

Introduction

Chapter 3 describes the resources that may be affected by implementing any of the alternatives, including the *Preferred Alternative*. Descriptions are only as detailed as needed for the reader to understand the effects of implementation. Where impacts are slight or nonexistent (climate, topography, natural history) descriptions are brief or omitted. More detailed descriptions of the resources in the planning area are available at the Safford District Office. Additional details on some of the resources may be found in the Appendix section of this document.

Setting

The Safford District is located in southeastern Arizona. See the Safford District Resource Management Plan/ Environmental Impact Statement area map in this document for the location of the District and its boundaries. The planning area for this Resource Management Plan includes all public lands administered by BLM within the District boundary.

The Resource Management Plan area lies within the Basin and Range Physiographic Province south of the Colorado Plateau. The area's northwesterly trending mountain ranges reach elevations of nearly 11,000 feet and are separated by broad, flat or gently sloping basins. The Gila Mountains and the mountainous area near Clifton represent the transition zone between the Colorado Plateau and the Basin and Range Provinces. Among the numerous topographic units are the San Simon, Gila, Sulfur Springs and San Pedro valleys and the Pelloncillo, Dos Cabezas, Gila, Santa Teresa, Chiricahua, Mescal, Galiuro, Dagoon and Mule mountains.

The entire District is drained by the Gila River and its tributaries with the exception of three areas. These three areas are on the south side of the Dos Cabezas Mountains, the Sulfur Springs Valley and the San Bernardino Valley in the extreme southeastern part of the District.

A limited amount of water quality data has been collected at a number of locations. Water from springs and wells is generally considered suitable for human contact and consumption except where livestock have access to the source. Water in the perennial streams is generally not suitable for human consumption because of high bacterial counts but is usable for human contact (recreation). Most of the reservoirs are used as livestock waters and are not suitable for either human contact or consumption. The Bureau of Water

Quality Control, Arizona Department of Environmental Quality, has repeatedly tested the Gila and San Francisco rivers for violations of state water quality standards from mining-related activities. Water quality standards have occasionally been exceeded.

Climatic conditions in the planning area are similar to those throughout the desert Southwest. Alternating lowlands and mountains create abrupt climatic changes over short distances. Higher elevations have cooler temperatures and more precipitation than valleys. Summer days are hot (often above 100 degrees) but usually not unbearable. Average minimum winter temperatures in the higher elevations fall below freezing, and snow is common. Winters in the valleys are relatively mild. Annual precipitation averages 7 to 16 inches in the valleys and 15 plus inches in the mountains, with most of the rainfall in the late summer. Dry conditions are most common from April to July and less severe in the fall. Long, severe droughts occur irregularly and usually last two to five years.



The northern oriole is a common bird in many plant communities in the Safford District.

Affected Resources

Air Quality

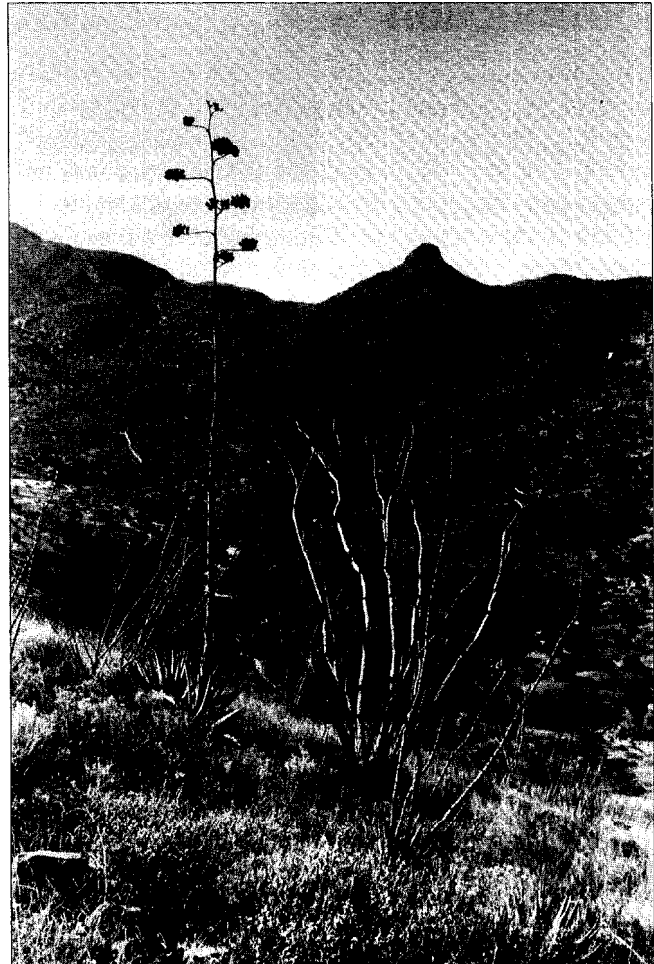
Air quality over the planning area is generally good and the ambient air quality is rated Class II by the State of Arizona. Class II standards allow for moderate deterioration of air quality associated with moderate, controlled industrial and population growth. Sulfur dioxide nonattainment areas are found in the vicinity of Morenci, Globe, Mammoth, Hayden-Winkleman and near the border area of southern Cochise County. The District monitors air quality at a monitoring station located in the Gila Valley. Precipitation samples are collected weekly and have consistently been measured at pH 4.7 over a six-year period. This indicates a fairly strong acid rain condition. The District does not manage any Class I air quality areas. Four Class I areas, however, lie within or are adjacent to the Resource Management Plan area. The designated areas are the Forest Service's Galiuro and Chiricahua wildernesses and the National Park Service's Saguaro National Monument Wilderness East and Chiricahua National Monument Wilderness.

Soil Resource

About 95 percent of the public lands in the Resource Management Plan area are included in modern, published soil surveys conducted by the Soil Conservation Service. The Soil Survey of San Simon Area, Arizona, 1980 and the Soil Survey of Gila-Duncan Area, Arizona, 1981, cover the areas of blocked federal lands in the District. Soil Conservation Service surveys not yet completed that include some federal lands are: Graham County, Arizona, southwestern part; eastern Pinal and southern Gila Counties, Arizona; Cochise County, Arizona, northwestern part; and Cochise County, Arizona, Douglas-Tombstone part. Lands acquired as part of the San Pedro Riparian National Conservation Area were surveyed by Soil Conservation Service in 1987 under contract with BLM. Information on this survey, although not published, is available from either the local Soil Conservation Service or BLM offices.

A total of 35 soil series were mapped in the San Simon Area survey and 42 in the Gila-Duncan survey. These soils ranged from shallow soils on hills and mountains to deep alluvial soils on the valley plains.

Salinity The San Simon Area soil survey identified three soil series, Bluepoint, Gothard and Pridham, on 24,167 acres that are affected by either excess salts or sodium. These soils all occur in the San Simon Valley.



Ocotillo and agave are two of the many plant species on hillsides surrounding Helen's Dome near Bowie Mountain.

The Gila-Duncan Area soil survey, which covers the Gila Resource Area and the northern portion of the San Simon Resource Area, identified no soils with excess salt or sodium problems, although areas too small to delineate on a map do occur.

Soils information received on the San Pedro Riparian National Conservation Area described no soils with salt or sodium problems. Springs in the St. David Cienega area, however, do produce saline waters that affect or will ultimately affect nearby soils.

Watershed condition in the areas of saline/alkaline soils is generally poor. The soils are generally bare of vegetation cover or plant cover is so sparse that little protection is provided to the soil surface from water or wind erosion. Portions of the Gothard soil unit support a cover of alkali sacaton grass that provides some erosion protection. Gothard soils with this type of plant cover are estimated at 1,000 acres.

According to the soil surveys (covering 95 percent of the public land in the Resource Management Plan



area), salinity problems are focused on the San Simon Valley. The only realistic solution to soil salinity problems seems to be to reduce soil erosion and improve watershed conditions to prevent soil salts from migrating downstream.

Erosion The two published soil surveys identified 49,680 acres of severely eroded soils. These soils are the Glendale, Gila, Guest and Hantz soil series.

The vast majority of the acreage, about 40,000 acres, is in the San Simon Valley from just upstream of the town of Solomon to the town of San Simon at Interstate 10. This area has been recognized since the 1930s as an example of severe erosion. Other areas of major erosion are on Railroad Wash southwest of the town of Duncan and Bear Springs Flat west of the town of Pima. The San Pedro Riparian National Conservation Area contains a few hundred acres of eroded soils on the north end, south of St. David.

The published soil surveys identified 221,030 acres of soils in the San Simon and Bear Springs Flat Watersheds with high susceptibility to wind and water erosion. About 150,000 acres occur on public lands and the remaining acreage is on state and private land. About 100,000 acres of the easily erodible soils are in a poor watershed condition. Vegetation cover is absent or so sparse it doesn't adequately protect the soil surface from wind or water erosion. The remaining 50,000 acres of these soils are in good or excellent watershed condition. Numerous small swales and larger drainages support a healthy cover of tobosa grass providing adequate protection for these soils. If native cover is removed or the soil is disturbed on these acres, severe wind and water erosion may occur. All of these soils occur in a bottom or floodplain position that floods frequently.

The Railroad Wash area, outside of Duncan, is currently improving in watershed condition. Structural treatments and livestock grazing management are improving conditions and further structural treatments are not necessary at this time.

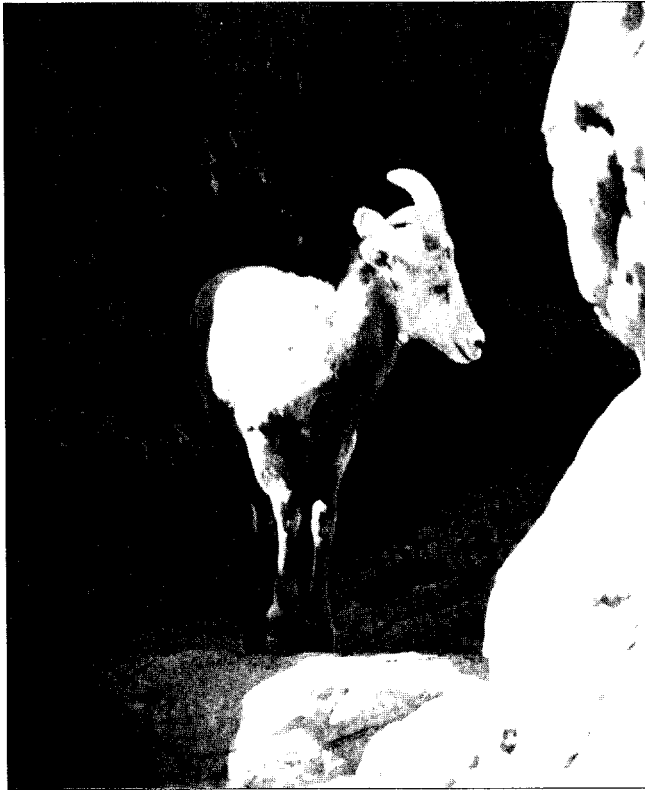
The San Simon drainage has been the scene of erosion control efforts, beginning in 1936 with designation of the San Simon Watershed as a critical watershed. Water-spreading dikes, range seedings and detention dams, both on the main channel and on side channels, have contributed to continuing decreases in soil erosion. Three main-channel and 16 side-channel detention dams, designed to catch soil and fill eroded channels, have been built on the San Simon Watershed. Historically, the Fan Structure has retained an average of 5,500 acre feet of sediment per year. Comparison of aerial photographs taken in 1935, 1953, 1972 and 1978 show that gully formation has decreased on the San Simon watershed as a whole. Over 20,000 acres of rangeland seedings on upland areas have not been successful due to the low rainfall of the areas. Seedings on reclaimed bottomlands have been very successful in terms of erosion control, livestock forage and wildlife habitat development.

With the implementation of livestock management decisions resulting from the *Upper Gila-San Simon Grazing Environmental Statement* (BLM 1978) and the implementation of the *Eastern Arizona Grazing Statement* (BLM 1986), vegetation cover is improving on the watersheds of the Safford District. With an increase in vegetation cover, soil erosion decreases.

The *Upper Gila-San Simon Grazing Environmental Statement* proposed the building of two soil-saving detention dams on the San Simon Watershed. One of these, the Barrier Detention Dam, was built in 1980. The proposed Timber Draw Detention Dam needed to continue rehabilitation of the river channel will be constructed as funds become available.

The Barrier Detention Dam has already had significant effects on the San Simon channel. The old eroded channel has been regraded to the natural contour for about one and a half miles and is continuing to build up the channel farther upstream. Vegetation, both natural and reseeded, is increasing the biomass due to the water spreading effects of the dam. Cattle are currently excluded from about 300 acres above the dam to allow for vegetation improvement.

The Bear Springs Flat area in the Gila Resource Area contains highly erosive soils and numerous headcuts. Rangeland seeding, construction of contour dikes and large detention dams have been built to control soil erosion. Each of these approaches has been only minimally successful. The rangeland seeding was a failure and much of the area only supports annual forbs and grasses to hold the soil. The Oso Largo Detention Dam failed in the floods of October 1983 and funds have not been available for its repair.



A young bighorn traverses the rocky ledges of Aravaipa Canyon.

The San Pedro Riparian National Conservation Area has two areas of accelerated erosion. One is in the northwest part of the National Conservation Area near St. David and the other is in the southern part of the National Conservation Area near Palominas. Watershed activity plans will be written and work implemented to mitigate the impacts of erosion. Removal of livestock from the National Conservation Area for a 15-year period will also help vegetation recover and gullies heal.

Throughout the remainder of the Resource Management Plan area, watersheds are in generally fair to good condition. Surface rock and vegetation cover protect the soil from erosion. Other actions, such as prescribed burning and livestock and riparian area management, are designed to maintain or improve watershed conditions by increasing vegetation cover. These actions are used where rough topography or high costs make structural treatments impractical.

Water Resources

Surface Waters The principal surface waters in the District are the Gila, San Francisco and San Pedro rivers. The Gila and its tributaries drain most of the District except for small parts that drain into the Willcox Playa (a closed basin) near Willcox, Whitewater Draw

north of Douglas and the San Bernardino Valley northeast of Douglas.

