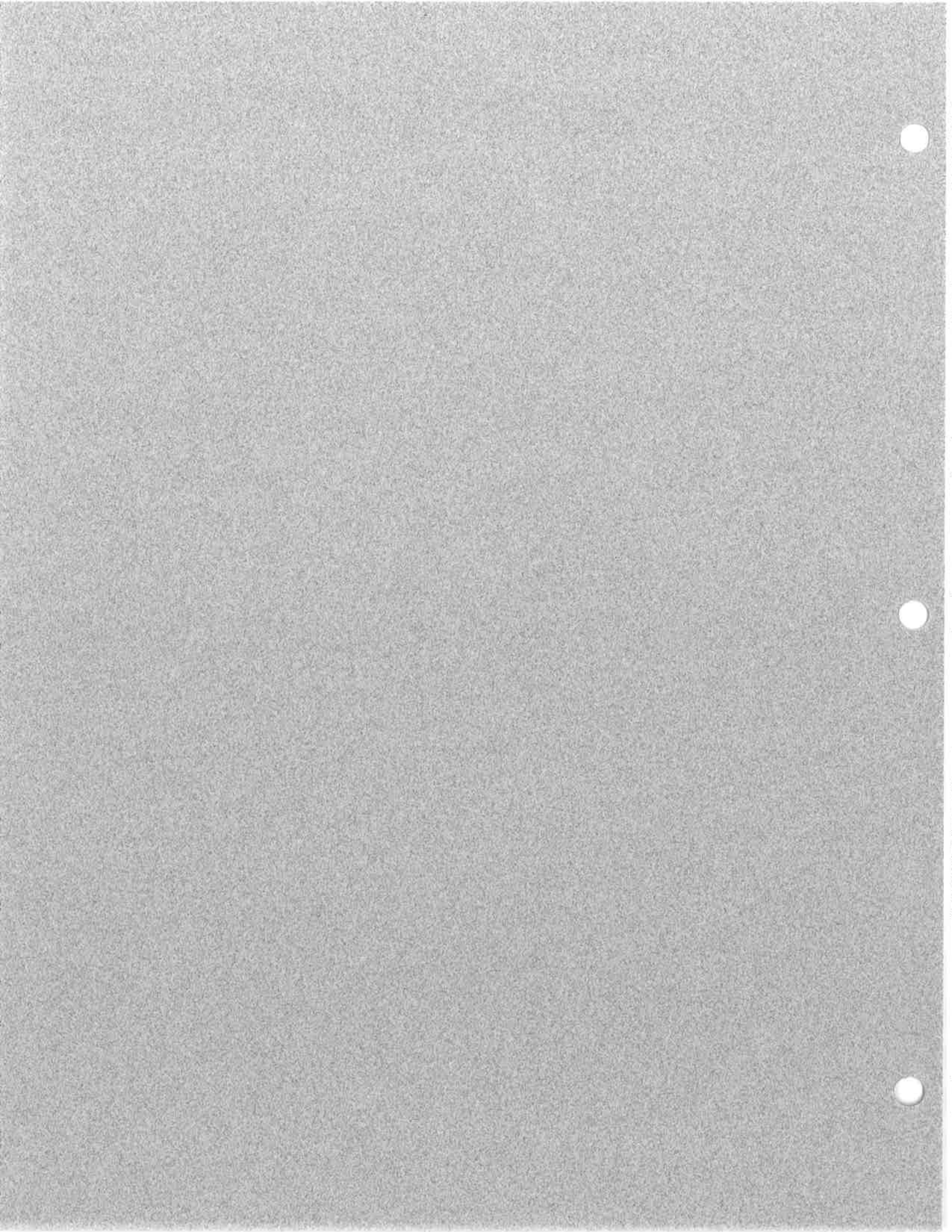


**NATURAL RESOURCE
MANAGEMENT AND
CONSERVATION**



8 NATURAL RESOURCE MANAGEMENT AND CONSERVATION

Throughout the Public Participation Process, Santa Fe's open spaces, mountains, and environmental resources were frequently cited as some of the Urban Area's major assets. Sustainable development and the preservation, enhancement, and restoration of Santa Fe's character and resources are pivotal issues and themes that have shaped this document.

Mapping of existing environmental resources, conditions, and constraints provides the basis for resource conservation and management policies contained in this chapter. Aerial photography research and fieldwork were performed prior to analysis.

Maps that show sites where natural resources are located have been developed. Citywide and resource based environmental standards are proposed to protect sites and resources. Natural resource management and conservation issues and policies are addressed in the following Plan elements. Additional environmental issues are referenced and addressed in other chapters.

- Biological and Natural Resources and Habitat Conservation,
- Hillsides and Visual Resource Conservation,
- Natural Landscapes and Landmarks, and
- Environmental Protection.

THEMES

- Quality of Life - Enhance the quality of life of the community and ensure provision of community services for residents.
- Sustainable Growth - Ensure that development is sustainable and that growth, conservation, redevelopment, and natural resource protection are balanced.

GUIDING POLICIES

8-1 BIOLOGICAL AND NATURAL RESOURCES AND HABITAT CONSERVATION

- 8-1-G-1 Protect, enhance, and restore environmental and biological resources, including the Santa Fe River and habitats that are sensitive or declining, to restore and to prevent or reduce their loss within the Santa Fe Area.
- 8-1-G-2 Consider riparian and wildlife corridors as a single, interconnected habitat, the numerous limbs of which branch throughout the entire watershed, providing access and habitat to a wide range of plant and animal species and preserving the natural character of the landscape.

The City of Santa Fe, the county, and the Extraterritorial Zone currently lack an areawide plan to deal with riparian corridors or connecting corridors to the natural forests. The drainages and arroyos are managed from a flood

control standpoint, but these riparian zones are not considered an integrated biological community. Consequently, modifications or construction activities may take place in one portion of a drainage without any consideration for the biological effects on another portion of the drainage.

- 8-1-G-3 Minimize the direct loss and/or modification of riparian and wildlife habitat, corridors, and wetlands within the Santa Fe area. This includes:
- Minimize sedimentation and flooding within the riparian corridors and the Urban Area;
 - Minimize entry of hazardous substances into riparian corridors and wetlands by use of on-site runoff treatment and biofiltration; and
 - Designate, protect, and restore habitat for endangered, threatened, or rare species.
- 8-2-G-4 Minimize the loss of use of riparian and wildlife corridors by wildlife and human populations, and enhance and restore the corridors.
- 8-2-G-5 Ensure appropriate environmentally sensitive design where humans access and use riparian and wildlife corridors.
- 8-1-G-6 Retain and enhance significant geological formations and features as habitat and visual amenities.

8-2 HILLSIDES AND VISUAL RESOURCE CONSERVATION

- 8-2-G-1 Protect visual open space, hillsides, and ridgetops.
- The city's Escarpment Overlay District and Natural Topography Performance Standards should be revised to reflect more restrictive policies. To protect hillsides and visual natural resources, factors other than slope need to be considered, such as habitat and soil conservation.*

8-3 NATURAL LANDSCAPES AND LANDMARKS

- 8-3-G-1 Protect, preserve, and restore natural and cultural landscapes and open space landmarks.

8-4 ENVIRONMENTAL PROTECTION

Air Quality

- 8-4-G-1 Curtail soil erosion by wind, stormwater, and development policies.
- 8-4-G-2 Undertake measures to maintain and improve the relatively pristine air quality in Santa Fe. Reduce dust at construction sites and from dirt roads.
- 8-4-G-3 Encourage land use and transportation patterns that promote use of alternatives to the automobile for transportation, including bicycling, bus transit, and carpooling.

Increased use of transit and carpooling, coupled with land use and circulation patterns that promote walking and bicycling, can lead to a decrease in daily trips, fewer emissions, and improved air quality.

Noise

- 8-4-G-4 Protect public health and welfare by reducing or mitigating existing noise problems where feasible, by establishing standards for acceptable indoor and outdoor noise, and by preventing significant increases in noise levels.
- 8-4-G-5 Incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effect of noise on adjacent land uses along major highways (Interstate 25 and Santa Fe Relief Route) and major roads.

