ENVIRONMENT / ENVIRONMENTAL EFFECTS

This section combines an overview of the study area's physical and natural environment with the state-mandated Environmental Effects element. The Environmental Effects element complies with requirements of the Growing Smarter Act, and helps ensure that planning for future development in Maricopa County is consistent with federal, state, and local requirements for air quality, water quality, and other elements affecting the environment. This section addresses anticipated effects that development may have on air quality, water quality, noise abatement, visual quality, and sensitive plant and wildlife species. The report is organized into the following sections:

Physical Environment

- Physical Setting
- Topography
- Climate
- Soils
- Geology
- Vegetation
- Wildlife

Environment Effects

- Sensitive Species and Habitat
- Visual Character
- Air Quality
- Noise
- Archaeology
- Water Quality
- Hazardous Material

Physical Environment

Physical Setting

The Rio Verde Foothills Planning Area is located in the northeast region of Maricopa County (**Figure 7-Physical Setting**). The planning area lies between the foothills of the McDowell Mountains to the south and the Tonto National Forest to the north. Its eastern boundary is a few miles from the Verde River and its western boundary borders pristine Sonoran desert lands planned for permanent preservation. The updated planning area encompasses approximately 20 square miles.

The Desert Foothills planning area (adopted in 1979) was a 323 square mile area bounded on the west by Cave Creek Wash, on the south by the Central Arizona Project and Salt River Indian Reservation, on the east by the Fort McDowell Indian Reservation and the Tonto National Forest, and on the north by the Tonto National Forest (**Figure 2-Original Plan Boundary**). Since 1979, Cave Creek, Carefree, Fountain Hills, Scottsdale, and Phoenix have incorporated most of this land. The updated plan focuses on the unincorporated Maricopa County lands remaining north of McDowell Mountain Park.

Topography

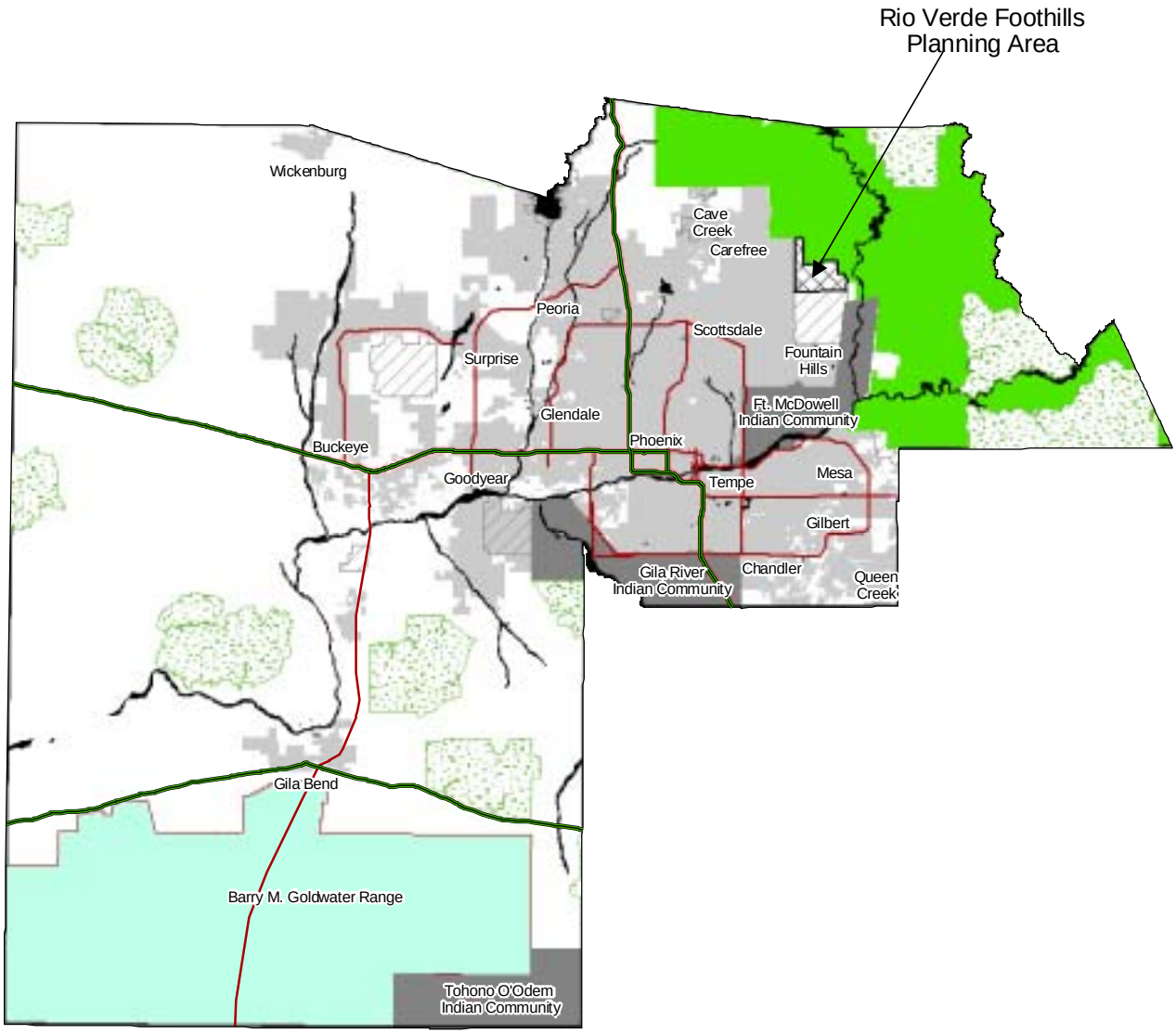
Rural, natural desert, and equestrian scenes characterize the typical landscapes in the Rio Verde Foothills planning area. Most of area is comprised of low-density residential development or horse-related facilities, and most of the natural scenes are composed of desert foothills where Palo Verde-Saguaro habitat is found. The planning area is gently sloped and drains east towards the Verde River. Striking mountain ranges such as the McDowell Mountains to the southwest and Mazatzal range to the north and east surround the planning area. The entire Rio Verde Foothills area is laced with small to medium-sized washes.

Figure 8-Elevation depicts general elevations within the planning area, which range from less than 1,700 feet above sea level near the Verde River to 2,700 feet above sea level near the northwestern portion of the planning area. The planning area can be characterized as a broad, gently sloping valley with Asher Hills, in the southeast corner, as the only significant topographical feature. The planning area slopes approximately three percent over nearly six miles as measured from east to west.

Climate

Generally, climate in the planning area is similar to the Phoenix metropolitan area with mild fall, winter, and spring seasons and hot, dry summer weather. Any differences that do occur are due to higher elevation and its location on the urban fringe. Over the past 30 years, precipitation has averaged 13.28 inches per year compared with only 8.29 inches for Phoenix. Precipitation can be three times greater in wet years than in dry years. Most of the precipitation occurs in the winter months and in July, August, and September. From mid to late summer, moist air from the Gulf of Mexico influences weather patterns. From November through March, the region is impacted by storm systems from the Pacific Ocean and the northwest United States. Storms in both seasons can create flooding and drainage problems depending on their intensity and duration.

