

Chapter Three



Chapter 3 - Affected Environment

3.1 Introduction

This chapter describes the environmental components of BLM-administered Federal lands within the planning areas that would potentially be affected by implementation of the proposed RMPs/EIS. These environmental components include lands, vegetation, wildlife habitat, cultural and paleontological resources, recreation, wilderness, rangeland, minerals, visual resources, wild horses and burros, soils, water, air quality, and socioeconomics. The data contained within this chapter is drawn from the Management Situation Analysis (BLM PFO 2003), and detailed resource assessments completed for each of the environmental components occurring within the planning area. The detailed resource assessments and the Management Situation Analysis are available for public review at the BLM's Phoenix District.

3.2 Special Area Designations

3.2.1 Introduction

Special Area Designations describe areas which have special values that warrant or require special management or protection. These areas, which are specifically addressed through this planning process, include Areas of Critical Environmental Concern (ACEC), Scenic and Back Country Byways, Wilderness Areas (WAs), and areas designated as part of the Wild and Scenic River System.

3.2.2 Wilderness Areas

Five congressionally designated wilderness areas administered by BLM are located within the Bradshaw-Harquahala Planning Area, including the Big Horn Mountains Wilderness, Harquahala Mountains Wilderness, Hassayampa River Canyon Wilderness, Hells Canyon Wilderness, and Hummingbird Springs Wilderness (Map 1-1). Castle Creek Wilderness, administered by the U.S. Forest Service, is located next to BLM-managed lands in the Bradshaw-Harquahala Planning Area. Agua Fria National Monument does not have designated wilderness. BLM-managed wilderness totals 96,820 acres within the planning areas.

3.2.3 Areas of Critical Environmental Concern (ACECs)

ACECs are areas where unique resources exist, making them worthy of a higher level of concern and protection. A designation of an ACEC on BLM-managed lands requires approval by the Arizona State Director, who can also remove the designation. Once an ACEC is designated, the focus of management is to preserve and restore the resources that inspired the recommendation for designation.

There are two ACECs located within the Agua Fria National Monument. The first is the Perry Mesa ACEC, encompassing 9,580 acres, which was designated in 1988 to protect its significant cultural resources, and the second is the Larry Canyon ACEC, totaling 80 acres, which was designated in 1988 to protect its unique riparian-forest/desert ecosystem habitat. Currently, the Bradshaw-Harquahala Planning Area does not have ACECs.

3.2.4 Wild and Scenic Rivers

BLM is an active participant in managing designated wild, scenic, and recreational rivers. It is also involved in studying the eligibility, classification, and suitability of rivers. Presently, there are not any officially designated wild and scenic rivers flowing within either planning area. Portions of the Agua Fria River were identified in the 1994 Arizona Statewide Wild & Scenic Rivers Legislative Environmental Impact Statement (BLM 1994b) as being suitable for designation. More specifically, in the Final Legislative Environmental Impact Statement for Wild and Scenic Rivers (BLM 1994), the Agua Fria River was found to have outstandingly remarkable values for its scenic characteristics, fish and wildlife habitat, and cultural resources. The scenic value reflects the topographic diversity and ancient volcanic activity of the area. Mesas and grasslands border a lush riparian valley surrounded by cliffs. The fish and wildlife habitat is representative of a rare riparian system that supports wildlife populations in the desert. The value of the landforms and habitat contributed to the development of one of the most important systems of late prehistoric archaeological sites in central Arizona. While awaiting congressional determination of designation, BLM is managing these river portions under the 1968 National Wild and Scenic Rivers Act and according to guidance in BLM's Manual 8351, Section 53.

According to the Agua Fria River Wild and Scenic River Study Area EIS (BLM 1994a), three river segments totaling 22.4 miles qualify for designation as either wild, scenic, or recreational depending on the segment characteristics see (Table 3-1).

Additionally, portions of the Hassayampa River were identified suitable for further study in the wild and scenic river evaluation process. However, in the *Proposed*

Table 3-1. Special Area Designations: Wild and Scenic Rivers

River/ Classification Eligibility	Distance	Location
Agua Fria River/Scenic	7.7 miles	Sycamore Creek to the juncture of Bloody Basin Road at Horseshoe Ranch.
Agua Fria River/Wild	10.3 miles	Horseshoe Ranch to the Arizona Department of Transportation pump house.
Agua Fria River/Scenic	4.4 miles	Segment between pump house to Larry Canyon.

Alternative developed in the 1994 Arizona Statewide Wild and Scenic Rivers Legislative EIS, BLM determined after further study that the Hassayampa River was not suitable. Therefore, BLM did not recommend the river to Congress for inclusion in the National Wild and Scenic River System (WSR).

3.2.5 Back Country Byways

Agua Fria National Monument does not have designated Back Country Byways. In the Bradshaw-Harquahala Planning Area, the Harquahala Mountain Summit Road Scenic Drive is designated a Back Country Byway. Located 40 miles west of Wickenburg, it includes 10.5 miles of dirt vehicle route leading from Eagle Eye Road to the Harquahala Peak Observatory.

3.3 Lands and Realty

3.3.1 Land Tenure

BLM is authorized under several authorities to acquire, dispose of, convey, and lease

portions of the federally owned land it manages for the benefit of the national interest. Land tenure decisions select lands for retention, proposed disposal, acquisition, or lease. The Federal Land Policy and Management Act (FLPMA) requires that BLM-managed lands be retained in Federal ownership unless BLM determines through the land use planning process that conveyance of a particular parcel will serve the national interest (43 USC 1701). Land tenure decisions must achieve the goals, standards, and objectives outlined in the land use plan. Land tenure options include the following:

- land purchase,
- land exchange,
- land conveyance by public sale, and
- land patents and leases under the 1954 Recreation and Public Purposes (R&PP) Act.

Land ownership in the planning area is a complex mosaic of Federal, State, and private lands. As shown in Table 3-2, BLM, the Arizona State Land Department (ASLD) and private owners each administer about one-third of the area.

3.3.2 Agua Fria National Monument (AFNM)

Agua Fria National Monument is located in Yavapai County, in central Arizona, 40 miles north of Phoenix. The 70,900 acres of Federal land consist of Perry Mesa and Black Mesa, the public land to the north of these mesas, and the Agua Fria River Canyon.

The national monument has 1,444 acres of scattered private lands within its boundary. In addition to recreation and hunting, the most common uses for these lands are ranching and mining.

As a requirement of the January 2000 Monument Proclamation (Appendix A), all Federal lands and interests in lands within the monument are appropriated and withdrawn from all forms of entry, location, selection, sale, leasing, or other disposition under the public land laws. This protection furthers the purposes of the monument. Although existing withdrawals, reservations, or appropriations are not revoked within the monument, Federal lands may not be disposed of. Lands and interests in lands within the monument that are not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

Table 3-2. Details of Land Ownership within the Planning Area

Surface Management	Agua Fria National Monument	Bradshaw-Harquahala	Total Acreage	Percentage of total (%)
Federal				
Bureau of Land Management	70,900	896,100	967,000	30%
National Forest Land	0	308,300	308,300	10%
Bureau of Reclamation	0	2,670	2,670	<1%
Subtotal	70,900	1,207,070	1,277,970	41%
State and County				
Arizona State Land Department (ASLD)	0	863,450	863,450	28%
State and County Parks	0	52,770	52,770	2%
County Lands	0	2,220	2,220	<1%
Subtotal	0	918,440	918,440	30%
Tribal Lands	0	450	450	<1%
Private Lands	1444	841,366	842,810	28%
Total	72,344	2,967,326	3,039,670	100%

3.3.3 Bradshaw-Harquahala Planning Area

The Bradshaw-Harquahala Planning Area is located within Maricopa, Yavapai, and La Paz Counties. It includes portions of the Phoenix metropolitan area, the fourteenth largest and one of the fastest growing metropolitan areas in the United States. This planning area also includes the following:

- The cities of Glendale, Peoria, Surprise, El Mirage, and Litchfield Park; portions of the cities of Phoenix, Prescott, Avondale, and Goodyear; portions of the towns of Buckeye and Prescott Valley.
- The unincorporated communities of Sun City, Sun City West, Sun City Grand, Black Canyon City, Castle Hot Springs, Cordes Junction, Mayer, Humboldt, Dewey, Morristown, Congress, Yarnell, and Aguila; and portions of the unincorporated communities of New River and Tonopah.

