

"Resilience is all about being able to overcome the unexpected. Sustainability is about survival. The goal of resilience is to thrive."

~ James Cascio





## PLAN ELEMENT

### Chapter 13

# RESILIENCE & SUSTAINABILITY







# 13.1 Background & Analysis

## 13.1.2 Introduction

Resilience and sustainability provide a unifying lens for understanding how patterns of growth, development, and daily life in our region interact with the natural environment, and how this affects our overall community health and our long-term ability to adapt to changing environmental conditions. Woven throughout the Comp Plan, the guiding principles of economic vitality, sustainability, and community health describe how these principles relate to the main topics covered in each chapter.

This chapter provides a more holistic perspective on our region's critical long-term challenges, thinking about the potential interactions among climate change, water scarcity, natural hazards, natural resources, and community health. It sets out strategies for addressing these issues, but also refers to many goals and policies in other chapters of the Comp Plan that can help achieve resilience and sustainability for our community.

A challenge common to all metropolitan areas is ensuring that water, energy, transportation, and communication systems become more resource-efficient and can better withstand adverse events. Creating resilient systems will help this region respond to climate change.

Water scarcity is the predominant environmental challenge facing our high desert region. To ensure the long-term livability of our community, we must use water wisely and fairly and maintain the water quality of the Rio Grande.

### WHAT IS SUSTAINABILITY?<sup>1</sup>

"Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs."

### WHAT IS RESILIENCE?<sup>2</sup>

"The capacity of a system to absorb a spectrum of disturbances and reorganize so as to retain essentially the same function, structure, and feedbacks – to have the same identity."

Natural hazards in this region are likely to be periods of drought and extreme heat, along with wildfires and seasonal flooding, which are expected to be more severe in the face of climate change.

Protecting natural resources, such as air quality, energy sources, and water supplies, can help mitigate some of the natural hazards that may occur here and maintain healthy habitat for wildlife.

Challenges to our community health include health disparities among neighborhoods and ensuring access to jobs, housing and services, healthy food, active transportation, and outdoor recreation.



Image credit: City of Albuquerque

# Applying the Guiding Principles

Each element of the Comp Plan uses guiding principles as the basis for its goals, policies, and actions. The six guiding principles and their definitions were developed from input received during the public involvement process, detailed in the Vision chapter.

Here, we apply the guiding principles to **resilience and sustainability** goals, policies, and actions.



## STRONG NEIGHBORHOODS

- Green infrastructure and restoration of natural systems make neighborhoods more pleasant and socially cohesive places to live.
- Revitalization efforts focused on eliminating disproportionate exposure to environmental hazards in certain areas improves quality of life and opportunities to thrive in all of the city and county's neighborhoods.



## MOBILITY

- Increasing access to public transit and safe options for active transportation help reduce greenhouse gas emissions and air pollution while expanding the number of viable options people have to move throughout their communities.



## ECONOMIC VITALITY

- A more diverse and resilient economy is less dependent on non-renewable natural resource industries and less prone to boom-and-bust cycles.
- Clean and renewable energy technology is a growing sector with potential to be a major local economic driver.
- Protecting natural features increases opportunities for responsible ecotourism and outdoor recreation-based business and helps attract a skilled workforce and employers.



## EQUITY

- Public investments are measured not only in terms of economic returns, but also for their social and environmental benefits.
- Minimizing pollution, natural hazards, and negative impacts on ecosystems addresses problems that often disproportionately impact vulnerable

populations and improves health outcomes in stressed communities.



## SUSTAINABILITY

- Framing challenges through a lens of sustainability helps maximize environmental, social, and economic health for today's residents and the ability of future generations to do the same.
- The triple-bottom-line evaluates social and economic benefits of our choices alongside environmental concerns.



## COMMUNITY HEALTH

- Balanced approaches to resilience and sustainability improve the overall health of the community.
- Holistic sustainability strategies address community health simultaneously with social, environmental, and economic issues.





## In the future...

A sustainable, clean water supply will be carefully protected and managed to support excellent ecological, human, and economic health.

Adaptive land use and infrastructure planning will help increase our resilience to extreme climate events, reducing risk and helping to manage uncertainty.

Compact development, energy-efficient design, and the use of green infrastructure will become commonplace. This will help reduce per capita resource consumption,

carbon emissions, and harm to the natural environment.

The built environment will contribute to better community health by providing more equitable access across neighborhoods to opportunities of all kinds, including public services and outdoor activities.

Habitat for flora and fauna will be abundant and thriving, supported by conservation measures, restoration projects, and high-functioning ecosystems.

## 13.1.3 Context & Analysis

### 13.1.3.1 IMPLICATIONS OF CLIMATE CHANGE FOR OUR REGION

Today, greenhouse gas concentrations are higher than they've been in the past 800,000 years, and it is widely accepted that human actions have been the dominating factor of the observed warming since the middle of the 20th century. Forecasts predict that even with extremely aggressive mitigation efforts, global temperatures will increase by the end of the 21st century, with potentially devastating impacts on natural and human systems.

Though the dynamics of climate change often seem abstract, it is important to do our part to minimize human contribution to greenhouse gas emissions and to plan for and adapt to the impacts of climate change on our own region.

The City and County have participated in multi-agency planning to better understand and tackle the expected local effects of climate change, including the Central New Mexico Climate Change Scenario Planning



Image credit: Bernalillo County

Project that informed the 2040 Metropolitan Transportation Plan (MTP) and through joint adoption of the *Multi-Jurisdictional Hazard Mitigation Plan*.

*For Central New Mexico and the Southwest region in general, the impacts of climate change will likely include:*

- More heat waves with more days requiring building cooling
- More frequent and severe droughts
- Greater variability and duration of precipitation events, but generally earlier snowmelts and increased flooding
- Greater frequency of large-scale forest fires
- Declining water quality and availability

The Comp Plan can help address the impacts of climate change, as they relate to land use and development patterns. As new information on climate change becomes available, the Comp Plan can also be amended so that the City and County continue supporting regional and inter-agency initiatives.

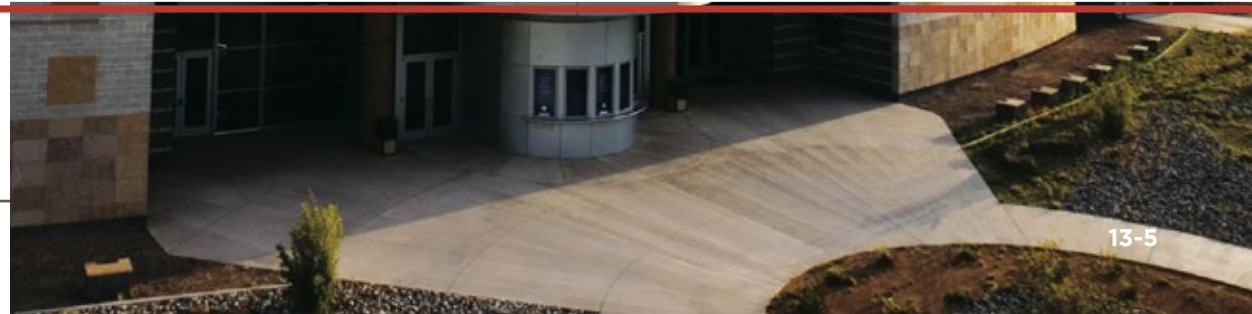
To achieve our vision, the City and County need to address key **challenges** and **strategies** summarized in this chapter:

### CHALLENGES

- Understanding and addressing the local impacts of climate change.
- Limited water supply.
- Maintaining the health of our mountain, desert, and river ecosystems including flora and fauna.
- Preparing for recovery from natural and environmental hazards such as drought, wildfire, flood, and chemical accidents.
- Dependence on non-renewable energy sources.
- Centralized and vulnerable infrastructure systems.
- Differences in health and life expectancy among different neighborhoods.