Tributaries of importance to other resource programs are Redfield, Hot Springs and Bass canyons and Bonita and Aravaipa creeks. These tributaries are significant because they are free-flowing, unregulated, high quality streams that sustain high quality riparian and aquatic habitat. They also possess significant recreational values. The three rivers and Aravaipa Creek provide water for agriculture (including livestock grazing), local communities, recreation facilities and mining operations. The other streams have their origin on public lands or the San Carlos Apache Indian Reservation where grazing and dispersed recreation are the major activities affecting water. Except during floods, surface waters in these major tributaries maintain their high quality.

The riparian areas represent rare and unique habitat in the Desert Southwest. Human development, overgrazing and extended droughts have significantly reduced the size and number of riparian areas that existed 100 years ago. Riparian areas provide valuable wildlife habitat (including for fish), recreation opportunities, flood control, water quality, nutrient recycling, oxygen production and scenic values. Riparian areas also promote on-site groundwater recharge, improved watershed and channel conditions and reduced erosion. Riparian areas further serve as migration corridors for wildlife by providing habitat continuity between territories.

There are numerous drainages and springs in the District that provide water for wildlife, livestock and riparian vegetation. Some of these are intermittent streams or have perennial flow for only a short part of their entire length. There are also several thousand stock ponds that provide water for wildlife and livestock throughout the District.

Groundwater Discussion of groundwater will be restricted to the artesian wells in the San Simon Resource Area because of their diminishing flows and importance to resource management. Ten artesian wells are located in the northern half of the San Simon watershed north of the towns of Bowie and San Simon. Several wells have ceased flowing and most of the remaining wells have diminished flow. Five of the wells were drilled during the mid-to late 1920's. Of these five, one has ceased to flow. The flow data for all the remaining wells, except for Salt Well, indicates a reduction in flow.

Water Quality Arizona Department of Health Services in 1984 and the University of Arizona in 1985 investigated and documented the quality of water statewide.

That documentation indicated that surface quality is generally good. However, the lack of adequate data is cited as a major hinderance to assessment of water quality in Arizona. Some state and federal surface water quality standards are occasionally violated, due primarily to intense or long-duration storms, resulting in non-point pollution sources.

The District has established an on-going water quality testing program within the study area. Data collection supports other management programs including state, by providing information to base decisions on current or future management actions, such as Unique Waters nominations, monitoring mining pollution, livestock management and reintroduction of extirpated fish. The testing program involves laboratory analysis of samples from selected sites, Water quality data is collected from various streams, springs and wells and are analyzed for variances from established water quality standards. See Appendix 9 for water quality testing sites.

Unique Waters Unique Waters is a special designation program of the State of Arizona designed to protect high-quality waters associated with exceptional recreational, ecological and wildlife values. The designation requires the submission of a nominating petition with rationales for the nomination and proof of the ability to monitor, maintain and manage the stream segment. The designation is approved by the Arizona Department of Environmental Quality.

The District, in coordination with the City of Safford, submitted a nomination for a segment of Bonita Creek for designation as Unique Waters. The rationale centered on the protection of the City of Safford's water supply and the maintenance and enhancement of the associated unique and unusual attributes, such as riparian habitat, native fish populations, recreational use and wildlife. Over the life of the Resource Management Plan, data will be collected and analyzed from the remaining streams to determine their suitability as Unique Waters. The streams that meet the criteria will be formally nominated.

In-stream Flow Water Rights In-stream flow water rights refers to those rights that can be obtained by submitting an application to appropriate a specified quantity of surface water through the Arizona Department of Water Resources. The application requires specific rationales for granting an in-stream flow water right, such as the maintenance of fisheries, riparian habitat, recreational use or wildlife. Also required are the establishment of minimum flows and the development of a hydrologic assessment to demonstrate that the requested quantity of water is available.

In 1981, the District submitted an application to appropriate an in-stream flow water right for a segment of Aravaipa Creek. The Arizona Department of Water Resources issued a permit in March 1989. The Department of Water Resources is prepared to issue a Certificate of Water Right after submission of five additional years of streamflow monitoring data. Since 1985 the District has submitted nine additional applications for instream flow water rights. These were for segments of the Gila and San Francisco rivers; Apache, Mescal and Bonita creeks; and Hot Springs, Redfield, Bass and Swamp Springs canyons. The rationale for the instream flow water rights for all these streams was to protect riparian habitat, native fish populations, wildlife and recreational use. The District has also acquired an application for an instream flow water right for the San Pedro River from the Huachuca Audubon Society and Sierra Club. Perfecting the water right will provide additional protection for the San Pedro Riparian National Conservation Area.

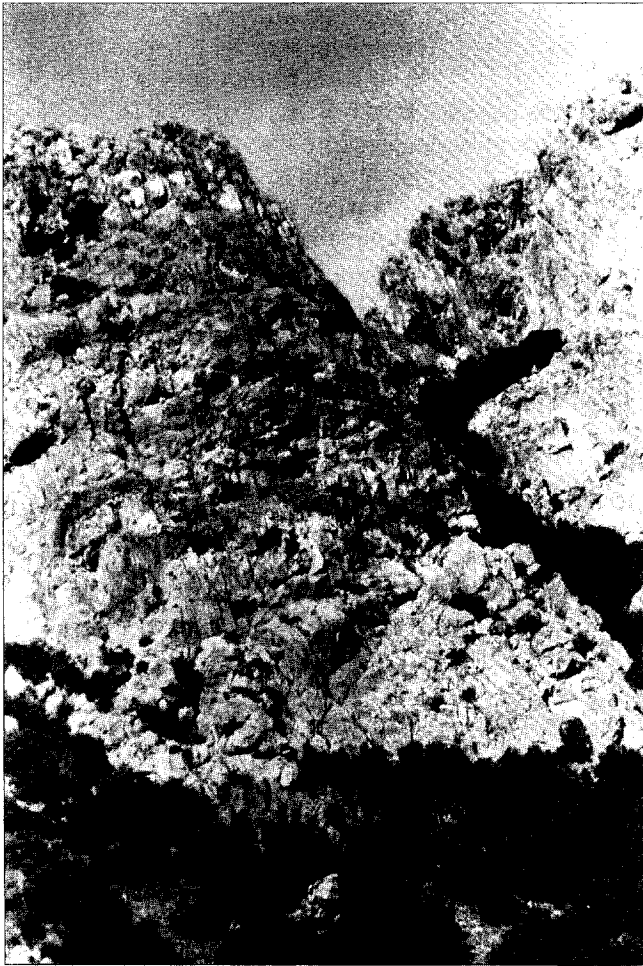
Geology

General Geology

The Safford District is situated in the southern portion of the Basin and Range Physiographic Province. This province is characterized by nearly parallel mountain ranges that trend north to northwest and are separated by broad valleys filled with sediments. The Basin and Range Province in Arizona is subdivided into a mountain region, including the Safford District, and a desert region occurring in the Sonoran Desert of southwest Arizona. The mountain region contains higher and wider mountains with less extensive alluvial valleys than does the desert region. The mountains of the Basin and Range Province represent blocks of rock



Bass Canyon is an enjoyable day hike through tree-lined canyons and flowing water.



The highly visible Dos Cabezas peaks were navigational landmark for early settlers.

bounded by near-vertical normal faults that were upthrown in late Tertiary times. The geology of these mountains is generally complex and variable. The rocks consist mostly of Precambrian phyllites, schists and gneisses; lower to mid-Paleozoic limestones and shales; and volcanic rocks from numerous ages, ranging from Precambrian through late Cenozoic. The geology of the valleys is poorly known because of their sediment cover.

The Basin and Range Province of Arizona is bounded on the north and east by what is called the Transition Zone. This area separates the Basin and Range Province in the southwestern part of the state from the Colorado Plateau Physiographic Province in the northeastern part of the state. The Transition Zone is a poorly defined band up to about 50 miles wide that generally has the rock characteristics of the Colorado Plateau and the complex structural characteristics of the Basin and Range Province. The Colorado Plateau of Arizona "...consists of a thick sequence of locally folded or faulted but, generally, flat-lying and

undeformed, sedimentary rocks overlying a basement complex of granite and schist. Most of the rocks exposed are upper Paleozoic or Mesozoic age, predominantly sandstone or limestone" (McColly and Anderson 1987).

Economic Geology

General

The mineral potential of the district has been rated using the guidance in BLM Manual 3031. A summary of the rating for all mineral resources is presented in Table 3-1. A description of the potential and certainty levels are given in Appendix 11. This mineral resource potential information shows the highest rating for a resource within the District, but does not imply the resource has the potential for uniform occurrence throughout the District.

Locatable Minerals Locatable mineral production in the Arizona portion of the Basin and Range Province has been prolific over the years and has played an important role in the development of the state. Major metallic locatable minerals found in the Province, in general order of importance, include copper, gold, silver, lead, zinc, molybdenum, manganese, tungsten and mercury. Non-metallic minerals include asbestos, barite and fluorite. The economic geology of the Province has been summarized by McColly and Anderson (1987) as follows:

... mineral deposits occurring within the Basin and Range Province are of many types and sizes Important resources of copper, gold, silver, lead and zinc are found in Precambrian-age rocks occurring as veins, massive sulfide deposits, or disseminated deposits. Asbestos, iron, manganese, mercury, uranium and pegmatite minerals also are found in Precambrian host rocks.

Paleozoic rocks, in the Arizona Basin and Range Province, are chiefly important for their role as host rocks for post-Paleozoic base and precious metals deposits. Because of their chemical composition, Paleozoic limestones are favored as host rocks and are a primary ore control at a number of Arizona's largest and most important mines. Mesozoic rocks, including those of Laramide [late Cretaceous] age, are of outstanding economic importance to Arizona mining. Intrusive rocks of this age are associated with nearly all of the larger metal deposits in the Basin and Range Province, as well as many of the smaller ones. Copper, molybdenum, gold and silver are the chief metals recovered from Laramide-age deposits, but lead, zinc

Table 3-1. Mineral Resource Potential Ratings

Mineral Resource	Level of Potential	Level of Certainty
Coal	O-No Potential	D
Oil and Gas	L-Low Potential	C
Geothermal	M-Moderate	C
Sodium	O-No Potential	C
Potassium	O-No Potential	C
Metallic Minerals	H-High Potential	D
Uranium	L-Low Potential	C
Non-Metallic	H-High Potential	D
Common Varieties	H-High Potential	D

Source: Safford District files. See Appendix 11 for a description of certainty levels.

and various other metals and mineral commodities also occur in significant quantities. Laramide-age rocks and associated mineralization are widely distributed in Arizona and where exposed have been extensively prospected.

Locatable mineral potential in the Safford District is evidenced by major producers situated virtually from one end of the District to the other. The Arizona Bureau of Geology and Mineral Technology (Keith et al. 1983) lists 27 mining districts in the Safford District. These districts, their principal commodities and overall value, as determined by McColly and Anderson (1987), are shown in Table 3-2. A number of small, poorly defined districts are not included with this list; nor are areas with mineral potential that are not organized into districts.

Table 3-2. Mining Districts, Commodities Produced and Estimated Values of Each District

Mining District	Commodities Produced	Estimated Value (in \$million)
Aravaipa	lead, zinc, silver, gold and copper	32.5
Ash Peak	silver, gold, manganese, copper and lead	39.5
Banner	lead, copper, silver, gold and zinc	34.8
Bluebird-Cochise	copper, zinc, silver, gold, tungsten and lead	207.1
Bunker Hill	copper-molybdenum, lead, silver and gold	65.1
California	lead, silver, zinc, copper and gold	5.3
Christmas	copper, gold and silver	1,010.1
Copper Mountain	copper-molybdenum, silver, gold, zinc, lead and manganese	25,319.0
Dos Pobres	copper	4,837.4
Dripping Springs	gold, uranium, copper-molybdenum, silver lead and zinc	2.3
Golden Rule	gold, silver, lead and copper	5.2
Lone Star	copper	4,200.0
Mammoth-San Manuel	copper-molybdenum, gold, silver, lead, zinc, uranium and tungsten	17,713.3
Mascot	gold, silver, copper and lead	14.8
Middle Pass	zinc, copper-molybdenum, silver, gold and lead	7.6
Mineral Creek	copper-molybdenum, silver, gold, lead and zinc	15504.1
Pearce	silver, gold, copper, lead and zinc	193.9
Reef	tungsten	1.6
Saddle Mountain	copper, silver, gold, lead and zinc	6.2
Sanchez	copper	1,679.6
San Juan	copper and silver	582.3
Summit	copper, silver, gold and lead	15.0
Swisshelm	lead, silver, zinc, copper and gold	11.0
Table Mountain	copper and gold	22.2
Tombstone	silver, gold, lead, copper, manganese and zinc	427.4
Turquoise	copper, silver, gold, lead and manganese	68.1
Warren	copper, gold, silver, zinc, lead and manganese	9,514.5

Source: McColly and Anderson (1987)

Copper Mountain and Warren are the largest mining districts in the area. The Morenci open pit copper mine in the Copper Mountain District is the nation's largest copper producer, with over a half billion pounds of copper produced in 1987. The Bisbee Mine in the Warren District is presently a small producer of leached copper but has historically been a major producer. Current exploration and development efforts indicate that the Warren District may again become a major producer. Magma Copper Company's San Manuel Mine in the Mammoth District is the nation's largest underground metal mining operation with a production in 1987 of nearly a quarter billion pounds of copper. Cyprus Mineral Company's open pit Christmas Mine (Christmas District) is currently inactive but has been a large copper producer. Large tonnages of copper ore occur in the Gila Mountains north of Safford. Phelps Dodge has developed one underground ore body there but temporarily suspended mining in 1983. There are currently plans for the development of a large open pit copper mine in the Sanchez District, located about 10 miles northeast of Safford.

Other metal producers are located around Tombstone, Pearce, Dos Cabezas, Ash Peak, Johnson and Aravaipa. Commodities produced include copper, gold, silver, lead and zinc. The industrial mineral zeolite is mined in the San Simon Valley. Most current production comes from non-federal lands, since the lands containing producing mines are generally patented mining claims. Recent mining activity on the public lands, as evidenced by the number of mining plans and notices filed in the Safford District Office since 1981 (when such notification became required), is mostly in the areas of Ash Peak, Copper Mountain, Turquoise Mountain, zeolite deposits north of Bowie, and gold placers scattered around the District (see Map 23).