BLM issues permits in response to requests for public-use easements or rights-of-way across the planning area. These easements are generally confined to clearly identified corridors. Corridors may be used for highways, railroads, and utilities including electric, gas, water and communications. Information on corridors appears in the Utility and Communications Corridors section of this chapter (Table 3-3).

In some cases land ownership is separated into (1) surface interests and (2) subsurface or mineral estate interests. BLM administers 945,160 acres of mineral estate within the planning areas. Where one party owns the surface estate and another owns the mineral estate, the land is termed "split estate."

Table 3-3. Existing Utility Corridors

Corridor Name	Width	Current Utility/Transportation Uses
Black Canyon	2 miles	Electricity, Gas
Wickenburg-Yarnell	1 mile	Transportation
Meade-Phoenix	1 mile	Electricity
Parker-Liberty	2 miles/varies	Electricity
Palo Verde-Devers	1 mile	Electricity
CAP Canal	1 mile	Water
Palo Verde-West Wing	1 mile	Electricity
Wenden-Wickenburg	1 mile	Transportation

A total of 54,370 acres within the Bradshaw-Harquahala Planning Area have been determined to be suitable for disposal. More than 100,000 acres in the Bradshaw-Harquahala Planning Area—mainly State and privately owned lands—have been determined to be potentially suitable for acquisition. BLM has acquired some lands since the adoption of the previous plans. The most commonly employed criterion for acquisition continues to be to create contiguous blocks of federally managed lands.

3.3.4 Utility and Communications Corridors

BLM easement procedures, including corridor designation, are set out in the BLM Rights-of-Way Manual, Sections 2801.11 and 2801.12. FLPMA and this manual are consistent in saying that designated utility corridors should include existing facilities that would lend themselves to a corridor designation. Once corridors have been designated, all future assigned uses should be compatible with existing uses. The eight major designated corridors within the Bradshaw-Harquahala Planning Area are listed in Table 3-3 and shown in Map 2-

7. Their widths and general-use categories are also shown in Table 3-3. A portion of the Black Canyon utility corridor runs parallel to Interstate 17 and edges into Agua Fria National Monument along its western boundary.

The existing corridors were designated in accordance with BLM's regulations in effect at the time of designation. While the corridor locations have not changed since they were shown in the Lower Gila North Management Framework Plan (BLM 1983) and the Phoenix RMP and EIS (BLM 1988a), the regulatory framework and adjacent BLM's area designations have changed.

Each of the existing utility corridors, except Wickenburg–Yarnell, has at least one active right-of-way occupying its full length.

National monument status for the Agua Fria area dictates that no new utility corridors will be designated on monument lands. Existing utilities as shown in Map 2-3, including the Black Canyon utility corridor, comply with regulations as prior existing uses.

The BLM's Rights-of-Way Manual, Section 2801.12, states that microwave communication sites, associated pathways, and communication lines for interstate use are to be considered for designation as corridors. Some of the designated communication site corridors in the Bradshaw-Harquahala Planning Area existed when the manual went into effect. The nine communication sites within the Bradshaw-Harquahala Planning Area are Lone Mountain, Harquahala Mountain, Burnt Mountain, Valencia, Black Canyon, and White Tank Mountain Park sites (North, Middle, East, and West). No communication sites are within the national monument.

3.3.5 Transportation Corridors

Transportation corridors are included as a part of the utility corridors in both planning areas. These corridors were first identified in the Phoenix RMP and EIS (BLM 1988a). All of the information about existing utility corridors also applies to the transportation corridors. Designated corridors that contain highways and railroads are shown on Map 2-7.

In the Bradshaw-Harquahala Planning Area the highway study corridor that appears in the Maricopa Association of Governments (MAG 2003) Long Range Transportation Plan 2003 Update (MAG 2002) is the CANAMEX Trade Corridor. The CANAMEX corridor, as defined by Congress in the 1995 National Highway Systems Designation Act, is a high-priority corridor. It follows Interstate 19 from Nogales to Tucson, I-10 from Tucson to Phoenix, U.S. 93 from near Phoenix to Las Vegas, and Interstate 15 from Las Vegas through Montana to the Canadian border.

A MAG resolution for designating the CANAMEX corridor through the Maricopa region included a recommendation for a portion of it to be “an alignment in the general vicinity of Wickenburg Road and Vulture Mine Road that connects to the future U.S. 93/U.S. 60 Wickenburg Bypass, the specific alignment of which is to be determined following the completion of needed studies by ADOT; and the future U.S. 93/U.S. 60 Wickenburg bypass from its junction with Vulture Mine Road to U.S. 93” (MAG 2002).

Railroads, particularly freight, are a key part of the transportation system within the planning areas. Rail is not considered a factor in designating more corridors because no new rail line locations are likely to be proposed in the foreseeable future.

3.4 Soil, Air, and Water Resources

3.4.1 Soil Resources

Most of the planning areas are located within the Basin and Range Geologic Province. The northern sections fall within the Central Highlands. The basins generally consist of surficial and sedimentary deposits. The mountain ranges consist of granitoid and metamorphic rock. The Bradshaw-Harquahala Planning Area includes several mountain ranges. The White Tank Mountains, Harquahala Mountains, and mountain ranges surrounding the town of Wickenburg are in the Basin and Range Province. The Bradshaw Mountains are within the Central Highlands region.

Geologic faults in central Arizona are generally short, discontinuous, normal faults that date back to the Quaternary Period, the last two million years. The Verde Fault, a potentially active fault, is located 25 miles northeast of Prescott near the town of Jerome. The only areas of concern for earthquake hazard within the planning areas are at the moderate to low level for the northern portions near Prescott. The remainder of the planning areas is in the low hazard level. The last known earthquake in the planning areas occurred near Constellation, Arizona in 1930.

Soil consists of mineral particles of different sizes, organic matter, and many species of living organisms. The planning areas contain a wide array of soil textures, including various types of cobble, gravel, clay, loam, silt, sand, and stone as shown in Map 3-1.

Soil texture in the monument is mainly clay loam. Small portions along the monument's southern boundary and the southern portion

of the Agua Fria River are classified as very gravelly-sandy loam.

The Bradshaw-Harquahala Planning Area contains a more complex soil composition. Southern portions consist of an assortment of gravelly-sandy loam textures. However, the Hummingbird Springs and Big Horn Mountains Wilderness Areas, and White Tank Mountain Regional Park, contain soil textures that are extremely stony-coarse, sandy loam. Areas, immediately surrounding these regions, have extremely gravelly-sandy loam. Additionally, the southeast corner of this planning area has one large parcel containing fine-sandy loam just west of the Agua Fria River. Soil on the eastern side of the Agua Fria is classified as loam.