### STRATEGIES

- Coordinating land use planning with all water agencies, including those that supply municipal and agricultural users or protect natural resources.
- Developing storm water infrastructure that replicates or restores natural ecological function.
- Encouraging higher-density and lower-impact development to minimize our environmental footprint.
- Establishing development restrictions in hazard-prone areas.
- Implementing networks for active transportation and transit.
- Including health indicators in local land use planning efforts to inform policy and regulations, as well as capital planning.
- Continuing and expanding interdisciplinary and interjurisdictional collaboration.





### Strategies to Address Climate Change

- Participate in implementation of the adopted Hazard Mitigation Plan.
- Encourage the use of renewable energy in developments, including community facilities, and for transportation.
- Protect and restore ecological health and functions through low-impact development and green building practices.
- Make needed infrastructure improvements and build redundancy into critical infrastructure systems.
- Prepare for increasing transportation maintenance and operations expenses and consider future conditions when making decisions about transportation system repairs, replacements, or retrofit.
- Discourage or prohibit development in sensitive environmental areas, and when feasible move any existing public facilities away from them.

The Comp Plan incorporates many guiding principles in support of a culturally, economically, and environmentally sustainable community.

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#### 13.1.3.2 ENSURING WATER FOR THE FUTURE

Water plays an essential role in maintaining healthy urban, rural, and natural environments. Indeed, achieving our community's vision of a vibrant future hinges on a safe and dependable water supply to serve numerous functions, from providing water for industry, to irrigating agricultural land, keeping the Bosque green and the silvery minnow alive, combating fires, and transporting waste.

Our water supply for the county comes from a combination of surface and groundwater sources. Different types of water users rely

on different water sources. **Figure 13-1** illustrates the relative demand that each use in Bernalillo County placed on different water sources and on the overall system in 2010. Irrigated agriculture used almost one-third of the total water supply, with a slightly higher proportion from surface water than groundwater. Note that the commercial use category (approximately 6 percent) only represents those businesses that self-supply water from wells, not for those using the municipal water supply.

Water is an extremely influential and powerful natural resource – too little of it or too much of it at once can be disastrous for communities and surrounding ecosystems. Water is such a priority concern in our region that it is addressed separately from other natural resources covered in this chapter. However, it is important to note that the City and County do not have direct control over the supply of water and have only partial responsibility for flood control. They have representation on the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). Water demand and supply are also subject to state, federal, and international law and the inter-state Rio Grande compact.

Bernalillo County's climate is already dry, averaging only around 12 inches of rain a





## HOW RESILIENCE & SUSTAINABILITY RELATE TO OTHER COMP PLAN ELEMENTS

### COMMUNITY IDENTITY

- Strong and vibrant neighborhoods foster social connections and encourage resource-sharing.
- Sustainable neighborhood design integrates green infrastructure.

### LAND USE

- Focusing more intense uses in Centers preserves open space, agricultural land, and sensitive natural areas.
- Infill and redevelopment require fewer natural resources for new infrastructure than greenfield development.

### TRANSPORTATION

- Increased options for non-auto travel and mass transit reduce greenhouse gas emissions and reliance on fossil fuels.

### URBAN DESIGN

- Green infrastructure can reduce carbon footprint, minimize harm to natural areas, and provide community benefits.

### ECONOMIC DEVELOPMENT

- A more diverse economy is less dependent on federal government funding cycles and less prone to boom-and-bust cycles.
- Encouraging clean and renewable energy industries contributes to local and global sustainability.
- Focusing development in Centers and Corridors promotes infill and preserves open spaces and agricultural land.
- Preserving the Open Space network and agricultural lands reinforces our unique identity and high quality of life, two factors that can attract talented workers and employers.
- Responsible ecotourism and outdoor recreation-based business capitalize on unique natural features and generate funding that can be used for maintaining and expanding public and agricultural lands.

### HOUSING

- Adaptive reuse and renovation uses fewer natural resources than new development.
- Concentrating housing near jobs reduces auto travel and decreases our carbon footprint.
- New standards encourage green building and low impact development techniques.

### PARKS & OPEN SPACE

- Well-designed and programmed parks and open space promote environmental stewardship.
- Sustainable management maximizes efficient water use, minimizes energy use, and helps protect and restore wildlife habitats and ecosystems.
- A well-connected Open Space Network reduces the need to drive to outdoor recreation and encourages active transportation options.

### HERITAGE CONSERVATION

- Protecting historic, archaeological and paleontological, and cultural resources helps sustain our built, natural, and cultural environments.
- Renovating historic structures is more socially and environmentally sustainable than replacing them with new development.

### INFRASTRUCTURE, COMMUNITY FACILITIES & SERVICES

- Sustainable infrastructure systems are high performing, resource-efficient, and cost-effective over their lifetime.
- Programming at community facilities can promote environmental stewardship, as well as social and economic sustainability.





Image credit: City of Albuquerque Open Space Division

*Water is an important resource, providing for human needs, as well as supporting the flora and fauna of the region.*

year. Meeting future water demand from all users will be more daunting in light of climate change, with its implications for higher average temperatures and less overall rainfall. The effects of climate change, while gradual and of uncertain magnitude, will likely be most acutely felt through our relationship to water. This uncertainty indicates the need to prepare for a range of future circumstances in terms of both water supply and demand. Rising temperatures will increase the amount of water needed to irrigate landscaping and agricultural crops and to keep ecosystems from degrading.

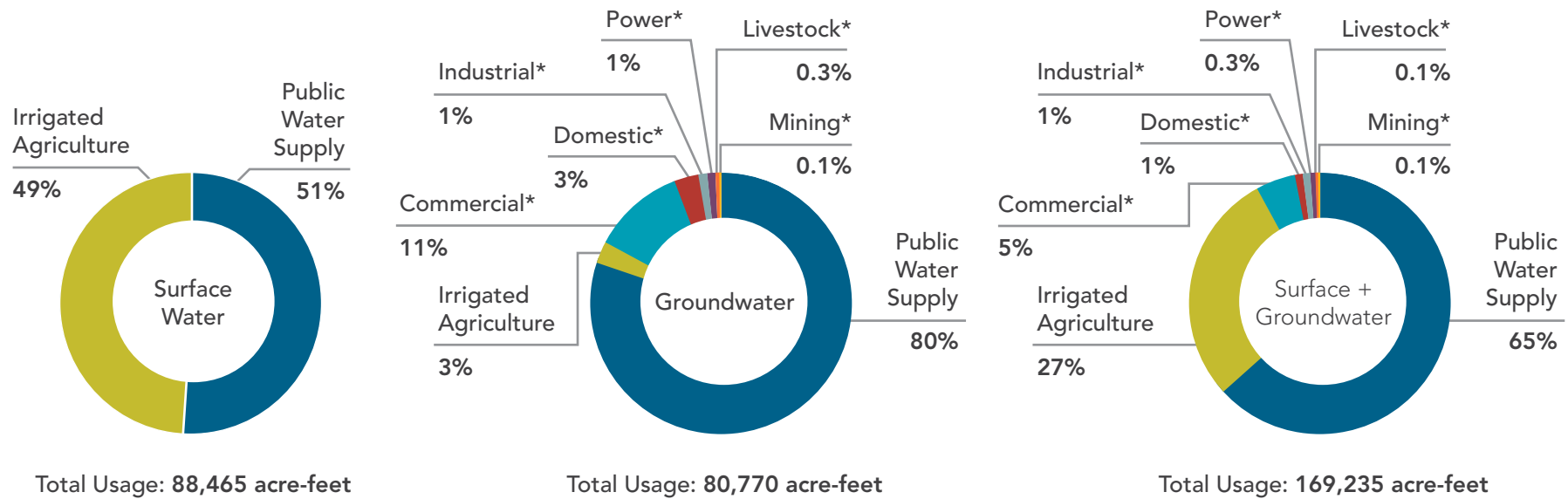
### Water & Urban Development

Development patterns play a significant role in determining water demand, and they influence the quality and quantity of supply. The impacts of climate change are compounded by the way we have impaired the ability of the landscape to absorb water. Urban development has typically been associated with vast swaths of impervious materials (roads, parking lots, and roofs), with engineered conveyance systems, increased pollutants in stormwater from vehicles and pets, and invasive plant species that have disrupted natural hydrological systems. More sustainable design of development

and infrastructure has been introduced in recent decades, and these best practices should be expanded in future.

