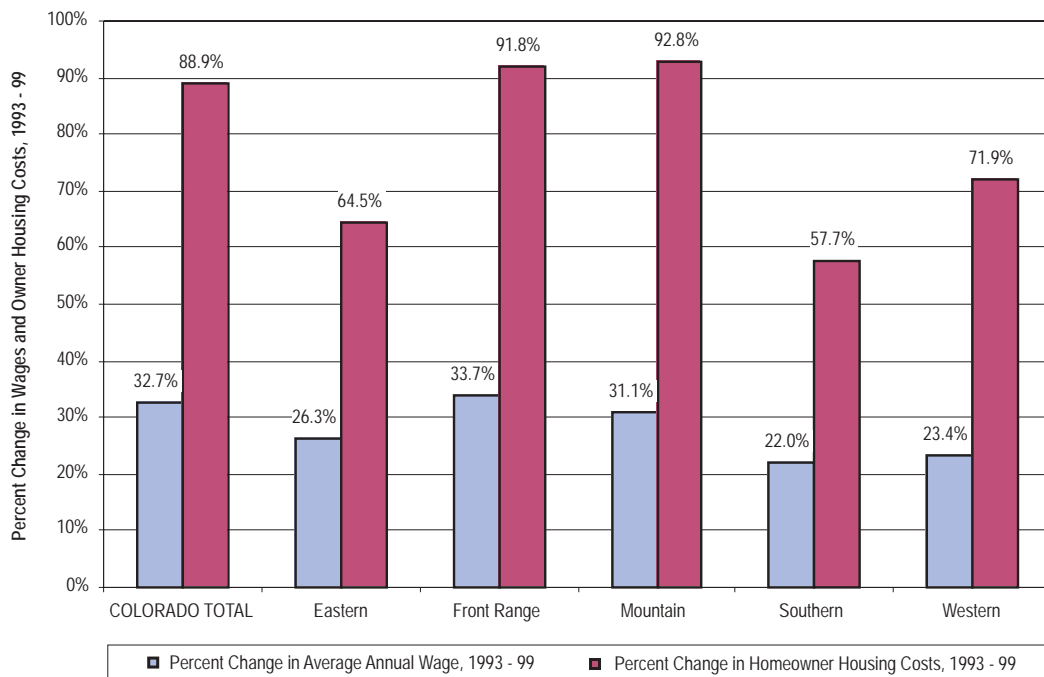
Data sources:
- National Low Income Housing Coalition. "Out of Reach 1999: The Gap Between Housing Costs and Income of Poor People in the United States." www.nlihc.org
- U.S. Census Bureau. "Profiles of General Demographic Characteristics 2000: Colorado." www.census.gov/prod/cen2000/dp1/2kh08.pdf.

Note: County affordability data was weighted on the basis of 2000 Census rental households and aggregated into regions for purposes of this analysis.

12. Change in Homeowner Costs vs. Change in Wages

Indicator definition: This indicator compares the percentage change in homeowner housing costs to the percentage change in average wages from 1993 to 1999. Homeowner housing costs include the costs of financing a single-family home purchased in the respective year (including principal, interest, taxes, and insurance), plus the cost of utilities, maintenance, supplies, and furnishings.

Why this measure is important: This indicator measures trends in the affordability of housing in Colorado to new purchasers. To the extent that homeowner costs increase faster than wages, homes become less affordable to new buyers. Conversely, if wages increase faster than home values, homes become more affordable.

What the data show: Figure 12 shows that homeowner costs far outpaced average wage increases in all regions of the state from 1993 to 1999. In the five regions, average wages increased from 22% to 33.7%, while average new homeowner costs increased by 57.7% to 92.8%. For the state as a whole, wages increased by 32.7%, while the cost of purchasing and operating a single-family home increased by 88.9%. Additionally, for existing homeowners, the data indicate the degree to which homes have appreciated in value. As the primary investment of many homeowners, appreciation in home values can create a "wealth effect" that stimulates additional spending and economic growth.

Data sources:
- Colorado Legislative Council. "School District Cost of Living Study," 1993 - 99 editions. www.state.co.us/gov_dir/leg_dir/lcsstaff/schfin/1999cola.PDF (1999 edition)
- U.S. Bureau of Labor Statistics. Covered Employment and Wages. www.bls.gov/cew/home.htm.
- U.S. Census Bureau. School District Population Estimates. www.census.gov/hhes/www/saipe/schooltoc.html.

Note: School district cost of living data was weighted on the basis of 1997 school district population and aggregated into regions for purposes of this analysis.

13. Number of Average-Wage Jobs Required to Purchase a Single-Family Home

Indicator definition: This indicator shows how many average-wage jobs are required to purchase single family homes of various sizes in Colorado. As such, it illustrates the affordability of single family housing relative to prevailing local wage rates.

To calculate the measure, single family home prices were estimated by multiplying the median price per square foot of homes sold in 1999 and 2000 by selected square footages (1300, 1500, 2000 square feet). The income required to afford these prices was calculated assuming that the total monthly mortgage payment could not exceed 28% of monthly wages, and assuming that the mortgage was structured with a 30 year term, 7.75% interest rate, and 10% down payment. The graph shows the ratio of the income required to afford the respective home sizes to the prevailing average wage levels.

Why this measure is important: This indicator measures the degree to which homeownership is attainable to Coloradoans by assessing the affordability of owner housing in different parts of the state. Homeownership is a widely shared cornerstone of the "American Dream." It provides the owner with a variety of quality-of-life benefits and brings stability to local communities.

What the data show: The Mountain region had the highest home prices relative to prevailing wages in 2000, with 2.6 average-wage jobs required to purchase a 1300 square foot home, 3.0 jobs required to purchase a 1500 square foot home, and 4.0 jobs required to purchase a 2000 square foot home. Housing prices relative to local wages are also above the statewide average in Western Colorado. Eastern Colorado and the Front Range have affordability ratios similar to the statewide average, while homes in Southern Colorado are somewhat more affordable relative to local wages than the statewide average.

The graphs also show that affordability relatively to local wages decreased between 1999 and 2000. Statewide, the number of average-wage jobs required to purchase a 1300 square foot home increased from 1.4 in 1999 to 1.5 in 2000. Similarly, the number of average wage jobs required to purchase a 1500 square foot home increased from 1.6 in 1999 to 1.7 in 2000, and the number of average wage jobs required to purchase a 2000 square foot home increased from 2.1 in 1999 to 2.2 in 2000.

It should be noted that a constant mortgage interest rate of 7.75% was used to calculate the affordability ratios, in order to focus the analysis on changes in wages and

Figure 13: Number of average-wage jobs required to purchase a 1300, 1500, 2000 square-foot single-family house, 1999 and 2000.
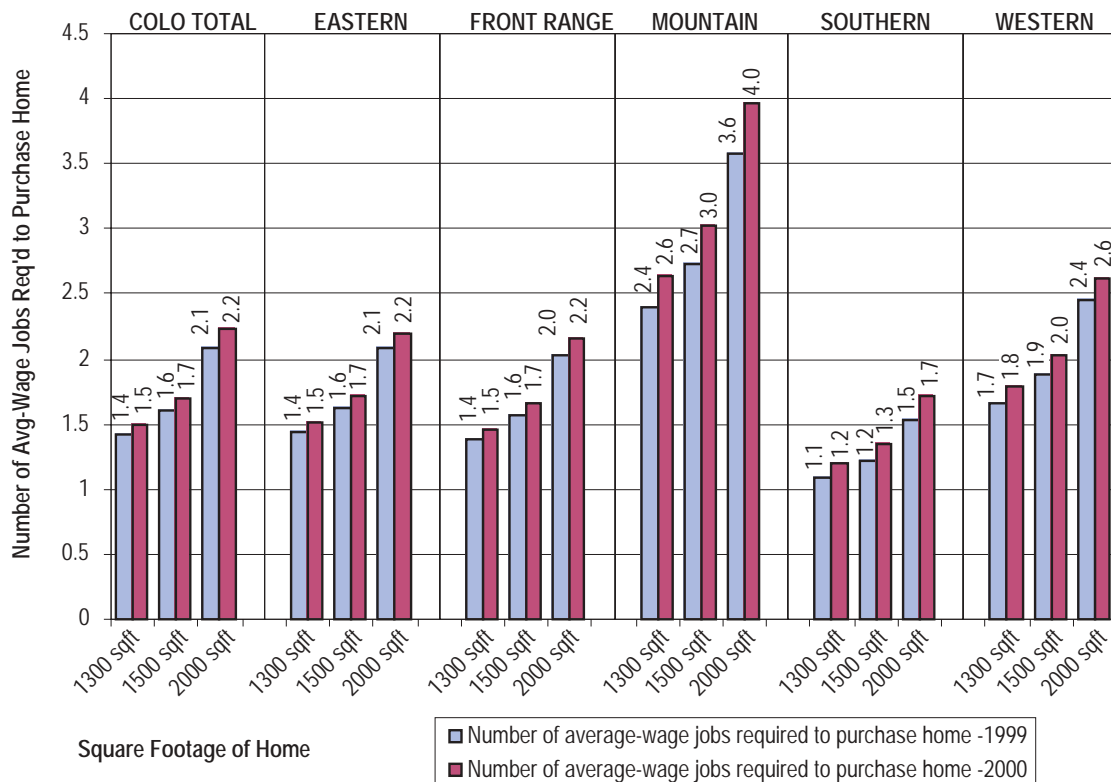
home prices. However, it should be noted that mortgage interest rates fluctuate and have a significant impact on affordability. Nationally, the 30-year conventional mortgage interest rate averaged 7.43% in 1999 and 8.06% in 2000. If these interest rates were used in the calculation, the decrease in affordability between 1999 and 2000 would have been even greater than is shown. However, rounded to the nearest decimal, the number of average-wage jobs required to purchase a 1300 square foot home statewide was still 1.4 in 1999 and 1.5 in 2000 using precise interest rates.

Data sources:
- Colorado Department of Labor and Employment, Labor Market Information. "Colorado Employment and Wages," 1999 and 2000. http://lmi.cdle.state.co.us/es202/index.htm
- Thomas Y. Pickett & Company. "Cost of Housing Analysis for Colorado Counties," August 29, 2001. Prepared for the Colorado Division of Housing. www.dlg.oem2.state.co.us/Doh/Documents/CostofHousing2001.pdf
- U.S. Census Bureau. 2000 population data. http://www.census.gov
- U.S. Federal Reserve. 30-year conventional mortgage interest rates. www.federalreserve.gov/releases/H15/data/a/cm.txt

   Note: County-level housing price data was weighted by 2000 Census population and aggregated into regions for purposes of this indicator.

14. Housing Construction by Unit Type
   Indicator definition: This indicator shows the number of housing units constructed in Colorado between 1990 to 2000, including the percentage of new housing units that are multifamily units.

Figure 14: Housing construction by unit type, 1990 to 2000.
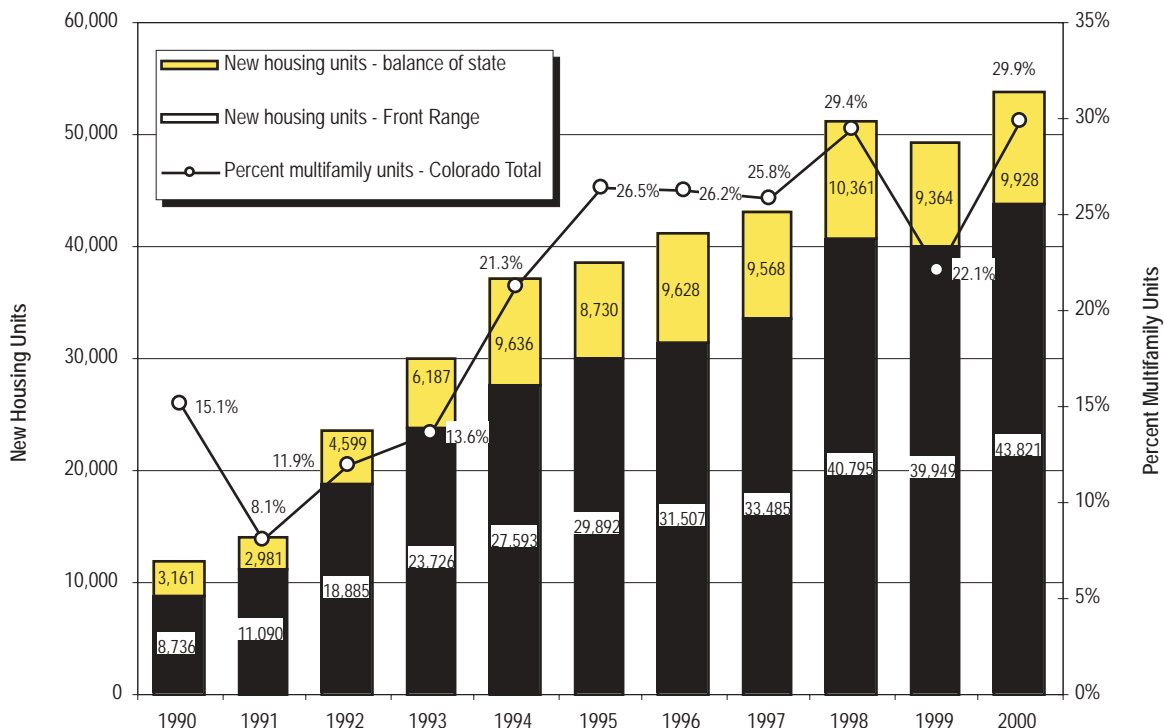
Why this measure is important: The mix of housing types in a community has a fundamental effect on the character of that community. Multifamily housing tends to be more affordable than single-family housing due, in part, to more economical use of land, infrastructure, and materials. Multi-family housing is, therefore, an important resource for lower to moderate income residents of a community. Also, because multifamily developments are associated with greater land-use densities, they tend to be better served by public transit, are more able to be incorporated into mixed-use development, and help conserve land for other uses (e.g. open space). However, because many persons prefer to live in single-family units (if they can afford to do so), providing multifamily housing in a community involves important tradeoffs.

What the data show: Figure 14 shows that the proportion of new multi-family units built over the 1990 – 2000 period increased at the same time that the state experienced a boom in overall housing construction. The proportion of new units that are multifamily units constructed statewide ranged from a low of 8.1 percent in 1991 to a high of 29.9 percent in 2000. Across the same period, the total number of new units built per year grew by more than fourfold, from 11,897 units in the 1990 recession year to 53,749 units in the 2000 boom year. Across the entire 1990 – 2000 period, a total of 23.3 percent of new units built statewide were multifamily units, including 23.9 percent of units in the Front Range region and 21.1 percent of units in the balance of the state.

The increase in multifamily construction throughout much of Colorado may be due, in part, to rising land and housing values stemming from the decade's strong economy. The increased land and housing costs may have encouraged more intensive use of land through multifamily construction, which in many situations can provide a developer a higher profit than a less-dense development on a given piece of land.

To the extent that the increase in multifamily housing construction implies increased residential density, greater affordability in new housing, more compact land use patterns, and greater feasibility of public transit, the increase in multifamily construction in the latter half of the 1990s could be viewed as a positive trend. Conversely, to the extent that the increase in multifamily housing construction is driven by an increase in the number of residents that are "priced out" of single-family homes, the trend may reflect a decrease in the affordability of single-family housing.

Data sources:
• U.S. Census Bureau. "Housing Units Authorized by Biulding Permits." www.census.gov/const/www/c40index.html#estimates.

15. Growth in Housing Units vs. Growth in Jobs

Indicator definition: This indicator compares the percentage growth in jobs to the percentage growth in occupied and total housing units from 1990 to 1999 by Colorado region. The comparison provides a measure of the degree to which housing development is keeping up with job growth in the state.

Why this measure is important: As documented in earlier housing indicators, Colorado has experienced significant increases in housing prices over the past decade, with increased housing costs generally outpacing gains in wages. This indicator examines one underlying cause of the affordability problem: the rapid growth in jobs that has, in many areas, exceeded the growth in housing construction.

At a local level, the issue has often been framed in terms of "jobs/housing" balance. While the definition of the "proper" jobs/housing balance varies with local circumstances, the issue has important implications in such areas as affordable housing, transportation planning, and intergovernmental cooperation. Communities with a high ratio of jobs to

housing often have to import workers, leading to increased commuting, increased demands on local transportation, and increased housing prices. Conversely, "job-poor" communities can be burdened with a smaller commercial tax base and increased demands for providing services to lower income workers.

What the data show: Figure 15 illustrates that the percentage growth in jobs exceeded the percentage growth in housing units statewide between 1990 and 1999. Overall, the number of jobs increased by 37.9%, outpacing the growth in total housing units (20.6%) and occupied housing units (25.4%). Growth in occupied housing units is, in some respects, more representative of trends than growth in total housing units due to high housing vacancy rates during the state's recession in 1990.

All regions of the state, except Eastern Colorado, experienced a more rapid growth in jobs than in occupied housing units. This imbalance may be a significant factor underlying the increases in housing prices, as more jobholders are forced to compete for limited housing.

Data sources:
• Colorado State Demographer. "Colorado Economic and Demographic Information System." www.dola.state.co.us/is/cedishom.htm

TRANSPORTATION

Desired Community Condition: residents are offered and take advantage of a variety of safe, efficient, and reliable transportation alternatives.

16. Daily Vehicle Miles Traveled

Indicator definition: This indicator summarizes average daily vehicle miles traveled (VMT) on the state highway system. This includes interstate highways, U.S. highways, and Colorado state highways, but excludes county and city roads. Over 60 percent of the state's daily VMT occurs on the state's highway system.

Why this measure is important: Vehicle miles traveled provides an indicator of demand on the highway system. Growth in VMT is often associated with increased traffic, which can lead to congestion, deterioration in air quality, time lost due to delays, increased need for transportation expenditures, etc. VMT has important linkages to our land use development patterns; for example, dispersed, low-density development can encourage increased VMT by increasing our dependence on cars and reducing the feasibility of cost-effective transit service.

What the data show: Statewide, average daily VMT on the state highway system increased by 36% between 1991 and 1998. Average daily

Figure 15: Growth in housing units versus growth in jobs, 1990 to 1999.
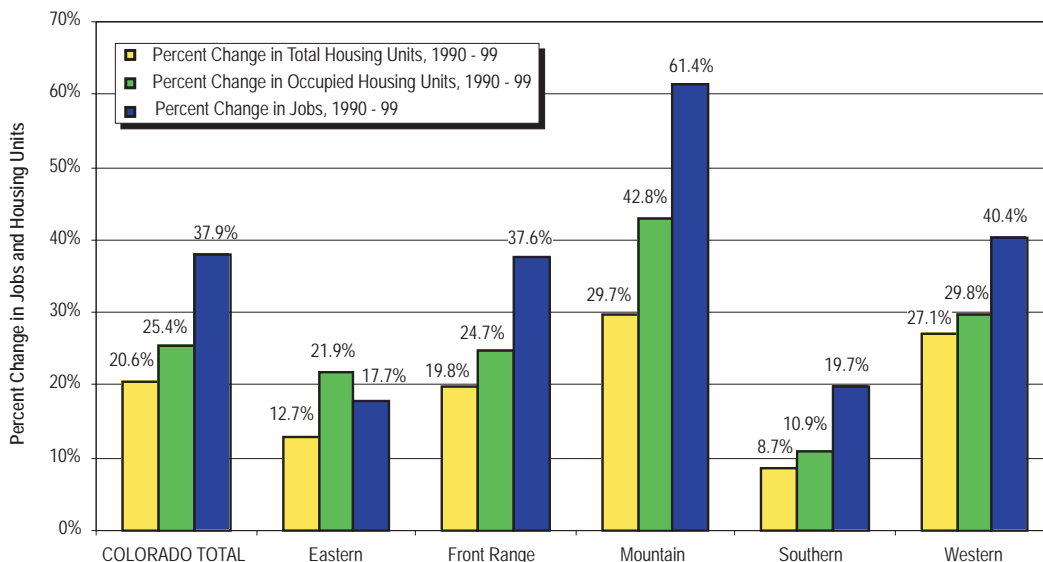
VMT increased by 34 - 40% in each region of the state except for Southern Colorado, which experienced slower VMT growth of 26%.

The 36% increase in statewide VMT between 1991 and 1998 outpaced the 21% growth in population over the same period. As a result, VMT per capita increased by approximately 12% between 1991 and 1998. The "2020 Statewide Transportation Plan," by the Colorado Department of Transportation, states that overall VMT increases have been due to increases in the state's population, increases in the number of trips made and trip length, and reduced vehicle occupancy.

Data sources:
• Colorado Department of Transportation. Annual estimates of ADT and VMT by state system highway segment (unpublished).

• Colorado Department of Transportation. "The 2020 Statewide Transportation Plan: Investing in Colorado's Future," November 2000. www.dot.state.co.us/DevelopProjects/PublicInvolvement/2020%20swp%20-%202001- 04-12%20web.pdf

• U.S. Census Bureau. "Profiles of General Demographic Characteristics 2000: Colorado." www.census.gov/prod/cen2000/dp1/2kh08.pdf.