3.4.2 Air Resources

The climate in central Maricopa, La Paz, and Yavapai Counties, including the planning areas is characteristic of the Sonoran Desert, with hot summers, mild winters, and annual average precipitation totals of about 8 inches (Map 3-2). From 1960 to 1995, the long-term annual average rainfall was 7.99 inches, and the median rainfall was 7.62 inches (CH2M HILL et al. 1997).

Air quality is evaluated by measuring ambient concentrations of pollutants known to have deleterious effects. The Environmental Protection Agency (EPA) has issued primary and secondary National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), particulate matter (PM₁₀), ozone (O₃), sulfur dioxide (SO₂), and lead (Pb). Primary standards are adopted to protect public health, and secondary standards are adopted to protect public welfare. States are required to adopt ambient air quality standards that are at least as stringent as the Federal NAAQS. The Arizona Department of Environmental

Quality (ADEQ) regulates air quality in the State and has adopted the Federal NAAQS as State standards. The Maricopa Association of Governments (MAG) was designated by the Governor as lead air quality planning agency for the Phoenix metropolitan area, and prepares air quality plans for nonattainment area pollutants.

EPA has designated several places within Arizona as nonattainment areas for criteria pollutants. Once an area has been designated as a nonattainment area, the State's implementation plan must be developed to show the measures that will be undertaken to reduce the pollutant levels to meet the air quality standards. Cumulative air quality impacts in the planning areas have been addressed by the air quality nonattainment plans and air quality maintenance plans that MAG and ADEQ have been required to prepare for approval by the EPA (MAG 2004; MAG 2003). These plans are required because the Phoenix area is already a nonattainment area for several air pollutants and these plans are, in reality, quantitative cumulative air quality impact assessments. The general steps the agencies conduct for their air quality forecasting are as follows:

- The counties in the region coordinate to predict future regional population and transportation growth. MAG assumes that all of BLM's parcels would be developed into residential areas at the same rate and intensity as all of the surrounding parcels, so MAG's forecasts accounts for the issue of "induced growth" by BLM's land disposal.
- ADEQ and Maricopa County develop regulations to reduce emissions from industry, while MAG (1) develops fugitive dust regulations for construction and commercial operations, (2) tracks trends in improved automobile emissions, and (3) prepares measures to reduce emissions from

on-road and off-road engines. Using this data, MAG forecasts future air pollutant emissions throughout the region, accounting for new ADEQ air regulations and vehicle emission trends. MAG then models future air pollutant concentrations to show that future air pollutant concentrations would be within allowable Federal limits. Future population growth in the outlying areas of the planning area is built directly into MAG's air quality modeling. MAG's modeling (using EPA's Urban Airshed Model) for future photochemical smog revealed that the maximum 1-hour ozone concentration in 2015 would be less than the Federal limit of 0.120 ppm at all points in the planning area (MAG 2004).

Yavapai and La Paz counties are in attainment for all criteria pollutants and do not need a State Implementation Plan (ADEQ 2002a). However, Maricopa County is considered a nonattainment area for three criteria pollutants, including particulate matter, carbon monoxide, and ozone. Criteria pollutant attainment status for the planning areas and sources of pollutants are described in the following sections.

3.4.2.1 Particulate Matter

On June 10, 1996, EPA reclassified Maricopa County as being in serious nonattainment for particulate matter (PM₁₀). Map 3-3, shows the current PM₁₀ nonattainment area for the Phoenix metropolitan area. On July 8, 1999, the Maricopa Association of Governments (MAG) submitted to EPA the MAG 1999 Serious Area Particulate Plan for PM₁₀ (Executive Summary, MAG 1999). This plan addressed both the 24-hour and annual PM₁₀ standards. In February 2000, MAG submitted a revised nonattainment plan. That plan requested that EPA extend

Phoenix's PM₁₀ attainment date to December 31, 2006. ADEQ submitted a SIP revision of the Agricultural PM₁₀ General Permit (Arizona Administrative Code, Title 18, Chapter 2, §609–611) on July 11, 2000. On June 13, 2001, ADEQ submitted to EPA a later SIP revision package for the Agricultural Best Management Practices program (Maricopa County PM₁₀ Serious Area State Implementation Plan Revision Agricultural Best Management Practices) to address issues with agricultural sources. On January 10, 2002, EPA announced the approval of Arizona's plan for attaining the annual and 24-hour standards for PM₁₀ in the metropolitan Phoenix area. In addition, EPA granted a five-year extension of the required attainment date for both the 24-hour and annual PM₁₀ standards from December 31, 2001, to December 31, 2006. This extension was based on the showing that, even by implementing the best available control measures, attainment by 2001 was not possible (ADEQ 2002b).

Emission Sources: According to ADEQ (2002b), the main sources of particulate pollution in the Phoenix area are fugitive dust from:

- paved roads,
- construction sites,
- unpaved vehicle routes,
- windblown dust from agricultural fields,
- disturbed areas on construction sites,
- vacant lots.

On June 10, 1996, EPA reclassified Maricopa County as being in serious nonattainment for carbon monoxide. Map 3-4 shows the boundaries of the Phoenix carbon monoxide (CO) nonattainment area. MAG submitted the required CO SIP to EPA on July 8, 1999. On April 18, 2001, MAG submitted A Revised MAG 1999 Serious Area Carbon Monoxide Plan (Executive Summary, MAG 1999). On October 9, 2001, EPA

determined the plan was complete, and approval is pending (ADEQ 2002b). The plan sets forth the required actions to bring Phoenix into attainment with the Federal carbon monoxide standards by December 31, 2005.

In September 2005, EPA received additional PM₁₀ control measures from ADEQ for the Salt River SIP, a portion of the Phoenix nonattainment area. These measures, when approved by EPA, will apply in the entire Phoenix PM₁₀ attainment area. The Phoenix area had a number of exceedances and violations of the PMN10 NAAQS in November and December 2005 and in January 2006. Based on this preliminary information (quality assured monitoring data will not be available until early April 2006), all indications are that Phoenix will not make its 12/31/2006 attainment date. This means that a CAA section 189(d) plan or "5% plan" will be due on 12/31/2007 and will need to show emissions reductions of 5% per year until attainment of the PM₁₀ standard can be shown.

Emission Sources: The main sources of carbon monoxide (ADEQ 2002b) are

- on-road mobile sources,
- non-road mobile sources, and
- area sources (e.g. fuel combustion, onsite incineration, open burning, fireplaces, and woodstoves).

3.4.2.2 Ozone

On February 13, 1998, EPA reclassified Maricopa County as being in serious nonattainment for ozone. Since that time, the area has experienced three clean years of air quality data, which is the minimum amount of time required to demonstrate attainment. The Maricopa County Serious Area One-hour Ozone SIP was submitted by ADEQ to EPA in December 2000 to fulfill the attainment demonstration requirements. On March 21, 2005, EPA proposed approval of MAG's Final Serious Area Ozone State

Implementation Plan for Maricopa County, and MAG's One-Hour Ozone Redesignation Request and Maintenance Plan (See 70 FR 1342). EPA finalized this action on June 14, 2004 at 70 FR 34362. EPA designated areas for the new eight-hour ozone standard effective June 15, 2004. The Phoenix metropolitan area was designated as a "basic" Subpart I nonattainment area, with all attainment date of June 2009, and a SIP demonstrating attainment of this standard due in June 2007. The eight-hour ozone nonattainment area can be seen at <http://www.epa.gov/oar/oaqps/greenbk/az8.html>.