Land use policies and zoning regulations that govern the location, density, and design of development also influence the water consumed at the scale of each site and the larger regional scale. Multi-family housing generally has lower per capita water consumption than single-family units. Further, a recent analysis of residential water use found a correlation between household water consumption and lot size, likely due to reduced need for landscape irrigation.<sup>3</sup> Zoning that allows smaller lot sizes and a range of multi-family housing options helps with water conservation efforts.

Conservation efforts over the past 20 years have been effective in reducing per capita water use in ABCWUA's service area by over 50 percent. On the supply side, the San Juan-Chama Drinking Water Project (Colorado River water diverted to the Rio Grande) has shifted primary drinking water dependency from groundwater to surface water. The river water, however, will not be immune to extended periods of drought and low flows as the climate in the Southwest gets warmer. Future conservation efforts and careful planning to manage the supply of water from



\* Self-supplied

**Figure 13-1: Water Demand by Source and Use Type in Bernalillo County (2010)**

Note: Totals may be less than 100 percent due to rounding, only Categories with usage of 0.1 percent or more are shown.  
Source: New Mexico Office of the State Engineer, Draft Middle Rio Grande Regional Water Plan Update, 2016.





surface and ground sources will continue to be important to ensure sustainable water resources into the future to serve the expected population and economic growth in the Albuquerque area.

Stormwater management practices have also greatly impacted water supply and quality. Historically, stormwater systems were designed to quickly convey rainfall runoff to the river by confining flows to channels, streets, and underground storm drains. More impervious surfaces, compacted soils, and topographic modifications to the landscape over the past 100 years have changed the distribution and flow of water and the speed at which it drains back into remaining arroyos and the river. The cumulative modifications

affect groundwater recharge and subsurface flows, and ultimately change the physical character of watersheds.

### Water & Agriculture

Irrigation systems for agriculture draw primarily from surface flows of the Rio Grande. The Middle Rio Grande Conservancy District (MRGCD) distributes available water for irrigation within its jurisdiction (see **Figure 11-1** in Heritage Conservation chapter) by gravity flow, in proportion with the amount of land served and accounting for farm crops scheduled for irrigation. Its local operators, known as Ditch Riders, open and close the gates, monitor the distribution, and generally enforce MRGCD rules.

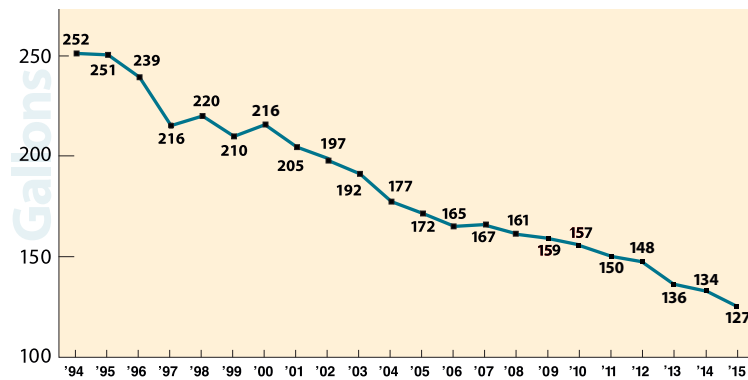
Certain Pueblo lands have prior and paramount rights to irrigation water per federal laws passed in the early 20th century.

While the majority of farms in the Albuquerque area are family owned and under 10 acres in size, there are a number of larger farms, mostly for livestock grazing and alfalfa. Most farmers are in their 50s and 60s or older, but there is a resurgence of farming among people in their 20s. Farming is a small yet growing part of our economy. It is not only appreciated by the community at large for providing fresh, local food and protecting rural landscapes, but the traditions and lifestyle contribute greatly to local cultural diversity. Farmers are switching to less water-intensive crops and using more greenhouses. Increasing urbanization and pressure from developers is making agriculture more vulnerable, with some water rights being sold off and some farmland being leased out for other uses.

### Water & Ecosystems

The Middle Rio Grande Basin is the central portion of the vast Rio Grande watershed, which includes the Albuquerque metropolitan area. There are some unquantified categories of water use in the basin, including natural evaporation from soil and vegetation (evapotranspiration) and water needed to maintain surface flow in

Since the mid-1990s, daily water consumption per capita in the area has declined significantly.



**Figure 13-2: Gallons Consumed per Capita per Day (1994-2015)**

Source: ABCWUA



**Figure 13-3: Major Physiographic and Hydrologic Features of the Middle Rio Grande Basin**

Source: United States Geologic Survey

the Rio Grande (instream flows). Instream flows are critical to protect the ecosystem for habitat, to comply with endangered species requirements, and also for tourism.

As of 2016, the New Mexico Water Resources Research Institute is developing estimates of riparian evapotranspiration for the Office of the State Engineer. It is anticipated to consume a relatively large quantity of water statewide, and this may increase in the future due to warming temperatures. In the Middle Rio Grande region, the updated water budget estimated that riparian evapotranspiration in recent years was about 150,000 acre-feet per year. The region may choose to incorporate specific instream flow protections in future planning.

### Groundwater

The Santa Fe aquifer system, the source of all the groundwater accessed through private and ABCWUA wells in the city and county, replenishes slowly. Until 2008 and the completion of the San Juan-Chama Drinking Water project, ground water from the aquifer was the only source of drinking water for ABCWUA customers. Since adding surface water as a drinking water source, aquifer levels in the Middle Rio Grande region have been rising and are anticipated to continue to rise at least through 2025.

Nevertheless, drawing water from the aquifer concentrates naturally occurring elements in groundwater. These elements do not cause problems at more diluted levels, but require additional treatment with lower water levels to decrease salinity and remove or dilute unsafe concentrations of arsenic. ABCWUA continues to analyze and monitor the rates of groundwater depletion and recharge.

### Water Quality

Generally, the quality of groundwater in the Middle Rio Grande Basin is good, but there are areas with naturally occurring elevated arsenic and uranium and isolated areas that have been contaminated by human sources. One particular concern is the Kirtland Air Force Base jet fuel spill in southeast Albuquerque that has affected the regional aquifer. The U.S. Air Force, under direction from the state, is cleaning up the spill, and a final remediation strategy is being developed as of 2016 under the federal Resource Conservation and Recovery Act (RCRA) with oversight from the state. Other potential threats to groundwater in the region are septic systems, leaking underground storage tanks, and closed landfills.

In addition to non-point pollution from urban and agricultural run-off, chemical spills from industrial and vehicular accidents and water





treatment plant malfunctions are rare but potentially very damaging threats to surface water quality, and therefore to human and ecosystem health.

Responsibility for monitoring and addressing water pollution is borne and coordinated by different local and state agencies depending on the water affected and the source of the pollution.