The average high temperature for the planning area is 81 degrees, compared to 84.3 degrees for Phoenix. **Table 13-Average Monthly Climate**, summarizes



Physical Setting

Figure 7

- Incorporated Area
- County parks
- Barry M. Goldwater Range
- Indian Community
- Tonto National Forest
- Wilderness
- Rivers/Major Washes

10 5 0 10 20

Miles

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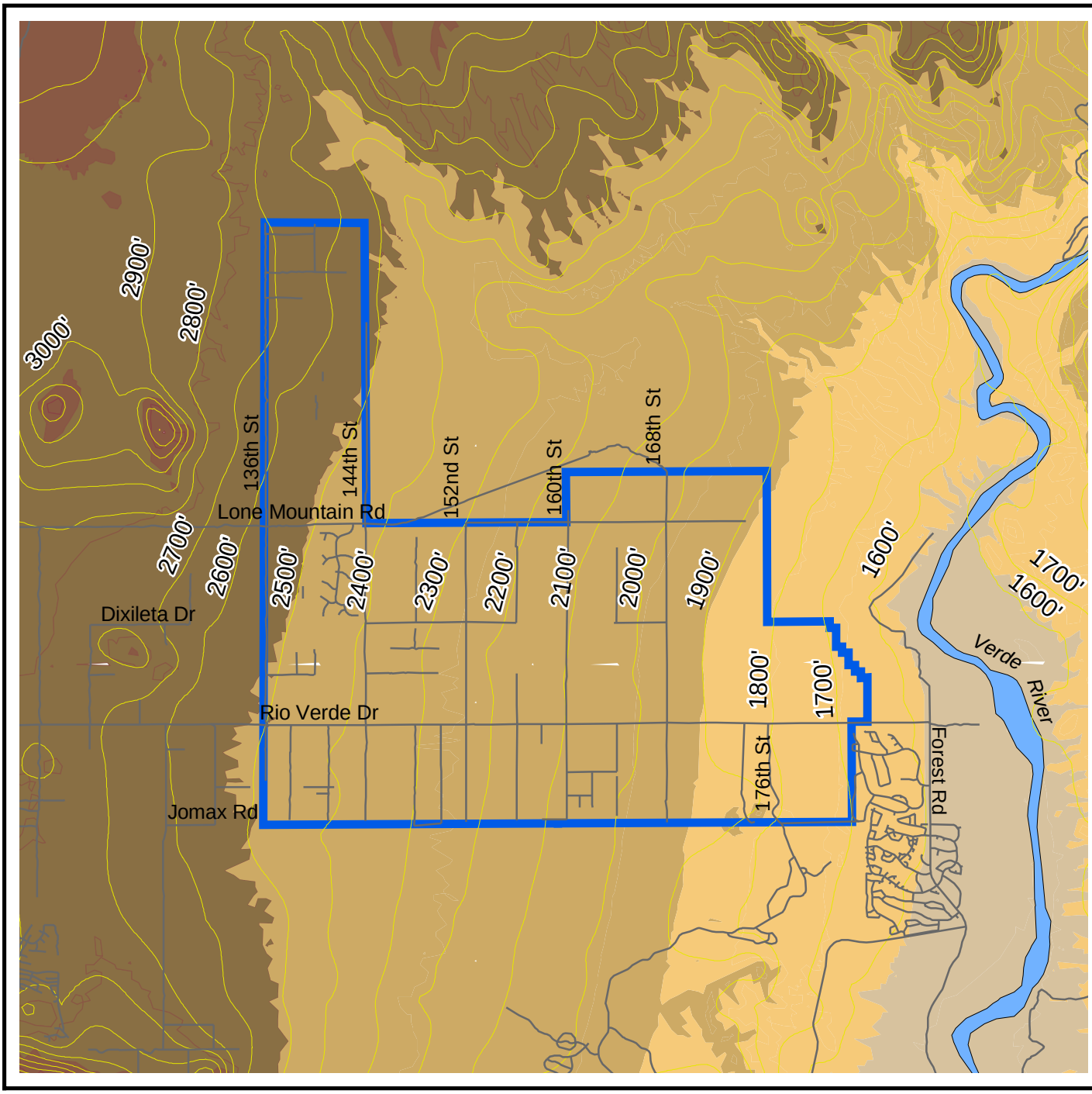

Elevation

Figure 8

Arterial Streets

Planning Area Boundary

Contour Lines

1 0.5 0 1 2 Miles

MARICOPA COUNTY 2020 Eye to the Future

Maricopa County Planning and Development Department

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monthly temperature and precipitation levels in the planning area.

TABLE 13: Average Monthly Climate

Month	Average Maximum Temperature (F)	Average Minimum Temperature (F)	Average Total Precipitation (inches)
January	62	41	1.7
February	66	44	1.56
March	70	47	2.01
April	79	52	0.51
May	88	60	0.16
June	98	70	0.14
July	101	76	1.16
August	99	75	1.5
September	94	70	0.9
October	83	60	1.29
November	70	48	1
December	62	41	1.35
Annual	**81**	**57**	**13.28**

Information based on 30 year average, Zip Code 85262. Source: www.weather.com

Soils

Soil types and their location have a direct effect on potential land uses. Development type, quality, and character can be significantly influenced by soil properties. Important soil properties include permeability, compaction, shear strength, shrink-swell potential, plasticity, salinity, susceptibility to erosion, corrosiveness, and the amount and type of cementation.

Soil types are categorized by *associations*. Soil associations describe a group of soils that occur in a repeating pattern, and usually consist of one or more dominant soil along with at least one minor soil. The association is typically named for the major soil it represents. There are ten major soil associations in the Rio Verde Foothills study area, and their characteristics are described later in this section. Because soil characteristics vary, testing should be done prior to development to determine if soils pose problems for septic tanks, water and sewer lines, and/or building and road foundations. In the planning area, alluvial soils prohibit seepage pit type septic systems because of potential contamination of the water table. Therefore, shallow trench systems are required in the planning area. Seepage pits are only allowed if specially engineered and must pre-treat the effluent before disposing to the pit. **Figure 9–Soils** illustrates the ten major soil associations in the planning area. These soils and their characteristics are as follows:

A) *Anthony-Arizo complex*: Deep and well-drained soils on floodplains and in drainageways. Runoff is slow, and the hazard of water erosion is moderate to severe. This unit is used as rangeland and wildlife habitat. To control erosion, extra care must be taken to maintain a good plant cover.