Figure 16: Daily Vehicle Miles Traveled, 1991 to 1998.
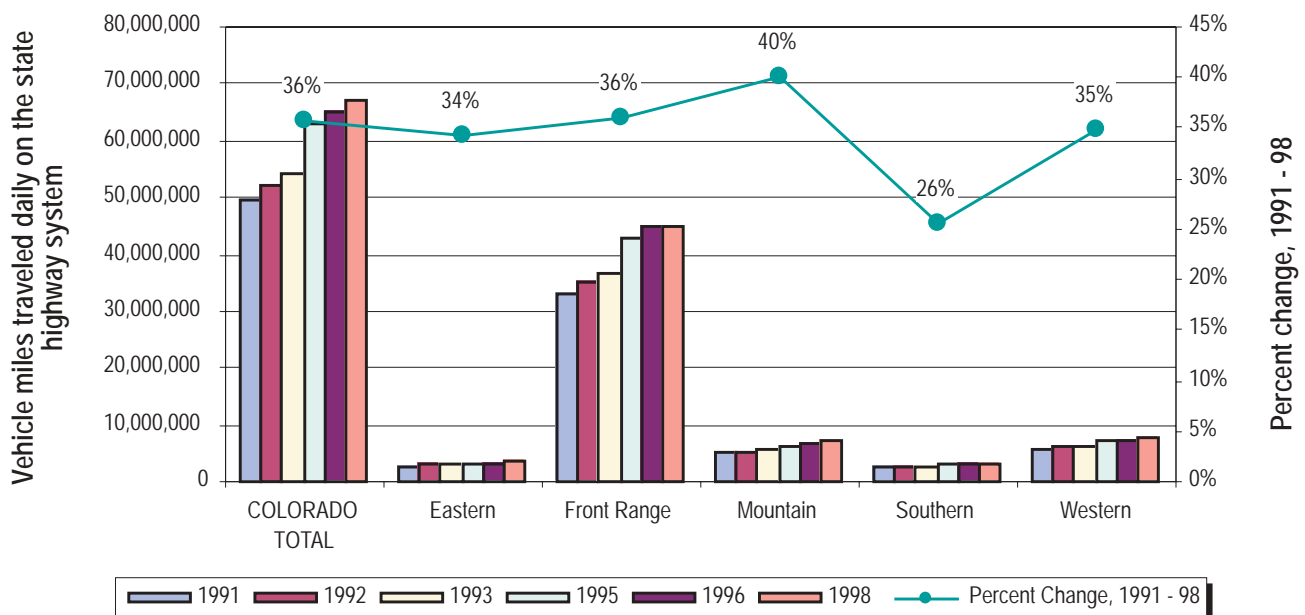
17. Public Transit Passenger Trips

Indicator definition: This indicator summarizes the number of passenger trips taken via public transit in Colorado in 1996, 1998, and 2000. The November 2000 "2020 Transportation Plan," by the Colorado Department of Transportation, identifies 36 public transit operators in Colorado. Table 17 summarizes the number of passenger trips accommodated by these agencies. There are approximately 50 other transit operators in the state that provide specialized services to the elderly, disabled populations, and/or persons with low incomes, plus numerous commercial transportation operators that operate on a "for-hire" basis (e.g., charter vehicles, shuttles, taxi services, intercity buses, rail services, etc.), which are not included in this analysis.

Why this measure is important: Public transit not only provides an alternative to automobile use, but can be the only affordable means of transportation for certain segments of the population (e.g., low income persons, elderly, etc.). Public transit can also serve important community goals such as alleviating traffic congestion, parking shortages, and air pollution; making high density land uses more practicable and efficient; and ensuring equitable access to transportation in the community.

What the data show: Statewide, public transit passenger trips grew from 87.8 million passenger trips to 98.2 million passenger trips between 1996 and 2000, an 11.8 percent increase. The state's population grew at a similar rate (10.2 percent) over this same period. The Front Range urban centers and mountain resort areas have the most heavily utilized public transit systems, although transit operators also serve several of the more rural, sparsely populated areas of the state.

According to a 1999 "Transit Benefits and Needs" study commissioned by the Colorado Department of Transportation, some manner of transit service is available to 70% of the state's urban residents and 39% of rural residents. The study also estimated that 44% of the state's transit demand was being met, while 56% of demand was not being serviced.

Transit funding in Colorado comes from a variety of sources. On average, Colorado's urban transit providers receive 75% of their operating revenues from local governments or dedicated taxes, 20% from passenger fares, and 5% from the federal government. Resort transit providers receive 75% of their operating revenues from local governments, 13% from fares, 10% from resorts, and 2% from the federal government. Rural and specialized providers receive 45% of their operating revenues from the federal government, 25% from local governments, 20% from contracts (usually with human service agencies), and 10% from fares.

The State of Colorado is one of five states (along with Alabama, Alaska, Hawaii, and New Mexico) that does not provide operating funds for public transit, with the exception of administering $3 million in federal funds that are distributed to transit agencies serving rural areas, the elderly, and disabled populations.

Data sources:
- Colorado Association of Transit Agencies and Colorado Department of Transportation. "Colorado Transit Resource Directory," 2000, 1998, and 1996 editions.
- Colorado Department of Transportation. "The 2020 Statewide Transportation Plan," November 2000. www.dot.state.co.us/DevelopProjects/PublicInvolvement/2020%20swp%20-%202001-04-12%20web.pdf

Table 17. Public transit passenger trips, 1996 to 2000.

Service Provider	Area Served	Passenger Trips 2000	1998	1996
Eastern Colorado				
City of La Junta	La Junta	15,106	76,900	78,834
County Express (NE Colo Assn of Local Govts)	Logan, Morgan, Phillips, Sedgwick, Washington, Yuma Counties	76,730	111,337	102,155
Outback Express (East Central Council of Govts)	Cheyenne, Elbert, Kit Carson, Lincoln Counties	39,633	49,311	31,346
Prairie Dog Express	Prowers County	11,026	6,500	n/a
Subtotal		**142,495**	**244,048**	**212,335**
Front Range				
City of Greeley - The BUS	Greeley & Evans	319,123	325,881	441,848
Clean Air Transit Company	Castle Rock	43,132	41,000	6,831
COLT (City of Loveland Transit)	Loveland	67,269	17,309	n/a
Mountain Wheels (Service of Seniors' Rsrc. Center)	Evergreen/Conifer	77,000	60,433	60,944
Pueblo Transit	Pueblo	856,266	1,017,191	1,017,191
RTD Denver	All/part of Adams, Arapahoe, Boulder, Denver, Douglas, Jefferson Counties	74,235,000	71,517,000	67,132,587
Special Transit / The HOP	Boulder County, Estes Park, rural Adams County	1,100,000	926,323	840,111
Springs Mobility	Colorado Springs	60,000	50,000	50,000
Springs Transit	Colorado Springs	3,689,982	3,061,722	3,124,337
The Link (Southeast Transit Authority)	Denver Tech Center area	170,000	n/a	n/a
TransFort	Fort Collins	1,496,947	1,360,000	1,263,655
Weld County Transportation Program	Weld County	82,167	192,646	142,908
Subtotal		**82,196,886**	**78,569,505**	**74,080,412**
Mountains				
Avon/Beaver Creek Transit	Eagle/Lake Counties	1,072,946	1,433,000	1,443,309
Central City Tramway	Central City	Closed 4/00	46,000	750,000
Cripple Creek Transportation	Cripple Creek	39,356	100,331	n/a
ECO Transit (Eagle County Rgnl. Trans. Authority)	Eagle/Lake Counties	692,362	570,000	n/a
RIDE Transit Services	Fremont, Chaffee, Custer Counties	52,401	58,459	104,254
Roaring Fork Transportation Authority	All/part of Pitkin / Eagle / Garfield Counties	3,662,663	4,000,000	3,784,000
Snowmass Village Transit	Snowmass Village	689,628	776,701	637,398
Summit Stage	Summit County	1,362,985	1,008,550	820,367
Town of Breckenridge	Breckenridge	258,265	299,458	253,410
Vail Transit	Vail	3,200,000	3,000,000	3,400,000
Winter Park - The Lift	Grand County	900,000	671,000	600,000
Subtotal		**11,930,606**	**11,963,499**	**11,792,738**
Southern Colorado				
South Central Council of Governments	Huerfano & Las Animas Counties	32,259	40,000	32,695
Subtotal		**32,259**	**40,000**	**32,695**
Western Colorado				
Durango LIFT	Durango	218,400	204,589	255,943
Galloping Goose Transit	San Miguel County	174,291	171,050	n/a
Grand Valley Transit	Grand Junction	70,982	n/a	n/a
Ignacio Roadrunner	Ignacio / Durango	875	5,648	55,692
Mountain Express (Archuleta County Transit)	Pagosa Springs	15,652	n/a	n/a
Mountain Express (Crested Butte/ Mt. Crested Butte)	Crested Butte / Mount Crested Butte	733,605	900,000	800,000
Mountain Village Metropolitan District	Telluride / Mountain Village	1,690,543	1,315,072	n/a
Steamboat Springs Transit	Routt County	966,833	955,721	590,496
Subtotal		**3,871,181**	**3,552,080**	**1,702,131**
Grand Total		**98,173,427**	**94,369,132**	**87,820,311**

18. Traffic Congestion

Indicator definition: The Travel Rate Index shows the difference in travel time between a trip taken during peak travel times and the same trip made in uncongested conditions. It measures the amount of additional time required to travel at peak periods *due to heavy traffic only*, with the impacts of roadway incidents (e.g. accidents) — a very common cause of delay — excluded. A Travel Rate Index of 1.2 means that a 10-minute trip when traffic is flowing freely would take 12 minutes, or 20% longer, during rush hour.

Why this measure is important: The Travel Rate Index provides a measure of the degree to which highways in three of Colorado's largest metropolitan areas are congested. Highway congestion is widely recognized as one of the most pressing issues facing several metropolitan and resort areas in the state. Congestion imposes direct costs on drivers in the form of unproductive time and frustration, while also affecting air quality, economic productivity and competitiveness, family time, and other dimensions of quality of life.

What the data show: Congestion in the Denver, Colorado Springs, and Boulder-Longmont Metropolitan Statistical Areas (MSAs) has increased significantly over the 1982 – 99 time frame, with the greatest increases occurring in the Denver MSA. In 1982, a drive in Denver during rush hour took 7% longer than a drive at uncongested times, due to heavy traffic. By 1999, rush hour driving took 34% longer than a drive during uncongested times. In Colorado Springs, the extra time required for rush hour trips increased from 1% in 1982 to 15% in 1999. In Boulder-Longmont, the extra time required for rush-hour trips increased from 1% in 1982 to 5% in 1999.

Data sources:

• Texas Transportation Institute. "2001 Urban Mobility Study." http://mobility.tamu.edu.

Note: The Denver MSA consists of Adams, Arapahoe, Denver, Douglas, and Jefferson Counties. The Colorado Springs MSA consists of El Paso County. The Boulder-Longmont MSA consists of Boulder County.

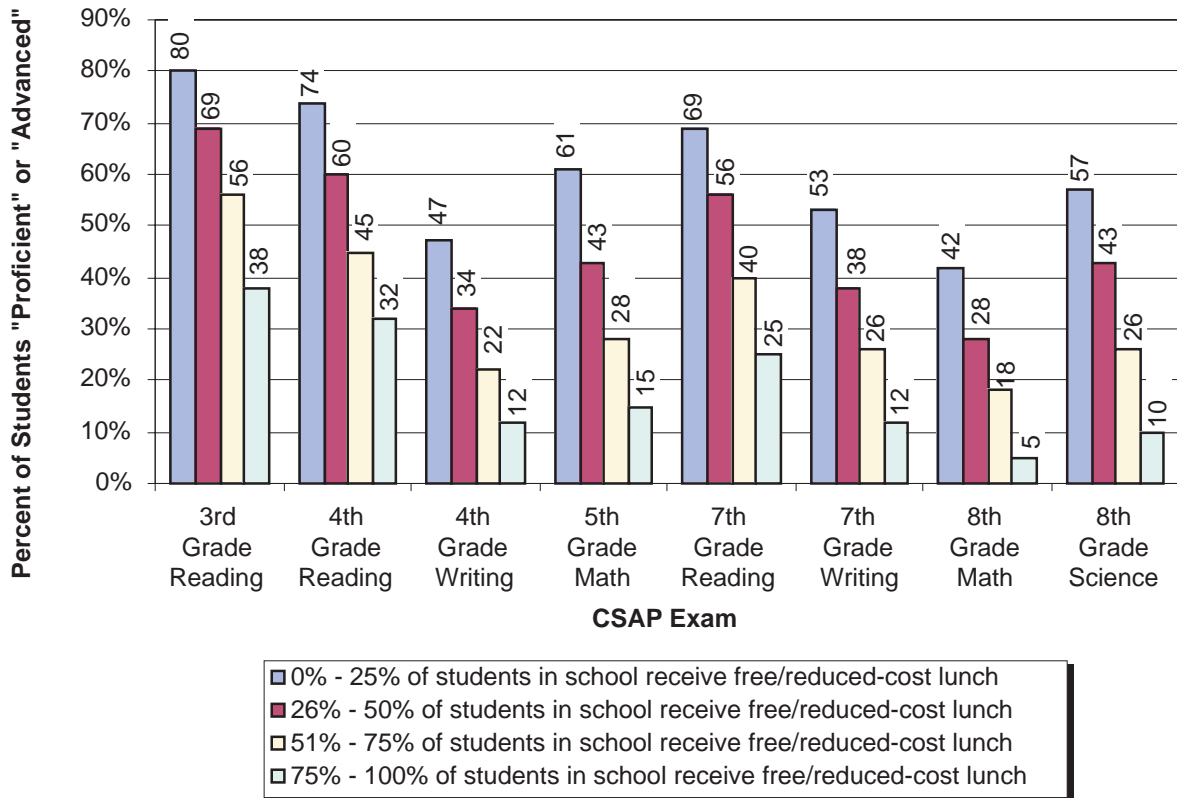**Figure 18: Travel Rate Index in Denver, Colorado Springs, and Boulder-Longmont MSA's, 1982 - 99.**
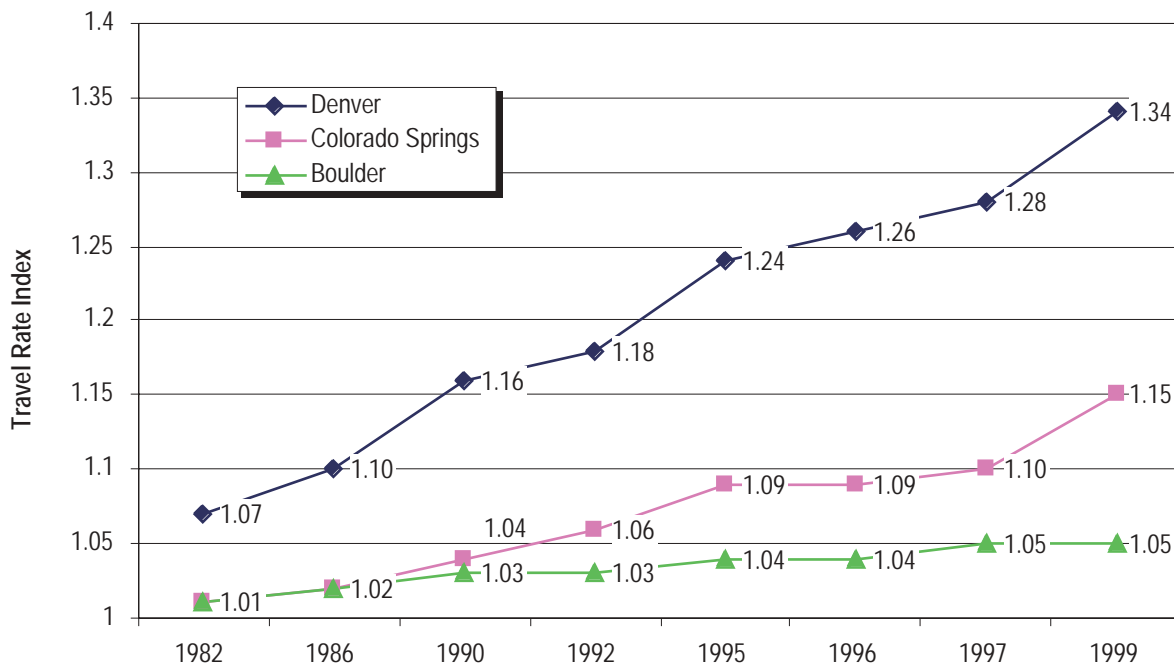
EDUCATION

Desired Community Condition: quality education is available to and reaches all members of the community.

19. Percent Proficient or Advanced on CSAP Test by School Socioeconomic Status

Figure 19: Percent of students "proficient" or "advanced" on CSAP test by school socioeconomic status (i.e. percent of students receiving free or reduced-cost lunch), 1999/00 school year.

Legend:
- 0% - 25% of students in school receive free/reduced-cost lunch
- 26% - 50% of students in school receive free/reduced-cost lunch
- 51% - 75% of students in school receive free/reduced-cost lunch
- 75% - 100% of students in school receive free/reduced-cost lunch

Indicator definition: This indicator measures the performance of students in schools of differing socio-economic status, where socio-economic status is defined as the percentage of students receiving free or reduced-cost lunches. The data are calculated by grouping individual schools by the proportion of their students receiving free or reduced-cost lunch (0 - 25%, 26 - 50%, 51 - 75%, and 76 - 100% of students receiving free or reduced-cost lunch).

Why this measure is important: This measure attempts to show the correlation between the socio-economic status of schools and student achievement levels. Ideally, the public educational system should be producing students of similar achievement levels across all socio-economic classes, though this is not typically the case. Social, economic, and cultural factors tend to affect student education as well as the quality of the educational program.

What the data show: Figure 19 shows the percent of students in various grade levels that scored proficient or advanced on various CSAP tests in the 1999/00 school year. As

shown in the figure, as the socio-economic status of schools decrease, so do achievement scores, for each grade level and subject area shown. This suggests a strong correlation between school socioeconomic status and test results, and implies that socioeconomic considerations need to be taken into account when developing strategies for improving student performance.

Data sources:
• Colorado Department of Education. "2000 CSAP Annual Report," January 2001. www.cde.state.co.us/cdeassess/download/pdf/2000CSAP%20Annual%20Report.pdf

20. Percent of Schools by Academic Performance Rating

Indicator definition: Starting with the 2000/01 school year, each public school in Colorado is rated for academic performance based on student proficiency on Colorado Student Assessment Program (CSAP) tests for reading, writing, and math. The 2000/01 Academic Performance Rating for each school was assigned after calculating the weighted total student performance for each academic area and grade level for each school, and comparing each school to all other schools in the state of the same type (elementary, middle, or high school). For the initial 2000/01 year, a pre-set 8 percent of schools at each of the elementary, middle, and high school levels were assigned a rating of "excellent," 25

Figure 20: Percent of schools by Academic Performance Rating by region, 2000/01 school year.
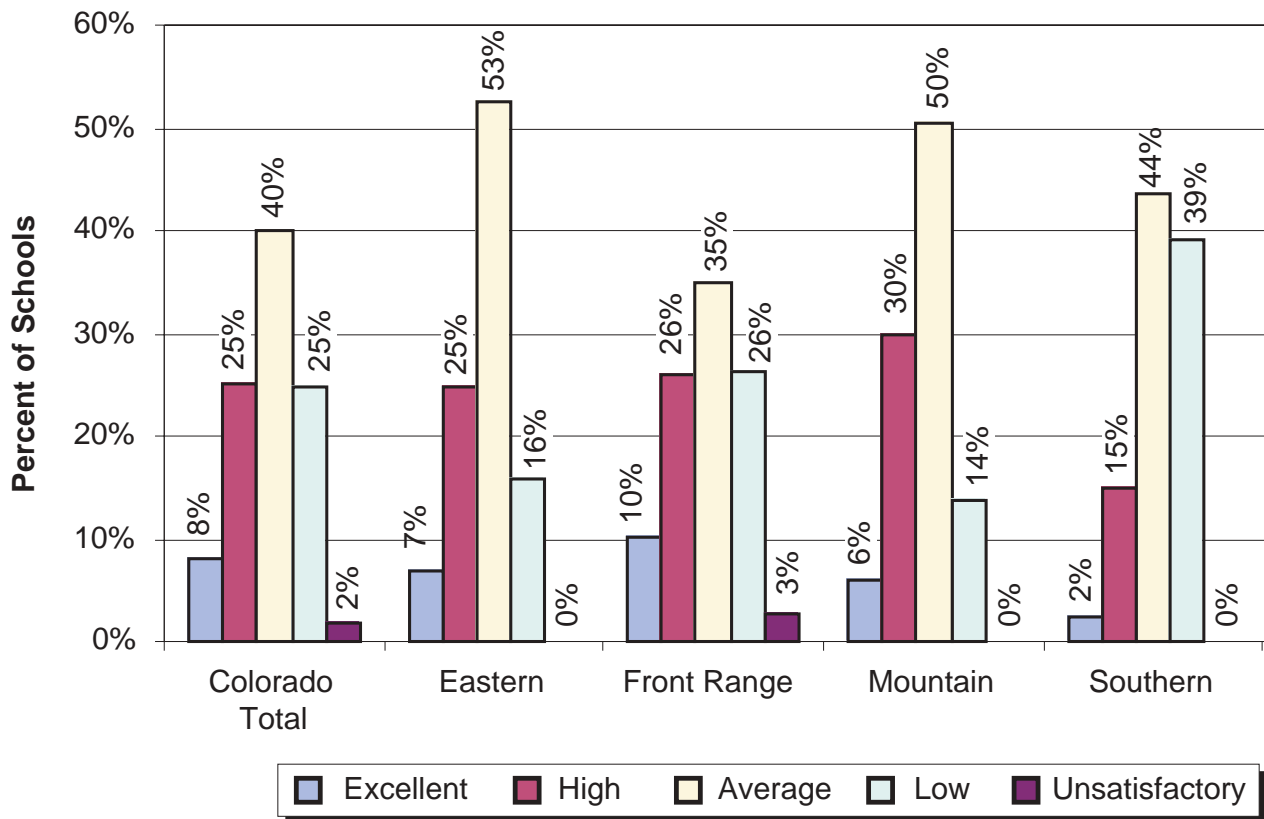
percent were assigned a rating of "high," 40 percent were assigned a rating of "average," 25 percent were assigned a rating of "low," and 2 percent were assigned a rating of "unsatisfactory." The graph below shows the percentage of total schools (elementary, middle, and high schools combined) in each region that fell into the five performance catagories in 2000/01. In subsequent years, schools will be evaluated relative to the 2000/01 baseline, so that improvements in the ratings will be possible (i.e., there will not be a pre-set percentage of schools in each category).