WRMS FUTURE DEMAND SCENARIOS	ANTICIPATED WATER DEMAND BY 2130 (ACRE/ FEET)
High Demand	275,000
Medium Demand	225,000
Low Demand	180,000

**Table 13-1: Future High, Medium, and Low Water Demand Scenarios for ABCWUA Customers by 2130**

Source: ABCWUA draft Water Resources Management Strategy (WRMS), 2016

Note: Historical system growth, Bureau of Business and Economic Research projections from 2008 and 2012, and MRCOG's Socioeconomic Forecast for 2040 data were used to develop the demand projections. Data for climate change were derived by the Bureau of Reclamation from base data first developed as part of the West-Wide Climate Risk Assessment. [http://www.abcwua.org/Water\\_Resources\\_Management\\_Strategy.aspx](http://www.abcwua.org/Water_Resources_Management_Strategy.aspx)

## Water Resource Management

Water resources are best managed within a watershed, because all the components of water ecology are interconnected at that level. Water rights in the Middle Rio Grande Basin, for both surface and groundwater, are administered by the New Mexico State Engineer. This state office also leads regional water planning efforts and negotiates and administers inter-state water compacts.

The ABCWUA, responsible for municipal drinking water and wastewater treatment, first adopted a Water Resources Management Strategy (WRMS) in 1997 and updated it in 2007. Progress has been made to implement the strategies aimed to address declining water levels in the aquifer, develop surface water as a drinking water supply, implement water conservation policies, and use reclaimed water to extend the life of the area's water resources.

The next WRMS, due in 2017, will update them to address the most critical long-term challenges: the impacts to the area's water supply due to climate change and population growth. In order to bring long-term climate change into the equation, ABCWUA is extending the planning horizon to 100 years and will analyze multiple supply and demand scenarios to prepare for a range

of conditions and potential doubling and tripling of demand in the next century.

Moving forward, the City and County should consider how best to represent the community's interests on metropolitan and regional boards in a balanced, equitable, and forward-thinking way, which is especially critical when water may become even more scarce.

### 13.1.3.3 NATURAL HAZARDS

Local governments are mandated by the federal government to coordinate preparations for adverse events and natural disasters and develop strategies and actions to recover from them. Flooding, wildfire, drought, and extreme heat are the most common natural hazards in our area. Each has the potential to cause significant damage and destruction to life and property, disrupt economic activity, and pose harm to community health. While these events are called "natural" hazards, they can be significantly influenced, for better or worse, by humans.

Our resilience to natural hazards relies on:

- Minimizing actions that increase the scale or frequency of natural hazards.
- Developing more flexible infrastructure that can better withstand natural hazard events.

- Creating and implementing systems that reduce the amount of time and resources needed to return to full functioning after natural disasters.

## Flooding

The Albuquerque area has experienced flooding in the past and will likely continue to experience a combination of flash floods and storm drainage and river flooding in the future. All three types of flooding events may become greater in scale and frequency due to the more intense precipitation events that are expected in the face of climate change.

Flooding can also be exacerbated when the natural path of surface water is altered by urban development from additional impervious surfaces, removal of vegetation, dams and levee systems, and improperly graded development sites. Flooding can have serious effects on water quality, depending on the volume and velocity of water involved. Combined with vegetation loss, erosion, and steep slopes, it contributes to sedimentation of waterways. Flooding can be mitigated through careful land use planning, low-impact design, and stormwater run-off controls.

## Wildfire

Given our arid climate, dry winds, and degraded stands of vegetation in some areas, catastrophic wildfire is considered highly likely in Bernalillo County. There are almost 180,000 acres of forest susceptible to damage from wildfires, especially in the East Mountains, the Bosque, and to a lesser extent, grasslands in the western portion of the county. Wildfires can be caused by human activity or ignited by lighting. In the U.S. Forest Service Sandia Ranger District, close to half are caused directly by humans; in the Bosque, nearly 100% of fires are caused by humans. Strategies to reduce human-caused fires would dramatically reduce our wildfire risk.

Our vulnerability to wildfire is the result of other human factors as well, including development next to wildlands. The more development next to forest lands, the more people and property will be subject to the risk of wildfire. Human practices like past fire suppression, logging activity, and cattle grazing have also changed the density and composition of vegetation in ways that increase fire risk.

Wildfire can affect water quality and supply as well. A thick mat of burned material on the ground after a fire can reduce stormwater absorption, for example.

## Drought

The length and severity of drought are often defined for a watershed or basin. It is not always apparent when a period of drought begins or ends or what the full severity of it will be until much later. Dry weather conditions must persist for months or even years before a drought can be verified, and it can be difficult in an arid state like New Mexico to determine if an area has actually recovered from drought. Many drought events are followed by years of average or slightly below average rainfall that are not enough to restore surface water and groundwater levels to normal.

Since 1900, New Mexico has suffered devastating periods of drought, and in 2013-2014, most of the state suffered from extreme or even exceptional drought. Cycles of drought are common and naturally occurring in the Southwest, but are expected to worsen due to increasing temperatures and rates of evaporation from climate change. Though changes in precipitation are less predictable than for temperature, the timing and intensity of precipitation events will almost certainly be altered, with more of the precipitation that reaches the ground likely to be rain rather than snow. Average surface flows in the Rio Grande, San Juan,





During years of severe drought, the riparian areas surrounding our region's rivers and streams – and the plants and animals that depend on them – are threatened.

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and Chama Rivers are expected to decline in the long term, partly due to declining snowpack that stores water at higher elevations through the winter months.

### Extreme Heat

Extreme heat is classified in the Hazard Mitigation Plan as a moderate threat. However, given its negative impact on the health of vulnerable populations, and the likelihood that baseline temperatures will rise due to urban development and climate change, it is worth addressing extreme heat along with other natural hazards that have higher risk scores. Human fatalities from extreme heat are usually caused by lack of adequate air circulation indoors or, particularly for people who work outdoors, heat exhaustion. The most vulnerable populations are the young, the elderly, and the infirm, especially those with low- and fixed- incomes who cannot afford air conditioning.

The urban heat island phenomenon is the cumulative effect of human development in urbanized areas that results in significantly higher temperatures than surrounding less developed or undeveloped areas. The rise in temperature is associated with the expansion of impervious and non-reflective surfaces, loss of vegetation and tree canopy, an increase in waste heat from air conditioning and refrigeration systems, industrial processes and motorized vehicular traffic, and the obstruction of cooler air flows. The effect is more pronounced at night, when core urban temperatures remain higher because buildings and paving radiate heat that they absorbed during the day.

Extreme heat increases risk of wildfires and drought. Heat can cause structural damage to transportation infrastructure. For example, pavement and rail lines have been known to buckle in extreme heat. While extreme heat doesn't pose a major threat for existing

buildings, we can expect higher maintenance and operational costs in the future as average temperatures and instances of extreme heat rise.

### Hazard Mitigation Plan

The Hazard Mitigation Plan guides how Albuquerque and Bernalillo County coordinate their preparation and response to hazards with other local municipalities (see the **Infrastructure, Community Facilities & Services chapter** for more information). The plan proposes various ways to bolster our resilience against natural hazards, including through land use and capital planning by:

- Preserving open space that contains unstable slopes and soils, protecting vital infrastructure, designing sustainable buildings, and protecting critical facilities.
- Considering hazard mitigation as a criterion for prioritizing capital investments in the construction or renovation of infrastructure and facilities.
- Steering growth and development away from identified hazard locations wherever possible, and when the hazard locations cannot be avoided, using building and zoning codes to minimize the danger.

### 13.1.3.4 NATURAL RESOURCES

Natural resources are critical to our own livelihood and well-being as well as to that of native plants and animals. By minimizing the impacts, and sometimes the size, of new development, we can help protect and restore key natural resources that will keep our community healthy and functioning far into the future and make it attractive to visitors.