Emission Sources: Ozone is a gas formed by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. VOC and NO_x emissions come from point, non-road, area, stationary, motor vehicle, and biogenic sources (ADEQ 2002b).

3.4.3 Water Resources

The public lands in both planning areas fall within the three major watersheds of south-central Arizona: the Middle Gila, Verde, and Bill Williams (See Map 3-5 for the locations of the major watersheds and sub-watersheds within the planning areas). These watersheds can be defined into river basins that collectively drain the watersheds. The river basins of the Middle Gila watershed that pertain to this planning effort include the Hassayampa, Agua Fria, and Lower Salt Rivers. The Agua Fria River originates northeast of Prescott and drains into the Gila River south of Avondale.

The Hassayampa River originates in the Bradshaw Mountains south of Prescott and drains the central Bradshaw-Harquahala Planning Area, flowing south into the Gila River east of Arlington. The Hassayampa is mainly an ephemeral stream, flowing typically when it rains. It flows perennially for several miles in limited

reaches, where the shallow depth of the bedrock maintains the flow at the surface. The Hassayampa flows most commonly at the northern end of the planning area, notably in Hassayampa River Canyon Wilderness. At the southern end of the planning area, the Hassayampa River fills the basin during high rainfall events, providing short-term recharge to the basin fill aquifer.

Tributaries of the Salt River, including the Grand and Arizona Canals, cross the extreme southeast portion of the Bradshaw-Harquahala Planning Area. In the Prescott area, the Verde watershed drains to the north via several small drainages, including tributaries of Willow, Miller, and Granite Creeks. This planning area also includes the extreme eastern portion of the Bill Williams watershed, which is drained by the tributaries of the Santa Maria River, including Kirkland, Cottonwood, and Date Creeks.

The groundwater in the planning areas is confined to the unconsolidated sand and gravel aquifer that underlies most of western Arizona. The planning areas extend across several designated groundwater basins and sub-basins, including the

- Phoenix Active Management Area (AMA),
- Prescott AMA, and
- Upper Agua Fria, Upper Hassayampa, Bill Williams, McMullen Valley, Tiger Wash, and Harquahala sub-basins.

Map 3-6 shows the major groundwater basins, sub-basins, and AMAs within the planning areas.

Groundwater in the planning areas occurs mainly in unconsolidated sand and gravel deposits, which fill the bottom of the Agua Fria River Canyon and occur locally in stream alluvium along streams in the Agua Fria River drainage and in drainages

in mountainous areas. Water levels are generally within a few feet of the surface near streams and tens of feet in areas away from streams. Groundwater also occurs locally in limited amounts within 20 to 50 feet of the surface in fractures in the rock that form most of the mountains in the northern part of the Bradshaw-Harquahala Planning Area. In deposits where pumping has lowered shallow groundwater supplies, water levels have declined.

In the southwest part of the Bradshaw-Harquahala Planning Area where broad basins dominate the landscape, groundwater occurs in basin fill deposits and in unconsolidated alluvium in the Bradshaw-Harquahala Basin, the Hassayampa Plain, and the West Salt River Valley. In these basins, irrigation has lowered groundwater levels. Declines range from 50 feet to more than 400 feet in some basins (USGS 1992). The magnitude of the water-level declines varies from basin to basin and reflects the influences of hydro-geologic conditions and the amount and length of pumping.

Groundwater also occurs in limited amounts within fractures in rock in localized areas. Well yields are often low, and these units are not a major source of groundwater.

Public lands in the planning areas are located within the Gila River System and Source General Water Rights Stream Adjudication (See Map 3-7 for adjudication watershed basins). BLM has filed claims for State-based water rights for stockwatering, wildlife, and recreation on many small springs, seeps, stock ponds, streams, and wells within the Agua Fria River, Upper Salt River, and Lower Gila River subwatersheds. In addition, BLM is quantifying its Federal reserved water rights established by the 1990 Arizona Desert Wilderness Act for the five wilderness areas within the Bradshaw-Harquahala Planning Area and by the proclamation establishing Agua Fria National Monument. The proclamation (Appendix A) states that “subject to valid

existing rights, a quantity of water sufficient to fulfill the purposes,” for which the national monument was established is reserved, and that “nothing in this reservation shall be construed as a relinquishment or reduction of any water use or rights reserved or appropriated by the United States,” on or before the date of the proclamation.

For more detailed information on water resources in the Agua Fria River watershed, please see Reconnaissance Watershed and Hydrologic Analysis on the Upper Agua Fria Watershed (Barnett and others 2002) and the U.S. Geological Survey 2004 draft report Hydrologic Characteristics of the Agua Fria National Monument, Arizona, Determined from the Phase One Reconnaissance Study (Fleming 2004).

3.5 Biological Resources

3.5.1 Vegetation

BLM manages vegetation within the planning areas to ensure high-quality wildlife habitat and to protect water resources and watershed conditions.

Agua Fria National Monument is dominated by a variety of grassland communities, with some mixed paloverde-cacti communities along its southern boundary.

Mixed paloverde-cacti and creosote-bursage communities dominate the Bradshaw-Harquahala Planning Area. Grassland communities are most abundant in the central portions of Yavapai County, which includes the northwest and northeast portions of the planning area. Evergreen sclerophyll (dry forests) dominate the north-central portions of the planning area. Pinyon-juniper and desert scrub grasslands

are predominant in this planning area's northern portion that is managed directly by BLM (Map 3-8).

The planning areas include a single type of wetland plant community and five upland vegetation formations. Most wetland formations in the planning areas are concentrated in riparian corridors along perennial and ephemeral streams, rivers, and washes.

3.5.2 Riparian Resources

Approximately 140 miles of riparian corridor occur generally in the north and northeast sections of the two planning areas, 47 miles within Agua Fria National Monument and 92 miles within the Bradshaw-Harquahala Planning Area (Map 3-9). These corridors are important resources that support a variety of rare plants, vertebrates, invertebrates, and native fishes. These corridors also serve as important water sources, habitat, and resting areas for many migratory birds. Additionally, livestock use these streams as water sources.

Since 1995, BLM completed a Proper Functioning Condition (PFC) assessment of the riparian corridors on BLM-managed lands. The table in Appendix Q1 and in Appendix Q2 summarizes the results of PFC assessments for both planning areas. Within the monument, 18.30 miles of riparian corridor were classified as PFC. The classification *functional-at risk*, indicating that riparian areas were functioning but susceptible to degradation, was assigned to 29.49 miles of riparian corridor. Of these 29.49 miles, 16.39 were considered in an upward trend toward PFC, 8.80 miles were showing no apparent trend and the remaining 4.30 miles were considered to be in a downward trend from PFC. Management factors that influence the condition and trend of riparian areas include livestock grazing and trampling; recreation

uses, including off-highway vehicle use; roads; and mining.

Within the Bradshaw-Harquahala Planning Area, 35.14 miles of riparian corridors were classified as PFC. The classification *functional-at risk* was assigned to 54.95 miles, and 2.50 miles were classified as nonfunctional. Of those classified as *functional-at risk*, 12.36 miles were considered in an upward trend toward PFC, 9.40 miles were considered to be in a downward trend from PFC, and 33.19 miles were found to be having no apparent trend.