8.1 BIOLOGICAL AND NATURAL RESOURCES AND HABITAT CONSERVATION

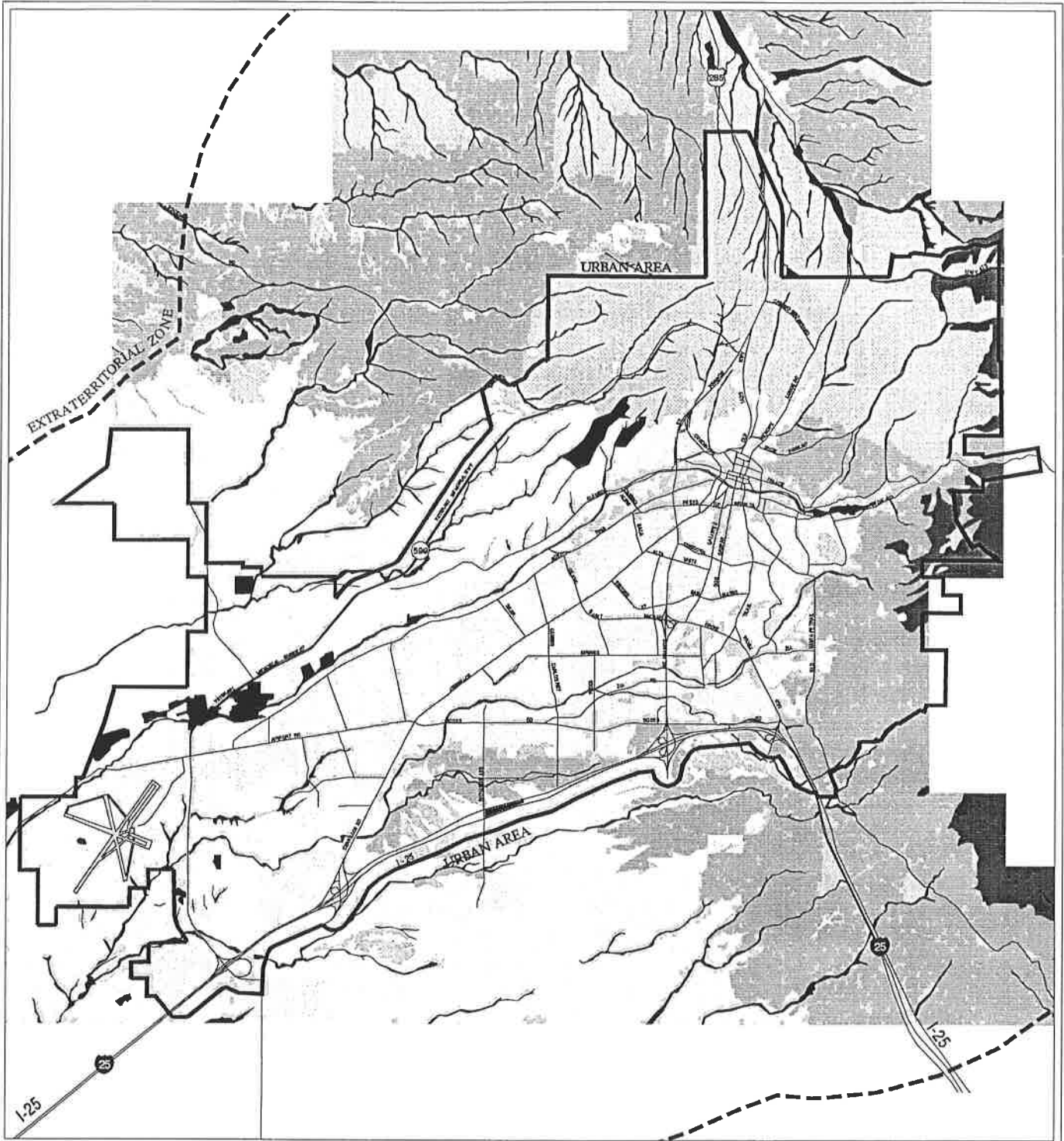
8.1.1 HABITATS

Habitat is a term used for a set of natural conditions including climate, elevation, solar aspect, water, wind, soils, geology, and other elements combined. Plants are most often used to characterize the biotic communities which form habitats for animals and other plants. A vegetation study was performed to map Santa Fe's biotic communities and to help locate and designate critical habitat for threatened and endangered species and for species of concern. From this composite information, it will be possible to designate and update the federal and state agencies lists on threatened and endangered species.

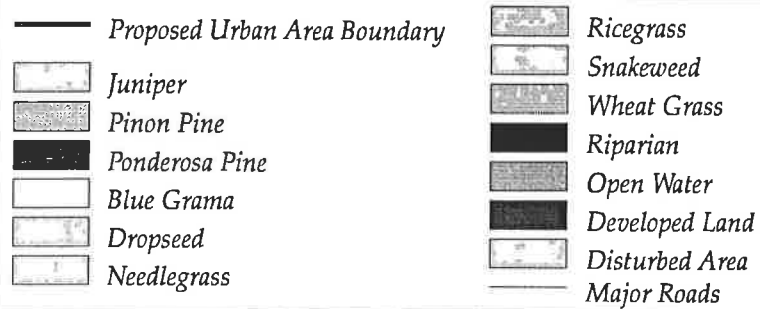
The range of habitats in Santa Fe County has fostered a broad diversity of biological resources. These include at least 300 common plant species and 357 species of vertebrate animals. The western part of the greater Santa Fe area is mesa-desert grassland with the Rio Grande forming the boundary. Continuing east, the elevation increases, and one-seed juniper appears in the grasslands, forming a savanna-like community. Near the urban portions of Santa Fe, piñon begins to occur, intermixed with one-seed juniper and grassland. Near the center of Santa Fe, the dominant community is piñon-juniper woodland. Proceeding eastward into the foothills of the Sangre de Cristo Mountains, ponderosa pine begins to appear, intermixed with piñon. At the easternmost edge of the city, ponderosa pine woodland is the dominant canopy coverage with aspens and cottonwoods appearing in the drainages.

The most sensitive and important of these biotic communities is the riparian area, which provides prime food, water, and nesting habitat for migrant as well as resident species. Since most of the biotic communities in the Santa Fe area occur over wide ranges of central New Mexico, few of them are rare or unique, but many of them provide habitat for rare, threatened, or endangered species of both plants and animals.

A very schematic representation of major biotic communities in the Santa Fe Urban Area are identified in Figure 8-1.



Biotic Communities



Scale in Miles

City of Santa Fe GENERAL PLAN

April 1999

Figure 8-1

8.1.2 PLANTS

Typical plant species occurring in the grassland are blue and black grama grasses, Indian ricegrass, galleta, dropseed, bush and ring muhly, sacaton, and broom snakeweed. Wildflowers present in the uplands include desert zinnia, globe mallow, bush penstemon, purple aster, butterfly weed, and chamisa, with species such as melilotus and solidago in the riparian zone. Shrubs include four-wing saltbush, sand sagebrush, winterfat, Mormon tea, broom dalea, yucca, and cholla cactus. The middle and eastern portions of the Urban Area support heavier vegetation, such as large shrubs and trees (piñon, one-seed juniper, chamisa, and saltbush). The eastern edge of the Urban Area supports woodlands dominated by ponderosa and piñon pine.

8.1.3 WILDLIFE

Wildlife in the Urban Area includes resident species such as rabbit, coyote, whiptail lizard, and bull snake. At least 357 species of vertebrate animals occur in the Urban Area: at least 48 species of reptiles and amphibians, 61 species of mammals, and 248 species of birds. Many of these species are migratory and are in the area only part of the year. Bird densities are likely to be greatest along the edges of habitats, with the greatest bird density and diversity noted along the riparian zones. Birds of prey, including hawks, eagles, falcons, and owls, receive special legal protection. The Santa Fe County area affords suitable habitat for raptor species such as red-tailed hawk and burrowing owl.

8.1.4 THREATENED AND ENDANGERED SPECIES, AND SPECIES OF CONCERN

The range of biological communities in the Regional Area and surrounding the city provides suitable environments for animal and plant species that are considered threatened, endangered, or of concern and are subject to protection under the Federal Endangered Species Act and the New Mexico Endangered Plant and Animal Act. These are listed in Table 8.1. These primarily occur within the foothills, riparian corridors, and other specific areas. Many of the animal species are migratory and are present infrequently. In some cases, such as that of the southwestern willow flycatcher or meadow jumping mouse, it is possible to enhance or restore habitat for a species to increase the possibility of its occurrence. Unlike the migrating animals, several of the rare plants (Santa Fe cholla, Santa Fe milkvetch, grama grass cactus) occur within the area and may be uprooted and destroyed as a result of construction and development (Table 8.2).

TABLE 8.1
THREATENED AND ENDANGERED SPECIES, AND SPECIES OF CONCERN POTENTIALLY WITHIN SANTA FE COUNTY

Animals	Federal Status	State Status
Rio Grande Chub (<i>Gila pandora</i>)	--	Species of Concern
Flathead Chub (<i>Platygobio gracilis</i>)	Species of Concern	--
Rio Grande Sucker (<i>Catostomus plebeius</i>)	Species of Concern	--
Northern Leopard Frog (<i>Rana pipiens</i>)	Species of Concern	--
Desert Kingsnake (<i>Lampropeltis getula splendida</i>)	Species of Concern	--
White-faced Ibis (<i>Plegadis chitri</i>)	Species of Concern	--
Osprey (<i>Pandion haliaetus carolinensis</i>)	Species of Concern	--
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Threatened	Threatened
Northern Goshawk (<i>Accipiter gentilis</i>)	Species of Concern	Species of Concern
Swainson's Hawk (<i>Buteo swainsoni</i>)	Species of Concern	Species of Concern
Zone-tailed Hawk (<i>Buteo albonotatus</i>)	Species of Concern	Species of Concern
Ferruginous Hawk (<i>Buteo regalis</i>)	Species of Concern	--
American Peregrine Falcon (<i>Falco peregrinus antum</i>)	Endangered	Threatened
Sora (<i>Prozana carolina</i>)	Species of Concern	--
White-tailed Ptarmigan (<i>Lagopus leucurus altipetens</i>)	Species of Concern	Endangered
Whooping Crane (<i>Grus americana</i>)	Endangered	Endangered
Western Snowy Plover (<i>Charadrius alexandrinus nivosus</i>)	Species of Concern	--
Mountain Plover (<i>Charadrius montanus</i>)	Candidate	Species of Concern
Flammulated Owl (<i>Otus flammeolus</i>)	Species of Concern	--
Mexican Spotted Owl (<i>Strix occidentalis lucida</i>)	Threatened	Species of Concern
Boreal Owl (<i>Aegolius funereus</i>)	Species of Concern	Threatened
Black Swift (<i>Cypseloides niger borealis</i>)	--	Species of Concern
Belted Kingfisher (<i>Ceryle alcyon</i>)	Species of Concern	--
Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>)	Endangered	Endangered
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	Species of Concern	--
Gray Vireo (<i>Vireo vicinior</i>)	Species of Concern	Threatened
Gray Catbird (<i>Dumetella carolinensis ruficrissa</i>)	Species of Concern	
Baird's Sparrow (<i>Amodramus bairdii</i>)	Species of Concern	Threatened
Western Small-footed Myotis Bat (<i>Myotis ciliolabrum melanorhinus</i>)	Species of Concern	Species of Concern
Yuma Myotis Bat (<i>Myotis yumanensis yumanensis</i>)	Species of Concern	Species of Concern
Long-legged Myotis Bat (<i>Myotis volans interior</i>)	Species of Concern	Species of Concern
Fringed Myotis Bat (<i>Myotis thysanodes thysanodes</i>)	Species of Concern	Species of Concern
Pale Townsend's Big-eared Bat (<i>Plecotus townsendii pallescens</i>)	Species of Concern	Species of Concern
Yellow-bellied Marmot (<i>Marmota flaviventris</i>)	--	Species of Concern

TABLE 8.1 Continued		
Animals	Federal Status	State Status
Gunnison's Prairie Dog (<i>Cynomys gunnisoni</i>)	--	Species of Concern
Heather Vole (<i>Phenacomys intermedius intermedius</i>)	--	Species of Concern
Red Fox (<i>Vulpes vulpes</i>)	--	Species of Concern
Ringtail (<i>Bassariscus astutus</i>)	Species of Concern	Species of Concern
American Marten (<i>Martes americana origenes</i>)	Species of Concern	Threatened
Western Spotted Skunk (<i>Spilogale gracilis</i>)	Species of Concern	Species of Concern
Rocky Mountain Bighorn Sheep (<i>Ovis canadensis canadensis</i>)	Species of Concern	Species of Concern
Lilljeborg's Pea-clam (<i>Pisidium lilljeborgi</i>)	Species of Concern	Threatened
Cockerell's Striate Disc Snail (<i>Discus shimeki cockerelli</i>)	Species of Concern	Species of Concern
Source: NM Department of Game and Fish, Conservation Services Division, April 3, 1999.		
Plants	Federal Status	State Status
Chatterbox Orchid (<i>Epipactis gigantea</i>)	--	Sensitive
Grama Grass Cactus (<i>Toumeyia papyracantha</i>)	Sensitive	--
Lady Tresses Orchid (<i>Spiranthes magnicamporum</i>)	None (Galisteo River)	Endangered
Rocky Mountain Lily (<i>Lilium philadelphicum varandinum</i>)	None (Upper Pecos)	Endangered
Santa Fe Cholla (<i>Opuntia viridiflora</i>)	Species of Concern	Endangered
Santa Fe Milkvetch (<i>Astragalus feensis</i>)	None	Sensitive
Source: NM Department of Energy, Mines, and Natural Resources, Forestry Division, March 1999.		