HAZARD RISK	HAZARD TYPE
High	Flood Wildfire Drought
Moderate	Extreme heat Severe winter storms High wind Thunderstorm Earthquake Dam failure
Low	Landslide Land subsidence Tornado

**Table 13-2: Hazards by Risk Level**

Source: Bernalillo County Hazard Mitigation Plan, 2014

### IMPLEMENTING THE HAZARD MITIGATION PLAN

The City and County have already adopted ordinances, land use policies, and building codes that are effective in mitigating natural hazards, such as development restrictions within the 100-year floodplain.

The 2015 Hazard Mitigation Plan recommends further steps that could be taken to bolster our resilience against the relevant hazards:

- Mitigation efforts should address other community goals, such as preserving open space, protecting vital infrastructure, designing sustainable buildings, maintaining environmental health, and protecting critical facilities.
- Hazard mitigation should be considered whenever the County and its municipalities consider investment like construction or renovation of infrastructure and facilities.
- All proposed new development should be evaluated against identified hazard-prone areas. The building permit approval system should include a review of all newly proposed development projects to keep them from being built in known hazard-prone areas, such as floodplains. If a proposed project falls within such an area, the permit may be disapproved or additional construction requirements may be established to eliminate any dangers that could be caused by the existence of the hazard. Projects identified in this manner should be included in the revision and updating of the Bernalillo County Hazard Mitigation Plan.
- All plans developed based on the community's predicted growth patterns should consider both hazard locations and the mitigating action plans to eliminate or reduce them. Melding these two efforts will help steer growth away from identified hazard locations wherever possible and avoid increasing the potential damage risk they represent.





Natural resources are so highly valued by Albuquerque's residents that through the City Charter we are committed to "protect and preserve environmental features such as water, air, and other natural endowments."

### Surface Water & Groundwater

Water is such an important natural resource that it is called out as its own section in the climate change discussion (see **section 13.1.3.2** above), in addition to as a utility in the **Infrastructure, Community Facilities & Services** chapter.

### Air Quality

Our community's climate and air quality are among its most attractive but least tangible natural assets. Located in a river valley bounded by a high mountain range to the east, Albuquerque's geographic location, mile-high altitude, and meteorological conditions such as canyon winds affect Albuquerque's air quality.

Maintaining air quality within the Albuquerque area is the responsibility of the City's Environmental Health Department, Air Quality Program and Albuquerque/Bernalillo County Air Quality Board. A network of air quality monitors sample the air per federal standards for concentrations of suspended

particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and ozone. Although occasional episodes of degraded air quality occur, typically due to winter inversions or dust storms, there have been no violations of federal ambient air quality standards since the early 1990s. More fuel-efficient vehicles, "no burn" days, erosion and dust controls, and permitting of industrial operations are measures that have helped keep our air quality relatively clean for a metropolitan area of our size.

Pollen from native and planted trees trigger allergic reactions among many residents. A City ordinance has been in place since the early 1990s to restrict the planting of high-pollen trees.

A future concern may be ground-level ozone, a pollutant that is not directly emitted but produced by a chemical reaction between volatile organic compounds in the presence of sunlight and heat. In 2015, the U.S. Environmental Protection Agency (EPA) strengthened the standard for ground-level ozone, which may affect our region's attainment status for this pollutant in the future.

Urban form and land use patterns also affect air quality, mainly as a consequence of our continued reliance on the auto to

get around. Encouraging more compact places by attracting projected growth in employment, population, and housing to Centers and Corridors would help reduce travel distances, along with improving conditions for bicycling, walking, and transit. The MTP sets regional policy and funding priorities to encourage multiple transportation modes in our region. Impact on air quality is one of the criteria used to evaluate transportation projects for funding.

### Energy Sources

Coal and natural gas – non-renewable energy sources – are found and extracted outside of the Albuquerque area and still meet the majority of our energy needs. However, our area is blessed with an average of 310 sunny days per year, and some parts are windy on a fairly regular basis. Solar and wind energy are renewable sources with fewer negative environmental impacts that should be increasingly tapped to generate utility-scale as well site-based energy. Cogeneration is also an option within some industrial and institutional facilities.

There are indications that per capita energy use has declined in certain economic sectors. Energy efficiency not only helps reduce consumption of non-renewable energy

but it also supports economic growth and development by freeing funds for private or public investment. Electricity and natural gas used in buildings will increasingly be conserved by incorporating energy-efficient techniques into design, siting, construction, and operations.

The City has an ongoing program to increase the energy efficiency of its 200+ facilities and regulations that preserve solar access in private development. These types of measures should be expanded to encourage energy efficiency and greater use of renewable sources by both the public and private sectors.

The **Infrastructure, Community Facilities & Services** chapter also discusses energy as a utility.

### Unique Landforms & Habitat

Our region's topography is very diverse, from high mountains and a rift valley, to volcanoes, mesas, and canyons. The range in altitude creates a variety of habitats for flora and fauna.

Among the county's wealth of natural resources, one of its most defining features is the Rio Grande valley. It represents the convergence of many prominent environmental features, including the floodplain, Bosque, and part of a watershed

that supplies drinking and irrigation water for nearly 50 percent of New Mexico's population.

Unique geological formations and landforms are fragile and valuable environmental resources that are home to plants and wildlife. Disturbances to the natural environment, in particular to the drainage, basaltic caprock, slopes, and vegetation could result in erosion and caving of slopes and boulders and pose a threat to the public safety and welfare by impacting existing and future downstream and down-slope development.

Diverse habitats for native plants and animals, including rare riparian habitat along the Rio Grande, are home to threatened and endangered species of fish and birds. The City and County are committed to protecting the extent and quality of these crucial habitats. Threats to natural ecosystems and wildlife include competing demands on water from urban and agricultural uses, as well as habitat fragmentation from roads and development.

These resources are also addressed in the *Bosque Action Plan*, *Tijeras Arroyo Bio-Zone Plan* and other agencies' plans, including the *Rio Grande Valley State Park Management Plan* and *Cibola National Forest Plan*, which covers the Sandia Ranger District within Bernalillo County.



Image credit: City of Albuquerque

*The Rio Grande and surrounding Bosque are an irreplaceable ecosystem at the heart of our community, providing a source for water in the Southwest.*

### Land for Agriculture

The county contains soils suitable for raising farm animals and growing crops, especially lands in the Rio Grande valley irrigated by MRGCD or community acequia associations. Some of these lands may have greater monetary value for urban development, but their alternative value as a finite natural resource for food production should be recognized in land use planning. Planning efforts should evaluate how much farmland is required to support local food systems goals.





The **Heritage Conservation chapter** discusses the importance of these rural and agricultural lands as part of our region's cultural heritage.

### 13.1.3.5 COMMUNITY HEALTH

#### Making the Connection Between Land Use and Our Health

Community health is one of the five guiding principles for the Comp Plan. As a guiding principle, it firmly establishes the community's priority to protect all residents from harm where they live, work, learn, shop, and play and to ensure they have convenient access to basic services, healthy food options, and everyday physical activity. Indeed, there has been a growing recognition in recent years that a community's well-being is closely associated with the quality of the built and natural environment and its transportation networks.

While various chapters in the Comp Plan cover elements that contribute to community health, this section focuses more explicitly on the impacts of land use and development on community health and on strategies for addressing them in the Albuquerque area to improve the overall health and resilience of the community.