3.5.3 Terrestrial Games Species

BLM manages habitat for wildlife on public lands. The Arizona Game and Fish Department (AGFD) manage the wildlife populations. The AGFD administers hunting, including permitting, bag limit identification, and population tracking. Hunting categories include big game, small game, upland birds, waterfowl, and predators. Throughout the State, AGFD's management of this program is based on the numbers of animals present in game management units (GMUs). The monument falls within GMU 21, while GMUs 19A, 20A, 20B, 20C, 42, and 44 are located within the Bradshaw-Harquahala Planning Area.

Large game species within the planning areas include black bear (*Ursus americanus*), desert bighorn sheep (*Ovis canadensis*), elk (*Cervus elaphus*), javelina (*Pecari tajacu*), mountain lion (*Felis concolor*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and white-tailed deer (*Odocoileus virginianus*). Occupied desert bighorn sheep habitat is depicted on Map 3-10. Recent drought conditions have generally affected large game population trends.

Upland bird and small game species within the planning areas include Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), and desert cottontail rabbit (*Sylvilagus auduboni*). Climate and habitat conditions dictate the relative abundance of these species. Upland bird and small game populations have also been affected by the recent drought conditions.

Furbearers found within the planning areas include the raccoon (*Procyon lotor*), ringtail cat (*Bassariscus astutus*), bobcat (*Felix rufus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), skunks (*Mephitis* sp. and *Conepatus leuconotus*), and badger (*Taxidea taxus*).

3.5.4 Aquatic Game Species

BLM also manages habitat for sport fish species. While most of the fish populations can be found in Lake Pleasant, some perennial streams and stock ponds in the planning areas also support populations. Sport fish within the planning areas are non-native, introduced species. These include largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), striped bass (*Morone saxatilis*), yellow bullhead (*Ameiurus natalis*), black crappie (*Pomoxis nigromaculatus*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictus olivaris*), common carp (*Cyprinus carpio*), bluegill (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*).

3.5.5 Federal Endangered, Threatened, Proposed, and Candidate Species

Federally listed endangered, threatened, and candidate species known to occur within the

planning areas include the bald eagle (*Haliaeetus leucocephalus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), southwestern willow flycatcher (*Empidonax traillii extimus*), desert pupfish (*Cyprinodon macularius*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), and Gila chub (*Gila intermedia*). Federally listed endangered, threatened, and candidate species, which are not known to presently occur within the planning areas, but have been historically recorded there or for which suitable habitat exists, are the threatened spikedace (Meda fulgida), endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*), endangered brown pelican (*Pelecanus occidentalis californicus*), endangered Yuma clapper rail (*Rallus longirostris yumanensis*) and threatened mountain plover (*Charadrius montanus*).

3.5.5.1 Bald Eagle (*Haliaeetus leucocephalus*)

Previously listed as endangered, this species was down-listed to threatened status in 1995. The bald eagle averages about three-feet in length and has a six-to-seven-foot wingspan. It feeds mainly on fish; however, waterfowl, small mammals, and carrion can constitute a portion of its diet. Bald eagles winter throughout Arizona, with at least 200 to 300 individuals identified each year. There are currently 46 bald eagle breeding areas in central Arizona. In 2004, 40 of these breeding areas were occupied and 27 of the areas fledged 42 young eagles (Jacobson et al. 2004). All of these breeding areas are associated with lakes or streams. The only breeding area in the planning areas is at the north end of Lake Pleasant in the Lake Pleasant Regional Park, managed by Maricopa County. They have been nesting in this area for many years. They are occasionally observed along the portion of the Agua Fria River above Lake Pleasant as far north as Cordes Junction and within Agua Fria National Monument.

3.5.5.2 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

A small (5.75 inches), generally olive-colored or grayish-brown, neo-tropical migratory bird, the federally listed endangered southwestern willow flycatcher is a riparian obligate species, whose range once included southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, and southwest Colorado. The flycatcher breeds in dense riparian habitats of the southwest United States along rivers, streams, or other wetlands where trees and shrubs are next to or near surface water.

Loss or modification of habitat is the main cause of the flycatcher's decline. Nesting habitats tend to be uncommon, isolated, and widely dispersed. The habitat has been historically unstable due to natural floods, fire, and drought. Increasing human demand for water from riparian systems has modified, reduced, or destroyed mechanisms that contribute to the natural production of suitable habitat. This species has been documented but is not known to nest in the Hassayampa River Preserve, south of Wickenburg and along the Agua Fria River channel below the dam at Lake Pleasant. Survey efforts have not recorded this species elsewhere in either planning areas. Most riparian areas in the planning areas are not considered suitable habitat for this species because stream gradient, channel width and flood frequency preclude the development of suitable habitat patches.

3.5.5.3 Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

The western yellow-billed cuckoo is a brownish, medium-sized migratory bird. Adults are typically about 12 inches long

and breed in dense willow and cottonwood stands in river floodplains. This species became a candidate species under review for listing as threatened or endangered on June 13, 2002.

A total of 168 yellow-billed cuckoo pairs and 80 single birds were found in Arizona in 1999, according to the preliminary results from a statewide survey that covered 265 miles of river and creek bottoms. The loss of riparian habitat is the main reason for yellow-billed cuckoo declines in the western United States. Despite habitat loss, the cuckoo can still be found in all counties in Arizona and has been recorded along several riparian areas in both planning areas. Although comprehensive surveys have not been conducted throughout both planning areas, cuckoos have been documented along parts of the Hassayampa River, Cow Creek, Humbug Creek and the Agua Fria River in the Bradshaw-Harquahala Planning Area and along Ash Creek, Little Ash Creek, Dry Creek, Indian Creek, Sycamore Creek and the Agua Fria River on the Agua Fria National Monument.

3.5.5.4 Desert Pupfish (*Cyprinodon macularius*)

The desert pupfish is a small (less than two inches long), federally listed endangered fish with a smoothly rounded body and narrow, vertical, dark bars on its sides. Once common in desert springs, marshes, backwaters and tributaries of the Rio Sonoita, San Pedro River, Santa Cruz River, lower Gila River, and lower Colorado River drainages in Arizona, California, and Mexico; this species is now restricted to three natural populations in California, along with the human-made irrigation drains around the Salton Sea. Desert pupfish are also found in restricted locations in Sonora and Baja California, Mexico.

In 1997 pupfish were transplanted into AD Wash, which is on State Trust Land within the Bradshaw-Harquahala Planning Area;

however, the populations did not survive. Reintroduction efforts, managed jointly by Arizona Game and Fish Department, the U.S. Fish and Wildlife Service, and BLM are ongoing and may include other perennial streams within the planning area. In 2001 pupfish were transplanted into Lousy Canyon Creek, within Agua Fria National Monument. This site was supplementally stocked in 2006. In 2006 pupfish were introduced into a tributary to Larry Canyon, also in the Agua Fria National Monument.

3.5.5.5 Gila Chub (*Gila intermedia*)

The Gila chub is a small-finned, deep-bodied minnow that was listed as endangered in 2005, along with the designation of critical habitat. The critical habitat designation includes portions of Silver Creek, a tributary to Larry Canyon, Lousy Canyon, and Indian Creeks, all in the Agua Fria National Monument. The Indian Creek and silver Creek populations are natural while the populations in Lousy Canyon and the tributary to Larry Creek were introduced in 1995.

Gila chub prefer quiet pools and have a tendency to remain near cover such as terrestrial vegetation, boulders, and fallen logs in smaller streams, springs, and cienegas (desert wetlands). Livestock grazing and high levels of recreation use can degrade Gila chub habitat. Additionally, competition or predation by introduced non-native aquatic species contributes to population declines.