Leasable Minerals Leasable minerals in the Safford District consist primarily of geothermal energy. The District contains three general areas with geothermal potential as well as several thermal wells and springs. The Clifton-Morenci area contains Arizona's two hottest springs (70°C and 82°C). The Safford-San Simon area contains several artesian wells that discharge water up to 49°C. The Willcox area contains wells that discharge water up to 54°C. One well near Pima reportedly produced water at 59°C. The Clifton-Morenci area has been leased for geothermal resources in the past, as has the San Bernardino Valley area. There are currently no geothermal leases on public lands within the District.

There are no known commercial reserves of coal, oil or gas in the District. A few deep exploratory wells were

drilled in the early 1980s but there has been no activity since. Any oil and gas drilling in the District would have to be considered exploratory. The current economic climate precludes much exploratory drilling by oil and gas companies with no change for the foreseeable future. A possible exploration and development scenario for the reasonably foreseeable future is shown as Appendix 10. The only known coal in the area occurs as thin, subeconomic seams of low quality coal on the San Carlos Indian Reservation.

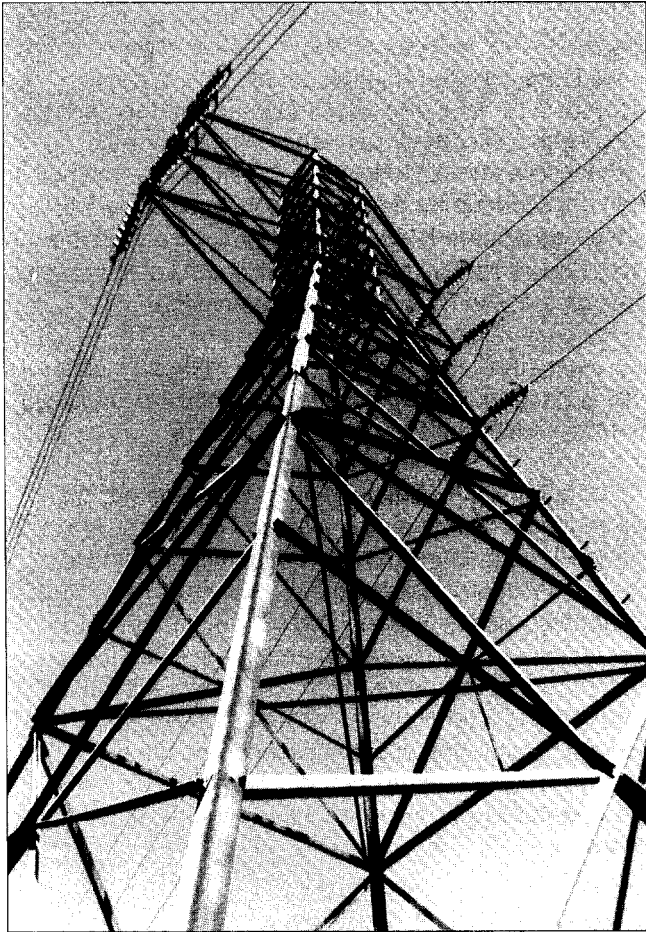
No other significant reserves of other leasable minerals, such as sodium, potassium and helium, are known to occur within the Safford District.

Salable Minerals Salable minerals in Arizona, such as sand and gravel, stone, clay and pumice "...are generally widespread and readily available in most places" (McColly and Anderson 1987). Construction materials, especially sand and gravel, are by far the commodities in greatest demand in the state. Such materials are very common in the District with sand and gravel occurring in virtually every wash and stream. Due to the economics involved in hauling material to the marketplace, most material sites are located within a range of about 10 miles from the point of use.

Lands and Realty

Exchanges The Arizona State Land Department, through a series of grants, in-lieu selections and exchanges since 1912, has acquired lands that created an intermingled land pattern with the public lands. These land ownership patterns have complicated the resource management programs of both agencies. In a cooperative effort to remedy this management problem, a Memorandum of Understanding was signed by BLM and the Arizona State Land Department in March 1985 to initiate a joint land exchange program.

As a result of the on-going exchange program with the state, the public land ownership pattern has been consolidated northeast of Interstate 10 in Graham and Greenlee counties; in the vicinity of Aravaipa Canyon; the Muleshoe Ranch area of the Galiuro Mountains; and north and west of Safford. There are still some isolated parcels of public land, mostly in Cochise County. Many of these parcels were included in exchange proposals, but were dropped because of mining claim encumbrances. Exchanged lands had similar resource values so no significant resources were lost. As a result of exchanges since 1985, 202,406 acres of public lands within the Safford District have been exchanged for 214,731 acres of state lands.



Under the proposed RMP, right-of-way corridors will be established to minimize impacts in sensitive areas.

Approximately 47,668 acres of land along the San Pedro River have been acquired through private and state exchanges. Congressional legislation in November 1988 designated these lands as the San Pedro Riparian National Conservation Area. The purpose of these exchanges was to place high-value natural resources in public ownership.

Recreation and Public Purposes Local governments and non-profit organizations have acquired public land at little or no cost under the *Recreation and Public Purposes Act of 1926*. Either by lease or patent, these lands have been dedicated to specific uses such as parks, schools, landfills or shooting ranges that benefit the public at large. Five parcels of land have been patented (totalling 399 acres) and nine leases issued (totalling 877 acres) under the Recreation and Public Purposes Act during the past 10 years.

Sales There have been some sales of public land within the District. Some tracts are better suited, often because of location, for private ownership rather than public. The sale parcels have not been large, the largest in recent years being 80 acres. The District has

sold 14 parcels of land, totalling 847 acres, during the past 10 years.

Communications Sites Three major communication sites are currently being utilized. The most developed is the Guthrie Peak site, located in the Black Hills east of Safford, supporting 10 primary right-of-way holders. The other two sites, Mule Mountain/Juniper Flats north of Bisbee, and Dos Cabezas east of Willcox have fewer holders. See Map 27. A communication site plan for Guthrie Peak is under development that will dictate the level of development for that site. Projects are pending for the development of site plans for the Dos Cabezas and Mule Mountain/Juniper Flats sites.

Rights-of-Way, Utility and Transportation Rights-of-way for utility and transportation facilities have been granted to qualified individuals, businesses and governmental entities. Issuance is based on identified need and stipulations to protect natural and cultural resources are provided to the applicant. The District has approximately 608 active rights-of-way involving such uses as power transmission/distribution facilities roads and highways, communication sites, telephone lines, irrigation and water facilities, oil and gas pipelines, federal facilities and railroads.

Major transportation and utility systems rights-of-way crossing the Resource Management Plan area are Arizona Electric Power Cooperative, Inc. and Tucson Electric Power Co. transmission lines, and All American Pipeline and El Paso Natural Gas Co. pipelines. Interstate Highway 10 crosses the entire District from east to west.

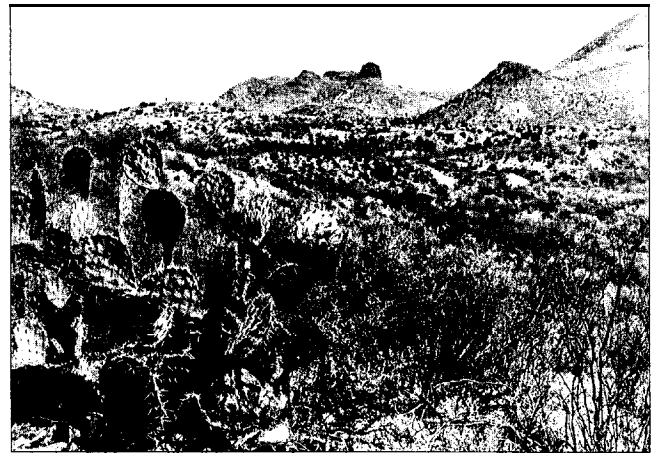
No formal utility corridors have been established. Corridors are often desirable to provide the private sector with secured routes for project planning purposes. Section 503 of the Federal Land Policy and Management Act requires that in order to minimize adverse environmental impacts and a proliferation of separate rights-of-way, corridors will be used to the extent practical.

Withdrawals Certain lands within the Safford District have been withdrawn. Withdrawals withhold an area of Federal land from settlement, sale, location, or entry under some or all of the general land laws. Withdrawals can also transfer jurisdiction of public land to another federal agency.

The following withdrawals are in effect in the Safford District (some of these are multiple withdrawals in the same area and some are overlapping withdrawals):

- Power Site Reserve 602 and Secretarial Order-Water Power Designation — 2,277 acres

- Power Project — 3,310 acres
- Middle Gila River Project — 804 acres
- San Carlos Irrigation Project (three withdrawals) — 9,383 acres
- Power Site Reserve 153 (two withdrawals) — 3,399 acres
- Power Site Reserve 590 and Secretarial Order-Water Power Designation — 2,023 acres
- National Guard Safford — 400 acres
- Charleston Dam and Reservoir (two withdrawals) — 1,989 acres
- Ft. Huachuca and Electronic Proving Grounds (four withdrawals) — 19,599 acres
- Willcox Bombing Range — 27,277 acres
- National Guard Douglas — 640 acres
- Camelback Dam and Reservoir — 14,592 acres



The desert vegetation of the uplands is quite different from the riparian vegetation below in Guadalupe Canyon.

Wildlife Habitat

The Safford District has a rich, diversified terrestrial wildlife fauna consisting of over 300 species of birds, 40 species of herptiles and 80 species of mammals. The existence of these species is due to the habitat diversity present throughout southeastern Arizona. These terrestrial habitats range from the low rainfall Chihuahuan Desert found in much of the southern portions of the District to the moderate rainfall at moderate elevations of the more mountainous regions.

Animal species receiving highest priority for funding and habitat improvement projects are: (1) federally listed threatened or endangered species; (2) priority wildlife species as identified by the Bureau in cooperation with the Arizona Game and Fish Department; and (3) other species, habitats or features of local importance.

Riparian/Aquatic Habitat In Arizona, 60 percent of wildlife species are dependent upon riparian and aquatic habitats. Twenty-eight priority species or communities require riparian/aquatic areas. They are the Colorado squawfish, Gila topminnow, desert pupfish, woundfin, loach minnow, spikedace, Gila chub, Gila roundtail chub, razorback sucker, bald eagle, western yellow-billed cuckoo, gray hawk, Mississippi kite, zone-tailed hawk, common black-hawk, willow flycatcher, belted kingfisher, osprey, spotted owl, ferruginous pygmy-owl, white-faced ibis, Chiricahua leopard frog, plains leopard frog, lowland leopard frog, Mexican garter snake, black bear, turkey and waterfowl. Protection and management of this biological diversity is linked to the 0.5 percent of the land that is riparian and aquatic habitat. Its ecological value is far greater than its proportionate size, and BLM has set a national goal of having 75 percent of its riparian habitat in good or excellent condition by 1997.

The larger aquatic habitats found in the District are the Gila, San Francisco and San Pedro rivers, Aravaipa and Bonita creeks. There are numerous smaller streams, providing isolated aquatic habitat throughout the District. In addition, ponds and springs are important local habitat for some of the 30 species of fish found on public lands.

Because so many priority species and communities on the quality and quantity of these small ecosystems, management efficiency can be enhanced by concentrating on riparian and aquatic habitat rather than on individual species. Physical, chemical and biological linkages between aquatic and riparian areas mean that impacts upon one quickly affect the others. Riparian areas in the Safford District also are important migration corridors through Arizona's deserts for birds moving between tropical wintering areas and breeding areas farther north. The value of riparian habitat extends beyond District, state or national boundaries.

Ferruginous hawks, a federal candidate species, are present in the District during migration and wintering times. The wide range and nonspecific habitat use precludes specific management prescriptions. They feed upon small mammals, therefore, Bureau management programs that maintain early successional communities favored by rodents, benefit ferruginous hawks.

Maternal bat caves are irregularly located throughout the District. Eagle Creek Bat Cave serves as the largest maternity roost for Mexican free-tailed bats, *Tadarida brasiliensis*, in Arizona and the entire Southwest. It now contains well over 100,000 bats, with historic estimates suggesting as many as 100 million. On a national basis, it is second only to some Texas caves. Due to the large number of bats, along with

other small animals, the cave reportedly once held the highest concentration of mammals and, perhaps, vertebrates in the state.

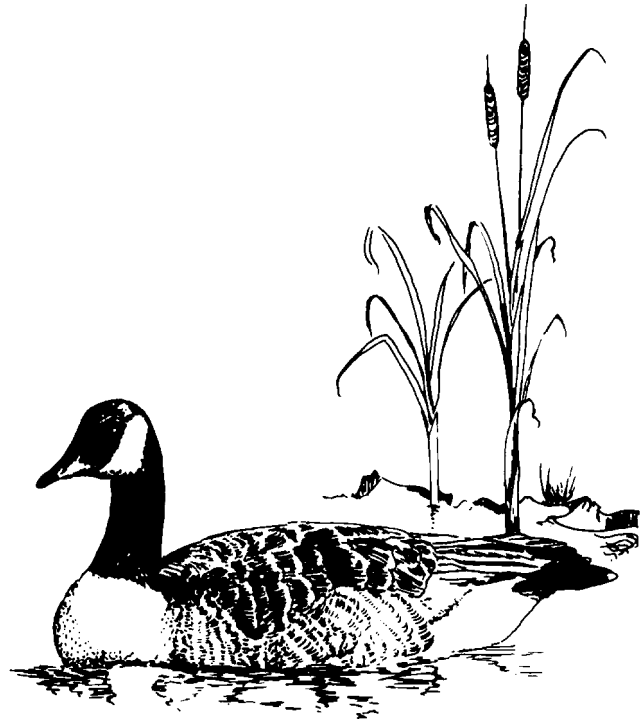
Bats are important for insect control, and Eagle Creek bats are estimated to consume over 80,000 pounds of insects nightly. Bats are also important prey for hawks and falcons.

Mexican free-tailed bats have an extremely low reproductive potential and are very susceptible to human disturbance. Human activities in and near the cave, as well as agricultural pesticides, have led to drastic population declines.

Terrestrial Habitat Priority species include the desert tortoise, bighorn sheep, mule deer, white-tailed deer, Montezuma quail, wild turkey, black bear, pronghorn antelope and Texas horned lizard.

Desert tortoises are restricted to Sonoran Desert areas in the lower San Pedro River Valley. Plant communities used include palo Verde-cactus, desert grasslands and some open chaparral or encinal (oak woodland) patches with southerly exposures. Desert washes appear to be especially important. Systematic transects to determine the range and abundance of the species were begun in 1988. Tentative results indicate desert tortoise may occur at low to moderate densities on 25,000 acres of public lands in the Safford District. The importance of the population of desert tortoise in the San Pedro basin is complicated since this is the northeast limit of the species' range, and its ecological and biological value may not be proportional to its apparent low numbers. Habitats will be categorized by densities and management options and will be protected to the degree required by Bureau policy. Preliminary observations indicate perennial grasses, low shrubs or annual grasses and forbs are important food items depending upon habitat and time of year. A critical feature throughout the District seems to be the presence of natural shelter sites, common along desert washes.