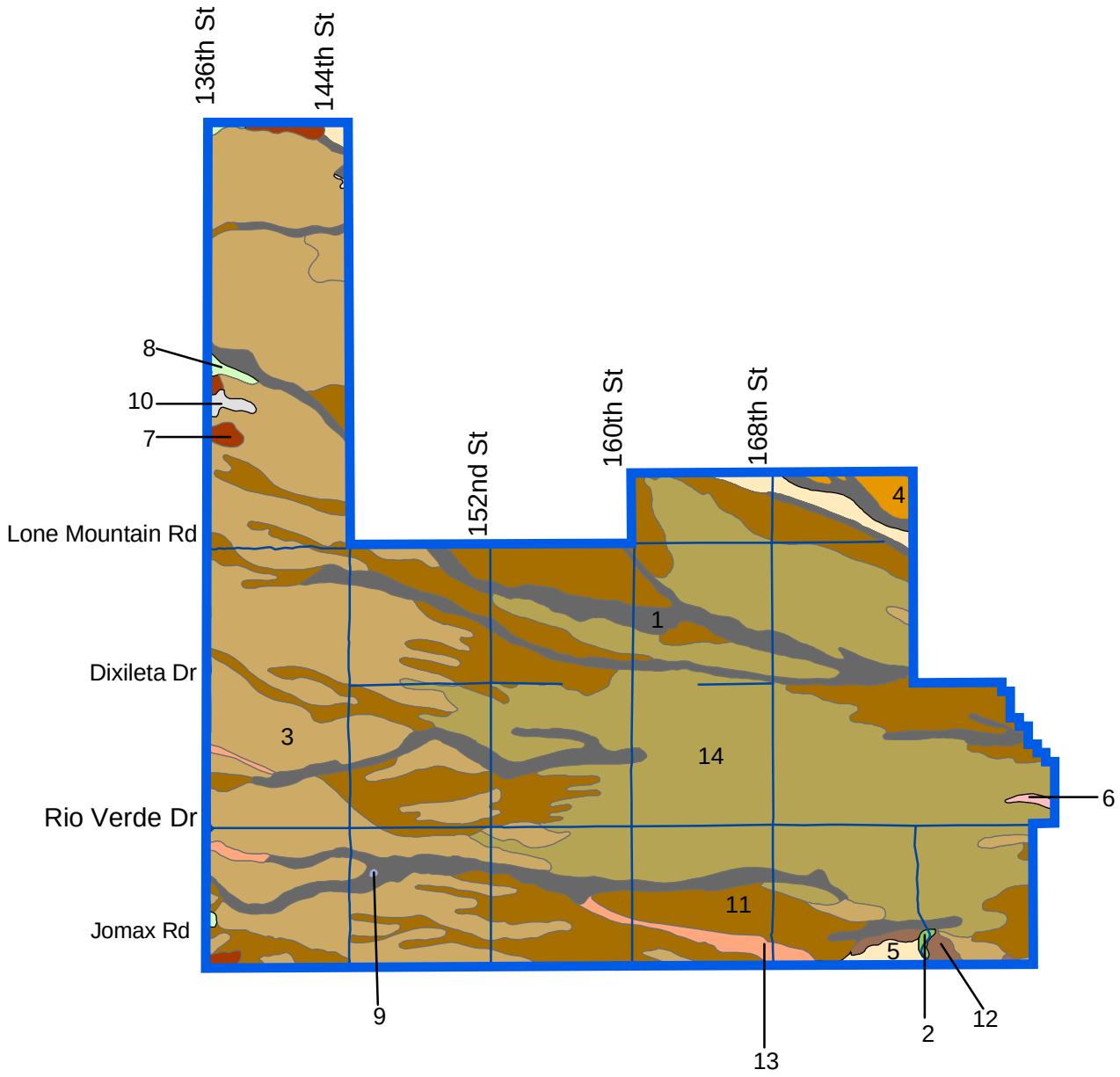
B) *Carefree cobbly clay loam*: Deep and well-drained soils on fan terraces of 0 to 8 percent slopes. Permeability of this soil is slow; runoff is slow to medium; and the hazard of water erosion is slight. Most areas of this unit are used as rangeland or wildlife habitat. A few areas are used for urban development. The shrink-swell potential and slow permeability may require specially designed septic systems, buildings, and roads.

C) *Eba series*: Deep, well drained soils on fan terraces and stream terraces. Permeability is slow to moderate. Slopes range from 0 to 40 percent. About 50 to 60 percent of the surface is covered with cobbles and pebbles. There are five sub-categories of Eba series soils in the planning area.

D) *Gila fine sandy loams*: Deep and well drained soils on alluvial fans and flood plains. Slope is 0 to 3 percent. Permeability is moderate, runoff is slow, and the hazard of water erosion is slight. If this association is used as sites for buildings or roads, the main limitation is the hazard of flooding, particularly during high intensity thunderstorms of short duration. Foundations built on this association should be placed on elevated fill material, and yards should be graded away from the foundations so that surface water will flow away from the buildings.

E) *Gran-Wickenburg complex*: Shallow, well drained soils on pediments, hill slopes, and mountain slopes. Hard rock may be encountered in some areas. Runoff is slow to medium and erosion hazard is slight. If the soils in this association are used for septic tank absorption fields, the main limitation is the shallow depth to bedrock, which restricts the movement of effluent. In areas of rock outcrop, runoff is medium to rapid, and hazard of water erosion is moderate. There are two sub-categories of Gran-Wickenburg soils in the planning area.

F) *Nickel-Cave complex*: This association is about 50 percent Nickel gravelly sandy loam and 35 percent Cave gravelly loam, occurring on fan terraces. The Nickel soil is deep and well drained. The Cave soil is very shallow to shallow and is well drained. For both Nickel and Cave soils, runoff is medium and erosion hazard is slight. Nickel soil is better suited to use as sites for buildings, roads, and absorption fields than is the Cave soil. Cemented hardpan may be present in the Cave soil.



Soil Associations

Figure 9

Soil Association

1	Anthony-Arizo complex	8	Gran-Wickenburg-Rock outcrop complex
2	Carefree cobbly clay loam	9	Lakes, ponds, reservoirs - perennial
3	Eba very gravelly loam Series	10	Nickel-Cave complex
4	Eba-Continental-Cave association	11	Pinaleno-Tres Hermanos complex
5	Eba-Pinaleno complex Series	12	Torriorthents
6	Gila fine sandy loams	13	Tres Hermanos-Anthony complex
7	Gran-Wickenburg complex	14	Vado gravelly sandy loam

0.5 0 0.5 1 Miles

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G) *Pinaleno-Tres Hermanos complex*: This association is about 45 percent Pinaleno very gravelly clay loam and 40 percent Tres Hermanos gravelly loam. Both soil components are deep and well drained; runoff is slow and the hazard of water erosion is slight. If the Pinaleno soil is used as sites for buildings or roads, it has few limitations. If the Tres Hermanos soil is used as sites for buildings or roads, the main limitation is the shrink-swell potential.

H) *Torriorthents*: Deep and well-drained soils on the side slopes of fan terraces and stream terraces. Slopes are formed by head cutting, undercutting by streams, and sloughing of sides. Torriorthents are stratified loamy sand to clay. Runoff is medium to rapid, and the hazard of water erosion is high.

I) *Tres Hermanos-Anthony complex*: This association is about 50 percent Tres Hermanos gravelly loam and 35 percent Anthony sandy loam. It is found on fan terraces, stream terraces, and associated flood plains. Both soil components are deep and well drained; runoff is slow and hazard of water erosion is slight. The Anthony soil is one of the most productive rangelands in the soil survey area. It receives extra moisture from runoff, which increases production. Extra care in management is needed to protect the soil from gullying and channeling. The riparian habitat in some areas of this association is extremely important to wildlife.