TABLE 8.2 NATIVE WILDLIFE EXTIRPATED OR APPARENTLY NO LONGER OCCURRING IN SANTA FE COUNTY		
Animals	Federal Status	State Status
American Eel (<i>Anguilla rostrata</i>)	--	Extirpated
Rio Grande Cutthroat Trout (<i>Oncorhynchus clarki virginalis</i>)	--	Extirpated
Rio Grande Silvery Minnow (<i>Hybognathus amarus</i>)	Endangered	Threatened
Speckled Chub (<i>Macrhybopsis aestivalis aestivalis</i>)	--	Extirpated
Rio Grande Shiner (<i>Notropis jemezianus</i>)	Species of Concern	--
Rio Grande Bluntnose Shiner (<i>Notropis simus simus</i>)	Extinct	--
Gray Wolf (<i>Canis Tupus</i>)	Endangered	Extirpated
Grizzly Bear (<i>Ursus arctos</i>)	Endangered	Extirpated
Black-footed Ferret (<i>Mustela nigripes</i>)	Endangered	Extirpated
Mink (<i>Mustela vison energumenos</i>)	--	Extirpated
Jaguar (<i>Panthera onca arizonensis</i>)	--	--
Sangre de Cristo Wooland Snail (<i>Ashmunella thomsoniana</i>)	--	--
New Mexico Fritillary Butterfly (<i>Speyeria hydaspe conquista</i>)	--	--
Source: NM Department of Game and Fish, Conservation Services Division, April 3, 1999.		

8.1.5 RIPARIAN CORRIDORS AND WETLANDS

Riparian areas in the Santa Fe area provide valuable habitat as well as corridors for wildlife movement. These areas include intermittent streams (arroyos) and perennial waterways.

Because of the arid climate, standing water is extremely rare, and permanent water sources are essential to sustain aquatic species, as well as upland species which reside adjacent to the bodies of water. The loss of these bodies of water would dramatically and drastically change the ecosystem of the surrounding area.

Arroyos, as habitat, also form an important part of the local ecosystem. In urban and semideveloped areas, numerous wildlife species, such as coyote, skunk, and rabbit, use these corridors to travel between remaining patches of native habitat. The sidewalls of these arroyos also provide nesting and burrowing habitat for species, such as coyote, badger, burrowing owl, and rabbits.

Wetlands in the Urban Area include two types of habitats: Riverine and Palustrine. Riverine habitats are found along river banks, such as the Santa Fe and Tesuque rivers. These rivers have both Lower Perennial and Upper Perennial subsystems. Upper Perennial subsystems often have high gradients, fast water, and predominantly rocky substrate. Lower Perennial subsystems often have water gradients low enough to sustain aquatic species, slow water, and bottoms composed of sand and mud, such as the Santa Fe River in the city. Palustrine habitats occur adjacent to Riverine habitats, where the ground is flat, and wet benches are adjacent to the water course.

8.1.6 IMPACTS OF DEVELOPMENT ON BIOLOGICAL RESOURCES AND HABITAT

Continued urban growth and expansion pose several challenges to plant and animal communities in Santa Fe, both rare and common. These impacts fall into the following broad categories, including:

- **Direct Species Removal** is essentially the killing of a plant or animal. Such removal can occur in a number of ways. Nearly every construction or development project that requires surface disturbance results in the taking of plants, which are destroyed by the activity of heavy equipment. In most cases, these are common plants that occur in abundance elsewhere. However, in some cases construction activities can destroy rare plants. For example, the Santa Fe cholla (a state endangered species), once occurred abundantly along the top and sides of Fort Marcy Hill in Santa Fe; construction projects have reduced the number of these plants there. Direct removal of plants also can occur from the use of pesticides, through indiscriminate collection of wildflowers, or through trampling of plants by heavy pedestrian, equestrian, or cycle traffic.

Although less obvious, direct removal of animals occurs during many construction projects. Small mammals such as kangaroo rats, as well as reptiles such as lizards, often rest in underground burrows during the heat of the day or hibernate during the winter. Clearing land with heavy equipment can crush these animals in their burrows or bury them beyond their capability to dig out. As with the plants, most of these species are

common, but in some cases protected raptors such as the burrowing owl (who nest in underground burrows) could be destroyed by large-scale land conversion activities.

Direct species removal can also occur from remote activities, such as the discharge of hazardous substances like pesticides or herbicides, which can make their way into aquatic environments, killing fish and invertebrates and potentially affecting terrestrial wildlife that prey on these species.

- **Loss of Habitat.** Aside from direct removal of species, land conversion activities can destroy or modify key habitats. Many wildlife species require territories for hunting or foraging. Birds often require specific nesting sites. Some animals utilize localized migration corridors to travel between habitats. Conversion of land can result in loss of key habitats, which indirectly can result in the removal of the species. Such conversion can occur, for instance, by indirect means such as changes in hydrological flow resulting from upstream changes in the land. This can increase stormwater runoff from paved areas, which can result in the erosion or sedimentation of habitats. In any case, the habitat may be irreparably damaged to the point where the species can no longer utilize it to survive.

Large construction projects often have direct and indirect effects on adjacent drainages and water courses. In many cases, existing drainages are channelized and lined with concrete or soil cement to reduce erosion. Although from an engineering standpoint these modifications may control erosion, they alter the natural character of the drainage, change the flow pattern and infiltration of water into the soil, and destroy wildlife habitat along and within the arroyos. Riparian zones are currently used by wildlife, as well as by people engaging in recreational activities. As development increases, it impinges on the natural habitats within and adjacent to these riparian zones, resulting in loss of habitat for wildlife species and loss of access for and enjoyment by human populations.

- **Interruption of Reproductive Cycles** in both plants and animals can result in a failure of reproduction by the species. In the case of plants, mowing, burning, or spraying herbicides or pesticides during the reproductive season can result in a total failure of reproduction for the species. Common species will likely reseed in the area, but rare species have highly limited distributions and could be extirpated by extensive use of herbicides or pesticides.

Animals are also sensitive to interruption of reproductive cycles. Birds are particularly sensitive to such disturbance, and some will abandon nests if they are subjected to increased levels of noise or disturbance while they are incubating eggs. In the case of rare birds, this could result in the extirpation of a population.

- **Sedimentation.** In recent years, urban development in the Santa Fe area has involved paving large areas of the foothills, bajada, and mesa that previously held infiltrated soils. Runoff from this pavement is clean water that picks up sediment as it flows to the Rio Grande. Depending upon the location and intensity of a storm, runoff can scour the sides and bottoms of some portions of riparian habitat (destroying plant communities adjacent to the water courses) and deposit sediment in other portions of the drainage. The deposition of sediment plumes generates two types of mechanical problems:
 - Physical blockage of the water flow into portions of the drainage, sometimes resulting in a shift of the alignment of the drainage; and

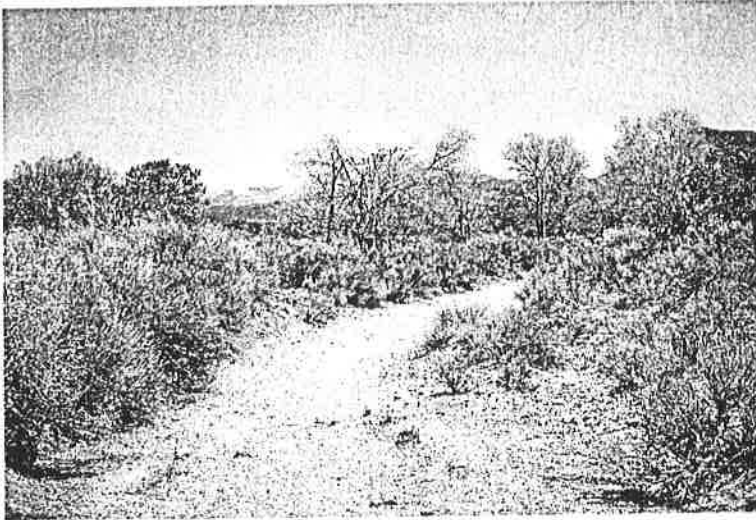
- Slow filling of Riverine and Palustrine wetland habitats and wildlife habitat within and adjacent to the water course. Additionally, some of these sediments could be conveyed outside the urbanized areas and affect riparian zones and wetlands downstream.
- **Flooding.** With increased development, less and less of the surface has permeable soils. During periods of heavy runoff, water pours off of streets and parking lots into rivers and arroyos. Any definable river channel has a limited capacity to hold water within its banks. If the water entering these channels is in excess of the capacity of the channel to hold the flow, then the stormwater will spill out of the channel, potentially flooding adjacent properties and damaging structures such as culverts and bridges.
- **Contamination by Hazardous Substances.** Runoff from roads and urbanized areas contains toxic metals such as lead, as well as nitrates, sulfates, chlorides, and organic compounds. Lead, in particular, is extremely hazardous in wetland environments. It binds to organic compounds and accumulates within the wetlands. Over time, lead can reach toxic levels. A variety of other polluting substances can enter riparian zones and wetlands, including pesticides, herbicides, hydrocarbon compounds, and other heavy metals. National Pollutant Discharge Elimination System standards (which do not yet apply to Santa Fe), if applied, could help to reduce or eliminate the deposition of hazardous materials.

However, as urbanization continues, the levels of potential contaminants within stormwaters can be expected to increase and may someday exceed the standards set for the National Pollution Discharge Elimination System and require mitigation measures to eliminate or reduce the hazardous materials in stormwater runoff.

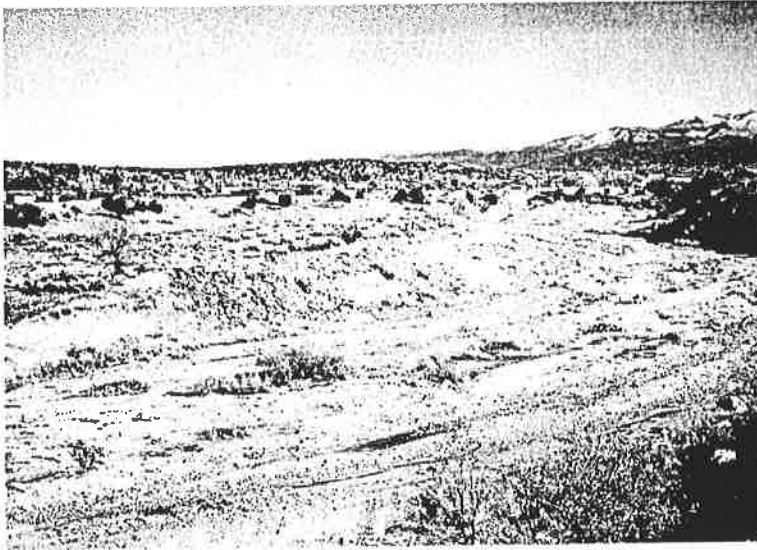
8.1.7 SOILS

Seventy-two types of soil are present in the Santa Fe area. These fall into three distinct groups: soils of recent alluvial valleys, soils of dissected piedmont plains, and soils of the Sangre de Cristo and Ortiz mountains and foothills.