Lands administered by the Safford District contain two subspecies of bighorn sheep. The Rocky Mountain bighorn is found in suitable habitat along the Gila and San Francisco rivers from Bonita Creek on the west to the New Mexico state line on the east. Desert bighorn sheep are found in three major places in the northern part of the District. The largest population, 150-200 or more sheep, is found in and around Aravaipa Canyon Wilderness. A smaller population, 50-100 sheep, is found in the Galiuro Mountains around the Muleshoe Ranch and Redfield Canyon areas. The smallest population, consisting of less than 50 individuals, is located in the Peloncillo Mountains in the east-central



part of the District. Habitats preferred by bighorn sheep are remote, relatively open, precipitous areas with rocky ridges, slopes and canyons. Preferred foraging areas are mostly found within the above mentioned habitats. These foraging areas consist of upland and mountain grasslands, with scattered trees and shrubs. Threats to bighorn sheep include habitat degradation or loss, predators, disease, poaching and human activities.

Desert mule deer occur throughout the District and are the most common big game species. Areas of highest concentrations are the Galiuro, Peloncillo, Dos Cabezas and Mule mountains. Concentrations range from five to seven deer per square mile (Arizona Game and Fish Department 1988). Mule deer prefer semi-arid, sparsely vegetated areas dominated by shrubs, such as mesquite, spicebush and oak, and scattered juniper and oak trees. These preferred habitats are found most often in the rolling hills and open mountain areas. There is some habitat overlap between mule deer and white-tailed deer in the Dos Cabezas, Chiricahua and Mule mountains. The major threats to mule deer are habitat degradation and loss.

The white-tailed deer prefer the oak woodland habitat dominated by oak and juniper trees with scattered shrubs, forbs and abundant perennial grasses. Areas of the highest densities are the Galiuro, Chiricahua, Santa Teresa and Mule Mountains. White-tailed deer populations are considerably lower than those of the mule deer with densities ranging from two to four deer per square mile on these better habitats.

Montezuma quail prefer grassy, open, oak woodland canyons and wooded mountain slopes with bunch-grass. The best habitat in the District is in the Dos Cabezas, Chiricahua, Mule and Galiuro mountains. The major threat to the existing populations is loss of high-quality perennial grasses in oak woodland plant communities.

Wild turkeys prefer oak woodland habitat with nearby riparian vegetation in the mountains of southeast Arizona. Suitable habitat is available in the Dos Cabezas, Chiricahua, Gila, Santa Teresa, Winchester, Galiuro and Mule mountains. The only verified presence of turkeys in the Safford District, however, is in Bonita Creek and Guadalupe Canyon. Turkeys have been observed on Forest Service lands adjacent to the District in the upper San Francisco River area. The current turkey population is estimated to be very low. An opportunity exists to reintroduce the Gould's turkey into suitable habitat in several mountain areas.

In the Southwest, black bears prefer mountainous vegetated areas of chaparral, pinyon-juniper and oak woodlands. Black bears are very adaptable and may be found in all habitats of the oak woodland vegetation types, especially when adjacent to riparian vegetation. The population of black bears is estimated to be moderate to low in these types. Bear numbers depend on the condition of oak woodland and adjacent riparian areas and will vary according to long-term management strategies.

Pronghorn antelope inhabit the semidesert grasslands in southeast Arizona. Habitat preference is open grasslands with scattered shrubs and moderate to high densities of forbs. A small population of pronghorn antelope exists in this habitat on the east slopes of the Peloncillo Mountains along the Arizona-New Mexico border. Pronghorns move unrestricted between the two states in this habitat. In December 1986, 37 pronghorn were released east of the Peloncillo Mountains to supplement the small, declining population of approximately 15 animals. The present population consists of 50 to 60 individuals. Suitable but unoccupied habitat exists in several small areas in the extreme southeastern portion of the District and around the Galiuro Mountains. Threats to pronghorn include disease, poaching, predation and human developments. The small number of animals increases their vulnerability to these threats.

Texas horned lizard habitat includes dry areas in mostly open country with loose soil supporting grass, mesquite and cactus. These lizards appear to be common in parts of the District. Few surface disturbances are so widespread as to jeopardize blocks of habitat, and preferred habitat is seldom exposed to

major disturbances except by mining and livestock grazing. No specific efforts have been made for management of this species.

Other priority species include the peregrine falcon, Sanborn's long-nosed bat, Mexican long-tongued bat, red bat, ferruginous hawk, mountain lion, javelina, quail and dove. These priority species are so widespread or use so many plant communities that management focus is difficult. Generally, good land management practices that balance uses with long-term production, plus standard stipulations on mining actions, provide good protection. Because of the large area occupied, projects are seldom constructed solely for one of these species. Their needs are, however, incorporated into the design and development of all proposed actions.

Peregrine falcons, Mexican long-tongued bats, red bats and Sanborn's long-nosed bats have very specific breeding sites and feeding areas that can be protected by specific Bureau actions. They do, however, forage in a wide area throughout the District at other times of the year. Javelina, mountain lions, quail and dove are present virtually throughout the District at varying densities. They are important either as an important component of the ecosystem, an economic impact upon the livestock industry, or for recreational activities.

Threatened, *Endangered and Special Status Species*
A number of threatened, endangered and special status species are found on public lands in the Safford District. Table 3-3 lists the species and their status.

Livestock Grazing

Livestock grazing is managed through allotment management plans, most of which were developed from decisions resulting from the Upper Gila-San Simon Grazing Environmental Impact Statement (BLM 1978) and the Eastern Arizona Grazing Environmental Impact Statement (BLM 1986). These plans were written for a specific unit of rangeland (allotment) based on multiple-use resource management objectives established through existing land use plans and activity level plans by resource specialists and permittees. An Allotment Management Plan establishes objectives, seasons of use, grazing system, numbers of livestock permitted on the range, range improvements, monitoring plans and evaluation procedures for the allotment.

The District range program manages 129,037 animal unit months of authorized active use and 10,150 animal unit months of non-use in 262 allotments. There are 109 allotments being managed under the guidelines of an implemented allotment management

Table 3-3. Threatened, Endangered and Special Status Wildlife Species

Common Name	Scientific Name	Status		
		Safford	Fed.	State
MAMMALS				
red bat	<i>Lasiurus borealis</i>	B		C
spotted bat	<i>Euderma maculatum</i>	?	2	C
southwestern cave myotis	<i>Myotis velifer brevis</i>	O	2	
California leaf-nosed bat	<i>Macrotus californicus</i>	A	2	C
Sanborn's long-nosed bat	<i>Leptonycteris sanborni</i>	O	E	E
Mexican long-tongued bat	<i>Choeronycteris mexicana</i>	O	2	T
greater western mastiff-bat	<i>Eumops perotis californicus</i>	O	2	
grizzly bear	<i>Ursus arctos</i>	Ex	T	E
Chiricahua western harvest mouse	<i>Reithrodontomys megalotis arizonensis</i>	O	2	
jaguar	<i>Panthera onca</i>	A	E	E
jaguarundi	<i>Felis yagouarundi tolteca</i>	Ex	E	
ocelot	<i>Felis pardalis</i>	Ex	E	E
river otter	<i>Lutra canadensis Sonora</i>	Ex	2	E
Arizona black-tailed prairie dog	<i>Cynomys ludovicianus arizonensis</i>	Ex	2	E
Chihuahuan pronghorn	<i>Antilocapra americana mexicana</i>	B		T
Arizona shrew	<i>Sorex arizonae</i>	?		T
Mexican gray wolf	<i>Canis lupus baileyi</i>	Ex	E	E
BIRDS				
American bittern	<i>Botaurus lentiginosus</i>	W		C
least bittern	<i>Ixobrychus exilis</i>	M		C
boblink	<i>Dolichonyx oryzivorus</i>	A		E
crested caracara	<i>Polyborus plancus</i>	A		C
gray catbird	<i>Dumetella carolinensis</i>	A		T
whooping crane	<i>Grus americana</i>	A	E	
western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	B	-	T
long-billed cuckoo	<i>Numenius americanus</i>	M	2	
black-bellied whistling duck	<i>Dendrocygna autumnallis</i>	O	-	C
bald eagle	<i>Haliaeetus leucocephalus</i>	B	E	E
great egret	<i>Casmerodius albus</i>	M	-	E
snowy egret	<i>Egretta thula</i>	M	-	E
northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	Ex*	E	E
American peregrine falcon	<i>Falco peregrinus</i>	B	E	C
southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	B	2	E

Table 3-3. Threatened, Endangered and Special Status Wildlife Species (continued)

Common Name	Scientific Name	Status		
		Safford	Fed.	State
Apache northern goshawk	<i>Accipiter gentilis apache</i>	A	2	C
common black-hawk	<i>Buteogallus anthracinus</i>	B	-	C
ferruginous hawk	<i>Buteo regalis</i>	W	2	T
northern gray hawk	<i>Buteo nitidus maximus</i>	B	2	T
violet-crowned hummingbird	<i>Amazilia violiceps</i>	O	-	C
white-faced ibis	<i>Plegadis chili</i>	M	2	
thick-billed kingbird	<i>Tyrannus crassirostris</i>	B		C
tropical kingbird	<i>Tyrannus melancholicus</i>	M		C
belted kingfisher	<i>Ceryle alcyon</i>	W		C
Mississippi kite	<i>Ictinia mississippiensis</i>	B		C
osprey	<i>Pandion haliaetus</i>	M		T
cactus ferruginous pygmy-owl	<i>Glaucidium brasiliarium cactorum</i>	B	2	E
spotted owl	<i>Strix occidentalis</i>	O	2	T
thick-billed parrot	<i>Rhynchopsitta pachyrhyncha</i>	R	E	E
Sprague's pipit	<i>Anthus spragueii</i>	W		C
western snowy plover	<i>Charadrius alexandrinus nivosus</i>	M	2	C
American redstart	<i>Setophaga ruticilla</i>	M		T
wood stork	<i>Mycteria americana</i>	A	E	
Baird's sparrow	<i>Ammodramus bairdii</i>	W		T
Arizona grasshopper sparrow	<i>Ammodramus savannarum ammolequus</i>	B	2	
elegant trogon	<i>Trogon elegans</i>	M		C
HERPTILES				
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	?		T
lowland leopard frog	<i>Rana yavapaiensis</i>	O	2	C
plains leopard frog	<i>Rana blairi</i>	?		E
Mexican garter snake	<i>Thamnophis eques</i>	B	2	C
Texas horned lizard	<i>Phrynosoma cornutum</i>	B	2	
Sonoran tiger salamander	<i>Ambystoma tigrinum stebbinsi</i>	?	2	E
desert tortoise	<i>Gopherus agassizii</i>	B	2	C
FISH				
bonytail chub	<i>Gila elegans</i>	Ex	E	E
Gila chub	<i>Gila intermedia</i>	B	2	T
Gila roundtail chub	<i>Gila robusta grahami</i>	B	2	T
loach minnow	<i>Tiaroga cobitis</i>	B	T	T
desert pupfish	<i>Cyprinodon macularius macularius</i>	B	E	E

Table 3-3. Threatened, Endangered and Special Status Wildlife Species (continued)

Common Name	Scientific Name	Status		
		Safford	Fed.	State
spikedace	<i>Meda fulgida</i>	B	T	T
Colorado squawfish	<i>Ptychocheilus lucius</i>	Ex	E	E
razorback sucker	<i>Xyrauchen texanus</i>	O	1	E
Gila topminnow	<i>Poeciliopsis occidentalis</i>			
	<i>occidentalis</i>	B	E	T
woundfin	<i>Plagopterus argenteus</i>	Ex*	E	E
INVERTEBRATES				
Bylas springsnail	<i>Apachecoccus arizonae</i>	B	2	
Gila Tryonia snail	<i>Tryonia gilae</i>	B	2	

A = Accidental occurrence
 B = Breeds on public lands
 C = Candidate for state listing
 E = Endangered
 Ex = Extirpated
 M = Migrant
 O = Known occurrence

R = Reintroduced
 T = Threatened
 W = Winter Resident
 ? = Probable
 * = Proposed for reintroduction
 1 or 2 = Candidate for federal listing

Source: Safford District Files

plan. Priorities for managing livestock use are determined through an allotment categorization process that helps determine management priorities. There are currently 60 allotments in the "Improve" category, 37 in "Maintain", and 165 in "Custodial." These categories are defined as follows:

Improve (I) Category criteria

- Present range condition is unsatisfactory and/or needs improvement.
- Allotments have moderate to high resource production potential and are producing at low to moderate levels.
- Serious resource-use conflict and/or controversy exists.
- Opportunities exist for positive economic return from public investments.
- Present management appears unsatisfactory and/or needs improvement.

Allotments in the "I" category require either a change in management practices to improve conditions and achieve a relatively high resource potential or mitigation of serious resource conflicts.

The management objectives for "I" allotments are to improve current resource conditions or resolve conflicts. Therefore, "I" allotments will have first priority for range improvement funding, AMP development, monitoring and use supervision.

Range condition, trend and precipitation will be monitored on all "I" allotments. Utilization and actual livestock use will be monitored on the allotments that receive livestock grazing use. Other studies to monitor water and wildlife habitat will also be conducted.

Maintain (M) Category Criteria

- Present range condition is satisfactory.
- Allotments have moderate or high resource production potential and are producing near their potential (or trend is moving in that direction).
- No serious resource-use conflict/controversy exists.
- Opportunities may exist for positive economic return from public investments.
- Present management appears satisfactory.

Generally, allotments in the "M" category have no serious resource conflicts and range conditions and present management are satisfactory. The



Ash and other riparian trees provide shade for hikers in Atavaipa Canyon Wilderness.

management objective for "M" allotments is to maintain current resource conditions. Range condition and trend, precipitation and actual livestock use will be monitored on "M" allotments by priority ranking as funding permits. "M" allotments will have second priority for funding of range improvements and for AMP development.