Naturally occurring populations of Gila chub can be found within the national monument in Indian and Silver Creeks. Additionally, in 1995 Gila chub were transplanted into Larry and Lousy Canyon Creeks within the monument; these introduced populations continue to exist.

3.5.5.6 Gila Topminnow (*Poeciliopsis occidentalis occidentalis*)

The federally listed endangered Gila topminnow is a small, guppy-like, live-bearing fish that prefers vegetated margins and backwaters of intermittent and perennial streams and rivers. Adults tend to congregate in waters of moderate current below riffles, and along the margins of flowing streams in accumulated algae mats. A decline in Gila topminnow populations has resulted from the following:

- the introduction and spread of nonindigenous predatory and competitive fishes, including the mosquitofish (*Gambusia affinis*),
- water impoundments and diversions,
- water pollution,
- groundwater pumping,
- stream channelization, and
- habitat modification.

Gila topminnows were transplanted to Tule Creek (within the Bradshaw-Harquahala Planning Area) in the early 1970s and to AD Wash on State Trust Land in the early 1990s. In 2000, this fish was transplanted into Lousy Canyon Creek within the national monument. In 2005 this species was transplanted into a tributary to Larry Canyon also on the Agua Fria National Monument. Gila topminnow populations continue to persist at all three of these locations. Reintroduction efforts are ongoing and may include perennial streams and springs within the planning areas.

3.5.5.7 Spikedace (*Meda fulgida*)

A small fish, federally listed as threatened, the spikedace is unique in that it is the only species in its genus. Spikedace were once abundant and widespread in moderate and large rivers and streams within the Gila River basin, including the Gila,

Salt, and Verde Rivers and their tributaries--the San Pedro, San Francisco, and Agua Fria Rivers. The current distribution in Arizona is restricted to Aravaipa Creek, Eagle Creek and the upper Verde River. The decline of this species has been attributed to habitat destruction or alteration and interactions with non-native fishes. The Agua Fria River is historic habitat that could still support a spikedace population with active management.

3.5.5.8 Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuena*)

The lesser long-nosed bat is a small bat that forages on the nectar, pollen and fruit of paniculate agaves and columnar cacti. This species is threatened by loss of foraging habitat and roost sites. It is a seasonal resident of southeastern and western Arizona as far north as Maricopa County. It has been collected from the Phoenix area within the planning areas, post breeding.

3.5.5.9 California Brown Pelican (*Pelecanus occidentalis californicus*)

The brown pelican is a large fish-eating bird that was threatened due to reproductive failure caused by pesticides. It is a coastal species, nesting on islands along the coast of California and Mexico. Post breeding birds are common along the Pacific coast north to Canada and along the Colorado River annually. Occasional wandering individuals are found along the Salt and Gila Rivers and at Lake Pleasant in the Bradshaw-Harquahala Planning Area.

3.5.5.10 Yuma Clapper Rail (*Rallus longirostris yumanensis*)

The Yuma clapper rail is a small wading bird that inhabits dense riparian and marsh habitat characterized by dense stands of cattail and bulrush along the shoreline. It is threatened by habitat destruction. The current distribution of the species is along the Colorado River downstream of Lake Mead and along the Salt and Gila Rivers. This species may be expanding its range to include suitable habitats within the planning areas, but has not yet done so.

3.5.5.11 Mountain Plover (*Charadrius montanus*)

The mountain plover is a small ground nesting bird. They nest on flat, sparsely vegetated ground in the Western Great Plains and Colorado plateau. This species winters in Arizona between November and March, utilizing cultivated and non-cultivated annual grasslands and sparsely vegetated valley bottoms. Within the planning areas, they have been found wintering on cultivated lands.

3.5.6 Other Special Status Species

The AGFD has a list of wildlife of special concern in Arizona. This list includes taxa that are federally listed as threatened or endangered under the Endangered Species Act as well as many that are not listed. BLM manages these species so as not to contribute to the need to list them as threatened or endangered. Within the planning areas are four bats, fourteen birds, and four reptiles or amphibians on the State list which are not federally listed. Fifteen of these species, 68 percent, either require or make use of riparian habitats.

In accordance with BLM's Manual 6840, the BLM's State Director, in coordination with staff professionals, developed a list of BLM's sensitive species. These are species that BLM believes warrant special consideration but are not on the list of wildlife of special concern in Arizona. Within the planning areas, there are three BLM's sensitive plant species, and 18 BLM sensitive wildlife species. The wildlife species include nine bats, three birds, three reptiles, or amphibians, and three native fish species. The state and BLM sensitive species are listed in Appendix U along with the occurrence and habitat.

Within the planning areas, six "conservation areas" have been identified as important to the long-term maintenance of biodiversity within the Sonoran Desert Ecoregion in An Ecological Analysis of Conservation Priorities in the Sonoran Desert Ecoregion (Marshall et al. 2000). The conservation areas identified are the Harquahala Mountains, Harcuvar Mountains, Hassayampa River south of Wickenburg, Agua Fria Watershed, Black Pearl, and El Tigre Mine.

Four additional conservation areas in the planning areas were identified in the Apache Highlands Ecoregion in An Ecoregional Analysis of Conservation Priorities in the Apache Highlands Ecoregion (Marshall et al. 2004). These conservation areas identified are the Agua Fria River/Sycamore Mesa, Castle Creek/Black Canyon, Hassayampa River/Blind Indian Creek and Kirkland Creek/Peoples Valley Grassland. Two of the conservation areas in the Apache Highlands Ecoregion are overlapped by the Agua Fria Watershed Conservation Area in the Sonoran Desert Ecoregion.

The Arizona Game and Fish Department recently completed a comprehensive wildlife conservation strategy (AGFD 2006) which identifies wildlife species and habitats with greatest conservation need, by ecoregion. This plan also identifies stressors that may

impact wildlife and wildlife habitat and describes actions to conserve the identified species and habitats.

The Agua Fria River and its tributaries designated as an Important Bird Area by the National Audubon Society (see Map 3-10), provide both breeding and wintering habitat for a number of bird species and are important bird migration routes.

3.5.6.1 Sonoran Desert Tortoise (*Gopherus agassizii*)

The Mojave population of the desert tortoise, which inhabits northern Arizona, California, Utah, and Nevada (not within the planning areas), is federally listed as threatened. The Sonoran population of the desert tortoise is not listed under the Endangered Species Act of 1973 but is considered a sensitive species by both the BLM and the AGFD.

BLM is working cooperatively with various State and Federal agencies to complete a management plan to stabilize the Sonoran population of the desert tortoise. In addition, the BLM is working with the AGFD and others on a conservation agreement specifically addressing the Sonoran population of desert tortoise.

The habitat preference for the Sonoran populations of the desert tortoise consists of paloverde-mixed cacti vegetation communities on rocky or bouldery slopes below 3,500 feet in elevation although it can be found up to 5,000 feet in elevation. Three habitat classifications, based on population, viability, size, density, trend, and manageability, were devised from BLM's inventories of desert tortoise habitat throughout the planning areas between 1989 and 1999. Map 2-92, shows tortoise distribution and habitat classification based on the inventory. The criteria used to classify the habitat areas are as follows:

- Category I – Habitat area essential for maintenance of large, viable populations. Conflicts resolvable. Medium to high density or low density contiguous with medium or high density. Increasing, stabilizing, or decreasing population.
- Category II – Habitat area may be essential to maintenance of viable populations. Most conflicts resolvable. Medium to high density or low density contiguous with medium or high density. Stable or decreasing population.
- Category III – Habitat area not essential to maintenance of viable populations. Most conflicts not resolvable. Low to medium density not contiguous with medium or high density. Stable or decreasing populations.