J) *Vado gravelly sandy loam*: Deep and well drained soil on fan terraces. One to five percent slopes. Runoff is slow and the hazard of water erosion is slight. Few limitations are present if the soil is used as sites for buildings, roads, or septic tank absorption fields.

The four primary soil properties that effect development suitability are permeability, available water capacity, shrink-swell potential, and corrosivity. **Table 14** categorizes the degree of constraint associated with the type of development activity for each soil association.

Table 14: Soil Association Development Constraints

Activity	A	B	C	D	E	F	G	H	I	J
Septic tank absorption fields	Moderate to severe: Flooding	Severe: percs slowly	Severe: percs slowly	Moderate: flooding	Severe: depth to rock	Severe	Moderate: percs slowly	No information provided	Severe: percs slowly	Slight
Dwellings without basements	Severe: Flooding	Severe: shrink-swell	Moderate: shrink-swell	Severe: flooding	Moderate: shrink-swell, depth to rock	Severe: slope	Slight	No information provided	Moderate: shrink-swell	Slight
Dwellings with basements	Anthony-slight; Arizo-severe	Severe: cemented pan	Moderate: too clayey	Slight	Severe: depth to rock	Severe: cut banks cave, slope	Slight	No information provided	Slight	Slight
Local roads and streets	Moderate to severe	Severe: low strength, shrink-swell	Moderate: shrink-swell	Moderate: flooding	Moderate: depth to rock, shrink-swell	Severe: slope	Slight	No information provided	Moderate: low strength, shrink-swell	Slight
Small commercial buildings	Severe: Flooding	Severe: shrink-swell	Moderate: shrink-swell, slope	Severe: flooding	Moderate: shrink-swell, slope, depth to rock	Severe: slope	Moderate: slope	No information provided	Moderate: shrink-swell	Slight
Lawns and landscaping	Anthony-slight; Arizo-severe	Severe: large stones	Severe: small stones	Slight	Severe: small stones	Severe: slope	Severe: small stones	No information provided	Moderate: small stones	Severe

Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Aguila-Carefree Area (1986)

Notes:

A) Anthony-Arizo
B) Carefree cobbly clay loam
C) Eba series
D) Gila fine sandy loams
E) Gran-Wickenburg
F) Nickel-Cave
G) Pinaleno-Tres Hermanos
H) Torriorthents
I) Tres-Hermanos-Anthony
J) Vado gravelly sandy loam

Permeability

Refers to the rate at which water moves through soil and is usually determined by soil texture. Soils with slow permeability pose severe limitations for septic tank absorption fields. Soils with slow permeability do not allow adequate absorption of effluent from tile or perforated pipe into natural soil.

Available Water Capacity

Refers to the amount of water a soil can hold which is available for plants. The ability of soil to hold water helps determine the type of plants that can be used for landscaping and lawns. It should be noted that these soil limitations do not prevent the use of imported topsoil for landscaping purposes provided that it has a high available water capacity.

Shrink-Swell Potential

Identifies the capacity of a soil to expand or shrink as the moisture content is increased or decreased. Soils with a high percentage of clay tend to have a high shrink-swell capacity, which can contribute to structural problems for buildings and roads.

Corrosivity

Refers to a soil's capacity to induce chemical reactions that will corrode or weaken metals and concrete. Corrosive soils may create problems for underground utilities if installed unprotected.

Geology

The Rio Verde Foothills planning area lies within the Sonoran desert region of the Basin and Range geographic province. The region is characterized by wide, essentially flat alluvium filled valleys surrounded by rugged, low relief mountain ranges. Central Arizona has a fascinating geologic history, which explains the dramatic escarpments, giant boulders outcrops, and vast mountain ranges seen in the landscape.

Robert Mason provides a brief account of the major geologic evolution that has occurred in the region.1 In summary, three billion years ago the land that is now Rio Verde and vicinity was at the bottom of a vast sea. Massive granite deposits seen today in the landscape are the result of great volcanic activity about one and one half billion years ago, during the formative Pre-Cambrian era. An uplifting process began about 600 million years ago and by approximately 100 million years ago this area became dry land. The former seabed, rich in silt and crustacean shells, nourished a variety of birds and land creatures, including the mammoth, dinosaur, giant sloth and saber-toothed tiger.

The last major volcanic activity occurred approximately 25 million years ago. During this volcanic period, the land in this region was actually higher than northern Arizona, and the waterway that is now known as the Verde River flowed north. It is estimated that the Verde River reversed its direction approximately five to 10 million years ago, following further uplifting to the north. The ancient Verde River was many miles wide and through its shifting deposited enormous amounts of sedimentary conglomerate rock. One example of this is Lousley Hill, a prominent landmark about a mile and a half south of Asher Hill. The McDowell Mountains were worn down into a gentle sloping pattern, primarily as a result of erosion by the once massive river. The Mazatzal Mountains display numerous valleys and canyons caused by water cutting away softer rock formations.

The McDowell Mountain range is a northwest-southeast ridge of gneiss, schist, and granite, all of which are classified as older Precambrian rocks, estimated to be two to three billion years old. The McDowells are partly composed of Miocene stream deposits. The Mazatzal Mountains, also oriented northwest-southeast, are composed of very hard, erosion-resistant Precambrian metamorphic and igneous rocks, with Quaternary lava flows between the foothills and Bartlett Reservoir. Coarse gravel with large rounded cobbles of Mazatzal Quartzite, basalt, and other hard rock types are found in the terraces of the Verde and Salt Rivers, which converge near the McDowell Mountains.[8]

Vegetation

The Rio Verde Foothills planning area is located in the Arizona Upland subdivision of the Sonoran desert and includes two general types of native plant communities: Palo Verde-Saguaro and Mixed Riparian Scrub. The Palo Verde-Saguaro community, also known as “Upper Sonoran” vegetation, is found throughout the planning area. Naturalists describe this plant community as including some of the most picturesque portions of the Sonoran desert: “Truly spectacular, it is one of the best watered and least desert-like desertscrub in North America.”[9] This community is composed of small trees including Palo Verde (*Cercidium* spp.), Catclaw (*Acacia* spp.), and Mesquite (*Prosopis* spp.); shrubs such as Creosote (*Larrea tridentata*), Bursage (*Ambrosia deltoidea*), and Saltbush (*Atriplex* spp.); and cacti including the Giant Saguaro (*Carnegiea gigantea*), Barrel (*Ferocactus acanthodes*), Hedgehog (*Echinocereus engelmannii*), Prickly Pear (*Opuntia* spp.), and Cholla (*Opuntia* spp.). The Palo Verde-Saguaro community is rich in species diversity and supports a number of wildlife species. In addition, this vegetative community provides scenic quality that enhances the overall area and should be protected wherever possible.