Custodial (C) Category Criteria

- Present range condition is not a factor.
- Allotments have low resource production potential and are producing near their potential.
- Limited resource-use conflict/controversy may exist.
- Opportunities for positive economic return on public investment do not exist or are constrained by technological or economic factors.
- Present management appears satisfactory or is the only logical practice under existing resource conditions.

Allotments in the "C" category include those with a small percentage of public land or those with low resource potential where response to management would not yield positive economic returns. The management objective for this category is to employ minimum management to the allotments while protecting existing resource values.

Permittees will assume a major role in range monitoring and range improvement construction for "c" allotments. BLM will conduct periodic use supervision on these allotments.

Currently, the District is heavily involved in monitoring allotments to determine the success of meeting allotment management plan objectives. Monitoring is described in the Safford District Monitoring Plan (BLM 1978 and BLM 1986) and more specifically in completed allotment management plans. Included in the monitoring program are livestock counts, trend and utilization studies, and precipitation data.

Cultural Resources

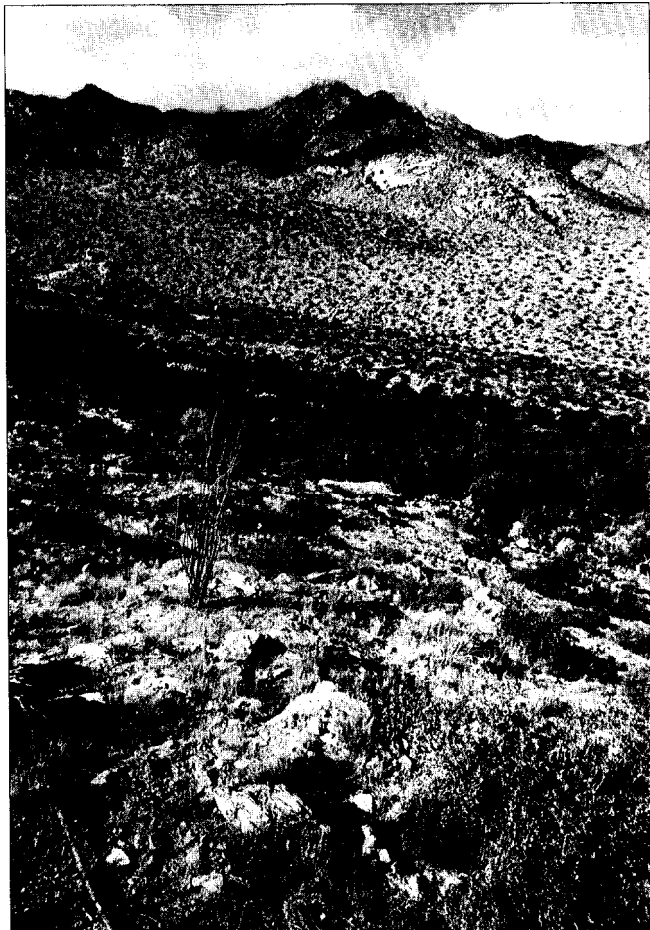
Cultural resources are identifiable cultural properties and any traditional lifeway value. Cultural properties are the nonrenewable remains of past human activity and consist of: (1) manufactured items such as stone tools, pottery, fire hearths, buildings, works of art, etc.;



(2) non-manufactured items used by people in their natural state such as rock shelters for housing purposes, or the skeletal remains of an animal that had been butchered by a prehistoric hunter; (3) areas where significant human events occurred even though evidence of the event no longer remains; and (4) the natural environment immediately surrounding the actual resource (BLM Manual 8100).

A traditional lifeway value is a group's shared values. These values are useful or important to the maintenance of a specified social and/or cultural groups traditional system of (1) religious belief, (2) cultural practice or (3) social interaction, not closely identified with definite locations. Because traditional lifeway values are abstract, nonmaterial, ascribed ideas, one cannot know about them without being told.

Cultural resources are viewed as part of the history of humankind. Since we cannot learn about past traditional lifeway values without public participation, cultural properties serve as the only link for understanding these nonrenewable resources. To facilitate



The Fishhooks WSA in the Gila Mountain is recommended for wilderness designation.

their discussion, cultural properties are commonly classified according to the cultural period or tradition they represent. A common scheme used in the Southwest classifies cultural resources as being associated with the (1) Paleoindian Period, (2) Archaic Period, (3) Southwestern Cultural Traditions, (4) Proto-historic Period (5) Historic Period or (6) Contemporary Period.

Paleoindian Period This cultural tradition refers to the original New World inhabitants who migrated into North America from Asia during the closing of the Pleistocene, or last great ice age. Most researchers date this period from circa 10,000 B.C. to circa 8,000 B.C. The Paleoindian lifeway was shaped by a highly nomadic existence wherein small social groups or bands would forage the countryside in pursuit of animal and plant resources.

Sites of Paleoindian activity are often extremely difficult to recognize due to the sparse physical remains of these highly nomadic hunters and gatherers. Recognition is further hindered by geological and other natural processes that, in the course of several thousand years, can hide or obliterate even the most highly visible cultural property or archaeological site.

Although Paleoindian sites are extremely rare, the San Pedro River Valley has produced the largest known concentration of such sites in North America. Most of the San Pedro sites have been interpreted as being kill sites where animals, particularly mammoth, were felled and butchered. Several of these sites are considered to be of world-class status because of the information they contain about early people in North America.

Evidence of these big-game hunters is characteristically associated with the distinctively shaped Clovis spear point. Usually these spear points are found alongside other stone tools and the bones of extinct Pleistocene mammals buried beneath soils marking the geological end of the Pleistocene Age in the Southwest.

The significance of Paleoindian sites is that they contain rare information regarding the peopling of the New World and human adaptation to a postglacial environment.

Archaic Period The Archaic Period is believed to have occurred from at least 8,000 B.C. to about A.D. 100. During this period people lived a more settled lifestyle than previously and only hunted modern species of game animals. They also relied on gathering wild plants and, toward the end of this period, began to domesticate plants such as corn, beans and squash. This reliance on vegetal resources is

evidenced by milling tools used for grinding seeds into edible flour and the presence of food storage pits inside the remains of brush houses.

Recognizing Archaic sites from surface observations can be extremely difficult because of their age, lack of distinctively shaped projectile point types, and other kinds of diagnostic artifacts. Because of this, the number of sites is difficult to determine.

The Archaic sites known to exist in the District are in fairly good condition due in part to their relatively unimpressive nature, which usually consists of small surface scatters of stone tools and chipping debris. Buried sites are threatened principally by erosion. Archaic sites located in rockshelters and caves are likely to be damaged by vandals and collectors searching for burial goods, basketry, sandals and other artifacts.

Archaic Period sites are significant in that they represent the most enduring adaptational period of human occupation in the New World. These sites fill a data gap bridging the transition from nomadic big-game hunting to settled village life and agriculture.

Southwestern Cultural Traditions At about A.D. 100 prehistoric societies in the Southwest began to undergo dramatic changes in response to adopting an agricultural way of life based upon a primary food complex of corn, beans and squash. The reliance upon these and other crops allowed these people to spend most of their time in one place. This new lifestyle was marked by a wide-scale population increase, establishment of numerous villages with large agricultural fields and complex irrigation systems, the development of extensive trading networks and regional trading centers, and an elaboration of ceremonial and religious customs.

The basic population groups taking part in these cultural developments were the Mogollon, Hohokam and Anasazi. A fourth cultural group, known as the Salado Complex, appears late in the period and probably represents a restructuring of the three existing traditions. By A.D. 1450 these developments ceased and native groups suffered extensive culture collapse. This was followed by wide-scale population abandonment and the disappearance of whole societies.

Cultural groups during this period are distinguished from each other on the basis of certain diagnostic traits particularly in architecture and ceramics. Mogollon-affiliated sites outnumber the others in the District and tend to be located in mountainous areas and in valleys alongside major drainages and terraces. Many of the so-called Mogollon sites along major drainages display

Hohokam characteristics as well, especially those that date toward the latter part of the period.

Researchers believe these Mogollon-Hohokam "blended" sites show that intense trading relationships existed with the Hohokam people from the Phoenix and Tucson areas. The major trading frontiers appear to have been along the Gila and San Pedro rivers. The Tres Alamos site along the San Pedro River, in part, appears to have been a major Mogollon-Hohokam regional trading center.

Bonita Creek Canyon, located northeast of Safford in the Gila Mountains, is the only area in the District known to contain properties that display Anasazi characteristics. Located along Bonita Creek are numerous cliff dwellings, elaborate rock art paintings and at least one ceremonial cave. This assemblage of sites represents one of the most dense and varied collections of cultural properties in the District.

Properties displaying Salado characteristics occur primarily as villages with associated agricultural fields along the Gila and San Pedro rivers. Most Salado villages have been destroyed by historic and modern farming practices. Relatively little is known about the Salado Complex; it remains somewhat of a puzzle to archaeologists in the Southwest.

Cultural resources from the Southwestern Cultural Traditions are much more elaborate and diverse than those from any other prehistoric time period. This is due to the variety of features and artifacts associated with complex societies. Because of this, these sites are more likely to be damaged by vandals and collectors searching for painted pottery and other elaborate artifacts than damaged from natural processes, grazing, recreation and other uses.

Cultural properties of the Southwestern Cultural Traditions are significant for several reasons. Most important, they show that the area apparently served as a "crossroads." Here the Hohokam from the west and the Anasazi from the north interacted socially and economically with the Mogollon, whose greatest cultural display occurred to the east in New Mexico. This overlap of cultures provides a rich variety of data for investigating the effects of trading relationships between societies, the rise of agricultural societies, and the ability of archaeologists to distinguish former culture groups.

Protohistoric Period. This period, occurring immediately before written history, occurred from about A.D. 1450 to A.D. 1700. The accounts of early Spanish explorers and missionaries in the late 17th century documented the existence of two distinct cultural



groups in southeastern Arizona, the Sobaipuri and the Apache.

The Sobaipuri were first encountered by the Spanish along the San Pedro River where these riverine adapted people were practicing agriculture and some irrigation. They lived in distinctively shaped wattle-and-daub houses known as "jacals." The Sobaipuri abandoned the San Pedro Valley in the mid-18th century due to diseases introduced by the Spanish, the social consequences of the Spanish mission system, and Apache raiding and warfare.

Apache peoples, specifically the Western and Chiricahua Apaches, practiced a hunting and gathering lifestyle. Later, the Western Apache began to practice some limited agriculture. Raiding and warfare were also important economic. The Aravaipa Canyon area harbored an extensive Western Apache settlement. Historic ranching and other related activities are believed to have destroyed most of the evidence of this settlement.

Both Sobaipuri and Apache cultural properties are difficult to recognize. The Apache made a crude, yet distinctive type of pottery. The only known Sobaipuri properties in the District are along the San Pedro River. Apache properties are relatively common within the District, at least theoretically. The number of sites is extremely hard to determine because of the difficulty in identifying them.

Protohistoric sites often contain European artifacts, making them difficult to distinguish from historic sites where Anglo-American remains overlay aboriginal remains. Their significance is that they provide the bridge between unwritten and written history.

Spanish Period (1534-1820) The earlier part (1534-1690) of the Spanish period was characterized by frontier exploration and military campaigns against the Hopi and Zuni in northeastern Arizona and northwestern New Mexico. Access to the Hopi and Zuni areas was generally through the San Pedro and Gila valleys from what is now Mexico. The exact routes are not known due to the lack of accurate historical records. The route, however, is believed to have traversed the San Pedro River until it reached the present day community of Benson. From there it trended north-easterly, passing between the Galiuro and Winchester mountains. The route then went into the Gila Valley by way of the upper Sulphur Springs and Aravaipa valleys. After crossing the Gila River in the vicinity of Fort Thomas, it proceeded over the Gila Mountains and northward to the Hopi and Zuni areas. The route is commonly known as the Coronado Trail. No known cultural properties remaining from this portion of the Spanish Period have been found.

The later part of the Spanish period (1691-1820) reflects the missionary influence of native populations and the military campaigns against the Apache. Numerous architectural sites, settlements and visitas remain as evidence of the Spanish presence. The Presidio of Santa Cruz de Terrenate, located on the upper San Pedro River, is listed on the National Register of Historic Places. Some also believe the site may be the location of the Sobaipuri village of Quiburi.



Ruins of a Butterfield Stagecoach station are located near the Peloncillo Mountains.

Mexican Period (1821-1848) Southeastern Arizona became a possession of Mexico in 1821 as a result of the War of Mexican Independence. The area, however, never really developed a Mexican identity because of its remoteness and sparse population.

Associated with this period is the probable military encampment of Colonel Stephen Watts Kearny, located along the Gila Trail. The encampment is listed on the National Register of Historic Places. Apache raiding and warfare continued throughout this period and traders and trappers, mountain men and bounty hunters spread into Arizona. These relatively few numbers of people involved with these short-term activities left little in the way of cultural properties and artifacts. The significance of the Mexican period is that it marks the beginning of the Anglo-American influence in southeastern Arizona.

Anglo-American Territorial Period (1848-1912)

This period began the development of travel routes, ranching, mining and towns. Settlers created trails, such as the National Register of Historic Places-eligible Safford-Morenci Trail, stage coach lines, such as the Butterfield Overland Stage Line, and military telegraph lines. Significant ranches, such as the Salazar, Muleshoe and Boquillas were established. Additional settlers came into the area to work at the newly created mines and ore-processing sites, such as Morenci, Millville and Contention. Historic farms with elaborate irrigation canals were built by pioneer Mormon farmers. Historic sites are considered significant for the information they contain about the development of the area by American pioneers.