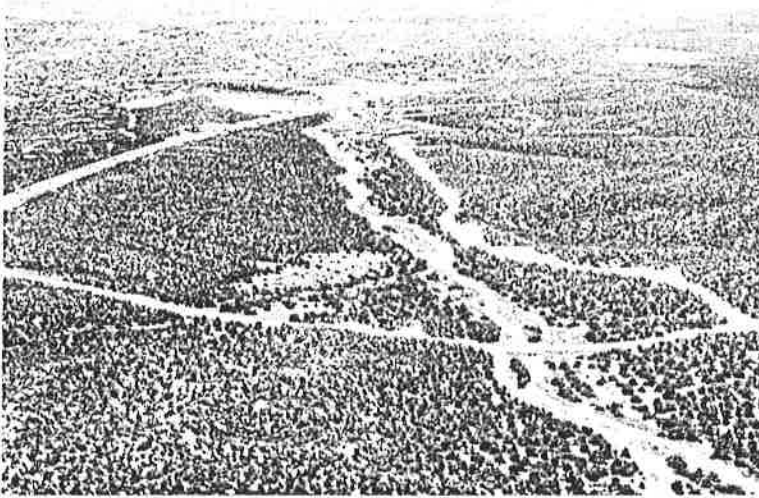
- **Recent Alluvial Valleys.** Nearly all of the soils that are in recent alluvial valleys are suitable for irrigated crops. The most common soil type in these valleys is the El Rancho-Fruitland association.
- **Dissected Piedmont Plains.** Soils of the dissected piedmont plains extend throughout the Santa Fe area. These soils are generally formed from reworked material in the Santa Fe Group. In the northern part of the Santa Fe area, the land is generally rough and broken, and it is dissected by many drainageways. The southern part of the Santa Fe area becomes more gently rolling, and nearly all of the soils are capable of range production. The Panky, Pojoaque, Las Lucas, Witt-Harvey, and Harvey-Dean-Tapia are some of the most common associations in the dissected piedmont plains. Runoff is mostly from Pojoaque soils and Rough Broken Land. Maintaining maximum plant cover on range land helps to minimize the hazard of erosion.



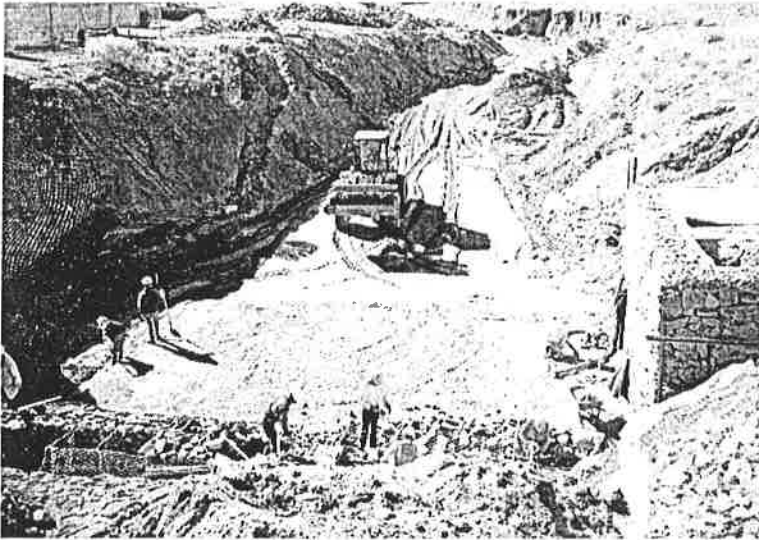
Arroyos form an important part of the local ecosystem, providing movement corridors, and nesting and burrowing habitat for wildlife.



Santa Fe River in southern Santa Fe. Because of the arid climate standing water is rare.



Most of the plant communities in the Santa Fe area occur over wide ranges of central New Mexico, and none of them are rare or unique. However, riparian zones are the most important of these communities to wildlife.



Construction and gravel mining operations can endanger or result in loss of wildlife.

The Panky-Pojoaque-Harvey association consists of level to hilly, deep, loamy to clayey soils. It is found on old alluvial fans and dissected, eroded terraces, south and southeast of the city, roughly coincident with the Santa Fe Plateau, and is used for range and for water supply. Runoff is largely from the Pojoaque soils. Soil and water conservation practices, in addition to maintaining maximum cover on the range, help minimize erosion hazards.

- **Mountains and Foothills.** The soils of the Sangre de Cristo Mountains and foothills are formed mostly from weathered granite, gneiss, and schist. These soils are often on steep slopes on rocky land. The most common soil groups in the area include the Chimayo, Mirabal, and Supervisor soils. The Chimayo-Mirabal-Supervisor association consists of moderately sloping to very steep, shallow to moderately deep, loamy and very gravelly or very stony soils. This association is used for timber production, range, water supply, and recreation. Runoff is rapid, so erosion hazard needs to be minimized.

8.1.8 SOILS RELATED CONSTRAINTS ON DEVELOPMENT

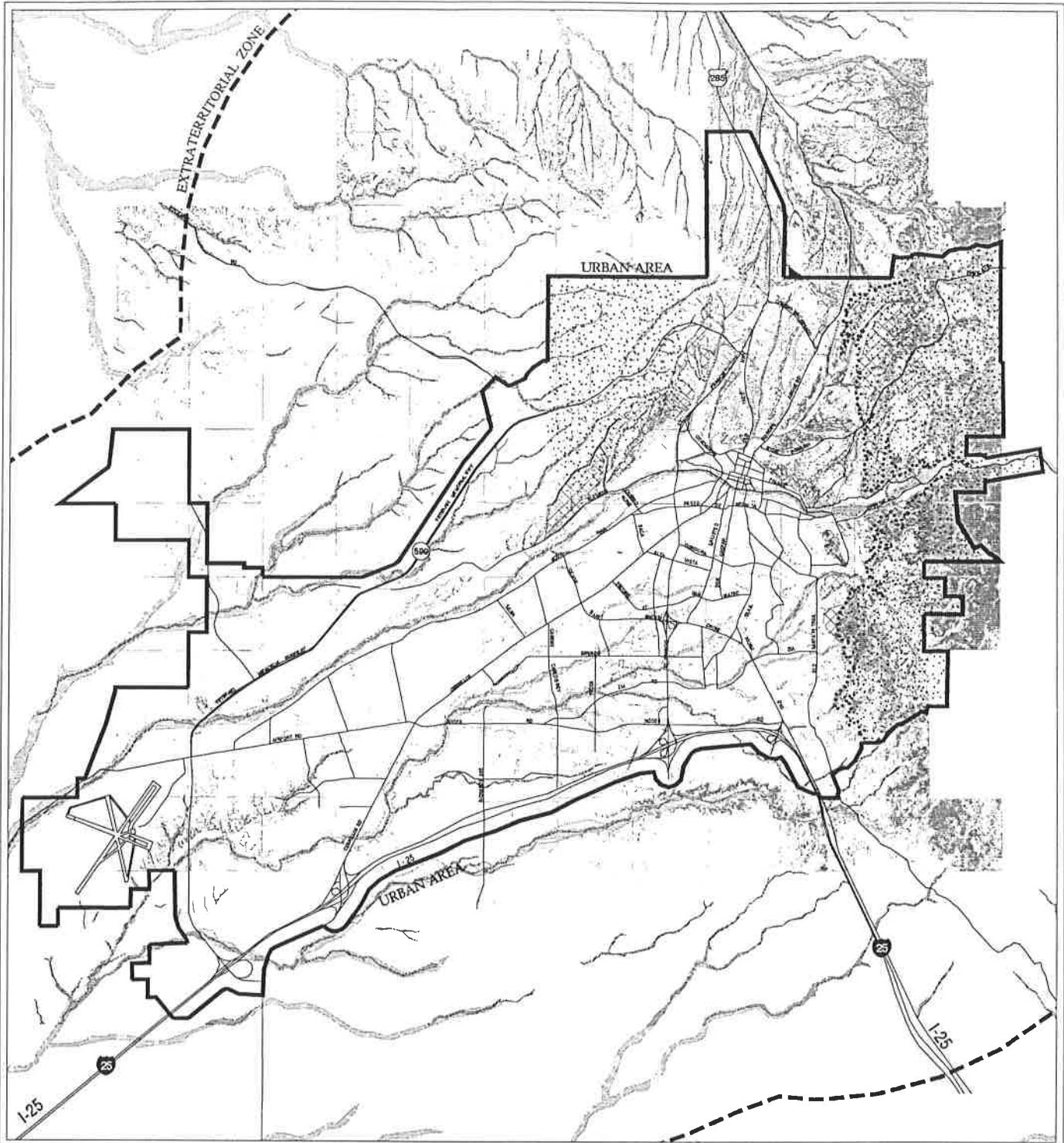
Almost all of the city is located on sites that have constraints on development due to the nature of the soils discussed above. These constraints include:

- **Wind Erosion and Rural Fugitive Dust.** Many of the soils in Santa Fe have a moderate to severe erosion rating. Once the vegetation is removed from these soils, they are often highly vulnerable to wind erosion.
- **Soil Erosion.** Some portions of the Urban Area contain soils that have been designated by the U.S. Natural Resource Conservation Service as having a moderate to severe potential for water erosion. Stormwater erosion can be a major problem in areas of high growth due to increased impervious surfaces and lack of water infiltration.











8.1.9 RESOURCE PROTECTION AND SENSITIVE RESOURCE AREAS

Two classifications are defined to protect habitats that are sensitive, declining, or represent valuable biological resources in Santa Fe: Resource Protection Areas (RPAs) and Sensitive Resource Areas (SRAs).

- **RPAs** contain the most sensitive and valuable habitats and require protection. They are located along riparian corridors and other areas (to be designated) that provide important habitat for plants and animals, and movement corridors for wildlife. RPAs include such areas as the 100 year flood zone, wetlands, riparian corridors, Santa Fe Landmark areas, slopes 30 percent or greater, escarpment and foothills areas. RPAs are designated as limited-build and limited-disturbance areas; development would be regulated by existing and proposed policies. RPAs are shown in Figure 8-2 Resource Protection Areas.
- **SRAs** shall be investigated with particular attention to sites that include habitat for sensitive species of plants and animals. Development is permitted on sites with SRA designation, provided certain steps are taken, and when development is in accordance with the special standards established for SRAs. Policies shall be designed to ensure that biological resources are considered and incorporated in development design. Both the RPAs and SRAs are intended to be of sufficient size to ensure the long-term viability of the habitats and species located within them and connected to them.