[8] Chronic, Halka. Roadside Geology of Arizona. Mountain Press Publishing Co., Missoula, 1983

[9] Turner, Raymond and D.E. Brown. Biotic Communities - Southwestern United States and Northwestern Mexico. University of Utah Press, Salt Lake City, 1994

The Mixed Riparian Scrub habitat is found along some washes in the planning area. The typical vegetation is composed of one or more of the following: Desert Willow (*Chilopsis linearis*), Mesquite, Catclaw, Blue Palo Verde (*Cercidium floridum*), and Ironwood (*Olneya tesota*). Not as lush or rare as true riparian habitat along rivers, riparian scrub habitat is nonetheless important for the control of erosion, natural flood control, and as habitat for wildlife. Due to the unique functions and values of the riparian scrub habitats, they should be preserved when feasible.

Most of the planning area is undisturbed Sonoran desert, although, residential uses and roads are increasingly becoming woven into the overall landscape. While the eastern region is sparsely developed, the western region is more of a patchwork of natural desert, homes on one to five acres, livestock enclosures, and a few pastures. Some residential landscapes have retained natural desert by building on small construction envelopes, with a narrow band of cleared land around the home. Other residential lots and most horse facilities have been partially or completely cleared of desert vegetation 100 feet or more away from structure(s). Analysis indicates an increasing number of roads created to reach home sites. Five years ago there was a sparse network of dirt roads throughout the area, mostly following section lines. Today, these have branched off into more numerous private roads and long driveways into residences set back from the main road.

In areas where large amounts of vegetation have been removed, the natural beauty of the region and the flood mitigating capacity is at risk of being lost. Further, once vegetation has been disturbed it is often invaded by desert broom, mustard weeds, and annual grasses. Future residential development should seek to preserve native vegetation, revegetate areas such as abandoned roads, and consider building envelopes that would limit lot disturbance, but would not necessarily apply to livestock corrals or pastures. Some rural Arizona communities have initiated a program, modeled after the Town of Oro Valley's *Save-A-Plant Program*, where planners and citizens rescue cactuses and other plants and replant them in the community.

Brush fires can occur in desert areas from mid-April through September. Rural-Metro Corporation recommends creating a 30-foot area of "defensible space" – an area free of dried grass or other highly flammable dry vegetation – around structures. Living plants need not be removed; only those that are dry or dead. They also recommend that dead branches be removed from trees, and that brush and grass around trees be cut very short.

The following is a partial list of some of the generally accepted common names of Arizona protected native plants which, by law can only be moved from one location to another after applying for a state permit.[10] Removing or destroying protected species from public and private property requires notification to the Arizona Department of Agriculture.[11]

Cacti:

Barrel
Cholla
Hedgehog
Mammillaria
Night Blooming Cereus
Pin Cushion
Prickly Pear
Saguaro

Other Plants:

Agave (Century Plant)
Crucifixion Thorn
Desert Holly
Desert Spoon (Sotol)
Ironwood Tree
Jerusalem Thorn
Mesquite
Ocotillo
Palo Verde
Yucca

Foreground to background: Buckhorn cholla, Palo Verde, and Saguaro cactus

[10] (A.R.S. Title 3, Chapter 7, Article 1)
[11] (http://agriculture.state.az.us/PSD/nativeplants.htm)

Wildlife

The Sonoran desert is thought to contain the most complex animal-plant community of any desert. The Palo Verde-Saguaro association, occurring in most of the planning area, is generally found on foothills and in valleys at an elevation of 1,200 to 4,400 feet. This habitat is important to a variety of birds that use the saguaro for nesting. Wildlife typical of this community include Gambel's quail, mourning dove, mule deer, javelina, coyote, several species of bats, and black-tailed jackrabbit. More solitary species like the mountain lion and bobcat may also be found. Species of special interest in this habitat include desert tortoise, Gila monster, and Harris' hawk. In addition, an array of small mammals, amphibians, and reptiles live in the area.

Desert dwellers also include several poisonous creatures that deserve respect and awareness, especially in the warmer months. These include the seldom seen Gila Monster, several species of rattlesnake, scorpions, centipedes, black widows, and the Hualapai Tiger beetle (also known as the assassin beetle or kissing bug).

A large variety of birds are found in the planning area due to the diverse desert habitat. More than 85 species have been counted in the nearby Cave Creek Foothills area. Roadrunners feed on grasshoppers, scorpions, lizards, and rattlesnakes, and in turn are food sources for hawks and coyotes. Spring brings back several species of hummingbirds that feed on cacti, ocotillo, and wildflower blossoms. Dozens of Gambel's quail chicks can be seen trailing the parents each spring and early summer. In addition, cactus wrens, cardinal, phainopepla, woodpeckers, Great Horned Owl, Red-tailed Hawk, vultures, and Great Blue Herons make their home in and around the planning area. Besides the pleasure of watching these beautiful creatures, they help control rodent, snake, and insect populations, cleaning up carrion (vultures), pollinating flowers, and dispersing seeds to help rejuvenate desert plant life.

Wildlife specialists recommend reserving a portion of one's property in a natural state, especially along washes and game trails, to provide habitat for desert inhabitants. This will be increasingly important as more people move to the planning area. Wildlife should not be fed as this encourages wild animals (e.g. coyotes, javelina) to become potential pests.

Mixed Riparian Scrub habitat is found in drainage ways in the region. These areas provide feeding, nesting, and shade areas for wildlife. Wildlife species in these areas are generally the same as the species in surrounding habitat but are more numerous. Conservation and preservation of local drainage ways could help provide some habitat preservation.

The McDowell Mountains, Matatzal Mountains, and Verde River encourage migration of larger animals from the unpopulated areas. Within the desert habitats, higher concentrations of wildlife live along the local drainage ways and within the riparian habitats. These drainage corridors also function as movement corridors for wildlife, including larger animals such as javelina and mule deer. The Arizona Game and Fish Department (AGFD) recommends protecting corridors that connect important habitat areas to facilitate wildlife movement between desert mountain ranges and other habitat areas.

Roads and highways can be a serious threat to wildlife as a result of roadkill, habitat loss, and habitat fragmentation. When roads disturb landscapes, they divide wildlife populations into smaller, more isolated units. Habitat fragmentation threatens all wildlife species that have to cross roads or highways to meet their biological needs. Strategies to counteract these threats range from site-specific projects like wildlife-friendly underpasses to regional models that combine landscape ecology with long-range transportation planning. A small-scale example of helping wildlife along roads was implemented on a portion of Arizona State Route 86 on the Tohono O'odam Reservation. Installation of a sturdy, welded-wire fence along two miles of the highway reduced desert tortoise roadkill by 75%. Wildlife managers recommend the use of "wildlife friendly" fencing in rural or formerly undeveloped areas. For example, a barbed wire fence consisting of three horizontal wires would leave the bottom wire smooth and about 18 inches off the ground. Open fencing such as pipe fencing allows for flooding and enables wildlife to continue to use large washes as movement corridors.