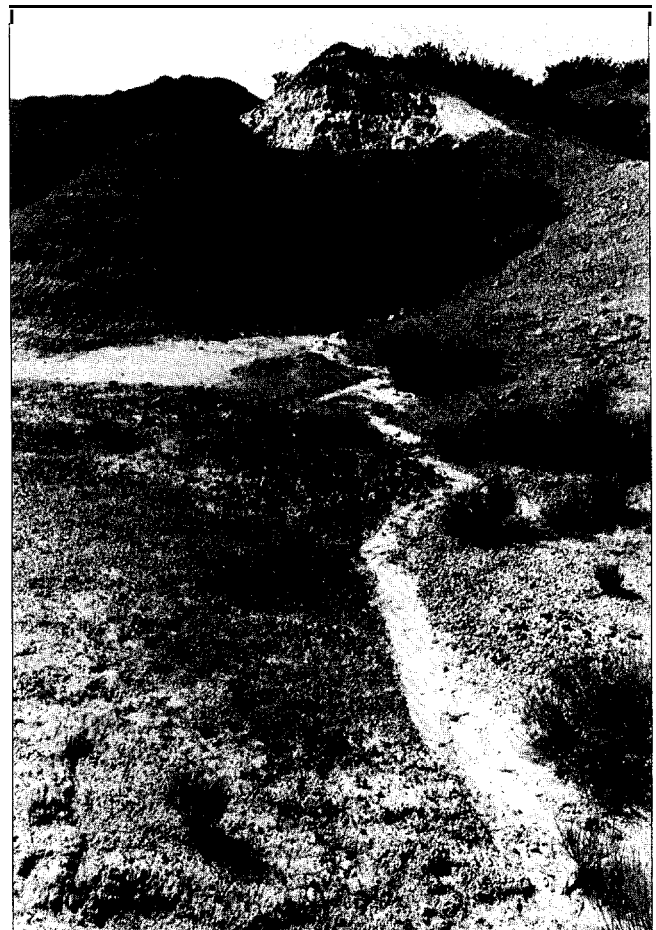
Contemporary Period (1912-Present) Farming, ranching and mining intensified during this period. The Civilian Conservation Corps built soil and water control features during the 1930s to help check erosion caused by overgrazing and farming. Cobble detention dams, rock features and camps that are still in good condition may possess National Register qualities. Isolated cabins and other habitation structures from this period can be dated through historic artifacts if they have not been removed by collectors. Sites associated with copper, lead and gold mining also have considerable local and historical significance.

Paleontological Resources

Paleontological resources (fossils) are the remains or traces of organisms that have been preserved by natural processes in the earth's crust. They are usually associated with sedimentary rocks and deposits rather than with igneous or metamorphic formations. Geologic formations were superimposed over one another

during the course of time and represent the depositional history of the earth's crust. Fossils occurring within this depositional history evidence the biological history of the earth. The earliest invertebrate fossils (those without backbones) are from the Paleozoic Era dating between 250 to 600 million years before the present. Fossils from the Mesozoic Era (65 million to 250 million years before the present) are conspicuous by the absence of reptiles such as the dinosaurs. The current mammalian age or Cenozoic Era began around 65 million years before the present. All of the District's vertebrate fossil sites are from the latter part of this era. Information on Safford District paleontological resources has been taken from a literature search (Lindsay 7979) of all existing records with references to District fossils.

Periodically, fossils become exposed on the surface. These exposures may be localized or, more typically, in numerous localities of varying extent. They occur in association with geologic formations that typically meander throughout the landscape.



White outcrops of diatomaceous earth on 111 Ranch are Pliocene and Pleistocene Age fossilized diatoms.

There are 64 invertebrate sites and 77 vertebrate sites on public lands in the District. The two paleontological areas of greatest significance are both Class I vertebrate sites. The Bear Springs Badlands Paleontological Area, covering approximately 16 square miles, contains fossilized remains of 12 different kinds of animals (Tomida 1987). Most of these were large elephant-like mammals, early horses including a three-toed horse, camel, peccary and cat. These mammals are grouped into the Blancan assemblage and lived from 1.9 million to 4.3 million years before the present. Also located in the Bear Springs Badlands are fossilized footprints of animals from this period. Erosion appears to present the greatest threat to the fossils. Vandalism of sites does not appear to be a problem to date.

The other major fossil area is known as the 111 Ranch Paleontological Area. Although large mammals such as those found at Bear Springs are present, 111 Ranch contains an extensive variety of intact, complete fossils of small mammals as well. The fossils represent one of the better assemblages of the Southwest. They are found in Pliocene deposits that are overlain by deposits of Early and Middle Pleistocene age. The Blancan vertebrate fossils provide a valuable climatological and chronological indicator. The fossils are contained in diatomaceous earth deposits that have been and are still threatened by mining activities.

The Hot Well area may be another area of possible significance. The area has not been extensively studied but does contain vertebrate fossils. Hot Well is an area of rapidly increasing recreational use containing sand dunes and a geothermal spring.

Vegetation

The vegetation resource on public lands within the Safford District is diverse, abundant and important to other resources and to the general ecology of the District. The significance of this resource is reflected in the riparian ecosystems, watershed condition, wildlife habitat, livestock forage, and water quality and quantity.

Riparian Communities The riparian areas of the District are composed of seven different plant communities. These communities are described as follows:

Mixed Broadleaf Riparian This type is a gallery forest with a double-layered canopy. The upper layer is composed of Arizona sycamore, Fremont cottonwood, velvet ash, Arizona walnut, Goodding willow and Bonpland's willow in various combinations of pure stands of a single species to mixed stands of three,

four, or five species. The understory comprises young trees of the above mentioned species as well as shrubs and trees from higher elevations. Forbs and grasses may or may not be present, depending upon disturbances and amount of shade.

Cottonwood-Willow Riparian This community is characterized by a gallery forest of Fremont cottonwood and Goodding willow along major drainages, usually below 3,000 feet elevation. This community is sometimes intermixed with mesquite and tamarisk as well as shrubs, grasses and forbs. The primary grass species associated with it are bermuda grass and giant sacaton.

Mesquite Bosque Large mesquite, with a closed canopy 30 to 45 feet high, characterize this community. A shrub layer may or may not be present. The major grass is giant sacaton. This community is located only along major drainages.

Tamarisk Bosque Tamarisk in pure stands or mixed with other short trees is found in disturbed or eroded areas along lower elevation streams and rivers and may occur on the edges of stock ponds.



Riparian Scrub This type is usually composed of a dense stand of narrowleaf shrubs. Dominant species are usually seepwillow, desert willow or coyote willow. Other species could include mesquite, catclaw and tamarisk.

Oak Riparian A continuous line of large oaks characterize this type, usually found above 4000 feet in elevation. Emory oak, Arizona white oak, Mexican blue oak and chittamwood are usually the dominant tree species. Other chaparral shrubs or mixed broad-leaf riparian tree species are intermixed with these.

Marshlands and Cienegas Associations of cattail, sedges and rushes dominate these areas. Salt grass may also be present at dryer edges.

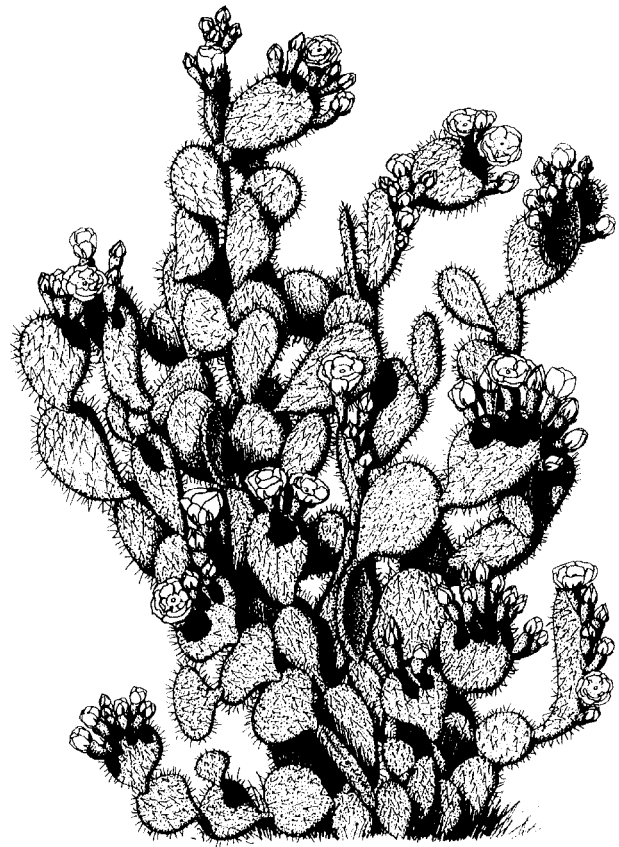
Approximately 7,906 acres (328 miles) of riparian vegetation have been defined in the District meeting the definition used by BLM. Of this acreage, 452 acres (11 miles) are classified as in excellent condition, 3,335 acres (100 miles) in good condition, 3,058 acres (150 miles) in fair condition and 1,061 acres (67 miles) in poor condition. In addition, 191 acres (10 miles) along the San Simon River were considered to have lost all riparian vegetation. Due largely to increased emphasis on riparian management over the past 10 years, the trend of most riparian areas is improving and much of the remainder is static. Overall, nearly 48 percent of the riparian vegetation within the District is classified as in good or better condition.

Upland Communities The District's upland or non-riparian vegetation was mapped into *Up/and Biotic Communities by Brown, Lowe and Pase (1979)*. The communities are described as follows:

Great Basin Conifer Woodland This community consists mainly of various junipers and several varieties of pinyon. Two small areas of public lands within the District contain some Ponderosa pine. Gambel oak is also present at the higher elevations. Mixed shrubs, forbs and grasses are usually present. This community comprises less than one percent of the public lands (about 42,200 acres) in the Safford District.

Madrean Evergreen Woodland This community, also relatively small (about 6,000 acres), is made up of evergreen oaks, various species of juniper and associated shrubs, forbs and grasses.

Interior Chaparral Pointleaf manzanita is the most abundant species in this community. It is associated with scrub oak and silk tassel. It usually forms a community that has a complete canopy cover with virtually no understory vegetation. This community occurs solely on granitic soils and covers less than one percent of the District (about 9,000 acres).



Scrub Grassland Tobosa grass, various grama grasses, shrubs and halfshrubs characterize this community. The most abundant shrubs are mesquite and whitethorn. Dominant halfshrubs are burroweed and snakeweed. This community comprises about 442,800 acres of public lands in the District.

Chihuahuan Desert Scrub This community is composed mainly of shrubs, principally mesquite, whitethorn, tarbush, creosote bush and mariola. Grasses are sparse or non-existent. This association covers about 592,100 acres of public lands in the District.

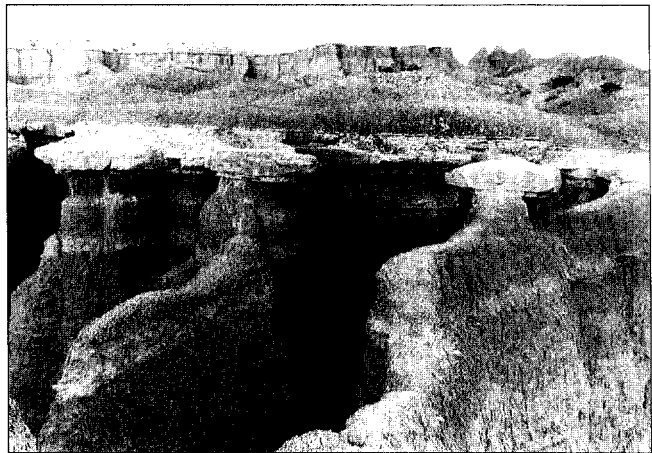
Sonoran Desert Scrub Dominant species are creosote bush, bursage, brittlebush, palo verde and cactus. This community is most prevalent on the lower portions of the western half of the District, covering about 300,000 acres. Grasses are relatively sparse.

The *End of Year Range Condition Report (1990)* lists about 66,000 acres in excellent condition, 542,000 acres in good, 406,000 acres fair, and 291,000 acres in poor condition and 111,000 acres unclassified. The apparent trend in rangeland condition is improving on

the vast majority of the District. This upward trend in condition is attributed to reductions in livestock numbers, better livestock management and increased rainfall in the past 10 years.

Threatened and Endangered Species

Several federally listed or candidate threatened and endangered plant species are found on public lands in the Safford District. Table 3-4 lists the species and their status.



Erosion of the soft rocks at Red knolls has resulted in a display of many unusual features.

Outdoor Recreation

The public lands provide the setting for a wide variety of recreation opportunities in the District. Though most opportunities are for dispersed activities, developed recreation sites are also present. Activities vary from off-highway vehicle driving to backcountry hiking in Aravaipa Canyon Wilderness or rafting in the Gila Box.

Some of the more common activities include hunting, fishing, hiking, backpacking, horseback riding, rockhounding, picnicking, camping, floatboating, sightseeing, birdwatching and nature study, photography and off-highway vehicle driving. Many of these activities do not require developed facilities.

Table 3-4. Threatened and Endangered Plant Species

Common Name	Scientific Name	Safford Status	Federal Status
PLANTS			
beeplant	Cleome multicaulis	?	2
night blooming cereus	Cereus greggii transmontanus	0	3c
Cochise pincushion cactus	Coryphantha robbinsorum	?	T
Arizona hedgehog cactus	Echinocereus triglochidiatus arizonicus	0	E
Pringle's fleabane	Erigeron pringlei	0	2
Lemmon's fleabane	Erigeron lemmonii	?	2
Bar-tram's echeveria	Graptopetalum bartramii	?	2
needle spine pineapple cactus	Echinomastus erectocentra	0	2
rosewood	Vauquelinia pauciflora	0	2

0 = Known occurrence
 ? = Probable occurrence
 E = Endangered
 T = Threatened
 2 = Federal candidate for listing
 3C= Larger representation than previously believed

Source: Safford District Files

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Arizona hedgehog cactus	Echinocereus triglochidiatus arizonicus	0	E
Pringle's fleabane	Erigeron pringlei	0	2
Lemmon's fleabane	Erigeron lemmonii	?	2
Bar-tram's echeveria	Graptopetalum bartramii	?	2
needle spine pineapple cactus	Echinomastus erectocentra	0	2
rosewood	Vauquelinia pauciflora	0	2

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Source: Safford District Files

Some facilities have been developed, however, for the benefit of the public. Fourmile Canyon Campground near Klondyke is used primarily by hunters and visitors to Aravaipa Canyon Wilderness. Three picnic sites have been built -two on the Gila River between Safford and Clifton, and a third at the foot of the Dos Cabezas Mountains near Bowie. Limited facilities are provided elsewhere. Signs, trash barrels, visitor register boxes and parking areas are provided at two rockhound areas, Safford-Morenci and Aravaipa Canyon Wilderness trailheads, and three access points to the San Pedro Riparian National Conservation Area. The old Safford-Clifton road has also been designated as the Black Hills Backcountry Byway and provides sightseeing opportunities for the public.