Resource Protection Areas

-  Proposed Urban Area Boundary
-  Open Space
-  100-Year Flood Zone
-  Riparian Corridor
-  Slope 15-30%
-  Slope greater than 30%
-  Major Roads
-  Ridgetop Escarpment Subdistrict
-  Foothill Escarpment Subdistrict
-  Mountain District (7400' & above)



Scale in Miles

City of Santa Fe
GENERAL PLAN

April 1999

Figure 8-2



The Santa Fe area contains numerous natural and man-made visual landmarks. Talaya Hill (above) is a natural landmark, while the Plaza (below) is a man-made landmark.

8.2 HILLSIDES AND VISUAL RESOURCES CONSERVATION

The hills to the north and southeast and the Sangre de Cristo Mountains play a major role in defining Santa Fe's regional setting. In addition, the Sangre de Cristo Mountains have long been sacred to Native Americans. Hills and mountains are visible from most locations in the city and help orient people. The hillsides are prone to erosion and ground failure, especially because of the arid climate and insensitive development practices. They are home to many sensitive biological resources, and alteration of topography can impact drainage and increase runoff. While hillside development generally has been sparse and most residences located on hillsides have flat roofs, recent years have seen large structures with colored pitched roofs that mar the pristine views.

The city's existing terrain management regulations, Natural Topography Performance Standards, and the Escarpment Overlay District impose limitations based on slope. However, the hillside and visual resources conservation strategy outlined herein adds more inclusive protective measures (see Figure 8-2):

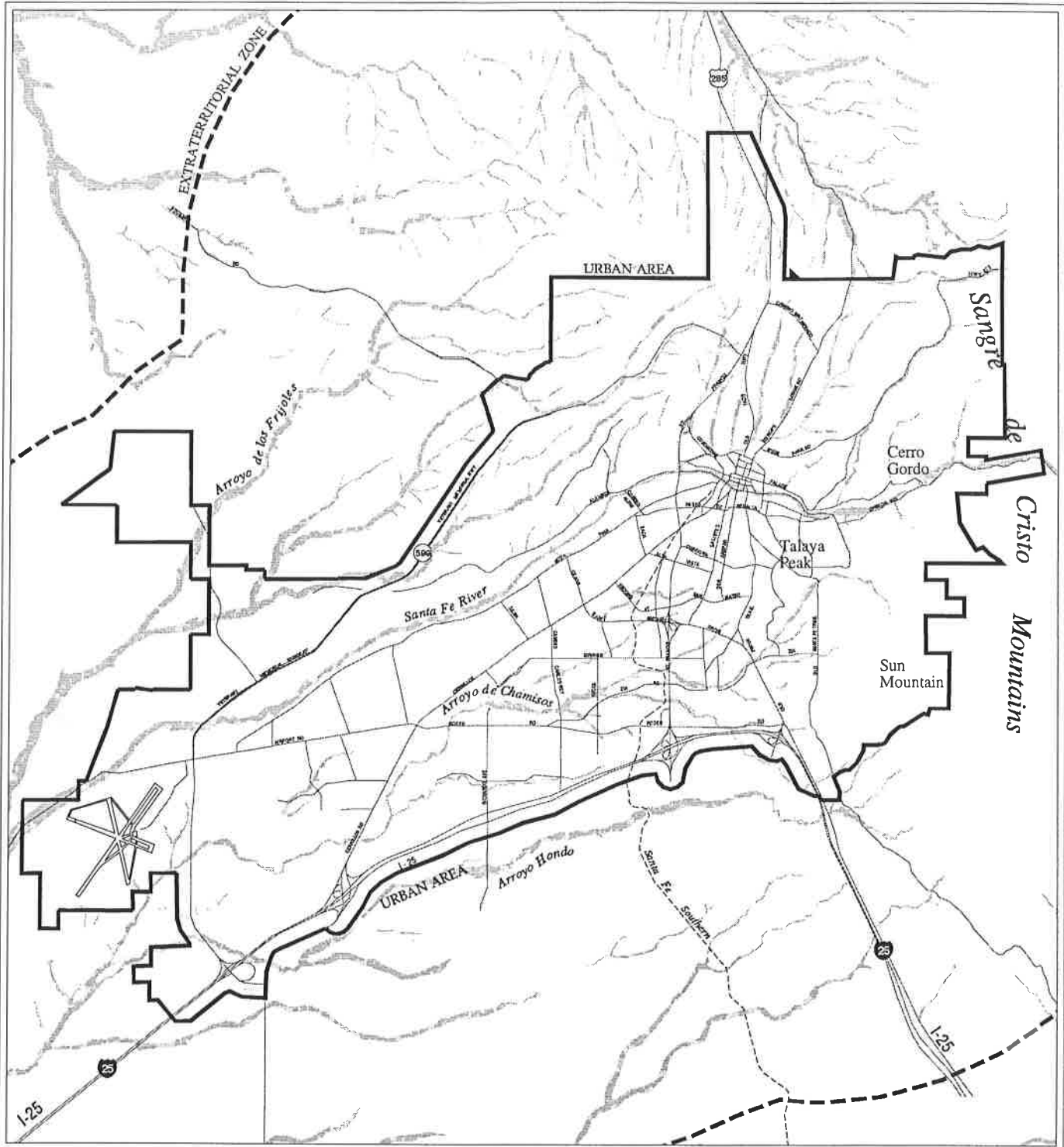
- The city's escarpment protection regulations should be strengthened by ensuring that they are applicable to all areas with a slope of greater than 15 percent, more stringent than the current slope threshold of 20 percent.
- Policies to protect critical ridgetops from poor development practices are established. Note that new policies addressing erosion from runoff are addressed in Infrastructure (Chapter 7).
- Nothing in this Plan is designed to, nor shall be construed to, impair the environmental protections contained in any terrain management program.

8.3 NATURAL LANDSCAPES AND LANDMARKS

Sited on the western edge of the Sangre de Cristo Mountains, Santa Fe has a high elevation with a dry, sunny climate and only enough precipitation to support a pygmy forest of piñon and juniper trees. The original town settlement was provided water year-round by the Santa Fe River as it flowed southwest to the Rio Grande. The river has since been largely diverted to city reservoirs and water supply treatment and distribution facilities. The foothills, arroyos, and distant mountains complete the natural setting, providing a varied landscape and diverse views. Figure 8-3 shows a historic diagram of Santa Fe's regional setting.

The Santa Fe area contains the natural biotic characteristics of a landscape that, although altered by our 400 years of intense human use, still includes salient features. Ecologically diverse forest, woodland, and grasslands habitats that were established in the Santa Fe piedmont, foothills, and valleys approximately 6,000 years ago, following the end of the Ice Age, are part of the landscape.

Landscape is the environment in which prehistory and history occurs; it both limits and permits man's cultural endeavor, our way of life and forms of settlement.



Regional Setting

— Proposed Urban Area Boundary



Scale in Miles

City of Santa Fe GENERAL PLAN

April 1999

Figure 8-3

Preservation and enhancement of the natural environment, most conspicuously formed of trees and lower growing plants, eventually results in ecologically rich landscapes, attractive to a wide variety of birds and other animals, as both year-round and seasonal inhabitants.

Many plants, especially flowering plants and mid-height grasses once present and common in and about Santa Fe, are now rare, some possibly absent. Likewise, the density and distribution of still common plants has been much altered. This is due to a combination of factors, including hundreds of years of heavy overgrazing, intensive wood cutting, and subsequent erosion. Grama grass sod development and still remaining, relatively uncommon, plant specimens should be encouraged to grow through soil stabilization and enhancement, reseeding, and protection. Likewise, plant species now found in quantity many miles outside of Santa Fe should be systematically reintroduced to areas of former abundance.

8.4 GEOLOGY AND SEISMICITY

The geology of the Urban Area presents constraints on development that need to be considered to protect the public health and safety, particularly in light of further urban development. Hillside conservation is also addressed to regulate development in potentially unsafe areas, as well as to preserve the community's unique character and environment.

8.4.1 GEOLOGY AND STRATIGRAPHY

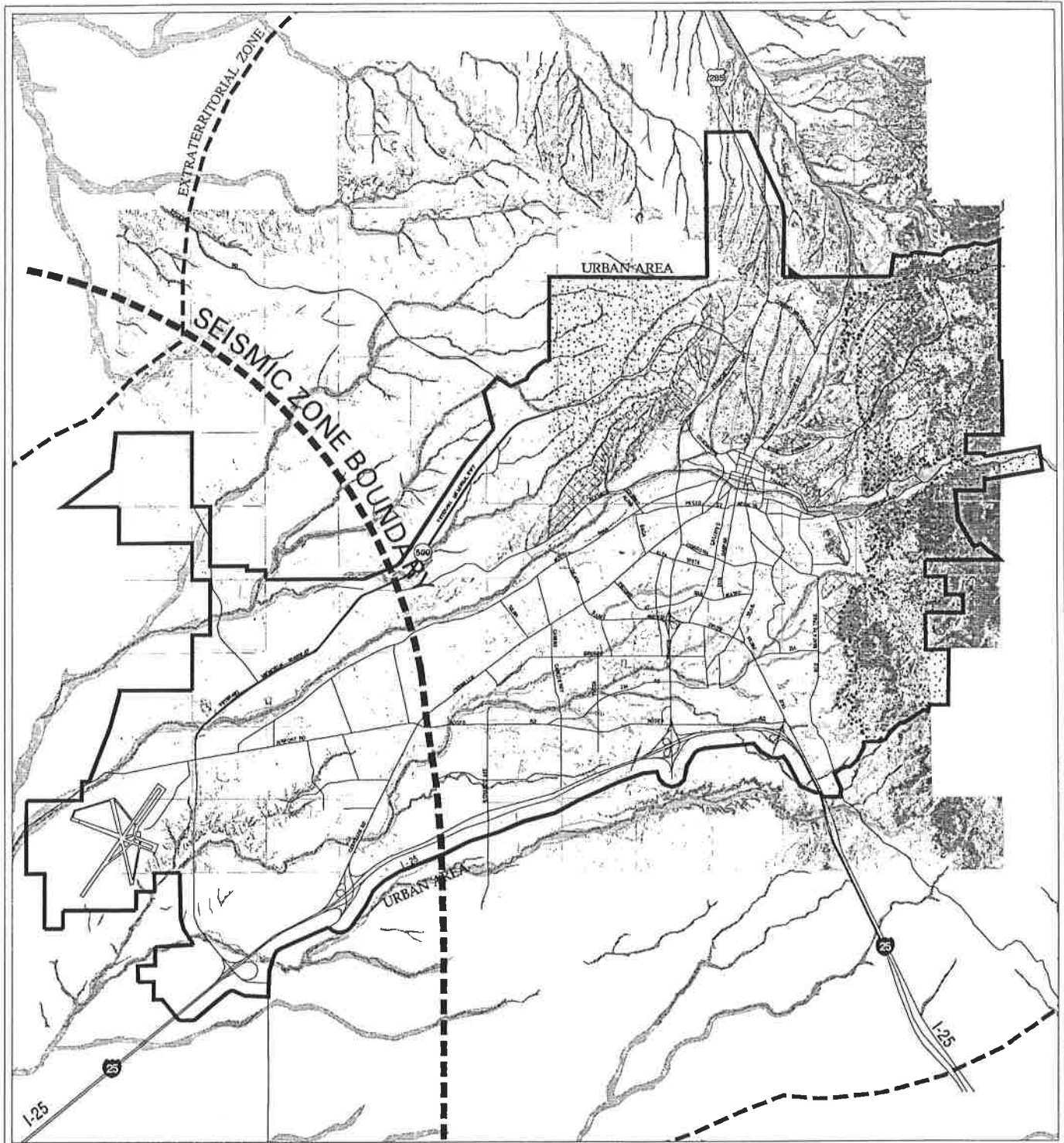
Santa Fe is at the southern end of the Alamosa-Santa Fe segment of the Rio Grande Rift, a series of north-trending basins extending from Colorado through New Mexico. The Urban Area is situated near the Espanola Basin, bounded on the west and northwest by the Jemez volcanic field, and on the east by the Sangre de Cristo Mountains. To the south the Espanola Basin is connected with the Albuquerque Basin by way of the White Rock Channel (Figure 8-4).