Why this measure is important: The Academic Performance Rating provides a summary indicator of the proficiency of students in individual schools in core academic areas. As the program continues in the future, it will also provide a measure for tracking student and school performance over time. Additionally, there are funding and policy implications associated with the ratings. Schools with "unsatisfactory" ratings are given additional funding for three years to implement a school improvement plan. If performance does not improve after three years, a committee is convened to choose a new team to implement a "proven" academic program. Furthermore, to encourage good performance, schools rated "excellent" receive small grants ranging from $75,000 for elementary schools to $125,000 for high schools, and schools improving by one rating level are awarded a bonus of $25,000.

What the data show: The data show that there is a range of schools in each performance category in each region of the state. As noted in Indicator #19 (student performance on CSAP by percent qualified for school lunch programs), low household income is closely associated with CSAP performance, which is in turn the basis

for a school's Academic Performance Rating. As such, schools that serve students in areas that experience high poverty rates tend to be more likely to receive a lower Academic Performance Rating.

By way of perspective in interpreting the results, it should be noted that if schools were rated on a straight standard in 2000/01, 56% of the schools would fall below average because they currently do not meet the requirement that 80% of their students are proficient or above in reading, writing and mathematics.

Data sources:

- "2001 Accountability Report Ratings," Colorado Department of Education. www.cde.state.co.us/cdeassess/ download/spreadsheet/ratings.xls

51%

26%

19%

3%

0%

Western
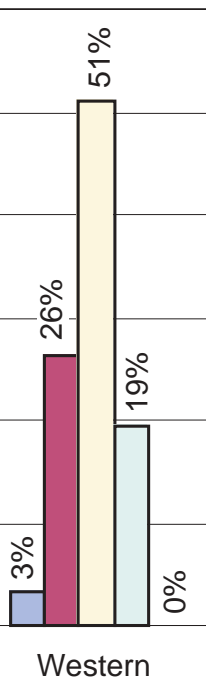
21. High School Graduation Rates

Indicator definition: The data in Figure 21A measures the number of students who graduate high school as a percentage of those students enrolled in ninth-grade four years prior to the graduation date, as obtained from the Center for the Study of Opportunity in Higher Education (1995/96 and earlier) and the National Center for Educational Statistics (NCES, 1996/97 and later). The high school graduation rate for Figure 21B is a cumulative rate that measures the number of students who graduate high school as a percentage of those who could have graduated over a four-year period (i.e., from grade 9-12), as obtained from the Colorado Department of Education (CDE). This rate is calculated by dividing the number of high school graduates by the "membership base," which is the end-of-year count of eighth graders four years earlier, as adjusted for the number of students who have transferred into or out of the district during the years covering grades 9 through 12. The fact that graduation rates reported by CDE are higher than graduation rates reported by NCES appears to be due to different methods of calculating the "membership base."

Why this measure is important: The high school graduation rate is an important measure for two primary reasons. First, it measures the ability of schools to retain and train students through the high school level. Second, it is a base by which to gauge the basic skill level of the future workforce. The new global economy and information age requires ever-increasing levels of knowledge and skills. Therefore, the more educated a state's population, the more competitive the state is likely to be economically. Additionally, the data regarding the educational attainment of the population can clarify the extent to which Colorado is creating and retaining an educated workforce.

What the data show: Figure 21A shows that Colorado's high school graduation rate, while higher than the average for the United States, has generally been on a declining trend since 1983/84. The U.S. graduation rate has also declined over the same period. Colorado's rank has fluctuated between 17th and 30th among U.S. states over the 1980/81 - 1998/99 period, while exhibiting an overall declining trend.

Figure 21B shows the change in Colorado's high school attainment, high school graduation rates, and college attainment from 1996 through 2000. High school attainment is defined as the percentage of the Colorado population aged 25 and over that holds a high school degree, while college attainment is the percentage of population aged 25 and older that holds a college degree. Figure 21B shows that Colorado's high school graduation rates are significantly lower than its high school attainment rates. This suggests that Colorado's highly educated workforce is in large part attributable to the in-migration of well-educated residents, as noted earlier in Chapter 2 of this report.

Data sources:
- Colorado Department of Education. "Colorado Graduation Rates," 1997-2000. www.cde.state.co.us/cdereval/download/pdf/4YearTrendGradRates.PDF
- Colorado Department of Education. "State Summary of 1999 Graduation and Completer Rates," 1996-1999. www.cde.state.co.us/cdereval/rv1999stategrad_complsummary.htm
- Mortenson, T. G. "Higher Education Opportunity for Students from Low Income Families," June 1999, p. 26. Prepared for the Colorado Commission on Higher Education. www.postsecondary.org/archives/Reports/ColoradoReport.pdf
- National Center for Educational Statistics. "Statistics in Brief," April 1999, June 2000, May 2001. http://nces.ed.gov/pubs99/1999327.pdf http://nces.ed.gov/pubs2000/2000330.pdf http://nces.ed.gov/pubs2001/2001326r.pdf
- U. S. Census Bureau. "Educational Attainment," 1996-2000. www.census.gov/population/www/socdemo/educ-attn.html

Figure 21A: Public high school graduation rates: Colorado and the United States, 1980/81 to 1998/99.
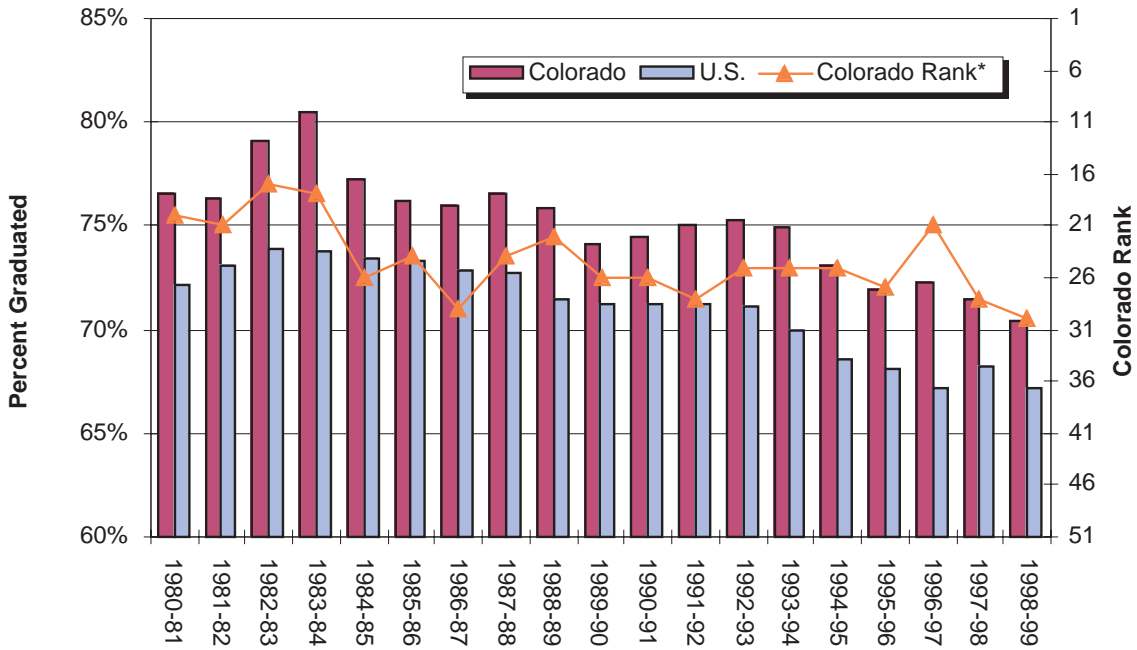
*Colorado's rank when compared to the other 49 U.S. states and the District of Columbia. The lower the rank, the better Colorado's comparative performance. 1= highest graduation rate; 51= lowest graduation rate.

Figure 21B: State high school graduation rates compared to high school and college attainment, 1996 to 2000.
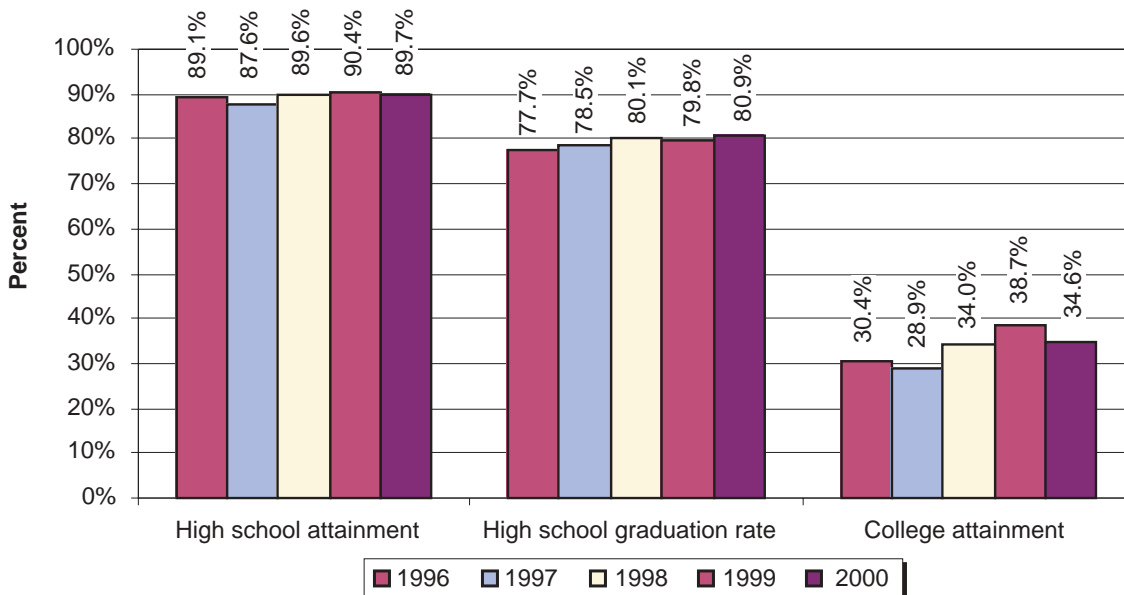
HIGHER EDUCATION

22. College Baccalaureate Graduation Rates

Indicator definition: This indicator measures the four-, five-, and six-year graduation rates at Colorado public four-year higher education institutions. The four-year graduation rate is calculated as the percentage of first-time, full-time, degree-seeking freshmen entering in summer/fall 1995 that graduated in four years from the same institution with a baccalaureate degree. The five- and six-year graduation rates were calculated as the percentage of first-time, full-time, degree-seeking freshmen entering in summer/fall 1994 and 1993 that graduated in five and six years, respectively. Students that transferred, entered as non-degree, or enrolled part-time the first year are not counted in the cohort. Students are removed from the cohort only for death, military service, or missionary service. Students that transferred to another institution and completed degrees elsewhere remain in the cohort for the Colorado institution, but are not counted as graduates of the Colorado institution.

Why this measure is important: According to the Colorado Commission on Higher Education, "graduation rates are the single most consistent indicators used by quality indicator and performance measurement systems across the United States." The graduation rate is a widely accepted measure of the educational and administrative effectiveness of public institutions in supporting and promoting their students through college attainment. The state of Colorado uses the baccalaureate graduation rate as one of ten specified quality indicators for their performance measurement system for public

Table 22. Cumulative baccalaureate graduation rates after four, five, and six years at Colorado public 4-year higher education institutions by institution: cohorts entering in fall 1993, 1994, and 1995.

Institution*	4-year (entered fall 1995, graduated by summer 1999)	5-year (entered fall 1994, graduated by summer 1999)	6-year (entered fall 1993, graduated by summer 1999)
UC-Boulder	34.7%	58.8%	63.7%
UC-Colo Springs	10.7	28.4	39.3
UC-Denver	15.4	33.2	37.9
Colo School of Mines	29.5	54.4	62.7
U of Northern Colo	22.9	39.9	44.1
Colo State U	31.4	57	59.8
Fort Lewis C	8.3	26.2	28.3
U of Southern Colo	11.5	22	25.4
Adams SC	13.4	27.5	29.8
Mesa SC	9	18.9	23.2
Metropolitan SC of Denver	3.9	12.7	19.6
Western SC	10.5	22	28
4-year inst total	23	41.5	45.4

*Institutions in **bold** met or exceeded expected benchmark graduation rates.

Figure 22A: Baccalaureate graduation rates after six years compared to freshmen retention rates, fall 1993 and 1998 cohorts.
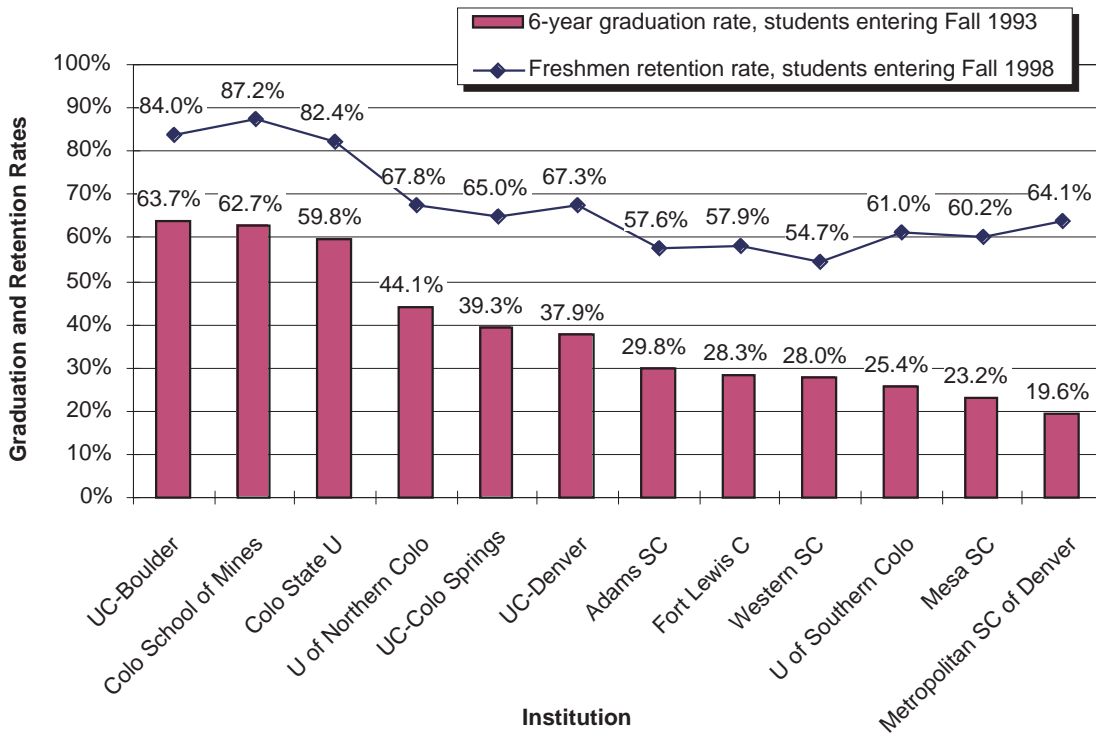
Legend:
- 6-year graduation rate, students entering Fall 1993
- Freshmen retention rate, students entering Fall 1998

Y-axis: Graduation and Retention Rates (0% to 100%)
X-axis: Institution

Freshmen retention rates:
- UC-Boulder: 84.0%
- Colo School of Mines: 87.2%
- Colo State U: 82.4%
- U of Northern Colo: 67.8%
- UC-Colo Springs: 65.0%
- UC-Denver: 67.3%
- Adams SC: 57.6%
- Fort Lewis C: 57.9%
- Western SC: 54.7%
- U of Southern Colo: 61.0%
- Mesa SC: 60.2%
- Metropolitan SC of Denver: 64.1%

6-year graduation rates:
- UC-Boulder: 63.7%
- Colo School of Mines: 62.7%
- Colo State U: 59.8%
- U of Northern Colo: 44.1%
- UC-Colo Springs: 39.3%
- UC-Denver: 37.9%
- Adams SC: 29.8%
- Fort Lewis C: 28.3%
- Western SC: 28.0%
- U of Southern Colo: 25.4%
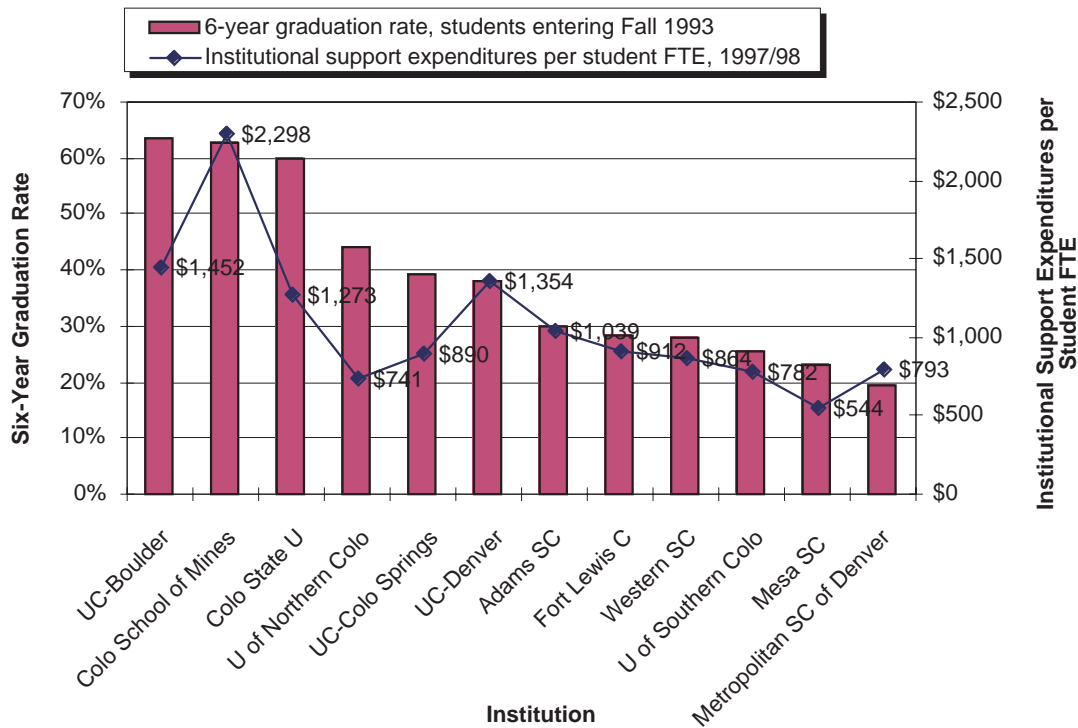- Mesa SC: 23.2%
- Metropolitan SC of Denver: 19.6%

Figure 22B: Baccalaureate graduation rates after six years (fall 1993 cohort) compared to institutional support expenditures per full-time equivalent student (1997/98 academic year).

Legend:
- 6-year graduation rate, students entering Fall 1993
- Institutional support expenditures per student FTE, 1997/98

Left Y-axis: Six-Year Graduation Rate (0% to 70%)
Right Y-axis: Institutional Support Expenditures per Student FTE ($0 to $2,500)
X-axis: Institution

Institutional support expenditures per student FTE:
- UC-Boulder: $1,452
- Colo School of Mines: $2,298
- Colo State U: $1,273
- U of Northern Colo: $741
- UC-Colo Springs: $890
- UC-Denver: $1,354
- Adams SC: $1,039
- Fort Lewis C: $912
- Western SC: $864
- U of Southern Colo: $782
- Mesa SC: $544
- Metropolitan SC of Denver: $793

institutions of higher education in the state. Several factors may affect college graduation rates, including school expenditures, student circumstances, and faculty teaching workload.

What the data show: The graduation rates in Table 22 show that cumulatively more students graduate over six years than four or five. The Colorado Commission on Higher Education compares the four-, five-, and six-year graduation rates to benchmark rates that are calculated for each institution based on a formula developed from data for 189 institutions throughout the United States. The institutions entered in **bold** in Table 22 met or exceeded these benchmark rates for at least two of the three graduation rates.

Figure 22A compares recent six-year graduation rates for each school with recent freshmen retention rates. Freshmen retention rates measure the percentage of first-time, full-time certificate or degree-seeking freshmen entering in summer/fall 1998 who were enrolled in the fall 1999 semester at the same institution. Students that transfer to other institutions are considered dropouts according to this calculation. Those institutions with the highest freshmen retention rates also met or exceeded their benchmark graduation rates, with the exception of the University of Northern Colorado.

Figure 22B compares the six-year graduation rates for each school with institutional support expenditures per full-time equivalent student. The amount of institutional support expenditures serves as a proxy for the level of expenditures for administration, although the categorization of institutional support expenditures can vary by institution. Although variability is apparent among the schools, higher graduation rates are generally correlated with higher institutional support expenditures per full-time equivalent student.

Data sources:
- Colorado Commission on Higher Education. "FY 1999-2000 Quality Indicator System Report," December 2000. www.state.co.us/cche/qi/rept2000.pdf

LAND USE

Desired Community Condition: efficient land development patterns that are in balance with local natural systems and support vibrant, sustainable communities.

23. Land Development Patterns

Indicator definition: Figure 23A shows total land area by type of use in Colorado over the 1982 - 97 period. Land classifications include federal land, developed land, open water, and various types of non-federal rural land. Developed land is defined as lands which "have been permanently removed from the rural land base," including tracts of urban and built-up land, and rights-of-way that lie outside of built-up areas. Rural land includes cropland, Conservation Reserve Program (CRP) land (highly erodible cropland which has been converted to vegetative cover for 10 years pursuant to a federal contract), pastureland, rangeland, forest land, and other non-federal rural lands.

Figures 23B and 23C portray selected aspects of farm production and land valuation over time, providing further insight on the relationships between the health of the agricultural sector and land development trends. Figure 23B illustrates the economic health of the agricultural sector in Colorado as represented by net farm income (value of production minus direct and capital costs) and net value added (the sum of the economic returns to all factors of production: farm employees, lenders, landlords, farm operators). Figure 23C illustrates farm land and building value as compared to farm production value, statewide and in selected counties.