These are typical conditions in the built environment that influence health outcomes:

- Lack of safe active transportation (i.e. walking and biking) and for outdoor recreation close to home
- Long distance and/or lack of transportation to access basic health services and job opportunities
- Lack of convenient access to fresh, nutritious, and affordable food
- Few local opportunities for social activities
- Proximity to transportation corridors with sustained heavy and/or high-speed traffic
- Proximity to sites with a higher risk of pollution, such as contamination from operating or former industries

Study after study indicates that these conditions matter a lot. They may contribute to higher rates of respiratory and cardiovascular disease, obesity, vehicle-related fatalities, stress, and/or mental health problems. While the impacts are on individuals' health, it becomes a community planning issue when we see persistent patterns of social, economic, and environmental health risks within a given area along with poor health outcomes. The spatial segregation of neighborhoods by ethnicity,

income level, and educational attainment, which does occur in the Albuquerque area, exacerbates the inequitable distribution of health risks related to the built environment. As a result, often those with the fewest health care resources are also faced with the most environmental hazards.

Community health may also be impacted by climate change, from increased risk of heat-related deaths, to flooding, changing patterns of infectious disease, decreased air quality, drought, crop failure, and food insecurity.

Individual City and County departments routinely compile and analyze demographic and public health data to identify the needs of residents in our community and how their services and programs can best meet them. Services are diverse, ranging from supportive housing services and day care for young and old, to recreational and job-training programs. The City Environmental Health Department permits and monitors land uses that have potential environmental impacts and enforces regulations that protect the community from risks. The **Infrastructure, Community Facilities & Services chapter** discusses these services and programs in more detail.

Basic demographic data is key to identifying the social, economic, and health status of residents and households and uncovering



Image credit: CABQ Open Space Division

*Access to open space and recreation facilities can improve community health.*

patterns of greater need in certain neighborhoods or among certain segments of the population. Some neighborhoods have different or greater needs because they include more children and/or older people, who tend to stay closer to home and for whom resources close at hand are therefore most important. Providing services in or near neighborhoods and expanding both housing and transportation options help create "lifelong communities" – places for residents of every age and ability. Providing access to parks and open space connects people with nature, which can have important mental and physical health benefits.

Research and analysis help departments prioritize their budgets and how funds are allocated and, just as importantly – if not more so – are used to request and leverage state and federal funding. The City and County's Planning Departments can take a leading role in tracking growth and development patterns and monitoring progress in achieving Comp Plan goals. Community health indicators (along with other types of indicators recommended in the **Implementation chapter**) should also be monitored as part of a systematic, evidence-based approach for analyzing and improving land use policies.

Advocacy groups play a critical role in providing channels of communication and engagement with "hard to reach" residents and neighborhoods. They highlight issues that overlap department functions and can help the City and County develop ways to make our practices and services more inclusive. Listening to residents' experiences through the City's Community Planning Area Assessments and the County's Sector Development Planning process, and addressing problems through departmental and agency coordination and partnerships should lead to more effective and fiscally efficient solutions for raising the general state of our community's health and making it more resilient (see also the **Implementation chapter**).





## Potential Strategies to Integrate Community Health in Land Use Planning

- Use community health indicators to assess the costs and benefits of development across neighborhoods, inform future changes to land use policy and regulations, and guide capital priorities.
- Improve public engagement in land use issues by coordinating with agencies and advocacy groups to reach areas and groups with lower participation.
- Maintain and strengthen controls on the location, design, and monitoring of land uses that have potential nuisance effects, so no one neighborhood is burdened by proximity to such uses, especially neighborhoods with poor health outcomes.
- Incentivize the location of health care facilities in areas that are currently lacking sufficient services.
- Ensure land use and development regulations encourage community gardens and farmer's markets to facilitate the production of fresh and minimally processed healthy foods and expand community access to the gardens and markets.

*Other Comp Plan chapters include strategies that also address community health, such as:*

- Ensuring meaningful participation of residents who may be impacted by proposed policies, plans, or projects in the Community Identity chapter.
- Encouraging compact, mixed use development in the **Land Use chapter**.
- Creating a well-connected network of safe active transportation options in the **Transportation chapter**.
- Preserving and promoting local agriculture in the **Heritage Conservation chapter**.
- Siting community facilities to provide equitable access for all residents in the **Infrastructure, Community Facilities & Services chapter**.

## Endnotes

1. Benson and Craig, 2014, via Melinda Harm Benson, 16th Water Assembly Conference 2015.
2. Walker and Salt 2012, via Melinda Harm Benson, 16th Water Assembly Conference 2015.
3. MRCOG, Futures 2040 Metropolitan Transportation Plan, 2015.
4. New Mexico Public Health Association (<http://www.nmpaha.org/page-491264>), New Mexico's Indicator-Based Information System (<https://ibis.health.state.nm.us/>), Centers for Disease Control and Prevention (<http://www.cdc.gov/socialdeterminants/>)

## ENVIRONMENTAL RISK ASSESSMENTS<sup>4</sup>

Where people live in Bernalillo County is a powerful indicator of whether they are healthy, whether they are sick, and how long they live. Communities facing the greatest array of health risks have a larger percentage of low-income, immigrant, and Hispanic families than communities facing the least health risks. Life expectancy, birth weights of infants, and community-level health risks can vary widely across census tracts.

Community-level health risks can be measured by factors such as educational attainment, household income, rental rates, foreclosure rates, unemployment rates, and the percentage of overcrowded households.

While neighborhood conditions may not cause poor health, the clustering of social, economic, and environmental health risks makes it more difficult for people in these areas to live healthy lives.

For this reason, community assessments should analyze these risk factors and recommend land use policies and actions to mitigate negative health impacts and improve health outcomes.



# 13.2 Goals, Policies & Actions

for Resilience & Sustainability



## Goal 13.1 Climate Change

Promote resource-efficient growth and development to help mitigate global climate change and adapt to its local impacts.

## Goal 13.2 Water Supply & Quality

Protect and conserve our region's limited water supply to benefit the range of uses that will keep our community and ecosystem healthy.

## Goal 13.3 Natural Hazards

Maximize the ability of built and natural environments to withstand natural hazards and recover from adverse events.

## Goal 13.4 Natural Resources

Protect, conserve, and enhance natural resources, habitat, and ecosystems.

## Goal 13.5 Community Health

Protect and maintain safe and healthy environments where people can thrive.

Policies are organized to support each Goal. Many Policies have supporting Sub-policies, cross-references to other relevant policies, and implementing Actions to more clearly guide decision-making.





# Goal 13.1 Climate Change

**Promote resource-efficient growth and development to help mitigate global climate change and adapt to its local impacts.**

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## **POLICY 13.1.1**

**Resource-Efficient Development:  
Promote development in the city  
and county that works with nature  
to slow global climate change.  
[ABC]**

- a) See **Land Use Policy 5.3.4** for conservation development.
- b) See **Urban Design Policies 7.4.2 and 7.4.3** on minimizing the environmental impact of off-street parking.
- c) See **Urban Design Goal 7.5 and Policy 7.6.1** for site, landscaping, and infrastructure design tailored to climatic conditions.
- d) See **Parks & Open Space Policy 10.4.4** for protecting arroyos and drainage as green space.

## **POLICY 13.1.2**

**Greenhouse Gas Mitigation:  
Mitigate greenhouse gas emissions  
in developments and streetscapes.  
[ABC]**

- a) Expand the tree canopy in developed areas and ensure its long-term health, through landscape regulations for developments and in streetscape improvements.
- b) Accommodate the use of motorized vehicles that run on alternative fuels through zoning and development regulations.
- c) See **Policy 13.5.3** below for energy conservation and renewable energy resources.
- d) See **Urban Design Goal 7.5** for trees and landscaping.