Areas of concentrated recreation use include hiking and backpacking in Aravaipa Canyon Wilderness; picnicking on the Gila River at the Old Safford-Clifton Road Bridge and Spring Canyon; picknicking on the Gila River near Winkelman, camping and picnicking at Bonita Creek; off-highway vehicle driving in the Gila Box (summer); northeast of Sierra Vista, and the Hot Well Dunes in the San Simon Valley southeast of Safford; floatboating the Gila and San Francisco rivers through the Gila Box (spring); and big and small game hunting Districtwide. Birdwatching and nature study occur mostly in riparian areas, particularly at Bonita Creek, Eagle Creek, Muleshoe Ranch, Guadalupe Canyon, Aravaipa Canyon and the San Pedro River.

The quality of the recreation experience in the District varies with the activity and the expectations people have of their experiences. High-quality experiences are generally available for most of the activities, though at times crowding and lack of facilities or information can diminish the experience. To maintain the wilderness setting and the quality of the backcountry experience, use of Aravaipa Canyon Wilderness is limited to 50 people per day. Special recreation use permits are issued by the District to control the numbers of visitors to protect the fragile resource and the wilderness experience.

Data on recreation use statistics is kept for Aravaipa Canyon Wilderness, Fourmile Canyon Campground, the two rockhound areas, the picnic site at the Old Safford-Clifton Road bridge and the three entry points to the San Pedro Riparian National Conservation Area. Use levels are generally stable Districtwide. Off-highway vehicle use at Hot Well Dunes, and floatboating in the Gila Box appear to be gaining in popularity. Visitor use is anticipated will continue increasing on the San Pedro and Gila Box Riparian National Conservation Areas as facilities are developed and the public lands are opened to further recreation use. Designated wilderness areas are also expected to receive increased recreation use.

Visual Resources

The landscape features of the District are varied and thus so is the visual, or scenic quality. While perceptions of scenery are individually determined, certain landscape features can be assessed. The form, line, color and texture (basic landscape elements) of the topography, soil, vegetation and human developments all affect a scene. Generally, a landscape with a harmonious variety of the basic elements will be more interesting and appealing.

Since the Basin and Range Physiographic Province is an area of broad, gently sloping valleys with rugged mountains rising abruptly above them, this Province includes a variety of landscape types with many scenic areas. The rugged topography of the Black Hills and the Gila, Mescal, Whitlock, Peloncillo, Mule and Dos Cabezas mountains provide varied landscapes and scenic views. The canyons of the Gila and San Francisco rivers and Aravaipa, Redfield and Swamp Springs creeks also provide interesting and scenic views. The combination of landform and vegetation creates outstanding scenery in other parts of the District, including the San Pedro River, Black Rock and Guadalupe Canyon. Soil erosion in the Bear Springs Flat area has created some interesting and scenic topographic features. Areas with less topographic and vegetation variability, and thus less scenic quality, include the creosote flats at the base of the Gila Mountains and the desert shrubs and grasslands along the San Simon River Valley.

Agricultural modification is evident along the Gila River from Safford to Fort Thomas, Interstate 10 near Bowie and San Simon, the Gila River near Duncan and the Aravaipa and San Pedro valleys. Mineral development has created significant changes to the landscape in the mountains north of Clifton and Morenci, in the Dripping Springs Mountains at Christmas, in the San Pedro Valley near San Manuel and in the San Simon Valley north of Interstate 10.

Visual resource management is a process used by BLM to identify and manage the scenic quality and to reduce the impact of development activities on the scenery. To manage the visual resources, management classes have been developed that describe the degree of landscape modification permissible (see Appendix 6 for management class definitions). Wilderness study areas are managed as Class II areas during the wilderness review process, unless previously designated Class I in prior planning. Table 3-5 identifies current acreage in the District by VRM class.

Table 3-5. Visual Resource Management Classes by Acreage

VRM Class	Acreage
I	131,716
II	17,287
III	489,063
IV	646,774
Unclassified	115,160
Total	1,400,000

Source: Safford District Files

Areas of Critical Environmental Concern and Other Types of Special Management

The District currently has no designated Areas of Critical Environmental Concern. Through the San Pedro Riparian Management Plan (BLM 1989), however, three Research Natural Area Areas of Critical Environmental Concern were recommended and those recommendations will be carried forward and implemented in this Resource Management Plan (see Maps 21 and 22). The San Pedro Area of Critical Environmental Concern proposals are:

St. David Cienega designate 350 acres to preserve a remnant cienega for scientific research.

San Pedro River designate 1,340 acres to preserve a cottonwood/willow riparian area, mesquite bosques and Chihuahuan Desert scrub vegetation for scientific research.

San Rafael designate 370 acres to preserve an alkali and giant sacaton grassland and a cottonwood-willow riparian area for scientific research.

The Willcox Playa (2,475 acres, eight miles southwest of Willcox) is a National Natural Landmark and has been managed to preserve the Pleistocene lakebed since its designation.

During the planning process, 34 areas were nominated as Areas of Environmental Concerns for consideration in this Resource Management Plan. See Tables 3-6 and 3-7. Dual nominations were received on several areas the nominated areas. A brief description of their values, and the determination of whether the areas qualify for consideration as Areas of Environmental Concerns. Areas of Environmental Concern proposals are referenced for various alternatives throughout Chapter 2, with a more detailed analysis of each area in Appendix 2.

Wild and Scenic Rivers

As required by FLPMA and the subsequent Guidelines for Fulfilling Requirements of the Wild and Scenic Rivers Act, BLM must study rivers that qualify for potential addition to the National Wild and Scenic Rivers System. Two rivers in this area (the Gila and San Francisco) were identified by the National Park Service in 1982 as needing further study, and are addressed in this document as well (See Appendix 3).

The Wild and Scenic River study process involves making an eligibility, classification and suitability determination. This Resource Management Plan/ Environmental Impact Statement will address only eligibility and classification as required by the Guidelines and will defer the suitability determination until a later date due to the need for further public involvement. Only through the detailed suitability assessment and further public involvement will BLM make a recommendation through the Secretary of the Interior to Congress on suitable Wild and Scenic Rivers. Only Congress has the authority to designate a Wild and Scenic River through this process.

Wilderness

On November 28, 1990, the Arizona Desert Wilderness Act was signed by President George Bush. The District now has seven designated wilderness areas: Aravaipa Canyon, Redfield Canyon, Fishhooks, Needles Eye, North Santa Teresa, Peloncillo Mountains and Dos Cabezas mountains totalling 84,622 acres. The remainder of the wilderness study areas which were not declared wilderness are now released from further study and returned to multiple use. Baker Canyon still remains as a Wilderness Study Area, but will be considered in future New Mexico wilderness legislation or released for other uses. Although the Gila Box was released from future study as wilderness, Congress declared the area a Riparian National Conservation Area.

Table 3-6. Area of Critical Environmental Concern Nominations

Nominated Area	Values/Hazards Requiring Special Management	Qualified for Study?
1. Aravaipa Canyon	riparian veg., native fish, T&E, wildlife, water quality	yes
2. Bass, Hot Springs, & Redfield Canyons	riparian veg., native fish, T&E wildlife, water quality	yes
3. Bonita Creek	city water supply, native fish, riparian veg., cultural resources	yes
4. Black Rock	unique vegetation, T&E wildlife	yes
5. Day Mine	aquatic, riparian vegetation	no
6. Dry Spring	relict riparian area	yes
7. Eagle Creek	scenery, riparian veg., sensitive wildlife	yes
8. Fishhook Canyon	riparian vegetation	no
9. Gila Box	scenery, riparian, T&E wildlife, native fish, geologic formations, recreation, cultural resources	yes
10. Gila River Canyon below Coolidge Dam	riparian veg., T&E wildlife, scenery, geologic formations	no
11. Gila River Mesquite Bosque	remnant vegetation type	yes
12. Javelina Peak	paleontological, wildlife	no
13. Johnny Creek	scenery	no
14. Markham Creek	riparian veg., T&E wildlife	no
15. Mescal Creek	riparian veg., native fish	no
16. Mescal Mountains	relict desert grasslands, T&E plant	yes
17. Muleshoe Coop Management Area	riparian veg., T&E wildlife, native fish, water quality	yes
18. Pilaes and Sombrero Butte	relict desert grasslands	yes
19. Salt Creek	riparian veg., wildlife, cultural resources	no

Table 3-6. Area of Critical Environmental Concern Nominations

Nominated Area	Values/Hazards Requiring Special Management	Qualified for Study?
20. Swamp Spring Canyon	riparian veg., sensitive wildlife, native fish	yes
21. Sycamore Canyon	riparian veg., scenery	no
22. Turtle Mountain	wildlife, scenery	no
23. Trujillo Canyon	riparian veg., scenery	no
24. Turtle Mountain	relict desert grassland	no
25. Bear Springs Badlands	paleontological resources, scenery	yes
26. Red Knolls	natural hazard	no
27. Baker/Guadalupe Canyons	riparian, T&E wildlife, vegetation, scenery	yes
28. Bowie Mtn/Apache Pass	scenery, T&E wildlife, cultural resources	yes
29. Dos Cabezas Peaks	historic landmark, vegetation, scenery	yes
30. Government Peak	geologic formations, scenery, cultural resources	no
31. Happy Camp, Howell and Tar Box Canyons	scenery, historic sites, riparian	no
32. Peloncillo Mountains	geologic formations, cultural resources, wildlife, scenery	yes
33. San Francisco River	riparian, wildlife, native fish, cultural resources	no
34. San Simon Cienega	riparian wetland	no
35. Willcox Playa	natural landmark, T&E plants and wildlife, geologic formation, cultural resources	yes
36. Coronado Mountain	unique vegetation	yes
37. 111 Ranch	paleontological resources	yes

Source: Safford District Files

Table 3-7. District Wilderness Status

Location	Total Acreage
<i>Designated Wilderness</i>	
1. Needle's Eye	9,201
2. North Santa Teresa (Black Rock)	6,590
3. Fishhooks	10,883
4. Peloncillo Mountains	19,650
5. Dos Cabezas Mountains	11,988
6. Redfield Canyon (Galiuro Add.)	6,600
7. Aravaipa Canyon	19,710
<i>National Conservation Area</i>	
8. Gila Box Riparian NCA	20,900
9. San Pedro Riparian NCA	54,189
<i>Wilderness Study Area</i>	
10. Baker Canyon	812
11. Hoverrocker**	22 N.M. acreage
12. Peloncillo Mountains**	4,061 N.M. acreage
<i>Areas released from further study</i>	
13. Gila Box	17,831
14. Turtle Mountain	17,422
15. Day Mine	17,309
16. Javelina Peak	18,853
17. Bowie Mountain	6,156
18. Hoverrocker (Arizona)	2,769

*Entire WSA in New Mexico

Source: Safford District Files

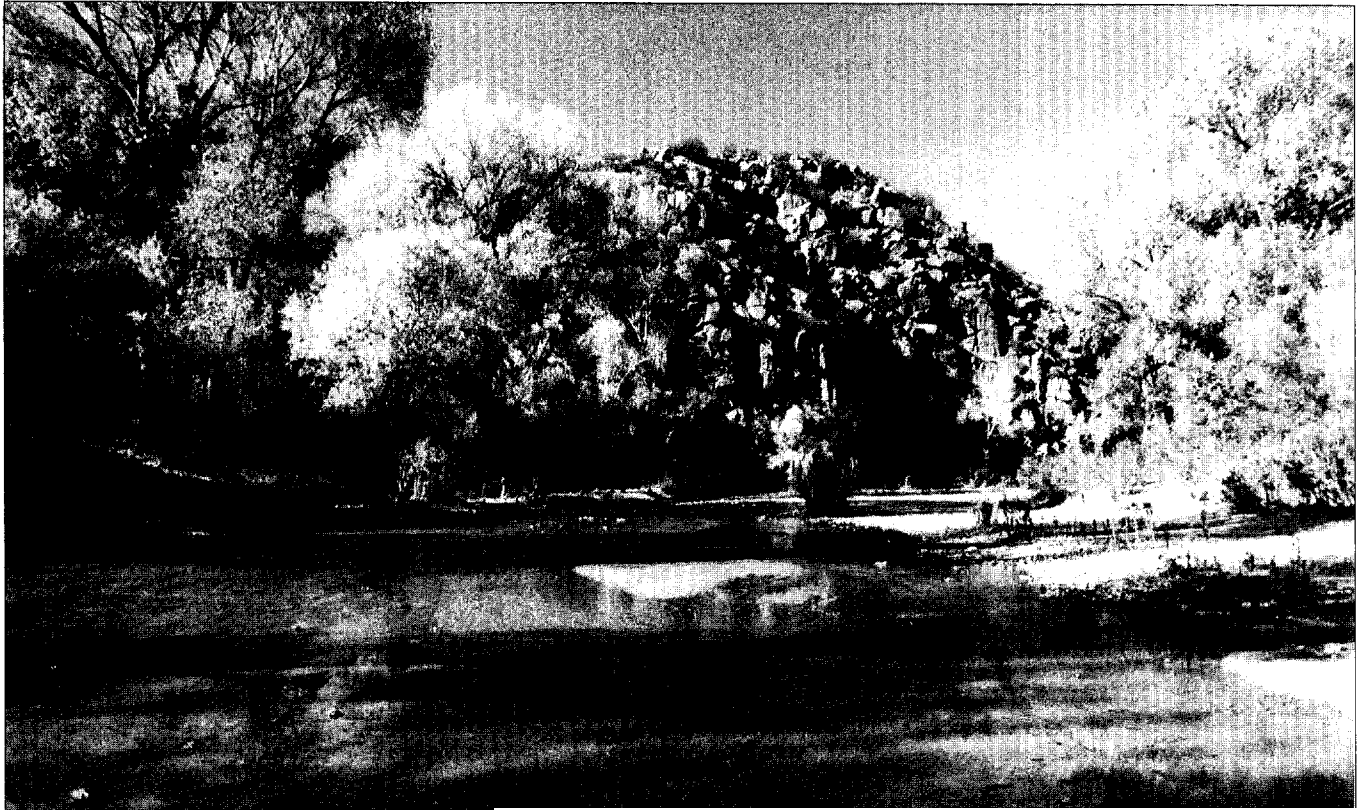
Fire Management

The fire management program in Safford District is separated into two different components, the wildfire suppression component and the prescribed fire component.

Wildfire During the past eight years, the District has averaged over 18 fires annually, burning slightly over 1,826 acres per year. These figures represent an increase from 10 fires each year and 1,310 acres per year for the previous 10 years. Increased frequency can be attributed to improved record keeping, an increase in winter and spring rainfall, and to increased



The coati spends hot summer afternoons napping in the shade of wooded canyons.