Why this measure is important: Land use patterns have important environmental, economic, infrastructure, and general quality of life implications. In existing urban areas, infill and redevelopment are often important issues. On the urban fringe, concerns regarding sprawl, open space preservation, and efficient development patterns are frequently voiced. In rural areas, debates frequently revolve around

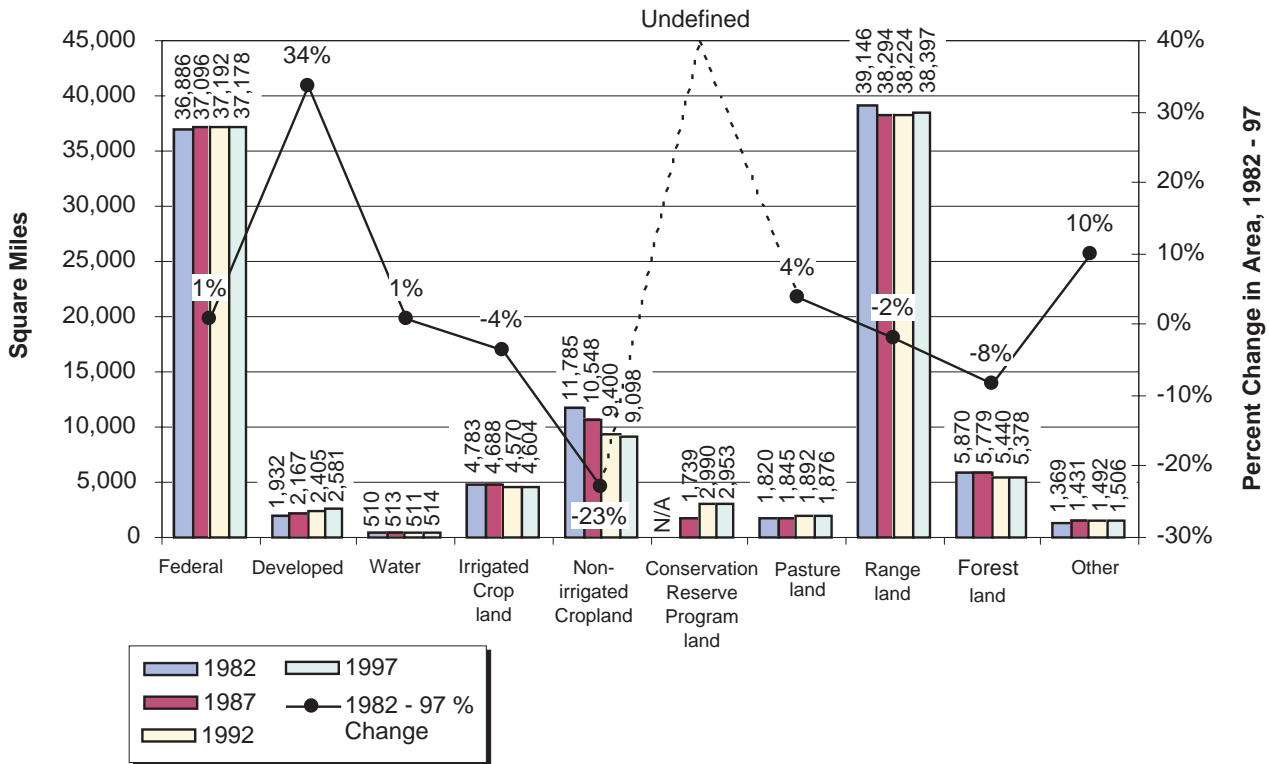Figure 23A: Colorado land use by square mileage, 1982 – 1997.

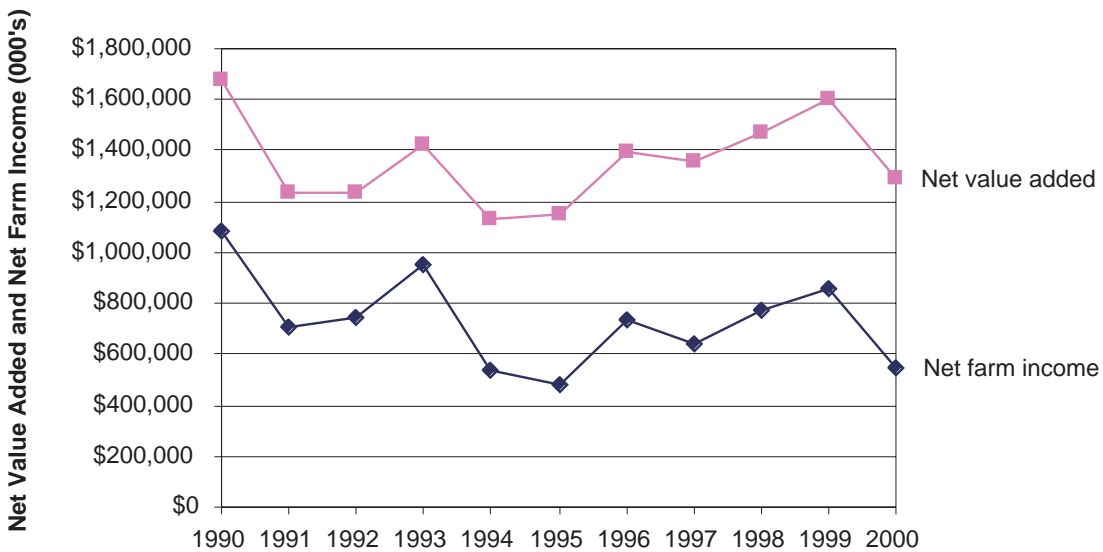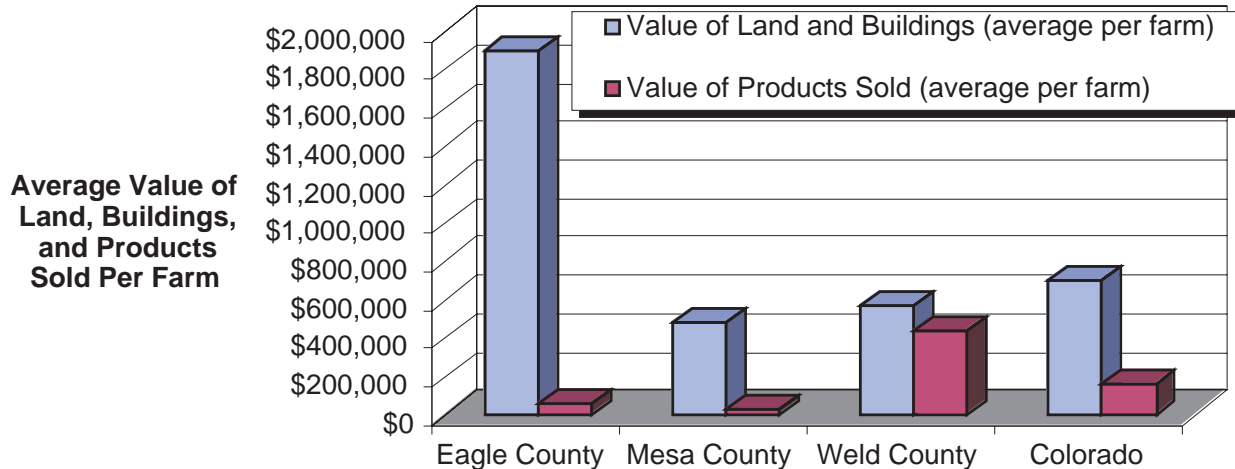Figure 23B: Net farm income and net value added for Colorado farms, 1990 to 2000.

Figure 23C: Average value of land and buildings vs. average value of products sold per farm, 1997.

natural resource use vs. land conservation. Because of the diversity of issues that involve land use, the geographic variability of land use issues, and limitations on data availability, it is difficult to consolidate relevant land use trends into a single indicator. Nonetheless, this indicator attempts to provide a general overview of selected land use trends in the state, and to explore some of the factors that contribute to the conversion of rural land to developed use.

What the data show: As illustrated in Figure 23A, a relatively small (but growing) amount of land in Colorado is developed: 2,581 square miles in 1997, or 2.5% of the state's land area. A much larger share of the state's land is federal land (35.7%), non-federal rangeland (36.9%), and other non-federal rural lands (24.4%). Approximately 0.5% is open water.

While most categories of land use have been stable over the 1982 - 97 period, some categories have showed significant change. Developed land area increased by 33.6% between 1982 and 1997. This is somewhat faster than the population growth of 27.1% over the same period, indicating that new development used an increasing amount of land per person, which some observers might describe as "sprawl." A few local regions in Colorado have recognized this as an issue, including the Denver Regional Council of Governments (DRCOG). DRCOG developed the "MetroVision 2020" growth plan for the Denver Metro area, which is intended to limit the Denver Metro urbanized area to 700 square miles by 2020 (an increase of 165 square miles over 1999), while accommodating 900,000 new residents. This equates to about 0.12 developed acres per new resident in the Denver Metro area, a substantial decrease in land consumption in comparison to the 1997 statewide average of roughly 0.42 developed acres per resident.

Figure 23A also illustrates that changes have occurred in the use of non-federal rural lands in the state. Most notably, over the 1982 - 97 period, the amount of acreage in nonirrigated cropland declined by roughly 23% (-2,687 square miles), non-federal rangeland declined by 2 percent (-749 square miles), and non-federal forest land declined by 8 percent (-493 square miles). Much of this land was converted into either developed

land (increase of 649 square miles) or into the new category of CRP land (2,953 square miles in 1997). The CRP program was established by the federal government in 1985 to assist private landowners in converting highly erodible cropland to vegetative cover to reduce soil erosion.

Figures 23B and 23C examine two of the underlying contributors to the spread of land development: the health and relative profitability of the agricultural industry. Figure 23B shows that farm income and net value added decreased substantially in actual dollars (even more if dollars were inflation-adjusted) between 1990 and 1995, rose from 1995 to 1999, before slumping again in 2000. Low profits in agriculture can encourage the conversion of rural land to developed uses. Figure 23C compares the value of a farm's land and buildings to the value of farm products sold for three counties in Colorado and the state as a whole in 1997. Figure 23C shows that, in the mountain resort community of Eagle County, the value of the land and buildings on the average farm far outweighs the value of agricultural products produced on the farm. This pattern, frequently repeated in the urbanizing areas of the state, illustrates that when the economic returns from the sale and development of rural land far outweigh the economic returns from agriculture, development pressure can be strong.

Data sources:
- U.S. Census Bureau. "State Population Estimates." www.census.gov/population/www/estimates/statepop.html

- U.S. Department of Agriculture, Economic Research Service. "U.S. and state farm income data." www.ers.usda.gov/data/farmincome/ finfidmu.htm

- U.S. Department of Agriculture, National Agriculture Statistics Service. "1997 Census of Agriculture - Colorado County Summary Highlights," March 1999. www.nass.usda.gov/census/census97/volume1/ co-6/co2_01.pdf

- U.S. Department of Agriculture, Natural Resources Conservation Service. "Summary Report: 1997 National Resources Inventory," revised December 2000. www.nhq.nrcs.usda.gov/NRI/1997/summary _report/report.pdf

24. Land Protected Through Local and Regional Land Trusts

    Indicator definition: This indicator illustrates the number of land trusts and acres protected by local and regional land trusts in Colorado from 1990 to 2000. The Land Trust Alliance, a charitable organization, compiled the National Land Trust Census, providing land protection statistics through December 31, 2000 by grassroots, non-profit, local and regional land trusts throughout the United States. The data was collected through mailed and phone surveys to about 1,700 land trust organizations and, where needed, through state land trust service centers or other organizations working directly with non-profit land trusts. For purposes of the National Land Trust Census, a land trust is defined as "a non-profit organization that, as all or part of its mission, actively works to conserve land by undertaking or assisting direct land transactions – primarily the purchase or acceptance of donations of land or conservation easements." Lands conserved through national land trusts (e.g., The Nature Conservancy, Trust for Public Land, American Farmland Trust, etc.) are not included in the Land Trust Census.

    Why this measure is important: The number, activity, and variety of local and regional land trusts provides an important indicator of the general community support behind protecting and preserving open spaces and important environmental and ecological resources in a region. Because land protection under non-profit land trusts occur under voluntary, as opposed to regulatory, circumstances, it is fueled by people's desire to save the green spaces, working landscapes, and open lands that make each community unique. Placing lands under conservation easements and in land trust ownership indicate, to some extent,

Table 24A. Change in the number of local and regional land trusts and local protected acreage in Colorado, 1990 to 2000.

	Colorado			U. S.
	1990	**2000**	**% Change**	**% Change**
Land Trusts	16	35	118.8%	42.4%
Acreage	24,729	339,122	1,271.4%	241.0%

Table 24B. Ten states with the largest number of land trusts and the most total acreage protected by local and regional land trusts, 2000.

States	Number of Land Trusts
Massachusetts	143
California	132
Connecticut	112
Maine	76
Pennsylvania	75
New York	72
Wisconsin	46
Michigan	38
Ohio	36

States	Acres Protected
California	1,251,782 acres
New York	552,220 acres
Montana	505,659 acres
New Mexico	495,823 acres
Vermont	444,036 acres
Pennsylvania	340,788 acres
COLORADO	339,122 acres
New Hampshire	288,197 acres
Virginia	236,160 acres
Massachusetts	209,967 acres

the economic tradeoffs that some individuals and communities are willing to make to ensure open lands are protected.

   What the data show: Since 1990, the number of land trusts with land interests in the state of Colorado has more than doubled. In the same time period, the amount of land owned by the land trusts, placed under conservation easements, and purchased by land trusts and transferred to alternate agencies for protection and stewardship has increased more than ten-fold. In other words, not only have the number of non-profit land trusts increased, but the amount of land each trust holds under conservation has increased as well. Comparatively, the number of land trusts has grown about 42% in the United States since 1990 and the amount of protected acreage grew 241%, now covering more than 6.47 million acres (an area twice the size of Connecticut).

   The National Land Trust Census found that the southwest region (Arizona, Colorado, New Mexico, and Utah) had a 2,201% increase in protected acreage since 1990, the largest increase of all regions in the United States. The Land Trust Alliance speculates that the private conservation movement may be the fastest growing segment of the conservation community.

Data sources :

• Colorado Coalition of Land Trusts website. www.cclt.org

• Governor's Commission on Saving Open Spaces, Farms & Ranches. "Natural Landscapes: Colorado's Legacy to its Children," December 2000. www.state.co.us/issues/open_space8.pdf

• The Land Trust Alliance. "National Land Trust Census," September 2001. www.lta.org/newsroom/census_summary_data.htm

WATER SUPPLY AND USAGE

   Desired Community Condition: water consumption does not exceed renewable supply, ensuring long-term sustainable use and drought resistance.

Figure 25: Freshwater Consumption as a Percentage of Local Average Annual Precipitation, 1990.
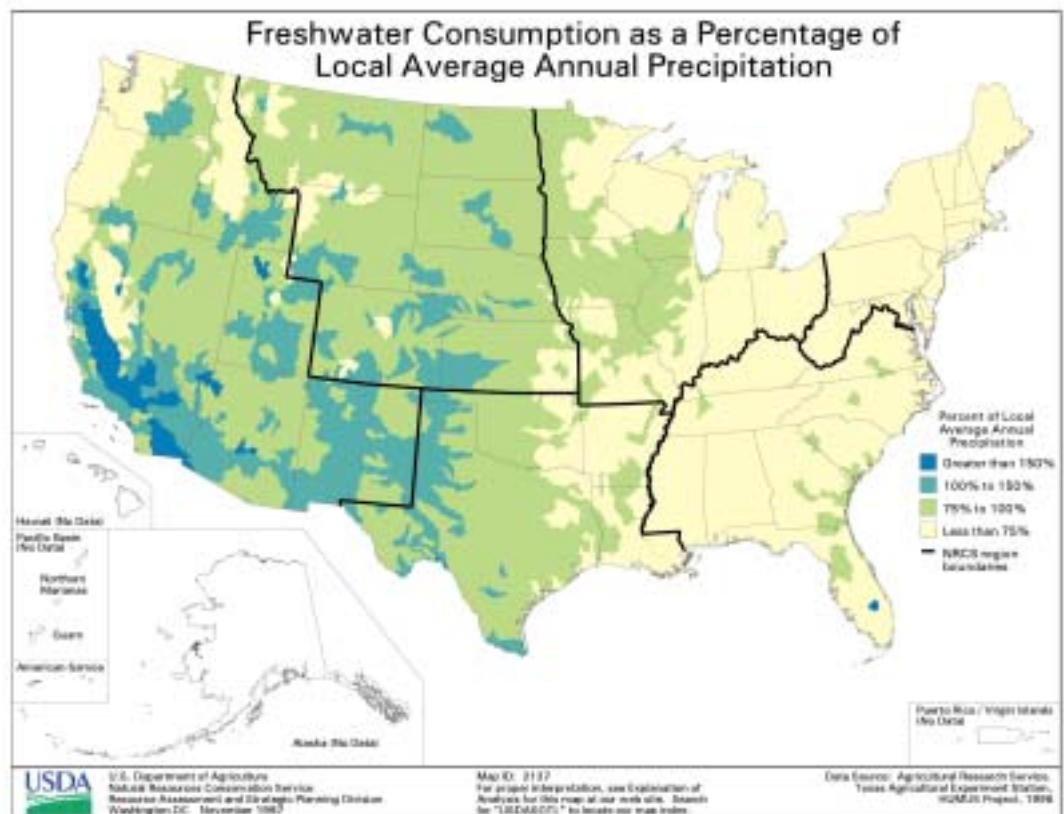
25. Freshwater Consumption as a Percentage of Local Average Annual Precipitation

Indicator definition: This indicator summarizes average annual fresh water consumption for all uses (residential, agricultural, industrial, etc.) as a percentage of local average annual precipitation throughout the United States. Average annual freshwater consumption was determined for the six-year period between 1985 and 1990; average annual precipitation was determined for the 30-year period between 1960 and 1989 and includes snowfall.

Why this measure is important: This measure indicates where demands for freshwater may be creating pressures on water supply in terms of water supplied through local precipitation (the primary natural means of renewing local fresh water resources). Because fresh water is a limited resource, especially in the arid west, keeping water consumption (and allocation) within the limits of freshwater regeneration rates will help ensure water resources are available for Colorado's economy, population, and environment over the long term. Perennial battles over water in Colorado are reminders of the limits of our existing supply. Wise and efficient use of water are practical steps we can take to make the best use of this limited resource.

What the data show: The Figure 25 map indicates that Colorado was already using over 75% of its annual precipitation throughout much of the state, and over 100% in some areas of the state, as of 1990. There are, of course, many factors that affect water availability other than precipitation (e.g., storage, recycling, etc.). Additionally, this indicator does not consider those areas where the freshwater consumed does not originate at the location of the precipitation. However, common sense tells us that, as individual states and the country as a whole move toward 100% or higher use of their local precipitation, there will be less water available on a sustainable basis, and more heated battles over the "right to water" will ensue.

Data sources:
• Resource Assessment Division: Natural Resources Conservation Service – USDA. www.nhq.nrcs.usda.gov/land/meta/ m2137.html

26. Water Diversions by Source

Indicator definition: This indicator examines total and per capita water use in Colorado for 1990 and 1995. Water use, as reported by the United States Geological Survey (USGS), includes water from both public and private supplies and surface and groundwater sources that is used (withdrawn and delivered) for any purpose. Water consumption is the amount of "water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed, or otherwise removed from the immediate environment." The USGS compiles this data every five years from state and hydrologic region information as part of the National Water-Use Information Program in an effort to create a single source of uniform, comparable information on water use.

Why this measure is important: Trends in per capita water use have implications for the adequacy of future supplies and the need for water efficiency measures. Water efficiency is crucial for maintaining a sustainable water supply for our growing population, given the arid climate in much of the state and the drought cycles that periodically occur.

Additionally, the sustainability of present allocations is influenced by whether the source is renewable or not. In some regions of the state, such as the Denver Basin Aquifer which underlies the northern Front Range, groundwater resources are essentially unconnected to surface streams and are not renewable. In such areas, well pumping can exceed the natural rate of recharge, causing the water level to drop and well pumping costs to increase or wells to run dry. This is presently occurring in parts of the shallow edges of the Denver Basin.

What the data show: Figure 26A shows the percent contribution of each source of water (surface and ground) to total water usage in Colorado for 1990 and 1995. This figure indicates that groundwater withdrawals as a percent of total withdrawals decreased in Colorado during this period. This follows the general U.S. trend observed by Thomas Brown in his report "Past and Future Freshwater Use in the United States," where "[o]ver the past 35 years, groundwater withdrawal as a percent of total

freshwater withdrawal has generally been falling in the West but rising in the East."

Figure 26B shows per capita water use and consumption in Colorado for 1990 and 1995. This shows that, despite an overall increase in withdrawn water in 1995 (Figure 26A), per capita water use and consumption declined during this period. The actual amount of water consumed is less than that used due to wastewater release (return flow) and conveyance losses that return much of the used water (in Colorado's case, about 60%) back to the hydrologic cycle. Overall, the USGS reports that the use of reclaimed wastewater nearly tripled in Colorado between 1990 and 1995, though this only equated to about 2.9 gallons per person per day in 1995.