## **ACTION**

- 13.1.2.1** Prioritize implementation of policies and programs in MRCOG's 2015 Integration Plan (resulting from the Central NM Climate Change Scenario Planning project). [ABC]

## **POLICY 13.1.3**

**Public Infrastructure and Facilities:  
Consider increasing temperatures  
and other potential impacts of  
climate change in the design and  
operation of public infrastructure  
and community facilities. [ABC]**

- a) Prepare for increasing transportation maintenance and operations expenses and consider future conditions when making decisions about transportation system repairs, replacements, or retrofit.

- b) Locate new community facilities – and move existing assets when feasible – away from vulnerable or sensitive environmental areas.
- c) Prioritize energy and water conservation in the design of public facilities.
- d) See **Policies 13.5.3 and 13.5.4** below about the impacts of infrastructure and facilities on communities.
- e) See **Infrastructure, Community Facilities & Services Goals 12.1 and 12.2** for additional policies on infrastructure and community facilities.

## ACTION

- 13.1.3.1** Embed stress and strain sensors in pavement and bridges and use heat-resilient pavement materials on a project-by-project basis. [ABC]

# Goal 13.2 Water Supply & Quality

**Protect and conserve our region’s limited water supply to benefit the range of uses that will keep our community and ecosystem healthy.**

## POLICY 13.2.1

**Water Supply: Coordinate with ABCWUA, state, and other agencies to plan and maintain an adequate water supply to meet municipal, agricultural, and ecosystem needs that ensure the overall resilience and sustainability of our community. [ABC]**

## ACTION

- 13.2.1.1** Represent the interests of city and county water users on local, regional, and state water boards.

## POLICY 13.2.2

**Water Conservation: Foster the efficient management and use of water in development and infrastructure. [ABC]**

- a) Collaborate across disciplines and agencies to integrate best practices in water management in land use policies and development standards, increase understanding of water-related impacts of development, and ensure regional coordination.
- b) Encourage and support alternative water uses for industrial and commercial sites, including self-sustaining water systems.





- c) Discourage wasteful water use, such as extensive landscape water runoff to uncultivated areas.
- d) Use water harvesting techniques and water reuse systems when possible for trees and landscaping.
- e) Design storm drainage facilities to optimize infiltration and help recharge the aquifer.
- f) Design rights-of-way to slow runoff by using permeable materials where possible and keeping lane widths to the minimum required for safe travel appropriate to the road's intended capacity.
- g) See **Community Identity Goal 4.2** for processes to engage the community in decision-making.
- h) See **Transportation Goal 6.8** for policies on context-sensitive rights-of-way.
- i) See **Urban Design Goal 7.5** on encouraging drought-tolerant plants in development.
- j) See **Urban Design Policy 7.6.1** on matching stormwater infrastructure to the surrounding context.
- k) See **Infrastructure, Community Facilities & Services Policy 12.1.4** for naturalized treatment of arroyos.

## ACTIONS

**13.2.2.1** Develop and implement innovative demonstration projects and disseminate the results to the development community and the public. [ABC]

**13.2.2.2** Develop education and training programs on the water-related impacts of development for the Citizens Academy. [A]

## POLICY 13.2.3

**Water Quality: Coordinate with the ABCWUA, state, and other agencies to maintain the quality of our groundwater and surface waters. [ABC]**

- a) Follow a total systems approach to water as a valuable resource.
- b) Minimize the potential for contaminants to enter the community's water supply.
- c) Clean stormwater flows by natural processes before they enter the storm drain system and treatment throughout the stormwater system prior to discharge to MRGCD drains and the river.

- d) Require grading and re-vegetation as appropriate to prevent erosion and sediment deposition during and after construction.

e) See **Urban Design Policy 7.6.1** for stormwater treatment.

f) See **Infrastructure, Community Facilities & Services Policy 12.1.4** for drainage and flood control.

## ACTIONS

**13.2.3.1** Coordinate with the appropriate governmental agencies to enforce policies adopted in the Water Quality Protection Policy and Action Plan. [ABC]

**13.2.3.2** Continue testing and monitoring stormwater for contaminants and implement management programs to reduce pollutants that exceed acceptable levels per state or federal guidelines. [ABC]

# Goal 13.3 Natural Hazards

**Maximize the ability of built and natural environments to withstand natural hazards and recover from adverse events.**

## POLICY 13.3.1

**Resilient Infrastructure and Structures: Ensure that infrastructure systems and structures are designed, renovated, and maintained to withstand natural hazards. [ABC]**

- a) Build redundancy into critical infrastructure systems.
- b) Coordinate with providers of water, energy, and communication services to minimize service interruptions after adverse events.
- c) Partner with service providers, agencies, and scientific research centers to develop, test, and implement new energy systems and technologies, such as micro-grids.

- d) Ensure structures are built for resistance to regional hazards, including strong winds, floods, and wildfires.
- e) See **Urban Design Goal 7.6** for policies on context-sensitive infrastructure.
- f) See **Infrastructure, Community Facilities & Services Goal 12.1** for additional policies on infrastructure.

## ACTION

**13.3.1.1** Adopt current building codes, as recommended in the 2015 *Multi-Jurisdictional Hazard Mitigation Plan*. [BC]

## POLICY 13.3.2

**Flood Mitigation: Prevent flood damage and coordinate flood control and response with other agencies. [ABC]**

- a) Limit development in higher flood risk areas.
- b) Limit the volume of water runoff generated from new development to ensure the viability of down-stream stormwater facilities.
- c) Coordinate stormwater and flood control management with other municipalities in the county, the Albuquerque Metropolitan Arroyo Flood Control District (AMAFCA), and MRGCD.
- d) See **Urban Design Policy 7.4.2** for reducing the amount of impervious parking area in developments.
- e) See **Parks & Open Space Policy 10.4.4** regarding arroyos and drains.
- f) See **Infrastructure, Community Facilities & Services Policy 12.1.4** on flood control.

**ACTION**

**13.3.2.1** Consider additional floodplain management actions to continually improve the City and County's FEMA Community Rating System (<https://www.fema.gov/community-rating-system>) scores in order to benefit individual property-owners and the community at large. [ABC]

**POLICY 13.3.3**

**Wildfire Mitigation: Mitigate the risk of wildfire damage to life and property. [ABC]**

- a) Discourage housing, commercial, and industrial growth adjoining forest and other Open Space by incentivizing development in existing developed areas, including in Centers and along Corridors.
- b) Use roads and other rights-of-way as defensive space to separate homes from Open Space.
- c) Locate minimum transportation infrastructure needed for mobility and evacuation at the interface between wildland and development.

- d) See **Heritage Conservation Policy 11.3.1** on single-loaded streets and transitions between Open Space and private development.

**POLICY 13.3.4**

**Drought Mitigation: Collaborate with the ABCWUA and other water-related agencies to determine best practices for mitigating drought effects and to assist with public education and implementation of water conservation measures. [ABC]**

**POLICY 13.3.5**

**Extreme Heat Mitigation: Mitigate the heat island effect of urban development and coordinate emergency response to extreme heat events with other agencies. [ABC]**

- a) Increase the tree canopy in existing neighborhoods and other developed areas to provide shade for people and mitigate heat radiating from buildings and pavement.

- b) Establish climate-controlled emergency facilities for residents susceptible to heat exhaustion, such as children and the elderly.
- c) See **Policy 13.4.3** below for energy conservation measures that also lower heat generated by urban development.
- d) See **Urban Design Policies 7.4.1 and 7.4.2 and Goal 7.5** for additional policies on providing shade and reducing impervious area in developments.