The San Pedro Riparian National Conservation Area, dedicated in 1989, is one of the best remaining desert riparian areas in the Southwest.

forage conditions due to intensive range management efforts brought about since the completion of the grazing EIS.

Present fire policy dictates that suppression action be taken on all fire starts, with the most intensive action taken when life, property or critical resources are threatened. Such areas have been delineated and planned for in the District Fire Management Plan.

One of the more critical vegetation types in the District is the Mixed Broadleaf Riparian. The components of this type are very susceptible to fire damage. Ordinarily, there are not enough contiguous fuels to successfully carry a fire very far and most fires in this type are small.

The more significant fires with respect to size occur in the scrub grasslands in the higher elevations, in the Sonoran Desert Scrub, in the higher elevations and in the Chihuahuan Desert Scrub. The amount of annual rainfall plays a very significant role in fire size and intensity, since rainfall affects the presence of fine fuels (grasses) needed to carry the fire from one area to the next.

Prescribed Fire has been used to a limited extent in the past for vegetation manipulation to reduce

heavy brush concentrations, to open areas for increases in grass species or better forage quality and to provide easier movement of both livestock and wildlife. Such fires are restricted to those times and places where control of the fire can be maintained. Certain conditions (prescriptions) must be met before ignition and maintained during the burning. Because of the difficulty of meeting prescription conditions, this technique of vegetation manipulation has not been extensively used. Where it has been used, however, the results have been favorable. Increased use of prescribed fire as a resource management tool is currently being planned.

Social and Economic Conditions

The Resource Management Plan socio-economic conditions of each of these counties. The source of the information is the *Arizona Statistical Review (Valley National Bank 1988)*.

Greenlee County Greenlee County, named for Mason Greenlee, an early southeastern Arizona pioneer, was created in 1909. Its topography consists of mountain ranges, river valleys and deserts. The County has a land area of 1,838 square miles. Land

ownership is 79 percent federal, 12 percent state and 9 percent private. The major communities are Clifton, the county seat, (4,215 people, 1988 estimate) and Duncan (690 people). The unincorporated mining town of Morenci is also located in the county. County population in 1980 was 11,406. The estimated population for 1988 was 9,500, a 17 percent decrease. Population projections for the year 2000 are 9,100, a continued decrease. Population density in 1988 was 5.2 people per square mile.

The principal industries of Greenlee County are copper mining and smelting, ranching and tourism. The following Table 3-8 shows employment figures.

Personal income totalled \$77,400,000 in 1986, down from previous years. Per capita income was \$9,003, 32 percent lower than the state average of \$13,300. Per capita income, however, was comparable or higher than previous years in Greenlee County. The following Table 3-9 shows economic indicators for Greenlee County.

Table 3-8. Employment in Greenlee County

Employment Status	Monthly Avg.-1987	June 1998
Total Employed	2,950	2,675
Unemployed Number	275	275
Rate (seasonally adjusted)	8.5%	9.7%
Non-farm Wage and Salary	3,175*	2,875
Manufacturing	25	75
Mining	1,575	1,600
Construction	625	225
Transportation & Public Utilities	50	50
Wholesale/Retail Trade	225	225
Finance, Insurance & Real Estate	25	25
Services	125	125
Government	525	550
Farm and Agricultural Related Wage & Salary and Self-Employed		No figures available.

*Many non-farm Wage and Salary employees work in Greenlee County but reside elsewhere.

Source: Arizona Statistical Review, Valley National Bank, 1998.

Table 3-9. Economic Indicators in Greenlee County

Indicator	1977	1987	% Change
Population	11,900	9,600	- 19.3%
Wage & Salary Employment	3,825	3,175	- 17.0%
Retail Sales	\$30,179,000	\$37,736,000	+ 25.0%
Bank Deposits	\$29,761,000	\$45,117,000	+ 51.6%
Vehicle Registrations	10,016	7,731	- 22.8%
Motor Fuel Consumption (gals.)	4,930,000	3,670,584	- 25.5%

Source: Arizona Statistical Review, Valley National Bank, 1988.

Graham County was probably named after Lieutenant Colonel Graham, a member of an 1850s survey party. The Gila River crosses the county from east to west and many farms flourish along its banks. The county has a land area of 4,630 square miles, with 22 square miles of water. Land ownership is 38 percent federal, 18 percent state, 37 percent Indian reservation and 7 percent private. The leading towns are Safford, the county seat, (7,755

people, 1988 estimate), Thatcher (3,485) and Pima (1,935). County population in 1980 was 22,862. The estimate for 1988 was 24,800, an increase of 8.5 percent. Population projections for the year 2000 are 26,300, an increase of 15 percent from 1980. Population density in 1988 was 5.4 people per square mile.

The principal industries of Graham County are farming and ranching, tourism and recreation. The following Table 3-10 shows employment figures.

Table 3-10. Employment in Graham County

Employment Status	Monthly Avg.-1987	1988
Total Employed	6,975	7,300
Unemployed		
Number	775	750
Rate (seasonally adjusted)	10.0%	9.1%
Non-Farm Wage and Salary	4,825	5,000
Manufacturing	200	200
Construction	175	200
Transportation & Public Utilities	150	150
Wholesale/Retail Trade	1,275	1,625
Finance, Insurance & Real Estate	125	125
Services	800	875
Government	2,100	1,825
Farm & Agricultural Related Wage & Salary and Self-Employed	2,150	2,300

Source: Arizona Statistical Review, Valley National Bank, 1988

Table 3-11. Economic Indicators in Graham County

Indicator	1977	1987	% Change
Population	21,000	24,700	+ 17.6%
Wage & Salary Employment	4,175	4,825	+ 15.6%
Retail Sales	\$71,241,000	\$78,427,000	+ 10.1%
Bank Deposits	\$59,342,000	\$98,779,000	+ 66.5%
Vehicle Registrations	14,727	18,083	+ 22.8%
Motor Fuel Consumption (gals.)	13,230,000	9,174,342	- 30.7%

Source: Arizona Statistical Review, Valley National Bank, 1988

Personal income totalled \$185,100,000 in 1986, higher than previous years. Per capita income was \$7,810, 41 percent lower than the state average of \$13,300. Per capita income, however, was higher than previous years in Graham County. Table 3-1 1 shows economic indicators for Graham County.

Gila County Gila County was named for the Gila River and is dominated by desert and mountainous terrain. The county has a land area of 4,752 square miles, with 41 square miles of water. Land ownership is 59 percent federal, 1 percent state, 37 percent Indian reservation and 3 percent private. The leading towns are Payson (7,745 people, 1988 estimate), Globe, the county seat (6,435), and Miami (2,545). County population in 1980 was 37,080. The estimate for 1988 was 40,500, an increase of 8.5 percent. Population projections for the year 2000 are 45,800, an increase of 19 percent from 1980. Population density in 1988 was 8.5 people per square mile.

The principal industries of Gila County are copper mining and smelting, ranching, lumber, tourism and recreation. The following Table 3-12 shows employment figures.

Personal income totalled \$357,200,000 in 1986, up steadily from previous years. Per capita income was \$8,997, 32 percent lower than the state average of \$13,300. Per capita income, however has increased from previous years. Table 3-1 3 shows economic indicators for Gila County.

Pinal County Pinal County probably received its name from the Western Apache word meaning deer. The county is divided into two distinct regions in geography and economy. The eastern part is characterized by mountains and copper mining. The western region is mainly low desert valleys and irrigated agriculture. The county has a land area of 5,344 square miles, with 30 square miles of water. Land ownership is 16 percent federal, 35 percent state, 23 percent Indian reservation and 26 percent private. The leading towns are Casa Grande (17,660 people, 1988 estimate), Apache Junction (15,950), Coolidge (7,720), Eloy (7,345), Florence, the county seat (6,890), and Superior (4,860). County population in 1980 was 90,918. The estimate for 1988 was 110,300, an increase of 17.5 percent. Population projections for the year 2000 are 149,100, an increase of 39 percent from 1980. Population density in 1988 was 20.6 people per square mile.

Table 3-12. Employment in Gila County

Employment Status	Monthly Avg.-1987	June 1988
Total Employed	10,800	10,900
Unemployed		
Number	1,500	1,350
Rate (seasonally adjusted)	12.2%	10.9%
Non-farm Wage & Salary	10,250	10,525
Manufacturing	1,300	1,325
Mining	1,275	1,375
Construction	675	600
Transportation & Public Utilities	425	400
Wholesale/Retail Trade	2,150	2,425
Finance, Insurance & Real Estate	275	275
Services	1,700	1,750
Government	2,450	2,375
Farm & Agricultural Related Wage & Salary and Self-Employed	550	375

Source: Arizona Statistical Review, Valley National Bank, 1999.

Table 3-13. Economic Indicators in Gila County

Indicator	1977	1987	% Change
Population	34,300	40,100	+ 16.9%
Wage & Salary Employment	10,075	10,250	+ 1.7%
Retail Sales	\$104,160,000	\$142,522,000	+ 36.8%
Bank Deposits	\$93,827,000	\$230,193,000	+145.3%
Vehicle Registrations	31,399	46,471	+ 48.0%
Motor Fuel Consumption (gals.)	20,443,000	20,059,033	- 1.9%

Source: Arizona Statistical Review, Valley National Bank. 1989

The principal industries of Pinal County are farming and ranching, copper mining, tourism and manufacturing. Table 3-1 4 shows employment figures.

\$13,300. Per capita income, however, has increased from previous years. The following Table 3-1 5 shows economic indicators for Pinal County.

Personal income totalled \$939 million in 1986, up steadily from previous years. Per capita income was \$9,170, 31 percent lower than the state average of

Cochise County Cochise County was named after the famed Chiricahua Apache leader. The county has a land area of 6,219 square miles. Land ownership is

Table 3-14. Employment in Pinal County

Employment Status	Monthly Avg.-1987	June 1988
Total Employed	33,425	33,675
Unemployed		
Number	4,175	3,275
Rate (seasonally adjusted)	11.1%	8.3%
Non-Farm Wage & Salary	28,900	20,100
Manufacturing	3,525	3,750
Mining	3,775	3,900
Construction	1,500	1,300
Transportation & Public Utilities	1,100	1,225
Wholesale/Retail Trade	5,125	5,250
Finance, Insurance & Real Estate	800	800
Services	4,175	4,200
Government	8,900	8,675
Farm & Agricultural Related Wage & Salary and Self-Employed	4,525	4,575

Source: Arizona Statistical Review. Valley National Bank. 1989

Table 3-15. Economic Indicators in Pinal County

Indicator	1977	1987	% Change
Population	87,100	107,200	+ 23.1%
Wage & Salary Employment	23,625	28,900	+ 22.3%
Retail Sales	\$276,745,000	\$362,742,000	+ 31.1%
Bank Deposits	\$163,348,000	\$477,941,000	+ 192.60%
Vehicle Registration	64,037	100,822	+ 57.4%
Motor Fuel Consumption(gal.)	43,824,000	65,373,638	+ 49.2%

Source: Arizona Statistical Review, Valley National Bank. 1988.

24 percent federal, 34 percent state and 42 percent private. The leading towns are Sierra Vista (34,290 people, 1988 estimate), Douglas (14,105), Bisbee, the county seat (8,065), Willcox (4,045) and Benson (3,975). County population in 1980 was 85,686. The estimate for 1988 was 102,400, an increase of 16 percent. Population projections for the year 2000 are 129,000, an increase of 33.5 percent from 1980. Population density in 1988 was 16.5 people per square mile.

The principal industries of Cochise County are farming and ranching, tourism and military. Table 3-16 shows employment figures.

Personal income totaled \$960,300,000 in 1986, up steadily from previous years. Per capita income was \$9,952, 25 percent lower than the state average of \$13,300. Per capita income, however, has increased from previous years. The following Table 3-17 shows economic indicators for Cochise County.

Table 3-16. Employment in Cochise County

Employment Status	Monthly Avg.-1987	June 1988
Total Employed	31,850	31,525
Unemployed		
Number	3,050	2,900
Rate (seasonally adjusted)	8.7%	8.3%
Non-farm Wage and Salary	24,700	24,600
Manufacturing	1,300	1,150
Mining	100	100
Construction	1,125	1,200
Transportation & Public Utilities	1,550	1,600
Wholesale/Retail Trade	5,425	5,375
Finance, Insurance & Real Estate	675	650
Services	4,350	4,525
Government incl. military	10,075	10,000
Farm & Agricultural Related		
Wage & Salary and Self-Employed	7,150	6,925

Source: Arizona Statistical Review, Valley National Bank 1988.

Table 3-17. Economic Indicators in Cochise County

indicator	1977	1987	% Change
Population	80,700	100,300	+ 24.3%
Wage & Salary Employment	18,900	24,700	+ 30.7%
Retail Sales	\$232,229,000	\$329,854,000	+ 42.0%
Bank Deposits	\$195,431,000	\$412,864,000	+111.3%
Vehicle Registrations	60,226	81,251	+ 34.9%
Motor Fuel Consumption (gals.)	50,297,000	40,721,989	- 19.0%

Source: Arizona Statistical Review, Valley National Bank 1998.

Payments in Lieu of Taxes (PILT) As required by law, the federal government makes a payment to each county that has federal lands (public land, national forest, national parks, etc.) in its boundaries. This payment is called a Payment in Lieu of Taxes and is made to compensate county governments for tax revenues that would be collected if federal lands were in private ownership. Table 3-18 identifies the payments that were made to the counties in the Safford District in 1990.

expanded as more and more people use these lands. There is an interest or advocacy group associated with nearly every program BLM manages. As such, public attitudes about how BLM manages the public lands cover the entire spectrum from support to opposition. Because there are so many uses of the public lands, there are many opportunities for user conflicts. As such, a decision that one user may find agreeable, may adversely affect or preclude the desired activity by another user.

Public Attitudes and Perceptions With the growth of the Bureau into intensive management of the multiple uses, BLM constituents have also grown. Public involvement in management of the public lands has

Table 3-18. PILT Payments by County in 1990

County	PILT Payment	1988 Est. Population	Federal Entitlement Acres
Cochise	\$611,561	102,400	955,238
*Gila	706,085	40,500	1,794,355
Graham	589,379	24,800	1,126,016
Greenlee	89,769	9,500	929,292
* Pinal	359,429	110,300	940,851

*Only parts of these counties are in the Safford District

Source: Safford District Files