Of the six ranger districts in the Tonto National Forest, the Cave Creek Ranger District is the largest. Bordering the planning area on the north and east, it covers about 1,000 square miles. The Verde River runs 63 miles through the district with 23 miles protected as a wild and scenic river. Several threatened and endangered species are protected along the river, including bald eagles, bighorn sheep, river otters, and several native fish species. Approximately 10 miles northeast of the planning area is the Mazatzal Wilderness, on the Tonto National Forest, where larger wildlife such as mountain lion, bear, and antelope can be found.

Environmental Effects

Sensitive Species and Habitat

The Arizona Game and Fish Department's (AGFD) Heritage Data Management System lists the following sensitive species that may occur in the planning area (**Table 15**):

Table 15: Sensitive Species

Scientific Name	Common Name	Federal Status*	State Status*
Agave murpheyi	Hohokam Agave	SC; S (USFS & BLM)	HS
Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	C; S (USFS)	WSC
Gopherus agassizii	Sonoran Desert Tortoise	SC	WSC
Haliaeetus leucocephalus	Bald Eagle	LT; S (USFS)	WSC
Rallus longirostris yumanensis	Yuma Clapper Rail	LE	WSC
Rana yavapaiensis	Lowland Leopard Frog	SC; S (USFS)	WSC

*Status Explanations:

Federal:
- **LE** = listed as endangered under the Federal Endangered Species Act
- **LT** = listed as threatened (imminent jeopardy of becoming Endangered) under the Federal Endangered Species Act
- **SC** = Species of Concern (USFWS)
- **C** = Candidate Endangered or Threatened (USFWS)
- **S** = Sensitive (USFS) (BLM)

State:
- **WSC** = Wildlife species of concern in Arizona (AGFD)
- **HS** = Highly Safeguarded; no collection allowed (Arizona Native Plant Law)

Five fish are listed by the AGFD as sensitive species that may occur in or near the planning area: Longfin Dace, Desert Sucker, Sonora Sucker, Roundtail Chub, and Speckled Dace. However, since these would only occur in the Verde River they are excluded from the above list. In addition, the USFS has listed the following species as “sensitive”, which may occur along and near the Verde River: Arizona Bell’s Vireo, Arizona Southwestern Toad, Arizona Night Lizard, Maricopa Leaf-nosed Snake, Obsolete Viceroy Butterfly, and Maricopa Tiger Beetle. Development in the planning area could have potential effects on the health of the watershed, the river, and on sensitive species.

The Hohokam Agave is a succulent, rosette-shaped plant with narrow spoon-shaped leaves approximately 20-30" long. Deep green leaves are edged with small teeth and end in a short spine. After several years, plants bloom once before dying. The flowering stalk is about 10 feet tall and contains many cream-colored blooms. Miniature plants called bulbils form after the flowers and can produce new plants. This plant was a major food source for the Hohokam Indians.

The Western Yellow-Billed Cuckoo is a neo-tropical migrant which winters in South America. This streamside bird is about 12" long and slender with short legs. The decline of riparian habitat is contributing to this species decline. River restoration has been identified as an important management need.

Sonoran desert tortoise occurs primarily on rocky slopes and is known to use dry watercourses to move between habitats. These tortoises can reach 14 inches in length and have a brown to gray rounded carapace. Desert tortoises cannot be collected, killed, transported, bought, sold, imported or exported from Arizona without authorization from the AGFD. The AGFD has developed guidelines for handling Sonoran desert tortoises encountered on development projects. The AGFD should be contacted during the planning stages of any project that may affect desert tortoises.

The Bald Eagle is a large raptor with brown plumage and a golden wash on the back of the neck and head. They are over 3 feet in length with a wingspan of over 7 feet. They are mostly found in western states and nest on rock ledges, cliffs, or in large trees. This species can be found in the Tonto National Forest, north and east of the study area and often nest along the Verde River at the Box Bar site, just east of the planning area. Bald Eagles are carnivores that feed primarily on small mammals. This species is susceptible to power line electrocution, occasional shootings, and habitat loss due to development. They are extremely sensitive to human disturbance during the nesting period. Residents have reported that Bald Eagles have recently been observed in the planning area. Tonto National Forest personnel note that Bald Eagles nest adjacent to the planning area at Box Bar Ranch, Needle Rock, and Bartlett Lake.

The Yuma Clapper Rail, a marsh bird (8 to 9" tall) with a short tail, long legs, and short rounded wings, is federally endangered and a state species of concern. The Rail can be found along the Colorado, lower Gila, and Salt rivers below the Verde/ Salt River confluence. Primary reasons for concern are that the Yuma Clapper Rail is very susceptible to modifications of wetland habitat, such as channelization, bank stabilization, and water impoundments. In addition, its prey base, including crayfish, is vulnerable to pesticide and heavy metal poisoning.

The Lowland Leopard Frog is found in lower and upper Sonoran desert, but is able to survive in a wide variety of natural and human-made aquatic systems, including rivers, springs, abandoned swimming pools, and ornamental backyard ponds. They are considered a species of concern due to the negative impact of the introduction of bullfrogs, crayfish, and predatory fish. Their population has also been stricken with the chytrid fungus, a fatal skin disease.

Other species of concern to wildlife management agencies include the Cactus Ferruginous Pygmy-Owl, Southwest Willow Flycatcher, and Lesser Long-nosed Bat. The Cactus Ferruginous Pygmy-Owl was listed as endangered in Arizona in 1997; critical habitat was designated in 1999 in Arizona. Pygmy owls were historically found as far north in Arizona as New River. Suitable habitat includes Sonoran scrub with trees and/or cacti large enough to support nesting cavities, such as

those found in the planning area. Southwest Willow Flycatcher, listed as endangered in 1995, makes its home in dense streamside habitats. Potential flycatcher habitat is found along the Verde River. The Lesser Long-nosed Bat, listed as endangered in 1988, has been observed as far north as the McDowell Mountains (Maricopa County). Adult bats arrive in Arizona in spring each year and leave by early October. The bats feed on nectar and pollen from plants including saguaros and agaves.

Visual Character

Visual resources in the planning area range from lush Sonoran desert accented by majestic Saguaro cactuses, sandy-bottomed washes lined with desert trees and shubs, to more sparsely vegetated areas (remnants of 1990s brush fires), and scattered low-density rural residential areas. The overall visual character is composed of gently rolling desert with no significant hills; however, dramatic mountain vistas can be viewed in nearly every direction. The following visual characteristics are described as viewed primarily from Lone Mountain Road, Dixileta Drive, and Rio Verde Drive.

Primary visual elements in foreground areas (along the roadside) from Lone Mountain Road and 140th Street include newly paved sections of road giving way to unpaved road, pipe-rail fencing outside of the roadway shoulder, cleared/grubbed areas where new underground utilities have been installed to serve a new subdivision, and overhead 500kV electric transmission lines and towers along the south side of the road. Free-range cattle were seen in this vicinity in spring of 2004. Middleground areas, approximately one mile from the roadway, include Sonoran desert vegetation, and Granite (3526') and Fraesfield (3055') Mountains approximately one mile to the west. In the distant background are views of Blue Mountain (3169') and Brushy Mountain (3533') to the north, McDowell Mountain (over 4000') foothills to the south, Mazatzal Mountains (over 7000') to the east, and views of undisturbed Sonoran desert to the west.