Data sources:
• Brown, Thomas C. "Past and Future Freshwater Use in the United States." U.S. Department of Agriculture, Forest Service, 1999. www.fs.fed.us/rm/pubs/rmrs_gtr39.pdf
• Colorado Division of Water Resources. "Cumulative Yearly Statistics of the Colorado Division of Water Resources," 1998 and 2000. http://water.state.co.us
• Colorado Legislative Council. "Finding Water for One Million New Residents," July 14, 1999. www.state.co.us/gov_dir/leg_dir/lcsstaff/1999/research/issuebrf99-5.htm
• U.S. Geological Survey. "Estimated use of water in the United States in 1990." U.S. Geological Survey. "Estimated use of water in the United States in 1995." http://water.usgs.gov/watuse

Figure 26A: Average gallons of water withdrawn per day in Colorado by source, 1990 and 1995.
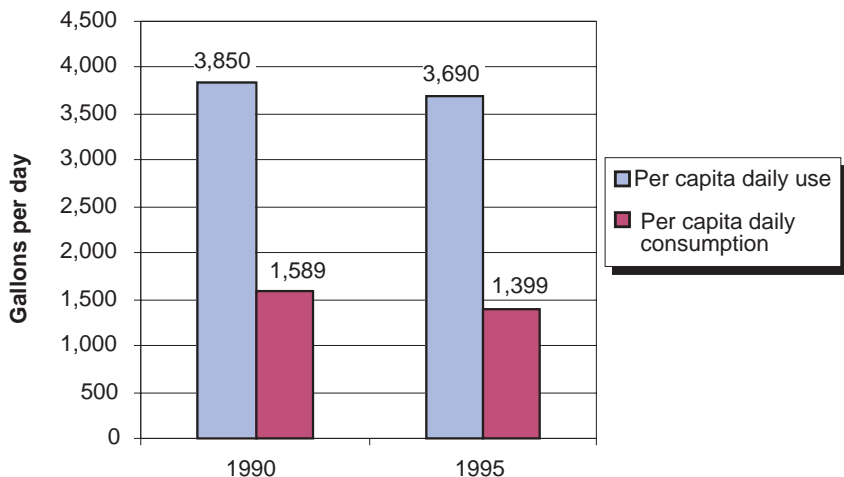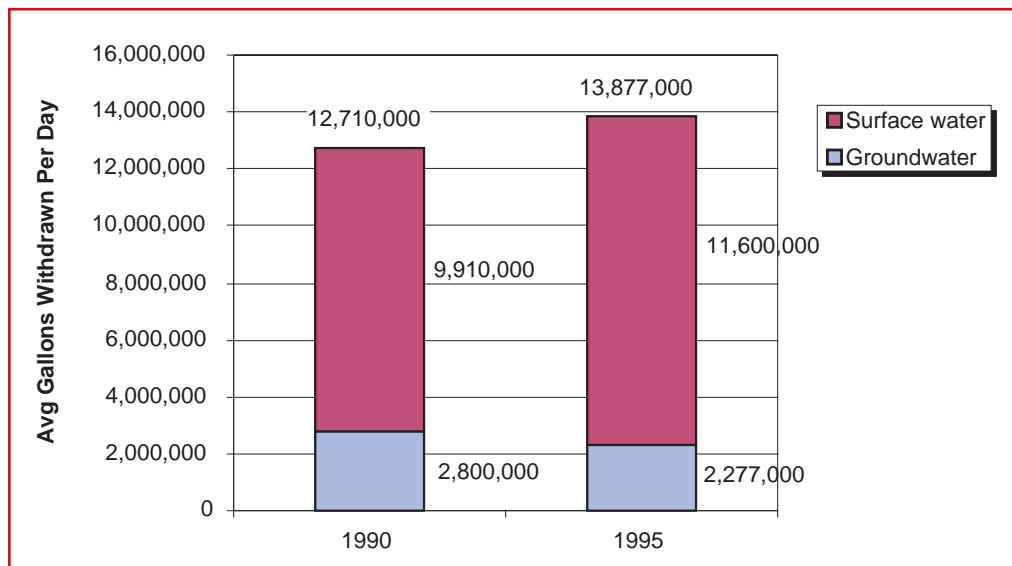

Figure 26B: Per capita daily water use and consumption in Colorado, 1990 and 1995.

27. Water Diversions by Use

Indicator definition: Water is used for many purposes, including agricultural, municipal, commercial, and industrial uses. Figure 27A shows the percent of total water diversions (surface and groundwater) in Colorado by type of use in 1995, as estimated by the United States Geological Survey (USGS). Figure 27B shows trends in total surface water distributions to each use from 1994 through 2000 (groundwater use excluded), as estimated by the Colorado Division of Water Resources (CDWR).

It should be noted that comparisons of the distribution volumes reported by the USGS and CDWR are not advised because the USGS data includes groundwater (while the CDWR data does not), and because use categories for the two sources differ. Additionally, CDWR data is reported and compiled from seven water districts, with potentially different use interpretations between and within districts. Because the USGS data includes groundwater and was compiled utilizing uniform definitions and assumptions for the entire U.S. and is, therefore, comparable to other USGS data for other states, this data was used for Figure 27A. The CDWR data is useful for looking at general trends in surface water distributions over time (Figure 27B), though year-to-year fluctuations may in part be due to differing use categorization methods.

Why this measure is important: To project future water demands and plan appropriate supply management and efficiency measures, it is important to know how water is being used. Trends in water allocation by use can identify whether use-specific water conservation goals are being achieved and where future efforts should focus. Additionally, water use trends are affected by climate, land-use changes, population growth, water quality, and other factors, and thus, at times, may be related to other "quality of life" factors that may need attention.

What the data show: Figure 27A shows that the vast majority of freshwater diversions in Colorado went toward irrigation in 1995 (92.0%). Public Supply, defined by the USGS as "water withdrawn by public and private water suppliers and delivered to users. for a variety of uses, such as domestic, commercial, thermoelectric power, industrial, and public water use," comprised 5.1% of the 1995 diversions. The remaining 2.9% of use was associated with self-supplied withdrawals for industrial, thermoelectric, mining, and other uses.

An important concept in water usage is consumptive use (i.e., water that is removed from the immediate environment through evaporation, transpiration, consumption, etc.) Nationwide, irrigation consumed about 60% of the water that was withdrawn for its use, livestock consumed 58% of its diversions, domestic and public uses consumed 21%, industrial and commercial consumed 15%, and thermoelectric consumed 3%, in 1995. (Brown, 1999)

Figure 27B shows general trends in surface water diversions by use in Colorado from 1994 through 2000. During this period, diversions for irrigation, industrial, and commercial uses decreased, whereas diversions for municipal and livestock uses increased. Similar trends were also observed by the USGS for the U.S. as a whole in their 1995 report, estimated use of water in the United States. The USGS found that decreases in irrigation application were mainly due to the loss of agricultural land to development, improved and more efficient irrigation systems, dry land farming practices, and sale of irrigation water rights to municipal (public) water suppliers. Decreased diversions to commercial and industrial uses were found to be primarily the result of conservation measures, including increased plant efficiencies and water recycling. Conversely, higher public supply and livestock diversions were largely a result of population increases, though per capita diversions tended to decrease over time, primarily due to implementation of conservation and efficiency measures. Further local analysis of these trends is warranted to determine the extent to which land-use changes, conservation and efficiency measures, and population growth affect water use and consumption in Colorado.

Data sources:

- Brown, Thomas C. "Past and Future Freshwater Use in the United States." U.S. Department of Agriculture, Forest Service, 1999. www.fs.fed.us/rm/pubs/rmrs_gtr39.pdf

- Colorado Division of Water Resources. "Cumulative Yearly Statistics of the Colorado Division of Water Resources," 1998 and 2000. http://water.state.co.us

- U.S. Geological Survey. "Estimated use of water in the United States," 1990 and 1995 reports. http://water.usgs.gov/watuse

Figure 27A: Total water diversions by use category in Colorado, 1995.

Irrigation 92.0%

Public supply 5.1%

Mining (self-supplied) 0.5%

Livestock (self-supplied) 0.4%

Domestic (self-supplied) 0.2%

Commercial (self-supplied) 0.1%

Industrial (self-supplied) 0.9%

Thermoelectric (self-supplied) 0.8%
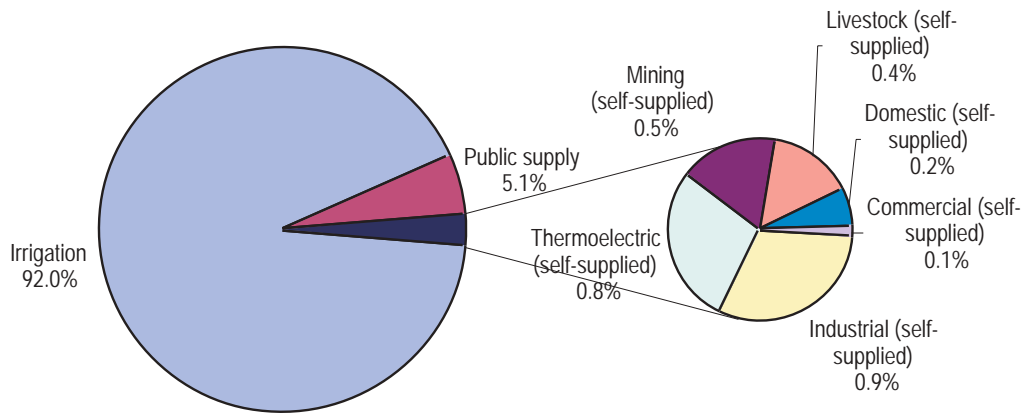
Figure 27B: Total surface water diversions (million gallons per day) by use, 1994 to 2000.

Million gallons per day (Irrigation)

Million gallons per day (other uses)

Irrigation
Municipal
Industrial
Livestock
Commercial
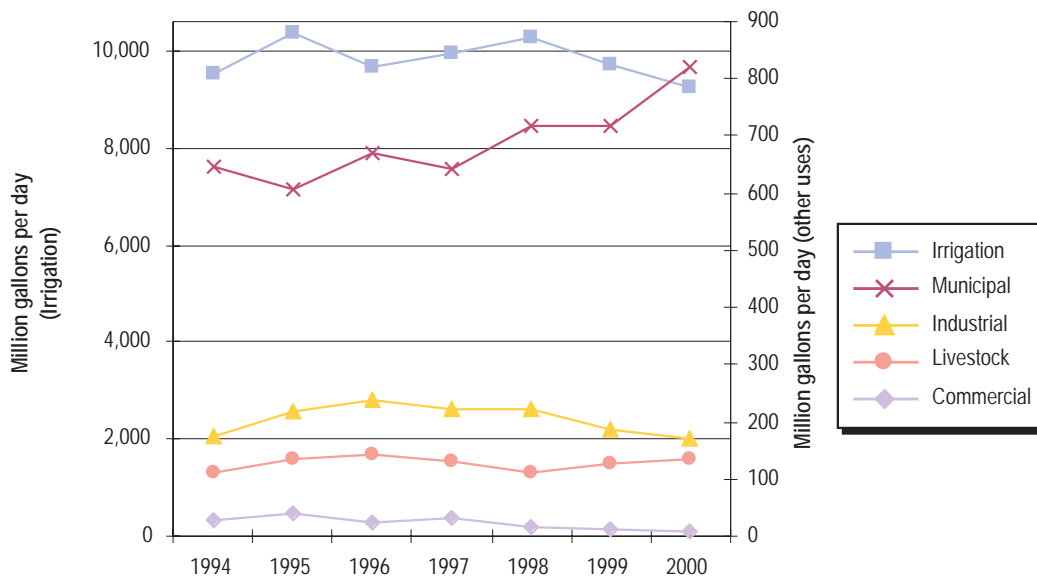
ENERGY SUPPLY AND CONSUMPTION

Desired Community Condition: energy efficiency and clean, renewable technologies are promoted to maintain economic vibrancy; decrease air, water, and land pollution; and provide long-term, sustainable sources of energy.

28. Total Energy Consumption

Indicator definition: This indicator illustrates total energy consumption in Colorado from 1960 through 1999, as well as consumption per capita, consumption by source, and consumption by use. Consumption by source and use is presented in both absolute and percentage terms. Absolute consumption is reported in British Thermal Units (BTUs), where one BTU equals the amount of energy required to heat one pound of water one degree Fahrenheit.

Why this measure is important: Energy is essential our economy and lifestyles. Energy drives our cars, runs our computers, lights our homes, cooks our food, and does about everything else in today's society. However, events such as electricity deregulation in California and volatile international oil prices have illustrated that we cannot take for granted that we will always have an abundant supply of inexpensive energy.

Energy use patterns are also important to examine for environmental reasons. In the state's urban areas, fossil fuels are the primary source of pollutants such as carbon monoxide, nitrogen dioxide, and sulfur dioxide. Additionally, as reported in Indicator 31, over 80% of greenhouse gases in Colorado result from fossil fuel use and energy production. Renewable "clean technologies" (i.e., energy sources with no atmospheric pollutant emissions, such as solar and wind power) avoid many of the environmental effects associated with fossil fuel use, including the human and environmental health effects of air pollution, and the impacts associated with fossil fuel extraction processes. Additionally, improved energy efficiency provides a clear opportunity to reduce environmental harm, achieve long-term cost savings, and conserve nonrenewable resources.

What the data show: Figure 28A shows total energy consumption and energy consumption per capita in Colorado from 1960 through 1999. While total energy consumption has shown continued increases
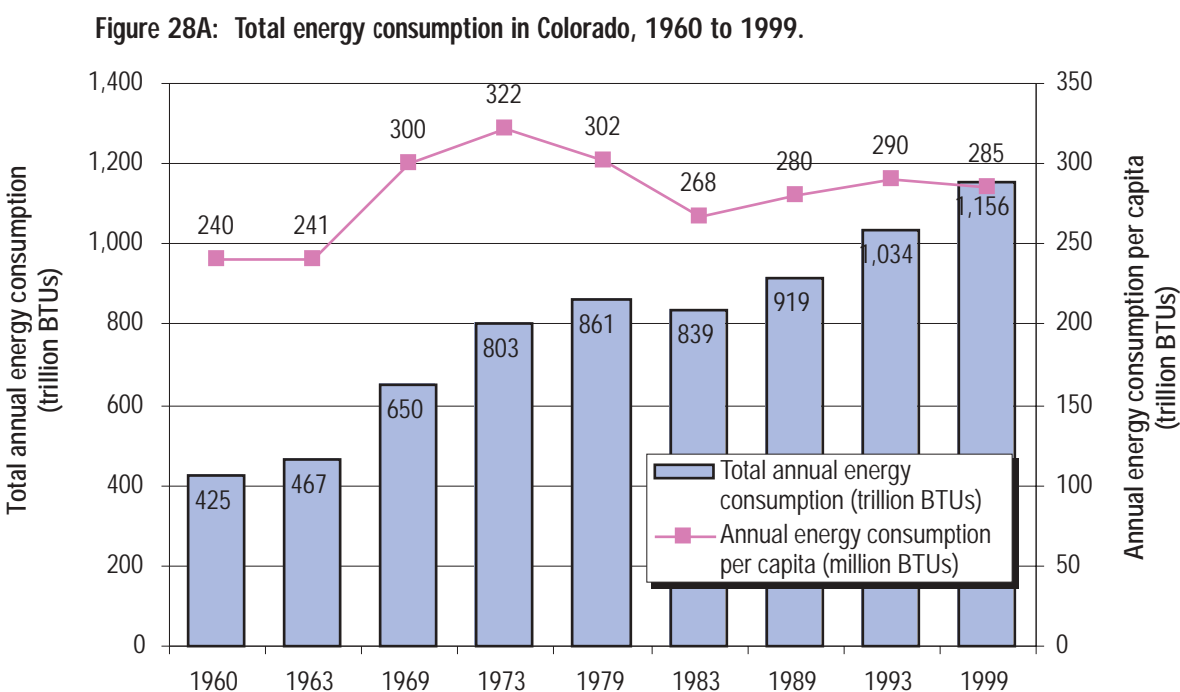
Figure 28A: Total energy consumption in Colorado, 1960 to 1999.

Figure 28B: Total energy consumption by source in Colorado, 1960 to 1999.
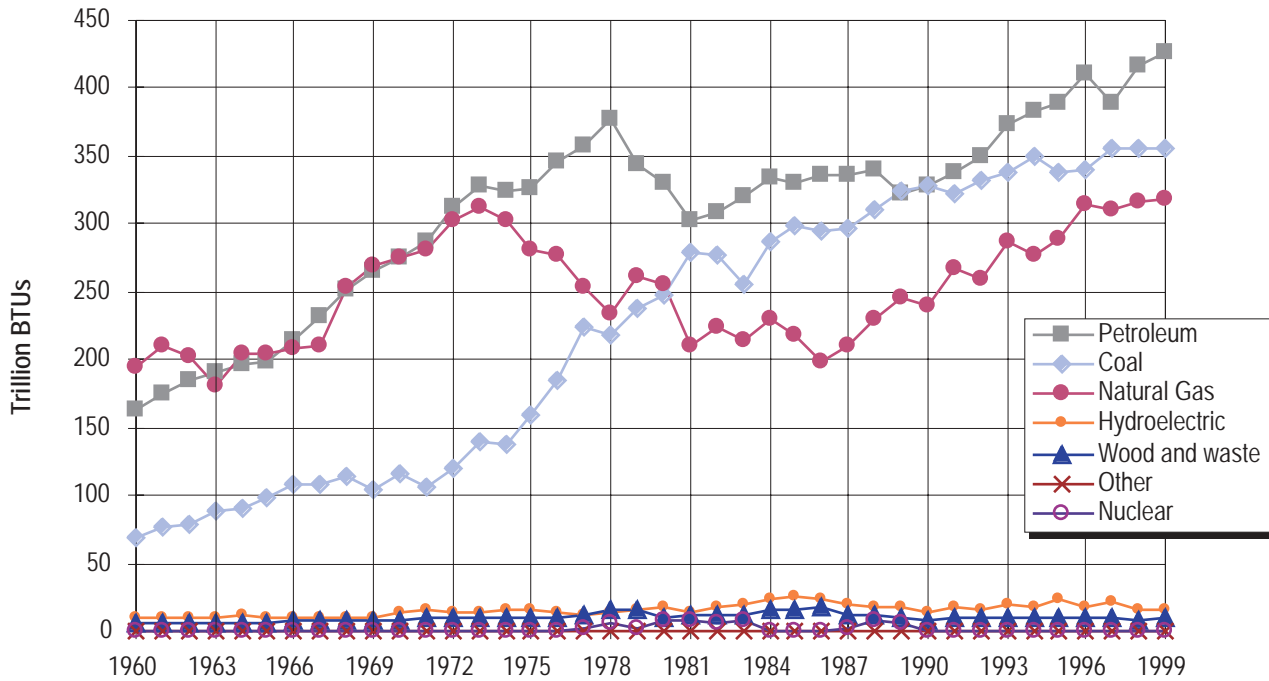

