

IMPACT

Urban Areas

“In a future of restricted or unpredictable water supply, determining priorities for water will become more pressing.”

Key Messages

1

The water supplies of Southwest cities, which are located in arid and semi-arid regions and rely on large-scale, federally built water storage and conveyance structures, will be under additional stress due to higher temperatures, reduced snow-pack, and associated reductions in runoff and soil moisture.

2

The large metropolitan areas that concentrate most of the population in the Southwest are governed by counties, cities, and hundreds or thousands of special districts. The complexity of coordinating these entities decreases the capacity for cities to adapt to climate change.

3

Some southwestern cities are likely to experience greater numbers of extreme high-temperature degree days; residents lacking air conditioning or access to cooling shelters will be especially vulnerable to these changes.



Planted urban forests in semi-arid climates provide benefits such as offsetting CO₂ production, but require irrigation. Improved quantification of the trade-offs between increased water demands and CO₂ mitigation is needed.

The thirteenth chapter of the *Assessment of Climate Change in the Southwest United States* describes the unique characteristics of southwestern cities and the ways they will be affected by and contribute to future climate changes. The chapter draws particular attention to six large urban areas: Albuquerque, Denver, Las Vegas, Los Angeles, Phoenix, and Salt Lake City. “Urban Areas” addresses ways in which cities may contribute to climate change through their urban metabolisms—flows of water, energy, materials, nutrients, air, water, and soil impacts. The chapter also examines key pathways through which cities will be affected, including fire, water resources, flooding, urban infrastructure, and sea-level rise.

About sixty million people live in the Southwest, with the majority in major metropolitan areas. Ten of the fifteen densest urban areas in the United States are located in California, Nevada, and Arizona. These cities are characterized by growing populations, dense urban sprawl, water-intensive vegetation, and a dependency on inexpensive and abundant fuels and water.

Climate Impacts on Southwestern Cities

Climate change will affect southwestern cities differently owing to their unique characteristics. However, the impacts of climate change on these arid cities will be largely centered on water scarcity and extreme weather events such as flooding, fires, and extreme temperatures. Cities that are not prepared for increased flows could be especially vulnerable to extreme flooding and degraded water quality, if they lack stormwater infrastructure.

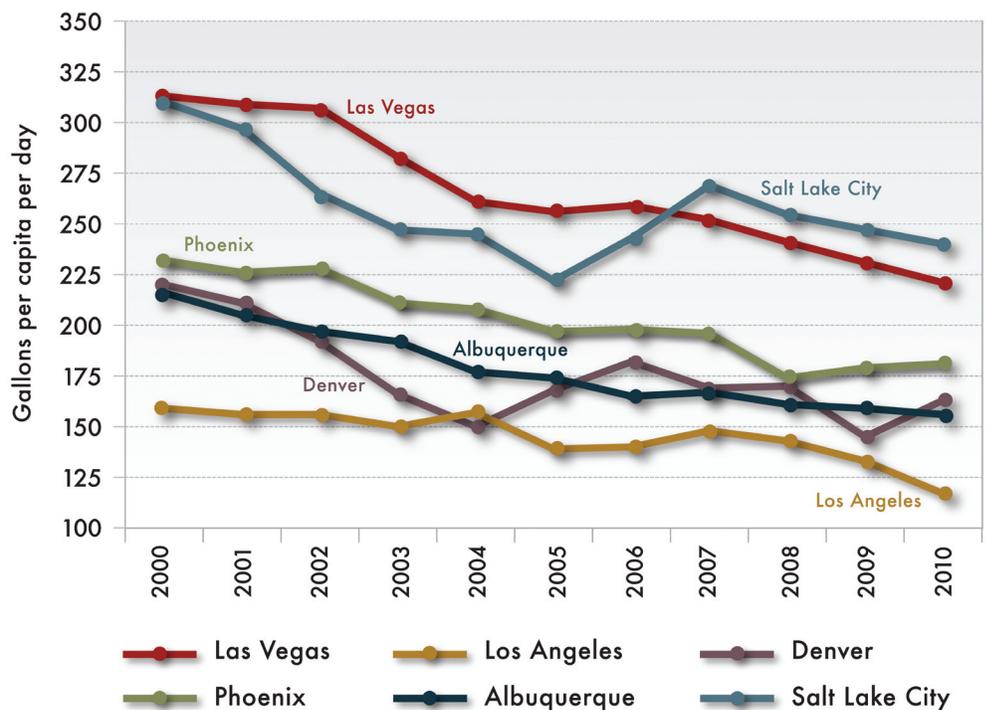
Unique Characteristics of Southwestern Urban Areas