Range cow in west end of planning area

Looking NE from 136th Street and Rio Verde Dr.

The primary foreground element at the northeast corner of Rio Verde Drive and 160th Street, is an approximately 16-acre equestrian riding and boarding facility enclosed by pipe-rail fencing. The facility includes several boarding stables, corrals, hay canopies, round pen, two arenas, modular home, four 26-foot tall arena lights, and other related structures. The site is entirely cleared of washes and vegetation with the exception of several rows of newly planted evergreen trees. Another equestrian facility, approximately 9 acres, adjoins the north border of the larger facility. The opposite (southwest) corner of Rio Verde Drive and 160th Street contains several smaller equestrian-related facilities of approximately 35 combined acres. The northwest and southeast corners of this intersection consist of a mix of undisturbed desert, residential homes on 1+ acres, and equestrian facilities. Middleground is dense desert vegetation with many trees and occasional Saguaro cactuses. The distant background features the same mountain views as described above.

At Rio Verde Drive at 176th Street, the primary foreground element is a cattle guard and fence controlling access south on unpaved 176th Street and small sign "Private Property-Keep Out." No structures are nearby and relatively dense desert vegetation covers the area. At this site is the intersection of smaller telephone lines on wood poles, running east/west with taller SRP electric lines on metal poles, running south from Rio Verde Drive. A wide unpaved shoulder runs along the south side of paved, 2-lane Rio Verde Drive. The telephone line runs parallel to and south of Rio Verde Drive. Middleground is dense vegetation with a view of Asher Hills less than a mile away to the south. Distant views of mountains can be seen to the north, east, and southeast from this location.

From Dixileta Drive near 176th Street, foreground elements include sparse desert shrubs, blackened Saguaro cactuses, and very few trees. Grasses and shrubs are beginning to return to this area, which was burned by the 1995 brush fire. East of 176th Street is a barbed-wire fence, marking the edge of the Tonto National Forest. The gate can be opened for local hikers and equestrians wishing to access the National Forest. The middleground is sparsely-vegetated desert. The gentle downhill slope to the Verde River is more evident now, but the Verde River still cannot be seen from this point. Distant views are of the same mountain views described above, but now Asher Hills and Lousley Hill are seen approximately two miles to the south.

Air Quality

The Environmental Protection Agency (EPA) is the federal agency in charge of setting air quality standards to protect public health and welfare. National Ambient Air Quality Standards (NAAQS) have been set for six criteria pollutants: carbon monoxide, nitrogen dioxide, particulate matter, ozone, sulfur dioxide, and lead.

States are required to adopt ambient air quality standards, which are at least as stringent as the federal NAAQS for the six criteria pollutants. The Arizona Department of Environmental Quality (ADEQ) is the state agency responsible for compliance and enforcement for all portable sources of air pollution within the state and all stationary sources outside Maricopa, Pinal, and Pima counties. The Maricopa Association of Governments is responsible for maintaining plans and addressing problems with carbon monoxide (CO), ozone (O_3), and particulate matter (PM_{10}) within Maricopa County. The Maricopa County Environmental Services Department issues air quality permits to regulated businesses, monitors ambient air for pollutants, writes the Maricopa County Air Pollution Control Rules & Regulations, and determines facility compliance. The Department sets the long-range direction for clean air within Maricopa County.

The EPA normally designates nonattainment areas only after air quality standards are exceeded for several consecutive years. Maricopa County has been designated as a nonattainment area for CO, O_3, and PM_{10}. The Rio Verde Foothills planning area lies within the nonattainment boundary.

Carbon monoxide is an odorless, colorless, toxic gas formed when carbon-containing compounds or fuels are burned incompletely. Potential primary sources of CO in the planning area are on-road mobile sources (e.g. automobiles and trucks), non-road mobile sources (e.g. lawn and garden equipment, construction, farm, and recreational equipment), and area sources (e.g. fuel combustion, open burning, fire places, and woodstoves). The EPA classified all of Maricopa County as a serious CO nonattainment area in June 1996. CO pollution can reach unhealthy levels in Maricopa County during the winter months.

At ground level, ozone (O_3) is a primary component of photochemical smog. It presents a serious health threat to people suffering from respiratory disease. The primary emission sources include volatile organic carbons and nitrogen oxides from nonroad, area, motor vehicle and biogenic sources (certain types of vegetation including citrus and eucalyptus). O_3 can reach unhealthy levels in Maricopa County during the summer months.

PM_{10} refers to fine particulate matter suspended in the atmosphere. These particles have a diameter equal to or less than 10 micrometers. When inhaled, the fine particles can be deposited in the lungs, resulting in difficult breathing, bronchitis, aggravation of existing respiratory diseases, and permanent lung damage. Earthmoving and windblown emissions from unpaved roads and parking lots, agricultural areas, construction sites, and disturbed open areas are the predominate causes of exceedences of air quality standards. Maricopa County's PM_{10} traffic volume standard was recently changed to require dirt road paving of County-

maintained roads if 150 vehicles or more per day use the roadway. In 1996, the EPA classified Maricopa County as a serious PM_{10} nonattainment area. The closest PM_{10} air monitoring site to the planning area is at the intersection of Forest and Del Ray Avenues in Rio Verde. To meet EPA and MAG standards, the City of Scottsdale paved one mile of 136th Street north of Rio Verde Drive in 2000, and an additional two miles of 136th Street in 2001 for a total of three paved miles due to increases in traffic counts north of Rio Verde Drive.

In the Rio Verde Foothills planning area, the main sources of dust include unpaved roads; trucks, ATVs and other traffic; corrals and arenas; and construction sites. Maricopa County has implemented several air pollution control programs including a Clean-Burning Fireplace Ordinance, Clean Burning Gasoline, Fugitive Dust, and Vehicle Emissions Inspection programs.

Noise

Prolonged exposure to loud noise can cause general community annoyance and reductions in property values. Residents in the Rio Verde Foothills community indicate the area is mostly quiet. The primary sources of noise would be vehicular traffic, ATV use, and occasional noise from special use permit facilities such as loud speakers at horse arenas. While there are several airports in Maricopa County, no major flight paths cross over the planning area.

Archaeology

Arizona, and especially Maricopa County, has one of the highest concentrations of archaeological sites in the United States and possibly the world. There have been over 800 Hohokam sites recorded just within the Salt River Valley. The State Historic Preservation Office (SHPO) has detailed information on file for site locations and surveys that have been conducted in the planning area. For resource protection, only members of federal, state, or local government agencies can examine the files.

If a federal or state agency is involved in a project that will affect an undisturbed area, that agency is required to consult with the SHPO to determine if any historic or archeological properties exist in the project area and/or if a survey is necessary. Given the high potential for sensitive sites, prior to development, excavation, or grading an archaeological/historical review should be performed to determine an area's full archaeological potential, and preservation precautions should be taken where necessary. On private property, Arizona state law requires the landowner to notify the Arizona State Museum of the discovery of human remains at least 50 years old or of the intent to disturb a known burial site.