Figure 28C: Percent of energy consumed by source in Colorado, 1960 to 1999.
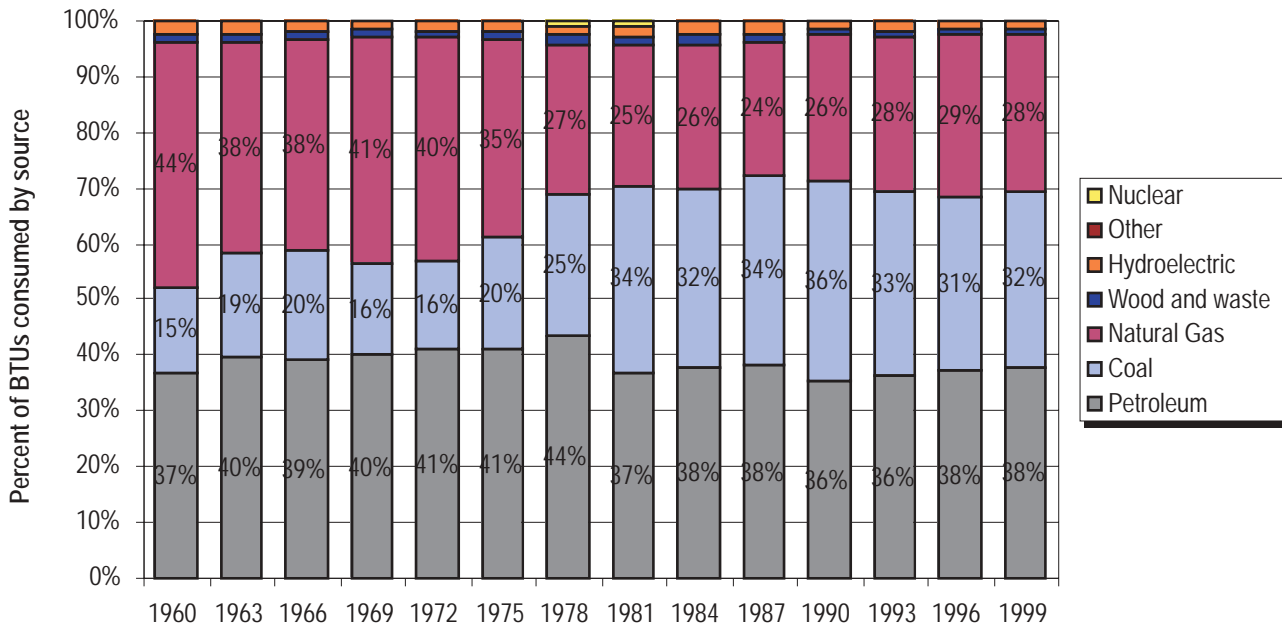
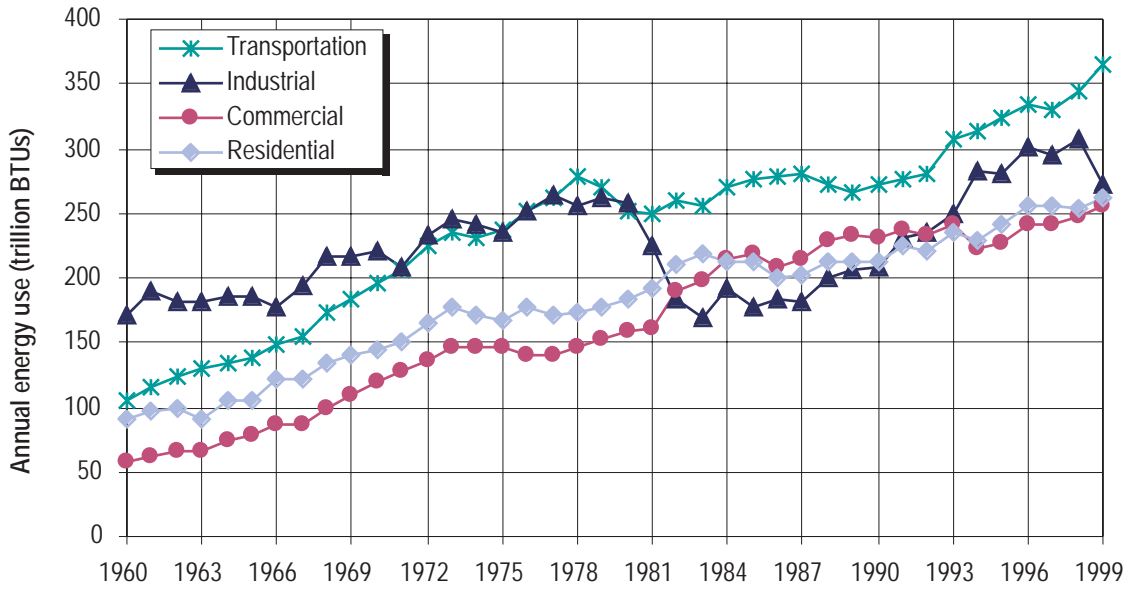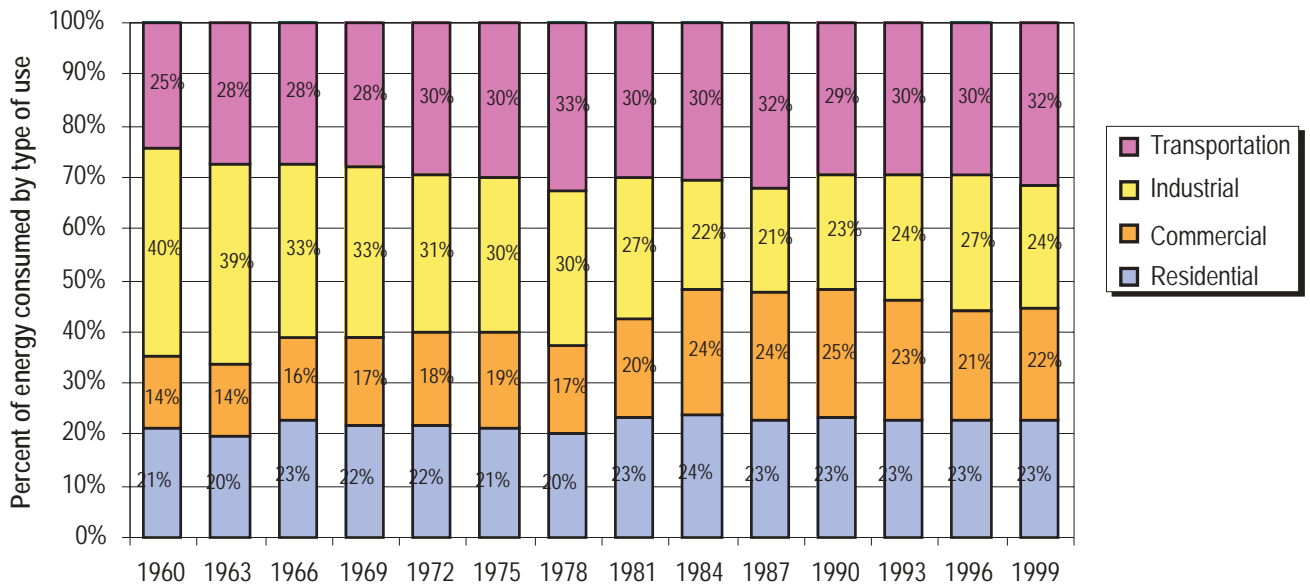Figure 28D: Total energy consumption by use in Colorado, 1960 to 1999.

Figure 28E: Percent of energy consumed by type of use in Colorado, 1960 to 1999.

(except for a slight drop between 1979 and 1983), per capita energy consumption has been more variable. Per capita energy consumption rose significantly from 1963 to 1973, before dropping through 1983, and then increasing more slowly from 1983 to 1993, before declining slightly again in 1999. A variety of factors such as energy prices, energy conservation measures, and the state of the economy have likely influenced these patterns. For purposes of comparison, 11 states consumed less energy per capita than Colorado in 1999, while 39 consumed more.

Figure 28B shows total energy consumption by source, measured in trillions of BTUs, from 1960 to 1999. Petroleum, coal, and natural gas are the three dominant sources, with each showing variable patterns, but overall increases over at least the past 10 years. Colorado had a brief experience with nuclear energy starting in 1977, but has received no energy from this source since 1989. Hydroelectric, wood and waste, and alternative renewable sources (e.g., geothermal, wind, photovoltaic, solar), still constitute a very small portion of Colorado's overall energy use.

Figure 28C shows that approximately 98% of Colorado's energy needs are supplied by fossil fuels. This is largely due to the fact that alternative, renewable, non-polluting sources (e.g., wind and solar) have not, until recently, been economically competitive with fossil fuels. In 1997, Colorado power companies began offering consumers the option of wind power for $2.50 to $3.00 more per 100 kilowatt hours of electricity each month, about one-sixth of typical monthly household use. As of July 2001, Xcel Energy was serving 14,110 customers with windpower. As of October 2001, Xcel had close to 60 megawatts of wind power capacity between its Ponnequin Wind Facility in northern Colorado near Cheyenne and its newer Peetz Table Wind Power Plant in northeastern Colorado.

Figures 28D and 28E illustrate total energy consumption by use in Colorado from 1960 to 1999. In general, the data indicate a steady increase in consumption over time by each use (transportation, industrial, residential, and commercial), with the exception of a large drop in energy use by the industrial sector between 1980 and 1985. More research is needed to determine if this drop was due to increased energy efficiency of industries during this period, a change in estimation methodologies by the Energy Information Association, a loss of industries, or other reasons. Figure 28D also shows that transportation has been the single largest energy-consuming sector since 1981.

Figure 28E shows that the relative share of energy use by type of use has been fairly steady since 1984, despite some fluctuation in the share attributable to industrial uses. In 1999, 32% of energy use was attributable to transportation, 24% to industrial use, 23% to residential use, and 22% to commercial use.

Not shown in graphical form, but worth mentioning, are the sources used for electric utility energy inputs in Colorado. In 1972, 50% of electric utility energy inputs came from coal, 40% from natural gas, 8% from hydroelectric, and 2% from petroleum. By contrast, in 1999, 91% of electric utility energy inputs came from coal, 5% from natural gas, 4% from hydroelectric, and a small amount from petroleum. In other words, since 1972, there has been a substantial increase in coal inputs to electric utilities, with a concurrent decrease in inputs from other sources, particularly natural gas.

Data sources:
• U.S. Census Bureau. "State Population Estimates." www.census.gov/population/www/estimates/statepop.html
• U.S. Department of Energy, Energy Information Administration. "State Energy Data Report 1999." www.eia.doe.gov/emeu/sedr/contents.html
• U.S. Department of Energy, National Renewable Energy Laboratory. "Utility Green Pricing Programs: What Defines Success?", September 2001. www.eren.doe.gov/greenpower/29831.pdf
• Xcel Energy. "Colorado's Second Commercial Wind Farm Debuts," 10/16/01. www.xcelenergy.com/NewsRelease/newsRelease101601.ASP

Desired Community Condition: clean air, pure water, and protected landscapes maintain the health and well-being of all residents (human and non-human); individuals, communities, and businesses actively conserve natural resources and minimize waste.

29. Percent of Days When Air Quality was "Good," "Moderate," and "Unhealthful," 1996-2000.

Indicator definition: The EPA developed the Pollutant Standards Index (PSI) in 1976 to provide timely and easily understandable information about daily levels of air pollution. The PSI measures five criteria pollutants established under the National Ambient Air Quality Standards: particulate matter (PM-10), carbon monoxide, sulfur dioxide, nitrogen dioxide, and ozone. For each day that pollutants are measured, air quality is placed into one of five categories based on the PSI value, as follows: "Good" (index value 0-50), "Moderate" (index value 51-100), "Unhealthful" (index value 101-200), "Very Unhealthful" (index value 201-300), and "Hazardous" (index value 301-500). Readings above 100 are in violation of the National Ambient Air Quality Standards.

The EPA updated the index in June 2000 and renamed it the Air Quality Index (AQI). The AQI serves the same purpose as the PSI, but incorporates a new health risk category ("unhealthy for sensitive groups": index of 101 – 150), and two additional pollutants: ozone averaged over 8 hours and fine particulate matter (particle size 2.5 micrometers or less).

In Colorado, the AQI is calculated for 27 of the state's counties. For purposes of this indicator, the county-level data has been aggregated into regional-level averages, with each county weighted equally.

Why this measure is important: On a daily basis, PSI figures alert the public as to whether air quality is "good," "moderate," "unhealthful," or worse in particular locations. The EPA and local officials use the PSI to help educate the public on general health effects associated with varying pollution levels and precautionary measures that can be taken to reduce risk of exposure.

Measuring PSI over the long term also gives an indication of trends in the general air quality of a region.

What the data show: As seen in Figure 29A, across the 27 measured counties, the proportion of days with "good" air quality has been relatively steady over the 1996 – 2000 period. An average of 83% to 85% of days have had "good" air quality each year, averaged across the measured counties. The Denver Metro area has had a lower share of "good" days over the period (62 – 70% "good") than the other regional groupings in the state.

Figure 29B illustrates the proportion of days with "moderate" air quality. Across the 27 measured counties, the average proportion of "moderate" days has again been relatively steady, at 15 – 17% of days over the 1995 – 2000 period. The Denver Metro area has had a higher proportion of "moderate" days over the period (30 – 38%) than other Colorado regions.

Finally, Figure 29C illustrates the percent of days when air quality was "unhealthful." Across all measured counties, the average proportion of days which are "unhealthful" has been relatively small, at 0.1% to 0.3% of days per year. Each region shown in the graph (except for "other Front Range") has had at least some "unhealthful" days in the past five years, however.

Data sources:
- U.S. Environmental Protection Agency. "AIRDATA."
  www.epa.gov/air/data/monpsi.html

- U.S. Environmental Protection Agency, Office of Air Quality and Standards. "Measuring Air Quality: The Pollutant Standards Index," May 2001.
  www.epa.gov/airprogm/oar/oaqps/psihold.html

- U.S. Environmental Protection Agency, Office of Air Quality and Standards. "PSI and AQI," May 2001. www.epa.gov/oar/oaqps/psiaqi.html

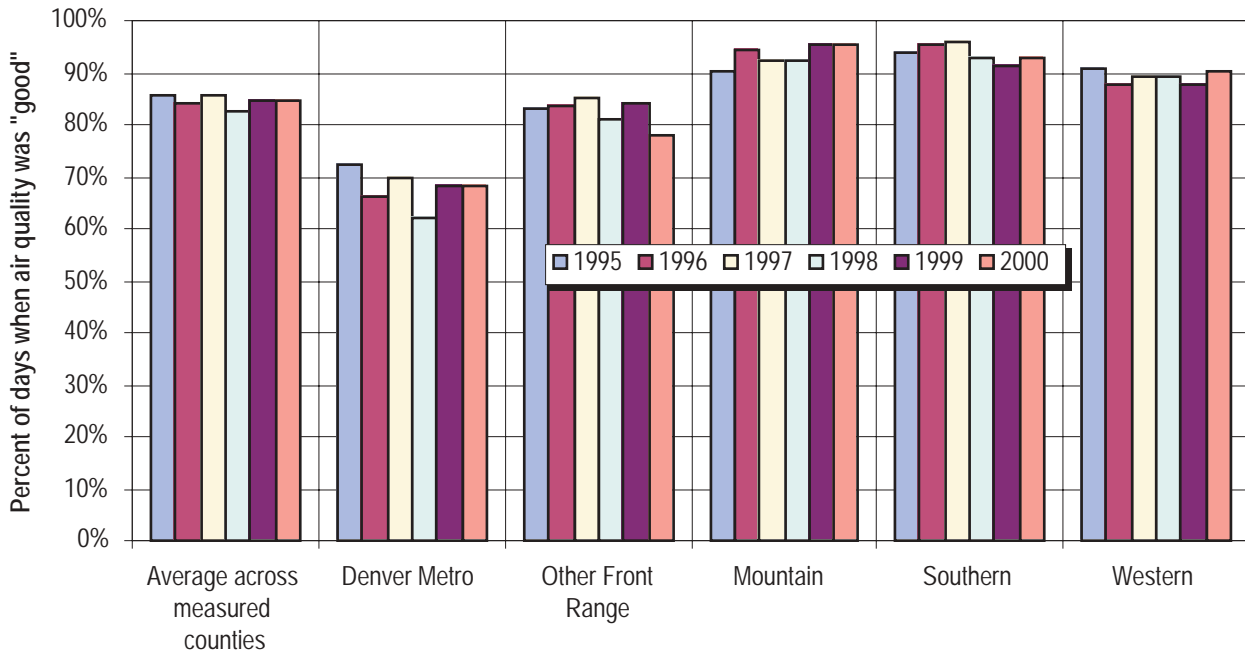**Figure 29A: Percent of Days When Air Quality Was "Good," 1996-2000.**

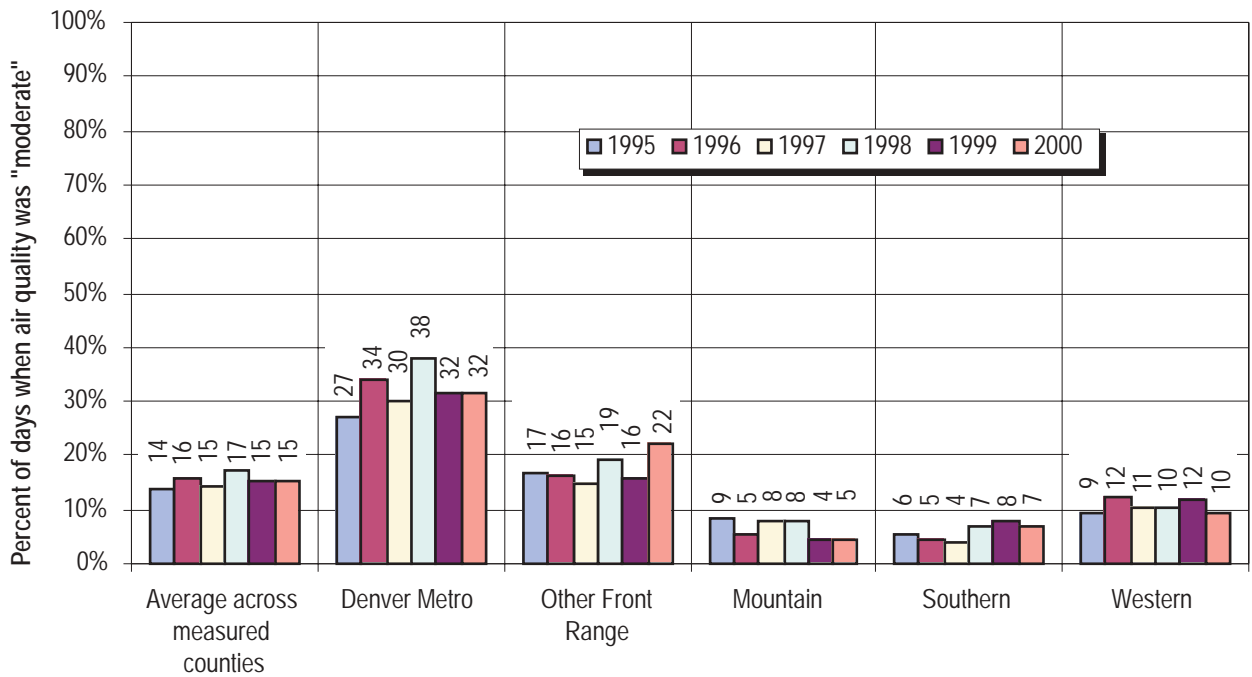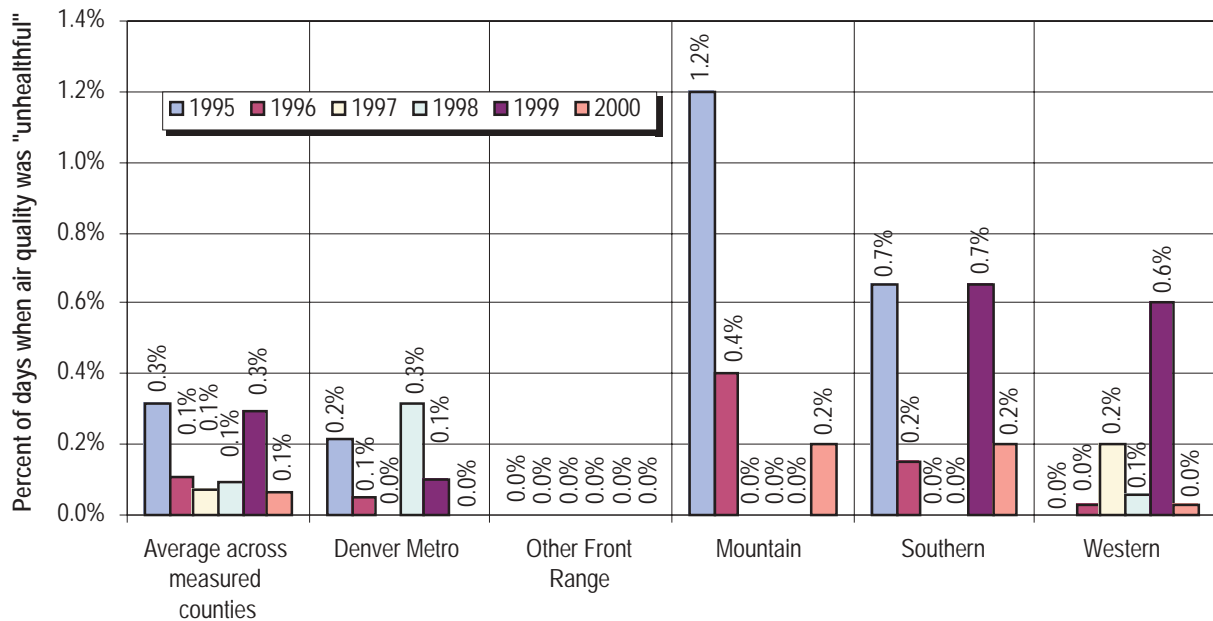**Figure 29B: Percent of Days When Air Quality Was "Moderate," 1996-2000.**

Figure 29C: Percent of Days When Air Quality Was "Unhealthful," 1996-2000.

30. Visibility Standard Index

Indicator definition: This indicator measures the percentage of monitoring days in which air quality in Denver and Fort Collins met state visibility standards. On the Colorado Visibility Standard Index, a reading of 100 equates to a condition where 7.6 percent of the light in a kilometer of air is blocked over a four-hour average period between 8am and 4pm. Readings of 0 – 50 are good, 51 – 100 are fair, 101 – 199 are poor, and 200-plus are extremely poor. Readings above 100 (poor or extremely poor) are considered to be in violation of the Visibility Standard. The standard is equivalent to a visual range of 32 miles and was established by the Colorado Department of Public Health and Environment pursuant to state law after assessing public perception and values of visual aesthetics. Days in which the relative humidity exceeds 70 percent or the monitoring equipment was out of service due to calibration and maintenance are excluded from the calculations.

Why this measure is important: Although there are no regulatory consequences for violating the state Visibility Standard, visual air quality is an important aesthetic, natural and economic resource for the state of Colorado. Because people value clear views, a loss in visual quality can make an area less attractive and enjoyable to residents, potential new residents, tourists, and businesses. Additionally, there is growing evidence that some of the pollutants which degrade visibility are linked to respiratory illnesses. As such, efforts to improve visibility may also bring health benefits.

What the data show: As illustrated in Figure 30A, Denver has been in compliance with the Visibility Standard for between 35% and 61% of monitoring days over the 1991 – 2000 period, with a long-term average of approximately 47% of monitoring days in compliance (53% of days in violation). As shown in Figure 30B, Fort Collins has been in compliance with the Visibility Standard for between 47% to 79% of monitoring days annually over the 1994 – 2000 period, with a long-term average of 62% of monitoring days in compliance (38% of days in violation). In both locations, the year-to-year patterns have been erratic, although 1999 and 2000 were the best or close to the best years recorded in each city.

Visibility is also measured at several of the National Parks and Wilderness Areas in Colorado, although under a different standard than the state Visibility Standard. Long-term monitoring over the 1988 – 1998 period shows

that Mesa Verde National Park and Great Sand Dunes National Monument have both experienced statistically significant increases in haziness over the period, although the degradation at Great Sand Dunes was driven primarily by one unusually hazy year (1994). By contrast, visibility in Rocky Mountain National Park has been unchanged over the 1988 – 98 period, while visibility in the Weminuche Wilderness Area has improved.