The Espanola Basin was formed by the geologic actions of the Rio Grande Rift Valley. As the valley deepened, large amounts of sediments were deposited. These sediments, of the Santa Fe Group, were formed from deposits of sand and cobbles, and they account for many of the substrates in the area.











Immediately east of the Santa Fe area is the Sangre de Cristo Uplift, one of the largest positive elements of the Rocky Mountain Foreland. The region is trenched by the ephemeral tributaries of the Rio Grande that have headwaters in the Sangre de Cristo Mountains. Much of the surficial geology of the area has resulted from deposition of material eroded from the nearby mountains (Figure 8-4).

8.4.2 SURFACE GEOLOGY

The geology of the Espanola Basin is dominated by the sands, gravels, mudstones, and other sediments of the Santa Fe Group. In many places these strata are overlain by the late Canada-early Pleistocene Ancha Formation and Cerros del Rio volcanics. Two types of sediment constitute the surface geology of the Urban Area:



Seismic Zone Boundary

- | | |
|---|--|
|  <i>Proposed Urban Area Boundary</i> |  <i>Ridgetop Escarpment Subdistrict</i> |
|  <i>Open Space</i> |  <i>Foothill Escarpment Subdistrict</i> |
|  <i>100-Year Flood Zone</i> |  <i>Mountain District (7400' & above)</i> |
|  <i>Riparian Corridor</i> | |
|  <i>Slope 15-30%</i> | |
|  <i>Slope greater than 30%</i> | |
|  <i>Major Roads</i> | |



Scale in Miles

City of Santa Fe
GENERAL PLAN

April 1999

Figure 8-4

- Bulk sediments that filled the Espanola Basin in the past but have no direct relation to recent landforms (Santa Fe Group); and
- Terrace, alluvial fans, and gravel piedmonts, which are all of recent origin and directly related to existing landforms.

The subsurface strata of the Santa Fe Group consist of a broad aggregation of temporally variable sandstones, mudstones, and siltstones, including strata deposited by river and alluvial action, playa deposition, and the wind; all of these beds are highly erodible. The more recent Pleistocene and Holocene deposits are represented by alluvium in arroyos, gravel terraces, gravel piedmonts, alluvial fans, and eolian deposits. Many of these deposits produce active and severe soils that are subject to erosion and present other hazards.

The surface geology, which consists of valley and arroyo alluvium, is particularly sensitive to development. Gravels, sands, and clays make up this unit, and they are found in the present-day drainages in and adjacent to the Santa Fe River, Arroyo de Los Chamisos, and Arroyo Calabasas. Many of these surface deposits are unconsolidated and allow ground water recharge, and in areas of topographic relief they may be vulnerable to soil erosion. As a result, these areas are unsuitable for normal construction.

8.4.3 BEDROCK GEOLOGY

The bedrock geology of the Santa Fe area consists predominantly of four formations. From oldest to youngest these are Precambrian granites and gneisses, the Tesuque Formation, the Ancha Formation, and terrace gravels. Figure 8-4 shows the geology and stratigraphy of the Santa Fe area.

1. **Precambrian** (greater than 600 million years old) basement rocks comprise the mountainous uplift of granitic rocks flanking the eastern side of the Española Basin.
2. The **Tesuque Formation**, part of the larger Santa Fe Group, is composed of conglomerates, sandstones, and mudstones with occasional thin, ash layers. It was deposited as ancient stream beds and channels, floodplains, alluvial fans, and windblown deposits.
3. The **Ancha Formation** is composed of gravels ranging from pebbles to large boulders. It is no more than 50 feet thick and represents the coarse-grained material of coalescing alluvial fans spreading out from canyons in the higher, more rugged Sangre de Cristo Mountains of the time. Much of the City of Santa Fe is built on the Ancha Formation.
4. **Terrace gravels** are the coarse-grained deposits from older, higher levels of the Santa Fe River. These deposits are distributed south of the present-day Santa Fe River and occur in a northeast-southwest trend parallel to the river.

8.4.4 SEISMICITY

Since 1849, over 600 earthquakes have been reported in New Mexico, primarily along the Rio Grande Valley. The largest recorded earthquake in the general vicinity of Santa Fe, the 1918 Cerrillos earthquake, estimated at between 4.5 and 5.5 on the Richter scale, was epicentered 15 miles southwest of Santa Fe. The most recent earthquake occurred in 1955, three miles (five kilometers) from Santa Fe with a magnitude of 4.0. Recent studies indicate a 10 percent probability of a quake in excess of .15G (15% of gravity) occurring within the

next 50 years. Such a quake could cause extensive nonstructural internal damage to buildings with the possibility of injuries from falling ceilings, roofs and other objects.

The Santa Fe Fault zone boundary, oriented north-south, is located through the western part of the city. Minor faults also tending to run north-south are located in the northern part of the Santa Fe area within the Tesuque Formation. These are inferred faults, however, since they do not break the surface of the earth (see Figure 8-4). Since existing and future development is susceptible to earthquakes, the city enforces the 1991 Uniform Building Code Standards (UBC). The 1997 UBC contains more updated standards for building construction to mitigate the impacts of seismic activity.

8.5 ENVIRONMENTAL PROTECTION

8.5.1 AIR QUALITY

The qualities of light and air in the area have drawn many of the current residents to Santa Fe, and environmental degradation is one of the top three concerns of residents. The city enjoys good air quality that meets federal and state standards for monitored pollutants (particulate matter and carbon monoxide). The New Mexico Environmental Department does not monitor other federal criteria pollutants, such as sulfur dioxide, nitrogen dioxide, ozone, and lead, because it does not expect values to approach federal standards. As long as the state and federal standards are met, authority for additional controls and plans rests with the Santa Fe city or county governments.

The New Mexico Environment Department monitors carbon monoxide (CO) and particulate matter (PM₁₀) concentrations in the City of Santa Fe. There are two PM₁₀ monitoring sites in Santa Fe, one located on Old Santa Fe Trail and Paseo de Peralta, and the other at St. Francis Drive and Alta Vista. The health-based federal standard for PM₁₀ is 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for a daily sample (see Table 8.3 for the federal and state ambient air quality standards). The average of all samples for both Santa Fe sites for 1993 was 15 $\mu\text{g}/\text{m}^3$, with a high of 34 $\mu\text{g}/\text{m}^3$ for the Old Santa Fe Trail site and 62 $\mu\text{g}/\text{m}^3$ for the St. Francis Drive site.

Continuous carbon monoxide monitoring is performed at a site on Cerrillos Road near the intersection of Third Street. The federal standard for carbon monoxide is 9 parts per million (ppm) for any eight-hour period and 35 ppm for hourly values. New Mexico standards are 8.7 ppm for eight-hour averages and 13.1 ppm for hourly values. For 1993, the high eight-hour average was 4.2 ppm and high one-hour average was 9.5 ppm at this site.

In the Urban Area, air quality degradation is caused in part by smoke from wood burning and smokestack emissions and other sources such as dust from dirt roads, but more importantly by emissions from motor vehicles and commercial and industrial development. The County Land Development Code sets a basic requirement that allows the Board of County Commissioners to determine if a development involving a commercial or mining use should be required to limit increases in air pollution. The policies included in this section seek to maintain the existing high level of air quality in the Santa Fe Urban Area.

**TABLE 8.3
SANTA FE AIR QUALITY COMPARED TO FEDERAL AND STATE AMBIENT AIR
QUALITY STANDARDS**

Pollutant	Measured Santa Fe (1993)	New Mexico Standard	Federal Primary Standard	Federal Secondary Standard
Total Suspended Particulate				
24-Hour Average	15 µg/m ³	150 µg/m ³	—	—
Annual Geometric Mean		60 µg/m ³	—	—
Sulfur Dioxide (SO ₂)	*			
24 Hour Average		0.10 ppm	0.14 ppm	—
Annual Geometric Mean		0.02 ppm	0.03 ppm	—
3-Hour Average		—	—	0.50 ppm
Carbon Monoxide (CO)				
8-Hour Average	4.2 ppm	8.7 ppm	9 ppm	9 ppm
1-Hour Average	9.5 ppm	13.1 ppm	35 ppm	35 ppm
Ozone (O ₃)				
1-Hour Average	*	0.06 ppm	—	—
Photochemical Oxidants	*			
1-Hour Average		0.06 ppm	—	—
Nitrogen Dioxide (NO ₂)	*			
24-Hour Average		0.10 ppm	—	—
Annual Arithmetic Mean		0.05 ppm	0.05 ppm	0.05 ppm
Lead (Pb)	*			
Calendar Quarterly Arithmetic Average		—	1.50 µg/m ³	1.50 µg/m ³
Particulate Matter less than Ten Microns (PM ₁₀)	*			
24-Hour Average		—	150 µg/m ³	—
Annual Arithmetic Mean		—	50 µg/m ³	—
µg/m ³	=	Data in micrograms per cubic meter.		
ppm	=	Data in parts per million by volume.		
*	=	Not measured		
Source:	Environment Department, Air Quality Bureau. <i>Annual Report 1989-1990.</i>			

8.5.2 NOISE

Noise is unwanted sound and is known to have several adverse effects on people, including hearing loss, communication interference, sleep interference, adverse physiological responses, and general annoyance. Noise sensitive land uses identified in Santa Fe include residences of all types, nursing homes, day-care centers, hospitals, schools, parks, and places of religious assembly. Outside the city, areas such as wildlife corridors and conservation districts are noise sensitive. In general, most portions of the Urban Area which contain noise sensitive uses are not negatively impacted by noise.