# Goal 13.4 Natural Resources

**Protect, conserve, and enhance natural resources, habitat, and ecosystems.**

## POLICY 13.4.1

**Air Quality: Maintain good air quality that complies with federal standards to safeguard public health and enhance quality of life for all residents. [ABC]**

- a) Continue to enforce air quality regulations to minimize pollution from particulates including fugitive dust, vehicle emissions, wood-burning in homes, and open burning.
- b) During temperature inversions, which cause smog, reduce air pollution from local sources through methods such as no-burn days.
- c) Protect residents from the risk of toxic air emissions through the permitting process and enforcement.
- d) See **Transportation Policy 6.1.3** for reducing auto demand.

- e) See **Urban Design Policy 7.5.1** for landscape elements that can help improve air quality.
- f) See **Transportation Policy 6.4.2** related to air quality.

## ACTIONS

- 13.4.1.1** Maintain the air quality monitoring network to determine if standards are being attained and provide data to help assess growth impacts on air quality. [ABC]
- 13.4.1.2** Follow U.S. EPA regulatory requirements for addressing the potential impacts of multiple sources of emissions. [ABC]

## POLICY 13.4.2

**Surface Water and Groundwater: Protect and conserve our region's limited water supply to benefit the range of uses that will keep our community and ecosystem healthy. [ABC]**

- a) See **Goal 13.3** above for other water-related policies.
- b) See **Infrastructure, Community Facilities & Services Policies 12.1.4 and 12.1.5** for water infrastructure.

## POLICY 13.4.3

**Energy Resources: Conserve energy and capitalize on renewable energy resources that are plentiful in our region, especially solar and wind energy. [ABC]**



- a) Encourage renewable energy generation and use in private and public development.
- b) Encourage light-colored and heat-reflecting roofing and building materials.
- c) Maximize energy efficiency for heating, cooling, and lighting systems in public facilities, transit and government vehicles, and street lights.
- d) Incorporate renewable energy technology in city and county facilities, including solar-powered lighting and signage.
- e) See **Land Use Policy 5.3.8** for solar rights protections.
- f) See **Infrastructure, Community Facilities & Services Policy 12.1.6** related to energy systems.

## POLICY 13.4.4

### Unique Landforms and Habitats: Protect areas with unique landforms, and crucial habitat for wildlife, through sensitive urban development or acquisition as Open Space. [ABC]

- a) Protect crucial habitat on private land, such as next to the Bosque, Far West Mesa and in the East Mountains, by limiting the density and intensity of adjoining development, encouraging wildlife corridors and buffers, and mitigating the impacts of development.
- b) Increase the tree canopy in existing neighborhoods and other developed areas to extend and help connect habitat protected within Open Space.
- c) Promote the use of local native plants in development and along public rights-of-way to provide the best food and shelter for local wildlife.
- d) Where vehicles cross arroyos, provide the shortest possible culvert with a diameter sufficient to allow for the movement of local wildlife.
- e) See **Land Use Policy 5.3.4** for conservation development.
- f) See **Parks & Open Space Policy 10.3.1** on Open Space acquisition.
- g) See **Heritage Conservation Goal 11.3** for policies related to protecting unique landforms including the Rio Grande Bosque, Petroglyph National Monument, Sandia Mountains, and Volcano Mesa.

# Goal 13.5 Community Health

Protect and maintain safe and healthy environments where people can thrive.

## POLICY 13.5.1

**Land Use Impacts: Prevent environmental hazards related to land uses. [ABC]**

- a) Remediate sites that pose a detriment to public health, safety, and welfare to return them to productive use.
- b) Protect public health, safety, and welfare by discouraging incompatible land uses in close proximity, such as housing and industrial activity.
- c) Mitigate potential adverse impacts – including noise, emissions, and glare – of new development on surrounding land uses during and after construction through land use regulations, environmental permitting, and enforcement.
- d) Buffer residential neighborhoods and agricultural land from heavy industry with less intense, non-residential land uses to protect the health and safety of residents,

agricultural products, and groundwater, while promoting diverse economic activity.

- e) Encourage environmentally-friendly technologies and processes for industrial activity.
- f) See **Policy 13.4.1** above for more general policies on protecting air quality.
- g) See **Policies 13.5.3 and 13.5.4** below for potential impacts of existing land uses.  
See **Land Use Policy 5.3.7** for objectionable land uses.
- h) See **Land Use Policy 5.6.4** for transitions between Areas of Change and Consistency.

## ACTION

- 13.5.1.1** Reduce the risk of disease caused by insects and/or rodents in site design by considering public health factors in land use policies and development regulations, such as those related to green infrastructure for stormwater management. [ABC]

## POLICY 13.5.2

**Healthful Development: Encourage public investments and private development that enhance community health. [ABC]**

- a) Promote family gardens, community gardens, farms, and livestock raising to encourage the availability of local food and to increase food security.
- b) Ensure access to parks and open space for all residents by walking, biking, and driving to provide opportunities for passive and active recreation in the outdoors and encourage healthful connections to nature.
- c) Use landscaping and trees in developments and streetscapes to maintain a healthy environment by providing shade and shelter from winds that carry dust and other particulates.





- d) See **Policies 13.1.2 and 13.4.4** above for greenhouse gas mitigation and protecting unique landforms and habitats.
- e) See **Land Use Goal 5.3** for efficient development patterns.
- f) See **Transportation Goals 6.2 and 6.3** for policies that ensure safe travel conditions for pedestrians, cyclists, transit users, and drivers.
- g) See **Urban Design Policy 7.5.1** for context-sensitive landscaping.
- h) See **Parks & Open Space Goal 10.1** for policies on the distribution and universal design of parks and Open Space.

## ACTION

- 13.5.2.1** Replace and replant unhealthy and dying trees in public streetscapes.

## POLICY 13.5.3

**Public Infrastructure Systems and Services: Coordinate with providers to ensure that systems and services do not compromise the health, safety, and welfare of the community. [ABC]**

- a) Recognize, analyze, and minimize the potential adverse, disproportionate impact on at-risk communities in siting new public infrastructure and services.
- b) See **Land Use Policy 5.3.7** for objectionable land uses.
- c) See **Infrastructure, Community Facilities & Services Goal 12.1** for infrastructure provision.
- d) See **Infrastructure, Community Facilities & Services Policy 12.3.2** for solid waste management.

## POLICY 13.5.4

**Environmental Justice: Recognize and work to address adverse environmental impacts that are experienced disproportionately by underrepresented and at-risk communities, in order to help improve the health outcomes of their residents over time. [ABC]**

- a) See **Policies 13.2.3 and 13.4.1** above for water and air quality.
- b) See other policies in **Goal 13.5** above to encourage healthful development and minimize community impacts of land uses.
- c) See **Community Identity Goal 4.2** for processes for community engagement in the planning process.
- d) See **Land Use Policy 5.3.7** on distribution of objectionable land uses.
- e) See **Land Use Policy 5.7.5** for community engagement processes in the development review process.
- f) See **Infrastructure, Community Facilities & Services Policy 12.4.1** for collaborative strategies to meet community needs.

- g) See **Appendix E** for a description and outline of the Community Planning Area assessment process.

## **ACTIONS**

- 13.5.4.1** Analyze demographics and health statistics for each Community Planning Area. [ABC]
- 13.5.4.2** Monitor health metrics by Community Planning Area to track changes over time and inform policy and regulatory decision-making. [ABC]
- 13.5.4.3** Coordinate with State Department of Health, UNM, MRCOG, and medical service providers on public health and environmental justice issues related to land use. [ABC]
- 13.5.4.4** Gather public health information, perform analysis, and recommend policy and regulatory changes with stakeholders, including UNM students from multiple programs and service providers in neighborhoods. [ABC]
- 13.5.4.5** Engage communities in health assessments and education about land use processes, conflicts, stakeholder roles and responsibilities, and regulatory powers and constraints. [ABC]