Data sources:
- City of Fort Collins Air Quality Program. http://fcgov.com/airquality/visibility.php

- Colorado Department of Public Health and Environment, Air Pollution Control Division. "Colorado Air Quality Data Report," 1991 – 2000 editions.
- Cooperative Institute for Research in the Atmosphere, Colorado State University. "Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report III," May 2000. http://vista.cira.colostate.edu/improve/Publications/Reports/2000/2000.htm

Figure 30A: Percent of Monitoring Days by Visibility Standard Reading, Denver, 1991 - 2000.
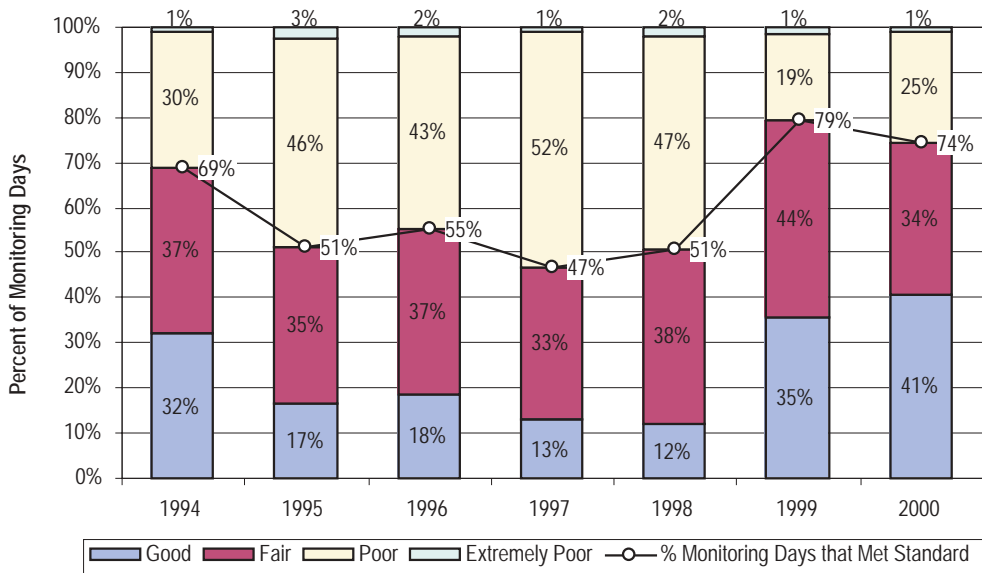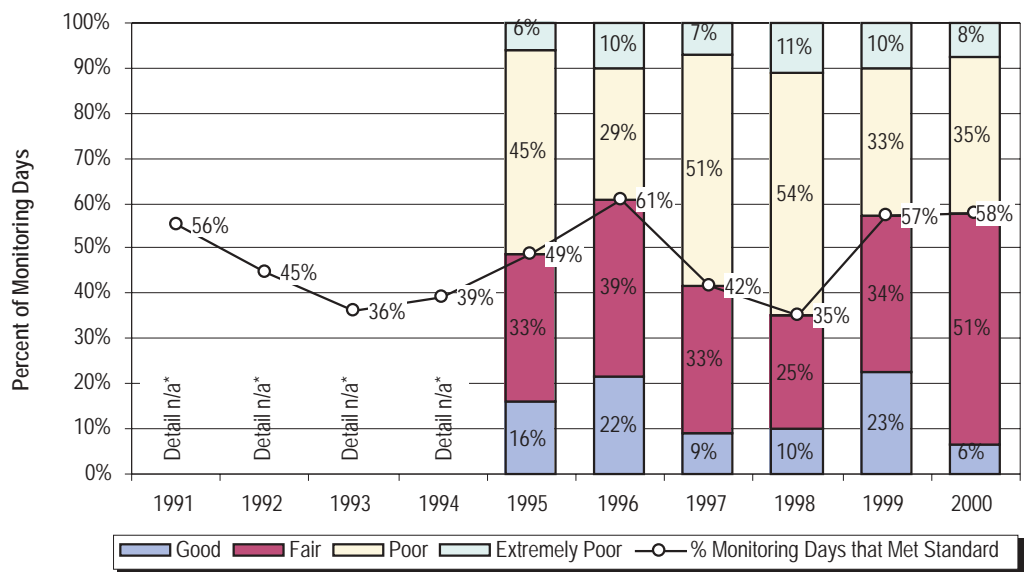

Figure 30B: Percent of Monitoring Days by Visibility Standard Reading, Fort Collins, 1994 - 2000.

31. Greenhouse Gas Emissions.

Indicator definition: This indicator measures the quantity of greenhouse gases produced in Colorado. Greenhouse gases include carbon dioxide, methane, chlorofluorocarbons, and nitrous oxide. To make comparisons between different greenhouse gases, the global warming potential of each gas has been indexed and equated to the global warming potential of carbon dioxide, as follows: carbon dioxide = 1, methane = 21, nitrous oxide = 310, chlorofluorocarbons (CFCs) = 5,000. In other words, each methane molecule has 21 times the global warming potential of each carbon dioxide molecule. Through these conversions, the quantities of each gas in Figure 31A are reported in units of carbon dioxide equivalents, and the sources of the gases are shown in Figure 31B.

Data in Figure 31C are reported in units of carbon equivalents, which reflect the weight of the carbon content of greenhouse gases. Carbon dioxide equivalents are converted to carbon equivalents by multiplying by 12/44.

Why this measure is important: Scientific evidence suggests that greenhouse gas emissions from human activities are affecting the global climate. This, in turn, affects agriculture, water availability, biodiversity, forestry, energy requirements, the economy, human health, recreation, and numerous other aspects of quality of life. Assessing the amount of greenhouse gases produced in Colorado is an important first step in understanding Colorado's role in the global greenhouse gas emission problem. Monitoring trends in greenhouse gas emissions per capita can help determine the need for and effectiveness of greenhouse gas emission reduction programs.

What the data show: Figure 31A shows the percent contribution of each greenhouse gas to total greenhouse gas emissions in Colorado in 1990. The graph shows that carbon dioxide is the most prevalent gas emitted, followed by methane, chlorofluorocarbons, and nitrous oxide. Overall, Colorado produced 105.1 million tons of carbon dioxide equivalent gases in 1990, or about 5% of the total greenhouse gas emissions in the United States. This equates to about 31.8 tons of carbon dioxide equivalent gases per capita.

Figure 31B shows the contribution of each major source of greenhouse gas emissions in Colorado in 1990. The graph shows that 77.9% of the state's greenhouse gas emissions were attributed to fossil fuel combustion, followed by production processes (11.0%), agriculture (5.4%), energy production (3.2%), and landfills, land use changes, and wastewater treatment combined (2.5%). Of the fossil fuel combustion emissions, 47.5% were from electric utilities (which are predominantly coal-fired power plants), 27.7% were from transportation, 12.0% were from industry, 7.4% were from residential uses, and 5.4% were from commercial uses. Of the production processes, over 90% of the emissions came from the production, use and disposal of CFC compounds.

Figure 31C compares greenhouse gas emissions per capita in Colorado and the United States for 1990. Overall, Colorado averaged 8.52 tons of carbon equivalents per capita in 1990, approximately 16.8% higher than the U.S. average of 7.29 tons per capita. Colorado had a higher per capita output than the U.S. average of CO_2 and CFCs, about the same amount of methane, and much lower nitrous oxide emissions. Colorado's higher CO_2 output may be

Figure 31A: Percent contribution of greenhouse gases in units of carbon dioxide equivalents (CDE) in Colorado: 1990.
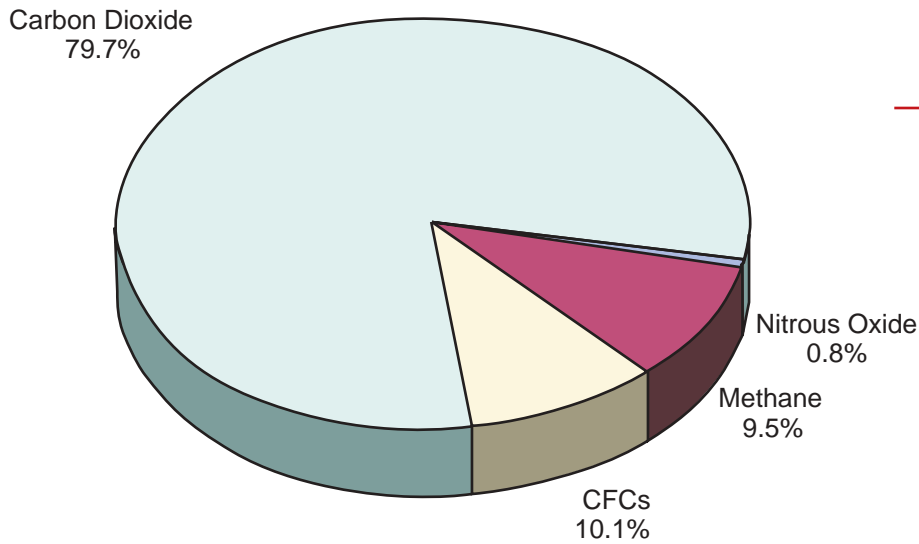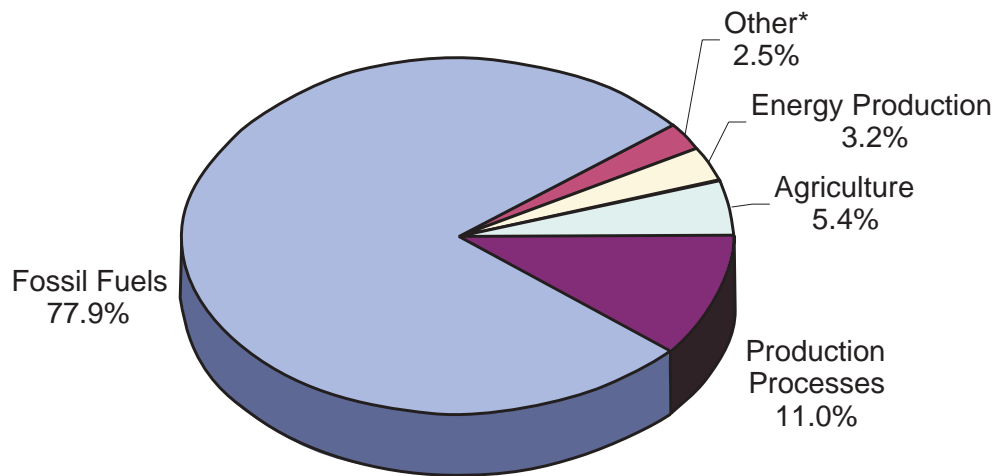
Carbon Dioxide
79.7%

Nitrous Oxide
0.8%

Methane
9.5%

CFCs
10.1%

Figure 31B: Percent contribution of uses to total greenhouse gas emissions in Colorado: 1990.

Other*
2.5%

Energy Production
3.2%

Agriculture
5.4%

Fossil Fuels
77.9%

Production
Processes
11.0%

*"Other" includes emissions from landfills, land use changes, and wastewater treatment systems.

Figure 31C: Greenhouse gas emissions per capita in tons of carbon equivalents for the United States and Colorado, 1990.
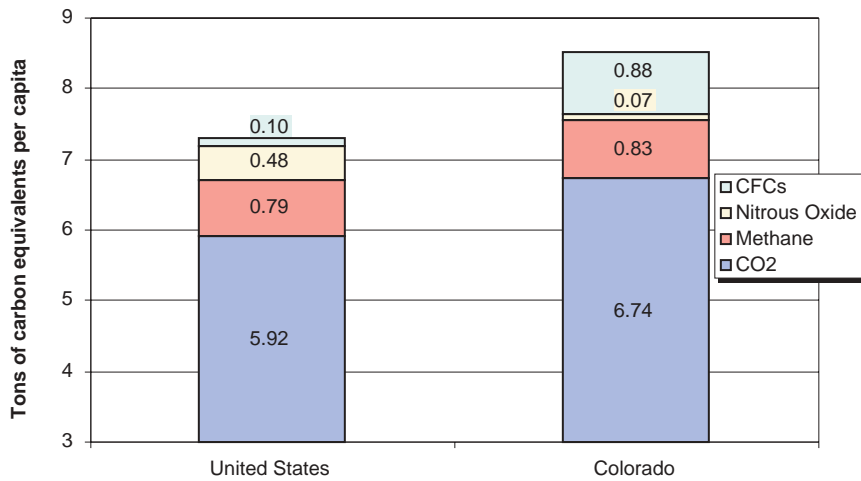
due, in part, to the fact that Colorado generates most of its electricity with coal (approximately 91% as of 1999). Regions where coal-fired generators dominate the utility industry show the highest rates of CO_2 emissions per kilowatt-hour. Colorado's CFC generation, which is primarily due to the production, use and disposal of CFC compounds, is expected to be phased out by 2015.

Data sources:
- Colorado Department of Public Health and Environment. "Colorado Greenhouse Gas Emissions Inventory and Forecast 1990 through 2015," September 1998.www.cdphe.state.co.us/ap/down/climatechange.pdf

- U.S. Census Bureau, Population Estimates. http://eire.census.gov/popest/estimates.php

- U.S. Department of Energy. "Carbon Dioxide Emissions from the Generation of Electric Power in the United States," July 2000. www.eia.doe.gov/cneaf/electricity/page/co2 _report/co2report.html

- U.S. Environmental Protection Agency. Global Warming website. http://yosemite.epa.gov/globalwarming/ghg.nsf/emissions/State AuthoredInventories

- U.S. Environmental Protection Agency. "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1998," April 15, 2000. www.epa.gov/globalwarming/publications /emissions/us2000/index.html

32. EPA Watershed Quality Ratings

Indicator definition: This indicator measures the overall "health" of Colorado watersheds based on the Index of Watershed Indicators (IWI) compiled by the U.S. Environmental Protection Agency. There are two components to this index: watershed condition (i.e., existing water quality), and watershed vulnerability (i.e., risk of water quality impairment from surrounding uses, such as pollution discharges and potential sources of pollution). Indicators used to evaluate the condition of watersheds include: state water quality inventory data showing public and aquatic health use attainment; fish and wildlife consumption advisories; source water quality indicators (drinking water systems); contaminated sediments; ambient water quality data (toxics, conventionals); and the wetland loss index. Indicators used to evaluate the vulnerability of watersheds include: aquatic/wetland species at risk; loads above limits (toxics, conventionals); urban and agricultural runoff potential; population change; hydrologic modification; estuarine pollution susceptibility index; and atmospheric deposition. For data to be considered sufficient, watersheds must have data for at least four of the seven "condition" indicators and seven of the nine "vulnerability" indicators. The data used for the indicators is based on information gathered between 1990 and 1999, most of which was compiled by individual states.

Why this measure is important: The health of Colorado's watersheds is an important aspect of the state's overall environmental health. The primary strengths of the IWI measurement lie in its ability to organize watershed unit data from a variety of sources into a common set of indicators, highlight data gaps through map presentations, promote improved data collection and reporting within each state, and provide the means by which to compare watershed health across the nation.

Figure 32A: Watershed quality in Colorado as reported by U.S. Environmental Protection Agency "Index of Watershed Indicators," 2000.
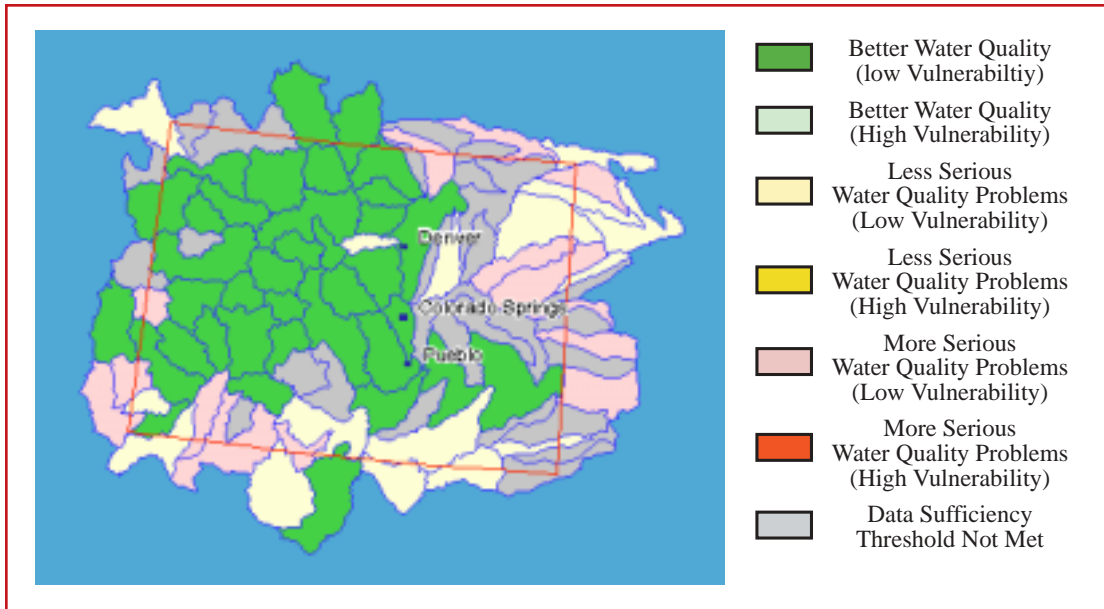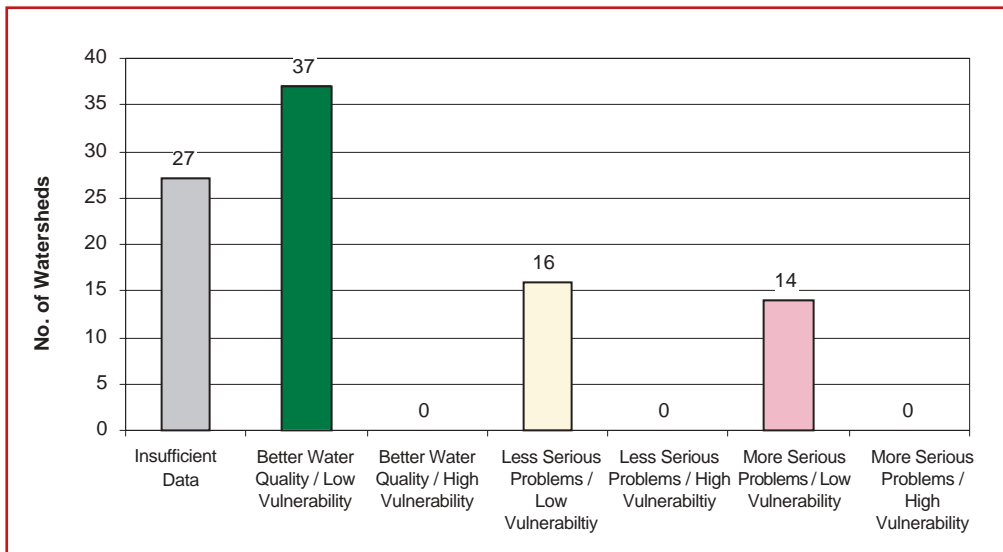

Legend:
- Better Water Quality (low Vulnerabiltiy)
- Better Water Quality (High Vulnerability)
- Less Serious Water Quality Problems (Low Vulnerability)
- Less Serious Water Quality Problems (High Vulnerability)
- More Serious Water Quality Problems (Low Vulnerability)
- More Serious Water Quality Problems (High Vulnerability)
- Data Sufficiency Threshold Not Met

Figure 32B: Number of Colorado watersheds in each "health" category.

What the data show: The state of Colorado encompasses all or part of 94 watersheds, 29 of which were not included in the U.S. EPA watershed evaluation due to insufficient data. Of the watersheds with sufficient data, 37 were reported to have better water quality/low vulnerability, 16 have less serious problems/low vulnerability, and 12 have more serious problems/low vulnerability. None of the 65 rated watersheds were considered to have 'high vulnerability' to future impairment from surrounding uses. Of the watersheds showing 'less serious' and 'more serious' water quality problems, Colorado reports that the most frequently identified pollutants are metals, and that the leading sources of pollution are mining and agriculture.

According to *Environmental Defense,* there are important limitations to the U.S. EPA Index of Watershed Indicators. First, the data are incomplete, as only about one-third of the water bodies and watersheds in the United States are included. Second, the criteria for including water bodies and determining whether a problem exists are not uniform from state-to-state, making comparisons potentially misleading. Finally, the Index does not give a complete picture of current conditions or future vulnerability. The EPA Science Advisory Board recommends that indicators measuring the biological and ecological effects of chemical stressors be added to the IWI and that the performance of all indicators be measured and weighted based on their relative importance as predictors of watershed integrity. These changes will result in IWI providing a more accurate measurement of watershed health.

Data sources:
• Environmental Defense. "Scorecard." www.scorecard.org/

• U.S. Environmental Protection Agency, Office of Water. "Surf Your Watershed – State Health (IWI) – Colorado." www.epa.gov/iwi/states/CO

• U.S. Environmental Protection Agency, Science Advisory Board. "Second Review of the Index of Watershed Indicators." www.epa.gov/science1/epec14.pdf

33. Threatened and Endangered Species.

Indicator definition: This indicator shows the number of plant and animal species that have been listed in Colorado under the Endangered Species Act (ESA) as of the start of each decade from 1970 through 2000. Before 1973, species were listed under the Endangered Species Preservation Act, which permitted listing of only native species under one classification: "endangered." In 1973 the ESA was adopted, providing a second classification of "threatened," and also considerably strengthening the provisions of preceding Acts.

Colorado candidate species are also shown in this indicator. Candidate species are defined by the National Marine Fisheries Service as "species whose status is of concern but more information is needed before they can be proposed for listing." The U.S. Fish and Wildlife Service encourages the formation of partnerships to address the needs of candidate species before they are listed for several reasons, including: self-regulation allows greater flexibility in stabilizing or restoring the species and their habitats and, as populations are stabilized and threats are reduced, priority for listing can be shifted to those species in greatest need of ESA protection.