Existing Noise

According to the Santa Fe Police Department, residents complain about excessive noise from two occasional sources:

- **Party Disturbances.** These can include loud music, loud talking/yelling, traffic noises, fighting, and other noises that disturb the general peace.
- **Electronic Noise.** This complaint is most often associated with loud audio equipment audible to citizens located at significant distances from the vehicular sources.

This document recommends that a community noise survey be conducted to record and analyze noise exposure in areas with sensitive land uses. Noise monitoring sites should be selected to record daily conditions. Typical types of noise sources include:

- **Traffic Noise.** Most roadways generate noise. Many of the built areas along travel corridors have very narrow setbacks, and residents or employees within these noise impact areas may be subject to significant noise levels. Shielding can reduce actual noise levels at specific sites, as evidenced by the walled areas along Rodeo and Zia Roads.
- **Airport Noise.** Around the Municipal Airport, some residential areas are subject to airport noises. These are located at either end of the runways, beyond the airport property.
- **State and Hospital Flightcare Helicopter Operations Noise.** The State Police have one helicopter and St. Vincent Hospital has a helicopter landing area. This facility is used on an occasional basis.
- **Stationary Noise Sources.** Stationary noise sources within the Urban Area include industrial and commercial facilities. Noise exposure within industrial facilities is controlled by employee health and safety regulations, but exterior noise levels are not regulated by the federal and state governments. Noise generated from fixed sources may vary based on open doors and windows, climatic conditions, time of day, and existing noise levels. Specific sources are elaborated below:
 - **Valdes Park Industrial Area.** Noise levels in the vicinity of light industrial and commercial facilities along Valdes Industrial Park are dominated by roadway traffic noise during the day- and night-time hours. Other noise sources include internal truck traffic, loading-dock activities, refrigeration trucks, and banging of metal-on-metal.

- **Siler Road Industrial Area.** Noise levels in the vicinity of light industrial and commercial facilities along Siler Road are dominated by roadway traffic noise during the day- and night-time hours. Other noise sources include internal truck traffic, loading dock activities, refrigeration trucks, banging of metal-on-metal, and HVAC systems.
- **Airport Industrial Area.** The airport and nearby airport salvage yards are considered to have the worst-case noise levels within the Santa Fe area. Noise sources include air planes, loading-dock activities, truck traffic, and banging of metal-on-metal.

Noise Compatibility Standards

From the known effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. For planning purposes, an A-weighted scale is recommended to describe environmental noise at any one particular time. However, community noise levels vary continuously. In order to account for the time-varying characteristics of noise, all of the individual noise readings must be averaged over a 24-hour period. Suggested noise compatibility standards for Santa Fe are shown in Figure 8-5. These have been designed to match each land use type with an appropriate range of noise levels. These standards should be used in conjunction with noise exposure contours shown on a noise map to determine where noise levels exceed the normally acceptable range so that acoustic reports and noise mitigation measures can be required for development projects.

Land Use Compatibility for Community Noise Environments

Figure 8-5

Building/ Land Use Type	Exterior Day/Night Noise Levels DNL or Ldn, dB					
	55	60	65	70	75	80
Residential-Single Family	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Multiple Family	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Transient Lodging-Motels, Hotels	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Schools, Libraries, Churches, Hospitals*, Nursing Homes	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Auditoriums, Concert Halls, Amphitheaters	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Sports Arena, Outdoor Spectator Sports	Normally Unacceptable	Normally Unacceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Playgrounds, Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Office Buildings, Business Commercial and Professional	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Industrial, Manufacturing, Utilities, Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable

INTERPRETATION

Normally Acceptable:
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements

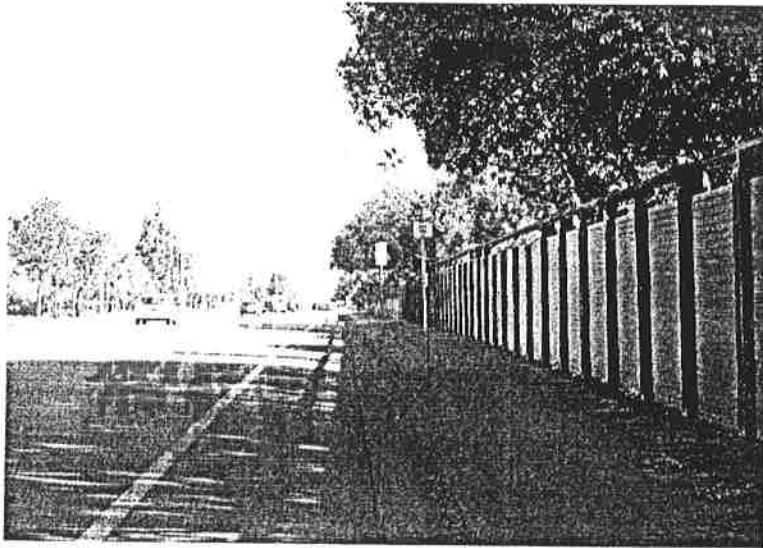
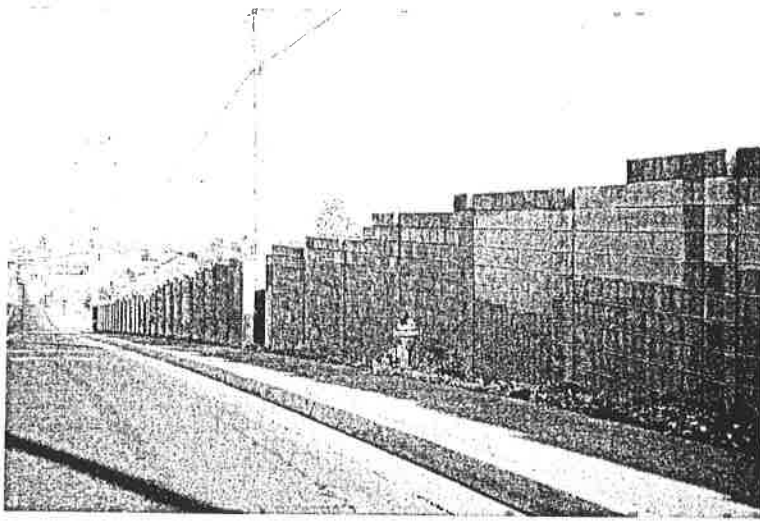
Conditionally Acceptable:
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

Normally Unacceptable:
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

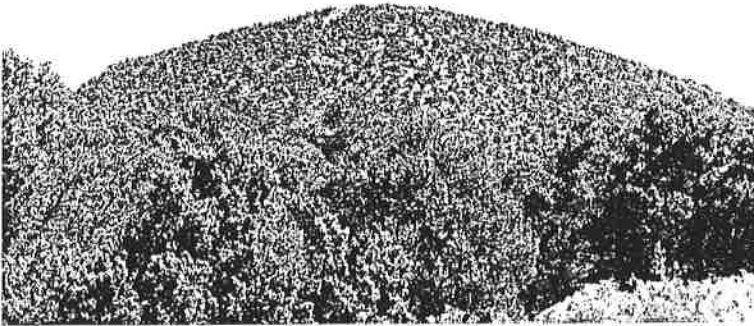
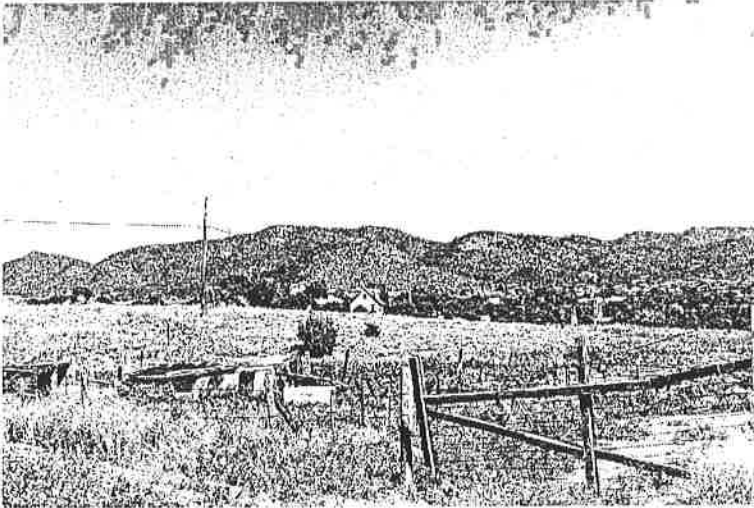
Clearly Unacceptable:
New construction or development clearly should not be undertaken.

*Because hospitals are often designed and constructed with high noise insulation properties, it is possible for them to be satisfactorily located in noisier areas.

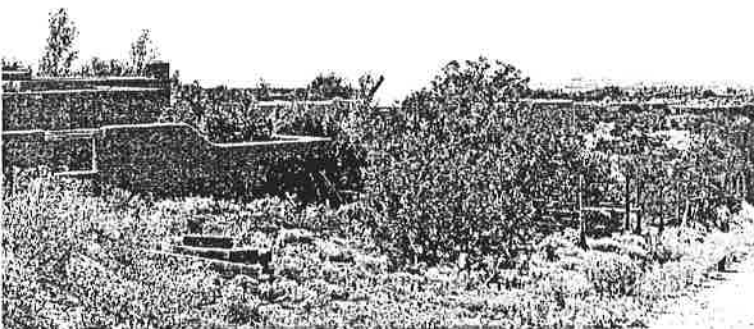
DNL or Ldn: Day-Night Noise Level
CNEL: Community Noise Equivalent Level (normally within 0.5 dB of the DNL value)



Sound walls are visually intrusive and close off neighborhoods from surroundings. The General Plan locates higher density areas away from major noise sources to minimize the need for sound walls.



Hills in Santa Fe play a prominent role in defining the city's setting and character.