Southwestern cities are often part of much larger urbanized regions. For example, the city of Los Angeles is one of eighty-eight cities in Los Angeles County, which all share infrastructure and paths of airflow and pollutants. A major obstacle for cities in adapting to climate change will be coordinating between fragmented metropolitan regions.

Despite their size, the largest southwestern cities) are relatively isolated from other metropolitan areas, are often surrounded by public lands, and rely heavily on imported water. The extensive public lands surrounding these major metropolitan areas make the interface between cities and wildlands susceptible to projected increases in wildfires.

Urban areas in the Southwest contribute to climate change and to local climate impacts, based on their various characteristics: urban form (dense or sprawling); land use density; infrastructure (including building technologies); road and built surface permeability and reflectivity; water supply and disposal systems; and transportation systems. Improved city-specific data collection and further research on the interactions between these factors, emerging technologies, costs, and carbon emissions will help planners and decision makers choose among options to reduce urban contributions to and impacts of climate change.

The city of Los Angeles probably uses 40 to 60 percent of its residential water for outdoor and landscaping application, much of this going to non-native and water-intensive species such as turf grass.



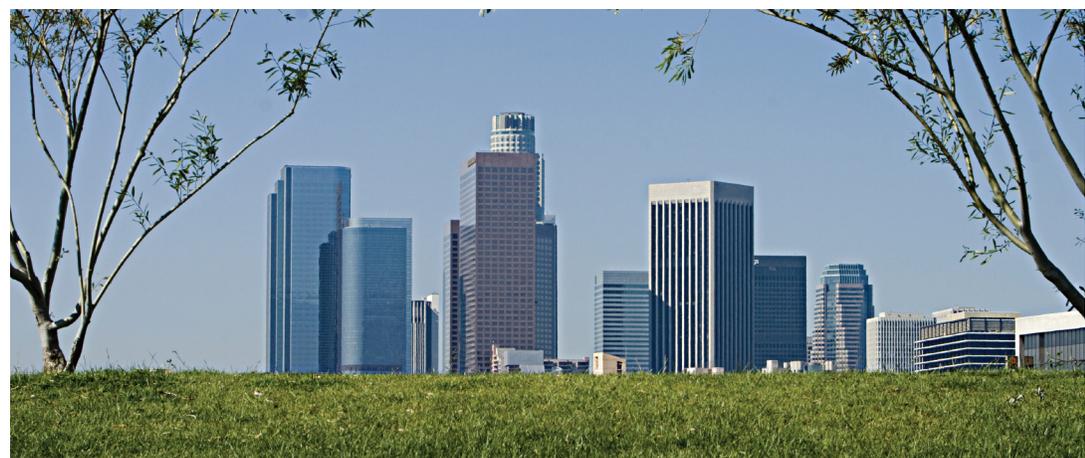
Per capita water use has decreased in southwestern cities—a remarkable achievement. Increases in total population, along with projected increases in heat waves and drought, will provide challenges to meeting future urban water demand.

Effects of Transportation Patterns

In regions where there is a greater reliance on single-occupancy vehicles, there will be higher production of greenhouse gases. Cities in the Southwest have very different patterns of public transportation use. The percentage of each city's population using public transit, for example, ranges from 1.6 percent in Albuquerque to 6.2 percent in Los Angeles.

Adaptation & Resilience

Coordination of data collection and planning is crucial for large cities to adapt to climate change and become more resilient. One such approach is the Los Angeles Regional Collaborative for Climate Action and Sustainability, which operates at the county level and includes all eighty-eight metropolitan area cities. The goal of the collaborative is to develop a plan for climate action and sustainability to build an integrated and coherent response to potential impacts of climate change. Although few examples of this type of initiative currently exist, it represents a feasible strategy for southwestern cities to increase resilience.



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