Although no systematic reconnaissance field survey of the county has been conducted, preliminary studies indicate high potential for significant archaeological resources north and east of the planning area, including the Verde River basin. The SHPO, in cooperation with federal, state and other agencies is developing a statewide electronic database to provide comprehensive survey information of all historic sites in Arizona. In general, there is evidence to show that the lower Verde River valley supported a large variety of encampments, including Hohokam villages, ballcourts, and several irrigation canals built near the river. As their population grew, the Hohokam spread out from the Salt and Gila River into the Verde and Agua Fria River valleys.

In 1991, the Bureau of Reclamation contracted an excavation project around the Horseshoe and Bartlett Reservoir areas north of the planning area. During this excavation one Hohokam Indian village was discovered, Scorpion Point Village. Hohokam Indians are believed to have inhabited the area from around 300 A.D. until the early 1400's when they vanished. The Scorpion Point Village contained two ball courts, cemeteries, plazas, and between 200 to 400 pit houses.[12]

Another significant site was found in Troon Village, west of the planning area, near Pinnacle Peak. Discovered in this site were seven pit houses, 30 trash mound, jars, bowls, grinding stones, a complete shell pendant and whole-shell ornament carved as a snake head, 679 human bone fragments, and a copper bell that is assumed was traded for in Mexico. This property has since been donated to the Archaeological Conservancy.

One large archaeological site was found along the bank of the Verde River near Rio Verde Ranch. This land is said to have once supported several thousand Native Americans around 800 A.D. This inference is drawn from the large number of artifacts found in the area, including trash mounds, fire pits, irrigation canals, pottery, arrowheads, and five ball courts.

Water Quality

The entire Rio Verde Foothills planning area lies within the Fountain Hills sub-basin, which is located in the northeastern part of Maricopa County and covers an area of approximately 360 square miles. Limited groundwater quality data indicate that most of the groundwater in the Fountain Hills sub-basin is suitable for most uses, including domestic use.

[12] More information on this site and others found in the lower Verde Valley is found in the book published from this project, *Vanishing River: Landscapes and Lives of the Lower Verde Valley: The Lower Verde Archaeological Project*.

In the Fountain Hills sub-basin, total dissolved solids (TDS) concentrations have been estimated to range from 294 milligrams per liter (mg/l) to about 834 mg/l in 1983.[13] Most groundwater in the Phoenix area contains TDS concentrations between 500-1,000 mg/l. TDS is an indicator of salinity or hardness of the water. The Environmental Protection Agency (EPA) has established a secondary maximum contaminant level (SMCL) of 500 mg/l for TDS, primarily for aesthetic reasons. From the perspective of human health, dissolved solids are less of a concern than pesticides or nitrates, for example. Dissolved solids are considered secondary contaminants that affect taste, smell, and appearance of drinking water.

Fluoride concentrations in the sub-basin ranged from 0.4 to 9.2 mg/l.13 The EPA's primary MCL for fluoride is 4.0 mg/l and the recommended SMCL (secondary MCL), an aesthetic standard, is 2.0 in order to prevent mottling of teeth. The Water Utility of Northern Scottsdale (WUNS) is the water provider for two new subdivisions in the planning area: Granite Mountain Ranch and Rio Mountain Estates. WUNS has no affiliation with the City of Scottsdale. Lab reports for the water utility's well no. 2 indicate a fluoride concentration of 1.4 mg/l. Water quality testing for the WUNS well no. 2 indicated very little arsenic, less than 2 parts per billion (ppb). In January 2001, the EPA lowered the arsenic standard from 50 ppb to 10 ppb, with an effective date of January 23, 2006. A nitrate concentration of 1.6 mg/l was found for well no. 2. Drinking water supplies are required to have less than 10 mg/l of nitrate. Lab reports for another WUNS well indicated a relatively low TDS concentration of 270 mg/l.

Surface water pollutants can originate from both single point sources such as a pipe or ditch, and non-point sources such as runoff from agricultural fields, construction sites and urban development. In Maricopa County, agriculture, industry, construction, wastewater treatment plants, motorized recreation, landfills, and resource extraction are the primary contributors to surface water pollution. Sources of elevated levels of nutrients may include fertilizers, livestock-feeding operations, sewer and septic systems. Best management practices and regulation of point-source pollution are methods to reduce the quantity of nutrients entering streams. Regulatory agencies and environmental legislation have resulted in greater attention to the mitigation of existing pollution problems and the prevention and mitigation of future problems.

In the planning area, there are a number of horses and other livestock in corrals, as well as free-roaming livestock. All of these animals contribute to the potential for effluent contamination of surface waters. Large horse operations, in particular, have a responsibility to clean up manure on a daily basis and store it in enclosed

[13] Arizona Water Resources Assessment, Volume II Hydrologic Summary. Arizona Department of Water Resources, August 1994

containers for proper weekly disposal, as indicated in the Maricopa County Environmental Health Code.

The U.S. Army Corps of Engineers regulates activities in the nation's waterways. In 1972, Section 404 of the Clean Water Act was passed. It prohibits discharging dredged or fill material into U.S. waters without a permit from the Corps. The Corps' first priority in its enforcement program is to protect the aquatic environment and other public interest resources. The Section 404 program's geographic jurisdiction extends to all waters of the U. S., including all tidal waters, all interstate waters, virtually all wetlands, lakes, rivers, perennial and intermittent streams, and dry washes in the arid west.

The quality of Central Arizona Project (CAP) water, although naturally high in dissolved solids, is acceptable for most uses with appropriate treatment. Imported from the Colorado River, CAP water has become a major source of water in the Valley. CAP water is not currently used in the planning area but is used as a primary water source in the City of Scottsdale.

Additional information on water quality in Maricopa County is available in the Water Resource element of *Eye to the Future 2020*, the Maricopa County Comprehensive Plan. A discussion of water quality issues in the Rio Verde Foothills planning area is also presented in the Water Resources section of this area plan

Hazardous Material

ADEQ's Emergency Response Unit responds to hazardous material and pollutant releases that pose an immediate threat to public safety. The Unit directly provides for containment and proper disposal of materials when responsible parties are not capable of doing so. They also operate the statewide hazardous substance spill reporting network. There have been no reported spills of hazardous materials in the study area since 1998.

Wildfire Prevention

Community wildfire protection planning is one of the priority issues that emerged with the enactment of the Healthy Forests Restoration Act in 2003. The legislation includes incentives for the USFS and Bureau of Land Management to consider priorities of local communities as they develop forest management and hazardous fuel reduction projects. The Rio Verde Foothills community may benefit from developing a Community Wildfire Protection Plan (CWPP) with assistance from the Healthy Forests Restoration Act. A website containing information on preparing a CWPP is available at: www.wildfire.org. Tonto National Forest policy is to

aggressively suppress any wildfires in the wildland/urban interface area. The USFS is not likely to conduct any major fuel reduction projects in the planning area because of its location within the Sonoran desert vegetative community. Currently, the USFS works together with Rural/Metro or other local fire departments when fire threatens communities adjacent to the national forest.