The planning areas contain 93,620 acres of desert tortoise habitat classified as Category I, 419,530 acres classified as Category II and 136,670 acres classified as Category III.

BLM is managing habitat for the desert tortoise under two existing plans; the Desert Tortoise Habitat Management on Public Lands: A Rangeland Plan (BLM 1988b) and Strategy for Desert Tortoise Habitat Management Plan on Public Lands in Arizona (BLM 1990a).

3.5.7 Invasive Species

Invasive species occur throughout the two planning areas and can generally be defined as “alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health” (Executive Order 13112). Invasive species, which have often been accidentally introduced into ecosystems by humans, can be detrimental to the environment because they can directly harm native species, either by predation or competition. In turn, this harm can affect general ecosystem functions.

Some of the floral invasive species known within the planning areas include African mustard (*Brassica tournefortii*), fountain grass (*Pennisetum alopecuroides*), bufflegum (*Cenchrus ciliaris*), wild oats (*Avena fatua*), saltcedar (*Tamarix ramosissima*), and Malta’s star thistle (*Centaurea melitensis*), which occurs within the monument. Invasive aquatic plants are also known to occur within some riparian areas. Other species are also likely to occur because of the presence of suitable conditions, substrates, or both.

Invasive animals, both terrestrial and aquatic, include starlings (*Sturnus vulgaris*), crawfish (*Procambarus clarkii*), bullfrogs (*Rana catesbeiana*), spiny soft-shell turtles (*Trionyx spiniferus*), mosquitofish (*Gambusia affinis*), and green sunfish (*Lepomis cyanellus*). Infestation by some of these species is so great that some native species are threatened with extirpation.

3.6 Cultural Resources

West-central Arizona has a rich and diverse cultural heritage. Native American groups have lived in the region for thousands of years. Settlers of European descent first arrived in small numbers in the late 16th century, and then in much larger numbers in the late 19th and early 20th centuries. Cultural resources represent the tangible remnants of this rich legacy; which include prehistoric and historic sites and places of traditional cultural importance. Today, portions of the planning areas are among the fastest growing regions in the United States. This growth threatens important cultural resources at an alarming rate.

BLM manages cultural resources to protect and make proper use of their important scientific, educational, and cultural heritage values. Within the planning areas, BLM’s

Phoenix District manages some of the most important and best-preserved prehistoric and historic archaeological sites in the American Southwest (Ahlstrom and Roberts 1995; North 2002; Stone 1986). Additionally, cultural resources include sites of significance to Indian tribes.

Archaeological evidence reveals that Archaic hunters and gatherers began to live in the region at least 6,000 years ago. Later, occupants included the farmers of the prehistoric Hohokam, Perry Mesa, Prescott, and Patayan traditions. These people may have been ancestors of the O'odham, Hopi, Yavapai, and Yuman Indian tribes.

Prehistoric archaeological sites include properties as diverse as pueblo ruins, agricultural terraces, hunting camps, seasonal settlements, lithic quarries, trails, and rock art. Many of the prehistoric and historic native people moved to different sites on the landscape during different seasons to gather a wide range of plant and animal resources. Therefore, many of the artifact scatters and other archaeological sites represent temporary camps or resource collection and processing areas.

This region of central Arizona played an important role in Arizona's modern history. It includes Arizona's two State capitals, Prescott and its successor Phoenix. Moreover, the region includes some of the most significant historical mining districts in the State, concentrated in the Bradshaw, Vulture, and Weaver mountain ranges. Homesteaders, ranchers, merchants, and dam builders followed the miners. Historic archaeological sites include properties as diverse as mines, mills, ghost towns, ranches, homesteads, roads, and trails.

Agua Fria National Monument was established to protect significant cultural and natural resources. The monument contains more than 400 known archaeological sites, including prehistoric pueblo ruins and spectacular rock art. The monument is

likely to contain thousands of sites, because archaeological surveys have covered less than five percent of its area. The zone north of Perry Mesa remains largely unexplored but may contain significant resources.

Perry Mesa Archaeological District is listed on the National Register of Historic Places. The district was established on BLM-administered land in 1974, when much of Perry Mesa consisted of State Trust Land. BLM and the Tonto National Forest cooperated to expand the district in 1996. Its territory of about 50,000 acres encompasses Black Mesa and Perry Mesa, including important sites in Tonto National Forest. The district represents a cultural landscape defined by a well-preserved settlement system of communities occupied between A.D. 1250 and 1450. The sites within this system include the following:

- Pueblos and other masonry structures ranging from one to more than 100 rooms,
- Hilltop sites that may have served defensive purposes,
- Agricultural terraces,
- Rock art, and
- Artifact scatters left by a wide range of temporary activities.

BLM recognized the significance of these resources in designating the Perry Mesa Area of Critical Environmental Concern in the Phoenix Resource Management Plan (BLM 1988a). Although prehistoric sites represent most of the known cultural resources, the monument also contains historic sites, including features from ranching history and the operation of the Richinbar Mine.

Under the existing management direction for the Phoenix RMP (BLM 1988a) and Agua Fria National Monument, BLM has carried out proactive management of cultural resources in the Perry Mesa ACEC and surrounding zones on Perry Mesa and Black Mesa. Since 1990 management

accomplishments have included the following:

- archaeological inventories on Perry Mesa and Black Mesa (Heuett and Long 1995, North 2002);
- documentation of rock art sites;
- coordinated efforts with Tonto National Forest to prepare a site vandalism study (Ahlstrom et al. 1992),
- an archaeological overview (Ahlstrom and Roberts 1995),
- documentation for expanding the Perry Mesa National Register District in 1996; and
- monitoring of significant sites by the Civil Air Patrol and Arizona Site Steward Program volunteers.

These actions have provided enhanced knowledge and protection of cultural resources.

Prehistoric sites on Perry and Black Mesas have suffered damage from vandalism and artifact theft over decades. In the early 1990s, BLM and Tonto National Forest produced a comprehensive study of the history and effects of these activities (Ahlstrom and others 1992). The publicity from the legal case against Jones, Jones, and Gevara, caught in 1977, vandalizing a site on Perry Mesa in Tonto

National Forest, contributed to the enactment of the Archaeological Resources Protection Act. The recent publicity surrounding the designation of the national monument attracted attention that may have put sites at greater risk. Since early 2000 BLM, has increased levels of patrol and site surveillance, and there have been no major incidents of vandalism.

The statewide AZSITE database lists more than 1,500 archaeological sites in the Bradshaw-Harquahala Planning Area, including slightly more than 200 BLM-administered sites. Also, this region has approximately a five percent level of archaeological survey coverage. Surveyed areas are clustered near urban areas and along transportation routes, utility lines, and the Central Arizona Project aqueduct. As mitigation for raising the New Waddell dam and raising the level of Lake Pleasant, the Bureau of Reclamation conducted 100 percent class III survey of the Lake Pleasant Regional Park. In addition, before preparing the Lower Gila North Management Framework Plan (BLM 1983), BLM completed a sample survey of one percent of Federal lands within the Vulture and Harcuvar Planning Units in the western desert.