IMPLEMENTING POLICIES

8-1 BIOLOGICAL RESOURCES AND HABITAT CONSERVATION

- 8-1-I-1 Prepare a comprehensive natural environment management plan for the Santa Fe area. Incorporate an analysis of and appropriate protection for: threatened and endangered animal and plant species and species of concern; identified habitat areas; riparian corridors and wetlands; floodplains; mountainous and steep terrain; aquifer recharge areas; natural drainageways; and conservation of topsoil and native vegetation.
- 8-1-I-2 Maintain an up-to-date inventory of sensitive biological natural resources as part of the city's Geographic Information System database.
- 8-1-I-3 Amend the Zoning Ordinance and Subdivision Regulations to include overlay or special review districts for RPAs and SRAs.
- 8-1-I-4 Limit development in or disturbance of any RPAs.
- 8-1-I-5 Establish special standards, procedures, and policies for SRAs to ensure that biological resources are considered and incorporated in development design. Include standards to ensure minimal impacts on biological habitats, not just individual species, particularly in areas abutting an RPA. Procedures may include requiring a field evaluation by a certified biologist as part of any development application, and requiring preparation of a biological resources management plan when field evaluation results in the identification of rare, threatened or endangered species.
- The land use regulations and development standards could include provisions for setbacks, buffering, clustering development, waiver of minimum-lot-width requirements, narrower local street widths where these would enhance protection of sensitive habitats and resources, and prohibition of grading prior to receipt of necessary approvals.*
- 8-1-I-6 Establish sensitive construction practices in the code to be implemented by the project proponent if rare, threatened, or endangered animal species are found to be directly impacted by the project. Such practices could include the following:
- Establishing noise standards,
 - Limiting the amount of earth that can be disturbed at one time,
 - Planning construction to minimize removal of necessary cover at critical times of the year, and
 - Coordinating with animal refuge organizations for live removal and relocation of animals with enough time prior to construction.
- 8-1-I-7 Establish resource-sensitive practices as part of the city's engineering standards. Evaluate all roadway projects that cut through riparian or other wildlife movement corridors, and ensure corridor continuity by building culverts or safe passageways.

All designated riparian corridors (RPAs) are wildlife corridors, and more corridors could be defined as part of the project field evaluation required for sites located in whole or in part in a SRA. New roadways such as the Santa Fe Relief Route, could cut through wildlife habitats, creating "islands" that may be too small to support certain species or block access to water.

- 8-1-I-8 Update the city's Geographic Information System database of riparian corridors based on information included in field evaluations required as part of any development application when a project is located in an RPA or an SRA.

The city's Geographic Information System database could serve as a starting point for analyzing a construction or development project's potential effect on the whole riparian system rather than limiting the analysis to its immediate effect at the construction site.

- 8-1-I-9 Minimize alteration of riparian corridors, designated as RPAs, to preserve their character.

- 8-1-I-10 Continue to regulate new gravel mining or soil disturbance within or adjacent to riparian zones.

The city and county need to enforce regulations governing gravel mining within arroyos, in coordination with the Army Corps of Engineers, and pursue remediation opportunities when new approvals are sought.

- 8-1-I-11 Require slow-release of stormwater from retention basins into riparian corridors.

During the growing season this slow-release can help support wetland vegetation, thereby increasing the wetland habitat within the Urban Area and Extraterritorial Zone while maintaining the existing riparian corridors. In addition, slow-release would prevent potentially contaminated sediments from entering the riparian corridor and create a biofilter at the site retention basin, reducing the concentrations of pollutants such as nitrogen and phosphorous.

- 8-1-I-12 Develop standards for new construction adjacent to riparian zones to reduce sedimentation and flooding.

- Require that low berms or other temporary structures such as protection fences be built between a construction site and riparian corridors to preclude sheet-flooding stormwater from entering the corridors during the construction period.
- As part of construction permits, require the installation of storm sewers or other structures before construction occurs to collect stormwater runoff during construction.

In many cases land development and construction projects do not take into consideration corridors for movement of wildlife or human recreational activities. The arroyo system in the Santa Fe area provides a ready-made network of existing wildlife corridors. Where appropriate, the city's trail

system may pass through these riparian corridors. Development standards could include minimizing paved areas, retaining large areas of undisturbed, naturally vegetated habitat to allow for water infiltration, and intermixing areas of pavement with the naturally vegetated infiltration sites to reduce the concentration and improve the filtration of stormwater runoff from pavement and structures.

- 8-1-I-13 Establish project review standards for any industrial site or fuel processing or distribution facility adjacent to a riparian zone.

The standards should be detailed in the City Code. Businesses using or distributing hazardous materials adjacent to a riparian zone may create a situation in which hazardous materials could discharge into headwaters of the United States.

- 8-1-I-14 Establish an SRA or designate a buffer zone on each side of all arroyos to ensure the continued use of riparian corridors by wildlife.

Sites within the buffer zone can remain in current use under their current ownership.

The buffer zone could also serve as the location for trails accommodating hikers, bicyclists, and equestrians, if acquired for public use. The buffer zone would also ensure the integrity of the adjacent upland habitats and prevent slumping or erosion of the banks of the riparian corridor.

- 8-1-I-15 Continue to regulate construction projects so that their ground disturbance activities is within city standards.

- 8-1-I-16 Establish and implement a comprehensive revegetation and reforestation program for the Santa Fe River Basin.

8-2 SOILS

- 8-2-I-1 Adopt practices for development and construction on sites where the erosion and slumping potential is moderate to severe.

- 8-2-I-2 Regulate large construction projects so that their ground disturbance activities are minimal:

- Require the installation of fencing around construction sites to reduce wind velocity and soil transport.
- Require straw mulching, swales, and reseeding open portions of construction sites upon completion of the project
- Restrict grading to only those areas going into immediate construction as opposed to grading the entire site. On large tracts of land, avoid having large areas bare and unprotected, require units of workable size to be graded at one time, and
- Establish and implement conservation and visual easements in designated areas.

8-3 HILLSIDES AND VISUAL RESOURCE CONSERVATION

8-3-I-3 Review and amend the city's Terrain Management and Escarpment Ordinance to include the following elements, at a minimum:

- Change slope standard from 20 to 15 percent.
- Specify the type and form of water and soil retention standards and structures on site. Retention of as much runoff as possible is critical to the stabilization of the environment.
- Review and amend the escarpment ordinance to include all ridgetops and foothills within the planning area.
- Coordinate the city's and the county's mountain and escarpment ordinances for development on hillsides and ridgetops to promote consistency.

The county is in the process of developing a ridgetop ordinance.

- Plan for and encourage conservation easements, where applicable, to preserve and enhance visual and natural resources.
- Specify the quantity and type of revegetation and soil conservation and restoration measures.
- Ensure more consistent application of regulations.
- Refine performance standards to further limit building heights and cut and fill.
- Review ridgetops established as part of the escarpment overlay district, and modify them to ensure that all visible ridges are protected.

8-4 NATURAL LANDSCAPES AND LANDMARKS

8-4-I-1 Develop an areawide landscape plan which would examine existing landscape conditions and propose a future plan for protecting, enhancing, and restoring landscape character in developing areas and improving and clarifying landscape design in existing areas. Coordinate efforts with the County Open Lands and Trails Planning Advisory Committee.

8-4-I-2 Adopt a tree ordinance to protect existing large trees and stands of trees and help in revegetation efforts.

8-4-I-3 Establish a tree bank for the reuse of valuable native trees and large shrubs dislocated by development, and require revegetation of all disturbed natural areas.

8-4-I-4 Preserve native vegetation to the extent possible.

8-4-I-5 Survey and describe existing historic natural and cultural landscapes and open space landmarks.

- 8-4-I-6 Reevaluate existing landscape ordinances and revise them to meet planning goals and established policies. Promote indigenous and drought tolerant landscaping in the majority of public and private sites.
- 8-4-I-7 Preserve native vegetation along roadsides and require the protection and reintroduction of native vegetation on all building sites except where domesticated courtyard and garden landscaping is called for.

8-5 ENVIRONMENTAL PROTECTION

Air Quality

- 8-5-I-1 Ensure that construction sites are dampened with water to reduce dust during periods of high wind.

Spraying of sites is part of an existing ordinance that may need to be enforced during periods of high wind.
- 8-5-I-2 Encourage the county to establish regulations for smoke, smoke-stack emissions, and particulate matter as part of the Land Development Code.

The City Code already includes such regulations. Air quality is a regional issue; what happens immediately outside the city limits affects the city almost as much as it affects the area where pollution is generated.

The County of Santa Fe's current air quality standards are minimal and the Land Development Code does not set standards for commercial, industrial, or other uses.
- 8-5-I-3 Consider emissions' control regulations for trucks and tour buses.

Noise

- 8-5-I-4 Conduct a noise survey to document existing noise, and prepare a noise contour map for noise-sensitive projects and land uses, the airport, highways and major roads, and General Plan build-out conditions.
- 8-5-I-5 Review and, if necessary, update the City Code, and establish noise levels where needed.
- 8-5-I-6 Ensure that new residential development is protected from exterior noise that exceeds normally acceptable standards. Use noise mitigation measures to reduce exterior sound levels in those areas to acceptable levels.

Verify projected noise levels with monitors at locations adjacent to residential and other noise-sensitive areas where traffic volumes are predicted to increase by more than 50 percent from baseline noise data.
- 8-5-I-7 Where noise mitigation measures are necessary based on project review, require project applicants to secure the services of a qualified acoustical engineer to perform a detailed technical study and to design mitigation measures.

Residential neighborhoods should be protected from the effect of noise from commercial and industrial land uses.

- 8-5-I-8 Assist in enforcing compliance with noise emission standards for all types of vehicles, through coordination with the Santa Fe City Police Department, Santa Fe County Sheriff's Department, and the New Mexico State Police.
- 8-5-I-9 As part of the City Code, require noise control measures such as insulation, berms, building design and orientation, buffer yards, staggered operation hours, and other techniques. Require that barriers are landscaped to reduce negative visual impact.
- 8-5-I-10 Encourage noise attenuation programs that avoid solid, visible walls where practical.
Open space, parking, accessory buildings, frontage roads, and landscaping can be used to buffer development from noise.
- 8-5-I-11 Work with the state to reduce noise levels associated with Interstate 25 and the future Santa Fe Relief Route.
- 8-5-I-12 Encourage Santa Fe County to adopt noise standards similar to the ones outlined in this document.
- 8-5-I-13 Where site conditions permit, require a noise buffer along the Santa Fe railroad alignment for all new and existing adjoining developments that are subject to unacceptable noise levels.
New development shall address the noise issue and existing development shall work with the city on the noise issue.
- 8-5-I-14 Conduct site-specific railroad and airport noise studies for noise sensitive projects to be sited in their proximity.
- 8-5-I-15 Verify existing noise levels with monitors at locations adjacent to residential and other noise-sensitive areas where traffic volumes are predicted to increase by more than 50 percent from current conditions, and project future noise levels and their potential impacts on noise-sensitive land uses.
- 8-5-I-16 Design and implement a noise abatement/prevention program. Collect and disseminate authoritative information on the effect of noise and noise control throughout Santa Fe.

Seismicity and Geologic Hazards

- 8-5-I-1 Prepare emergency management plan and earthquake response protocol.
- 8-5-I-2 Adhere to seismic engineering standards as contained in applicable codes.
- 8-5-I-3 Based on national seismic zone maps, work with the state to calculate areas of potential loss and property damage, with earthquakes in excess of 5.0 on the Richter scale and include mapping of the locations and sizes of the over 600 documented earthquakes in the Rio Grande Valley.