Figure 33A: Colorado species listed as "threatened" or "endangered" under the Endangered Species Act, 1970 to 2000.
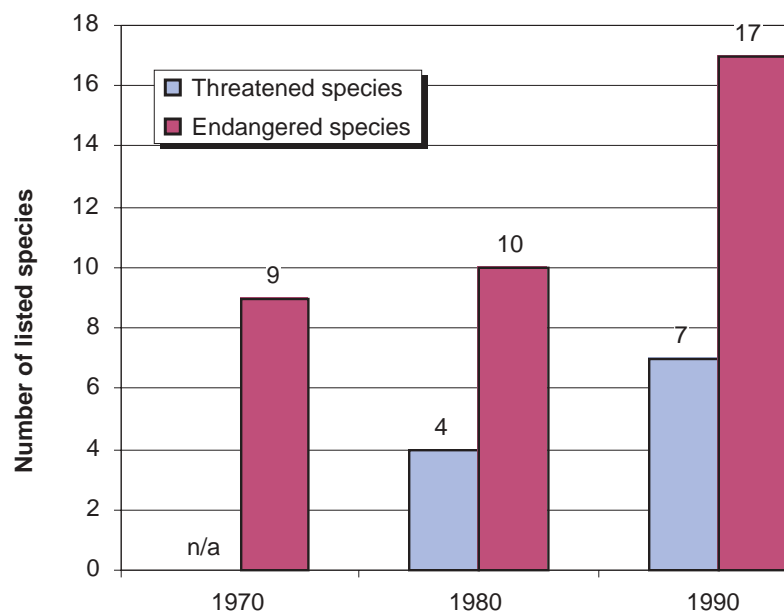
Table 33A. Colorado species down-listed or delisted since 1966.

Listed Species	Original Listing (date)	Down-listed (date)	Delisted (date)
Grizzly Bear	Endangered (1967)	Threatened (1975)	-
Greenback Cutthroat Trout	Endangered (1967)	Threatened (1978)	-
Bald Eagle	Endangered (1967)	Threatened (1995) -	Under review for delisting as "recovered" (1999)
American Peregrine Falcon	Endangered (1970)	-	"Recovered" (1999)
Spineless Hedgehog Cactus	Endangered (1979)		"Not a listable entity" (1979)

Table 33B. Colorado "candidate" and "proposed candidate" species, July 2001.

| Candidate (plant)	Candidate (animal)	Proposed candidate (Threatened)
Sleeping Ute milk-vetch	Black-tailed prairie dog	Mountain plover
Slender moonwort	Boreal western toad	
Parachute beardtongue	Lesser Prairie Chicken	
Graham beardtongue	Yellow-billed Cuckoo	
White River beardtongue		

Why this measure is important: Establishment of the ESA was based, at least in part, on the following findings of Congress:

    (1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation;

    (2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction;

    (3) these species of fish, wildlife, and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people.

Monitoring Colorado listings and candidate species under the ESA indicates how effective (and proactive) the state has been in addressing the needs of indigenous plants and animals while providing for the desires and needs of the human population. The change in the number and status of listed species indicates the extent to which economic growth and development has occurred at the expense of (or within the bounds of) our environment and natural infrastructure. The ability of other species to thrive is a prime indicator of ecosystem and, in a broad sense, societal health.

What the data show: As of the adoption of the ESA in 1973, Colorado had 9 species listed as endangered. As of July 2001, the number of endangered species had nearly doubled to 18 and a total of 14 species were listed as threatened, for a total of 13 plant species and 18 animal species listed under the ESA. There are currently an additional 10 "candidate" species (6 plants and 4 animals), and one "proposed candidate" animal species.

As shown in Table 33A, three species originally listed as endangered in Colorado have since been down-listed to threatened. Interestingly, the grizzly bear does not presently reside in Colorado, but, due to efforts in the Glacier and Yellowstone National Park regions, the grizzly has been down-listed in the lower 48 states to threatened. The only down-listed species with most, if not all, of its habitat in Colorado is the greenback cutthroat trout.
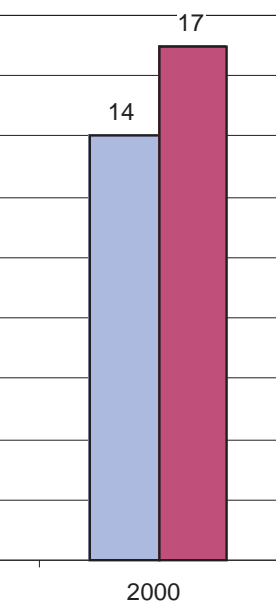
Two species that have part of their range in Colorado have been delisted (removed from ESA protection) since the inception of the ESA in 1973. These include the peregrine falcon and spineless hedgehog cactus. The former was defined as "recovered" and, therefore, no longer in need of ESA protection. The spineless hedgehog cactus, on the other hand, was found to not be a distinct species as defined by the ESA, but rather a spineless variation of the relatively abundant red-flowered hedgehog cactus. This plant was therefore delisted based on its inability to fit the definition of a "listable entity."

Data sources:
• U.S. Fish and Wildlife Service. "Threatened and Endangered Animals and Plants," 2001. http://endangered.fws.gov/wildlife.html

34. Pounds per capita of municipal solid waste produced and recycled.

Indicator definition: Municipal Solid Waste (MSW), as reported by the U.S. Environmental Protection Agency (EPA; Figures 34A and 34B), consists of everyday items such as product packaging, grass clippings, food scraps, newspapers, bottles, batteries, and furniture. It does not include construction and demolition wastes, industrial process wastes, or a number of other wastes that may go into a municipal waste landfill. The amount of MSW that ends up in landfills is typically measured by the amount of MSW generated minus the amount recycled through composting, purchases of post-consumer recovered materials, and other recycling means. The EPA data for the United States measures the amount of MSW generated per person each year and overall recycle rates.

The information reported by the Colorado Department of Public Health and Environment (Figure 34C) includes all wastes that enter Colorado landfills each year. This includes construction and demolition wastes, brine from gas and oil drilling, MSW, etc. The data is based on a mix of actual and estimated weights of materials entering landfills. Figures are reported in cubic yards and converted to tons at a rate of 3.333 cubic yards per ton. Though this information is not directly comparable to MSW reported by the EPA, it is useful in establishing local waste generation trends over time.

Why this measure is important: Total waste and MSW generation per capita are important for two primary reasons. First, most waste that is not recycled eventually ends up in landfills. Because landfills require a large land area, have the potential to contaminate groundwater and other important resources, and require extensive labor and resources to collect, transport, and bury trash, it is generally in the community interest to avoid constructing new landfills. Knowledge of waste generation and recycling trends are, therefore, important for forecasting future landfill needs. Second, because individual consumer purchasing choices and recycling activities largely affect MSW generation, MSW generation per capita is an important indicator of how involved a community is in its own sustainability. By reducing MSW generation and increasing recycling efforts, communities can ultimately save resources, energy, landfill space, and transportation.

What the data show: Figure 34A compares MSW generation per capita to total MSW generation from 1960 through 2000 for the United States. Both total MSW and MSW per capita increased from 1960 through 1990. From 1990 through 2000, total MSW continued to increase, whereas MSW per capita remained relatively stable. Figure 34A also shows the 1998 MSW generation rate per capita in Colorado, as estimated by BioCycle Magazine. This shows that the average person in Colorado generated almost twice as much waste in 1998 than the average person in the United States.

The EPA attributes the overall increase in MSW generation to the strong economic growth that occurred throughout the 1990's, whereas the decrease in per capita generation is primarily a result of on-site yard waste composting, use of mulching mowers,

Figure 34A: Municipal Solid Waste (MSW) generation in the United States: aggregate tons per year and pounds per capita, 1960 to 2000.
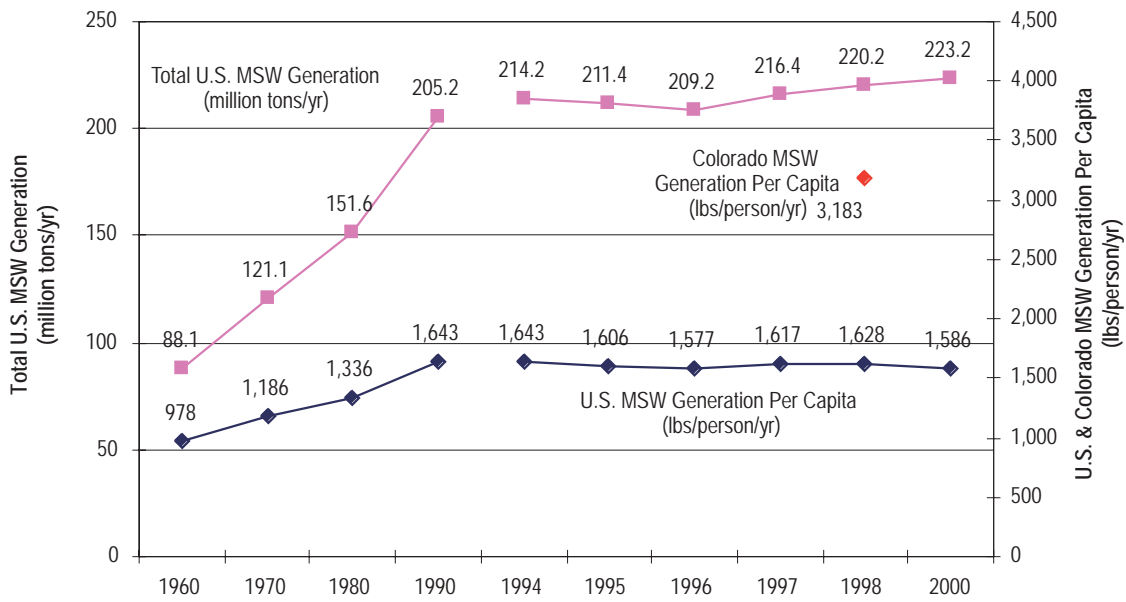

Figure 34B: Total Municipal Solid Waste discards and recovery per capita in the United States, 1960 to 2000
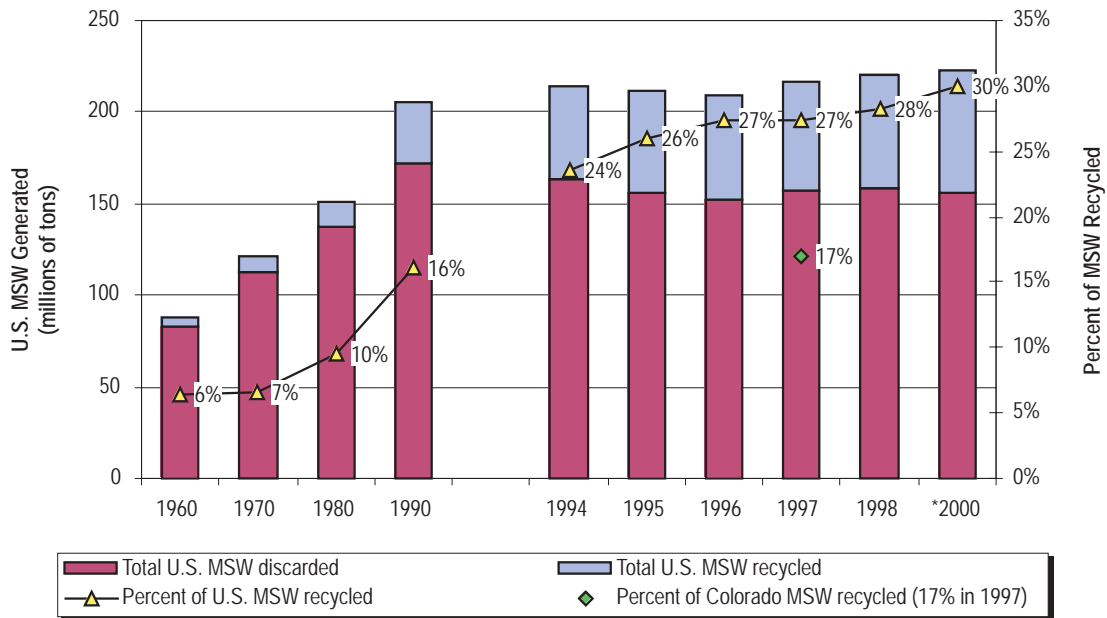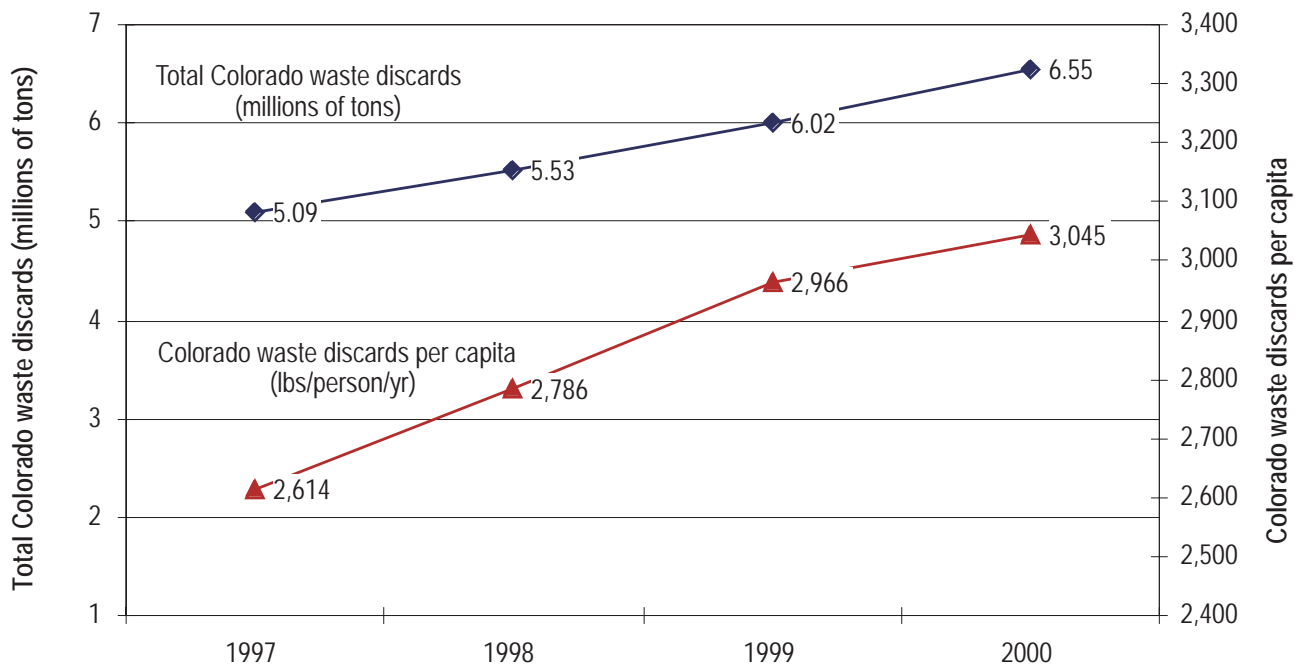
Figure 34C: Waste discards in Colorado: total million tons per year and pounds per capita, 1997 to 2000.

reduction in the weight of beverage containers, and other source reduction activities. Information on Colorado's economy throughout the 1990's and changes in waste generation by category over time could help identify factors involved in Colorado's high rate of waste generation.
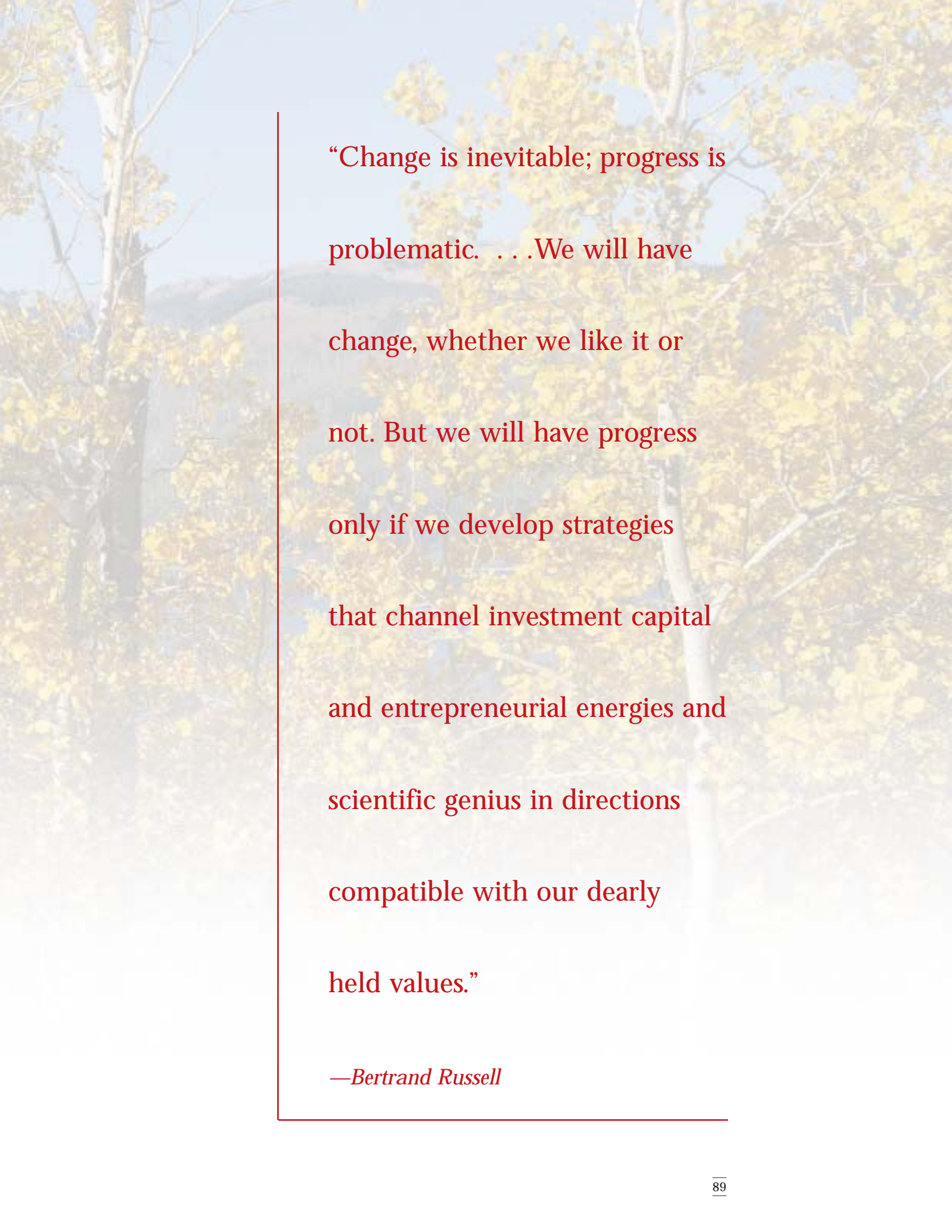
Figure 34B shows the amount of MSW discarded and recycled per capita in the United States. The graph shows that the amount of MSW actually discarded per person has slowly declined since 1990. This is due, in part, to the increase in recycling rates during the same time period, as well as source reduction activities. Figure 34B also shows Colorado's recycle rate for 1997, as estimated by BioCycle Magazine. Colorado's estimated recycling rate of 17% was well below the 27.4% average for the United States in 1997.

Finally, Figure 34C shows the amount of *all* waste discarded into Colorado landfills from 1997 through 2000, which includes MSW, construction and demolition wastes, etc. This shows that the total amount of discarded waste steadily increased during this time period. The total amount of waste per capita steadily increased from 1997 through 1999, with a slightly lower increase per capita from 1999 to 2000. Trends in the Colorado economy and construction and demolition activities may help explain much of this increase.

Data sources:
- BioCycle Magazine, 1997 and 2000. www.Biocycle.net
- Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division. www.cdphe.state.co.us/hm/hmhom.asp
- Franklin Associates. "Characterization of Municipal Solid Waste in the United States: 1998 Update," July 1999. Conducted for U.S. Environmental Protection Agency. www.epa.gov/epaoswer/non-hw/muncpl/mswrpt98/98charac.pdf
- Sustainable Community Committee for the City of Albuquerque, N.M. "Sustainable Indicator Report," December 1996. www.cabq.gov/progress/sir/si2.html
- U.S. Environmental Protection Agency. "Municipal Solid Waste in the United States: Facts and Figures for 1999." www.epa.gov/epaoswer/non-hw/muncpl/pubs/mswfinal.pdf

"Change is inevitable; progress is problematic. . . .We will have change, whether we like it or not. But we will have progress only if we develop strategies that channel investment capital and entrepreneurial energies and scientific genius in directions compatible with our dearly held values."

—*Bertrand Russell*

APPENDIX

Other indicators considered

Following is a list of other indicators considered
for inclusion.
Arts
    35. Arts funding
    36. Arts attendance

Demographics
    37. Level of education

Economy
    38. Share of income by source – labor, transfer
        payments, dividends/rents
    39. Household finance (foreclosure rate / late
        payment rate / debt ratios)
    40. Underemployment
    41. Economic diversity
    42. Impacts of TABOR and
        Gallagher amendments

Education
    43. Percent of income needed to pay for
        college expenses
    44. Annual expenditures per pupil vs. annual
        expenditures per inmate
    45. Local spending on education vs. state
        spending on education

Environment
    46. Noise
    47. Toxics
    48. Quality of design of physical environment
    49. Wildlife health threats (e.g. whirling
        disease, loss of habitat, etc.)

Health
Health status
    50. Sedentary lifestyle and/or regular and
        sustained physical activity
    51. Overweight
    52. Smoking
    53. Asthma hospitalizations
Child health issues
    54. Teen births
    55. Low birth weight
    56. Late prenatal care
    57. Child abuse rates

Cause of death
    58. Suicide
    59. Homicide
    60. Work-related
    61. Cancer
    62. Heart disease
    63. Motor vehicle

Housing
    64. Homeownership rate
    65. Low-income rental housing need vs. low-
        income rental housing production
    66. Homelessness
    67. Housing quality measures

Land use
    68. Jurisdictions with zoning and land
        use plans
    69. Buildout potential by county; or,
        total/annual approved subdivision lots; or
        acreage of subdivided land by county
    70. Percent change in land preserved vs.
        percent change in developed land

Other community services
    71. Recreation, libraries, animal control, public
        maintenance, commercial services, youth
        services, childcare

Transportation
    72. Funding for roadways vs. funding for transit
    73. Street-lane miles per capita
    74. Commuting by single-occupant vehicle
    75. Rail

Water
    76. Major water imports into water basins
    77. Water deliveries in acre-feet by use
    78. Percent agricultural vs. municipal
        ownership of water rights in
        Colorado-Big Thompson project

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