Given the incomplete status of the AZSITE database and the low level of survey coverage, one can reasonably expect that

Table 3-4. Ages of Known Cultural Sites in the Planning Areas

Age	Number of Sites	Percentage of Total	Comments
Prehistoric	774	45.58	12,000 BC to AD 1500
Historic	641	37.75	AD 1500 to 1950
Unknown	196	11.54	No diagnostic information or not listed on site card
Multicomponent	53	3.12	Historic and prehistoric elements
Recent	28	1.65	AD 1950 to present
No information	6	0.35	No information or no site card available

several thousand prehistoric and historic sites remain undiscovered on public lands in the planning areas (Table 3-4). Known Cultural Sites summarizes the periods of occupation (ages) of known sites within both planning areas, regardless of land status.

Away from Agua Fria National Monument, the highest density of prehistoric sites is along the Agua Fria River and other streams north of Phoenix. These data, although incomplete, may well reflect the distribution of prehistoric populations, which tend to cluster near perennial streams and water sources. Several mountain ranges, notably the Bradshaw foothills, the White Tanks, the Harquahalas, and the Harcuvars, also appear to have relatively high densities of prehistoric sites. Sites generally are concentrated along the lower slopes and in canyons because of the presence of springs, natural tanks, and wild food resources in these zones. Additionally, many of the more productive mountain ranges were home to several regional bands of the Yavapai Tribe. The Vulture, Big Horn, and Harcuvar mountain ranges contained localized sources of high-quality materials for stone tools, sometimes transported or traded over great distances. Although people used the desert expanses west of the Hassayampa River over several thousand years, this arid zone has a relatively low density of archaeological sites. It does contain distinctive features, such as prehistoric trails potentially linked into networks extensive enough to connect villages along the Colorado and Gila Rivers.

Historic period sites tend to be concentrated near the modern towns of Prescott, Wickenburg, and Black Canyon City. Many significant mines or mining-related sites are on public lands in and around the Bradshaw foothills and the Vulture and Weaver Mountains. Among the notable historic roads and trails is the route of large-scale sheep drives through the Black Canyon corridor. Many sites reflect the critical interdependencies among mining, ranching,

homesteading, commerce, and economic development.

The Harquahala Peak Smithsonian Observatory, a unique building at the summit of the Harquahalas, supported astronomical studies by the Smithsonian Institution during the 1920s. The Harquahala Mountain Observatory Historic District listed on the National Register of Historic Places; includes the observatory building, the historic Harquahala Pack Trail, Ellison's Camp, and associated features. This observatory is the only cultural site within the planning areas that has been the focus of interpretive development for public visitation.

Interpretive signs have been installed at the observatory building and at a kiosk along the Harquahala Peak Back County Byway located at the base of the mountains.

Historically, Pima groups of the O'odham people lived in the southern portion of the Bradshaw-Harquahala Planning Area, generally south of the Bradshaw foothills and east of the Hassayampa River. These groups claim cultural ties to the prehistoric Hohokam, who ranged further north during prehistoric times. Their descendants now live in the Salt River Pima-Maricopa, Gila River, and Ak-Chin communities.

The Yavapai people occupied the remaining zones within the planning areas, including Agua Fria National Monument. The Kewevkapaya (Southeastern Yavapai) lived in the Bradshaw Mountains. The Yavepe (Central Yavapai) occupied the area around present-day Prescott, and the Tolkapaya (Western Yavapai) lived in the desert and mountains of western Arizona. The Yavapai now live in the Fort McDowell, Prescott, Middle Verde, and Clarkdale communities.

The Maricopa and Mohave tribes, who spoke Yuman languages and lived along the Gila and Colorado rivers, likely hunted or

collected natural resources in the western portion of the planning area.

The Hopi, who currently reside several hundred miles northeast of Phoenix, have oral traditions that describe extensive migrations throughout Arizona. The conspicuous presence of Hopi Yellow Ware pottery at villages in Agua Fria National Monument shows prehistoric cultural ties to the Hopi people.

Tribes have expressed concerns regarding preserving cultural heritage values of prehistoric archaeological sites. Tribes often cite special significance to rock art, springs, habitation sites, and cemeteries. Therefore, ongoing consultations are needed to determine which traditional cultural properties or other places are of singular significance.

Cultural diversity in the planning areas also encompasses the history of ethnic groups, including Mexican and Cornish miners, Chinese workers, Basque shepherds, and African-American settlers. Archaeological sites in the planning areas may hold compelling clues about their lives and challenges in the Arizona desert.

Damage and destruction from natural processes and human activities threaten cultural resources. Natural sources of damage include geological processes such as, erosion and deflation. Prehistoric and historic standing structures are in danger of collapse from the effects of weathering. Rapid population growth and urban expansion have intensified the risks of damage from development and recreation activities. Damage from trash dumping, indiscriminant off-highway vehicle use, looting, and vandalism is expected to increase as more people travel farther and more often into previously remote areas.

The Phoenix District strives to avoid or mitigate adverse effects to cultural resources in evaluating and implementing proposed

projects and activities. However, it is more difficult to manage impacts caused by unplanned and casual activities. Frequently monitoring inspections and public education can help protect archaeological sites, particularly those near the Phoenix urban area, rural towns, and transportation routes. Through a partnership with the Arizona Site Steward Program, BLM regularly monitors at least 50 sites within the planning areas. In the future, community partnerships may provide more opportunities for site monitoring, public education, and interpretive developments for cultural heritage tourism.

Most known sites represent native archaeological cultures such as the Hohokam and Sinagua. A substantial percentage of sites are Euro-American. The number of native archaeological culture sites conforms closely with the prehistoric sites, whereas the number of Euro-American sites fit closely to the number of historical period sites. Some sites were affiliated with both prehistoric and Euro-American cultures, and a small fraction represents unlisted or unidentified cultural affiliation. An even smaller portion consists of sites affiliated with extant Native American cultures, such as the Yuman or Pai groups.

3.7 Paleontological Resources

Paleontological resources, or fossils, are a nonrenewable resource that provides scientific value and clues to the geologic history of central Arizona. While a minimal amount of paleontological research has been conducted in the region, 11 paleontological sites are known to occur within, or in close proximity to the planning areas. None of the known paleontological occurrences have been found on BLM-managed land within the two planning areas.

Paleontological resources are not currently actively managed under any existing management plans for these two planning areas.

3.8 Recreation

The closeness of the planning areas to the fast-growing Phoenix metropolitan area has dramatically increased the level of recreation within the planning areas. While opportunities for developed or formalized recreation exist at relatively few locations, such as the Lake Pleasant area, open recreation opportunities abound throughout both planning areas. BLM is responsible for integrating recreation needs and demands with other uses on public lands.

BLM uses a planning tool known as the Recreation Opportunity Spectrum (ROS) to determine which areas are suitable to be managed or maintained for various types of recreation. The ROS classification system is a way to help assure that people recreate in desirable settings and opportunities exist for a broad range of users. The Recreation Opportunity Spectrum on Map 3-11, shows the ROS inventory prepared as part of the planning process.

BLM issues Special Recreation Permits (SRPs) for commercial and competitive uses, organized group events and activities, and vending operations conducted on public lands. The permits can be for one-time events, such as an OHV race or horse ride, or for on-going commercial uses such as jeep tours. BLM issues SRPs on a first-come, first-served basis. BLM issued 57 SRPs in 2004, to include 3 competitive races; 18 motorized and non-motorized special events and organized group fundraisers, and 32 commercial permits for outfitter and guide activities such as big game hunting, OHV tours and horse trail rides.

To help direct future management and planning, BLM's Phoenix District engaged Arizona State University (ASU) West to conduct a survey to better understand and quantify recreation use in the planning areas (Andereck and others 2002). Respondents said, hiking/walking were their most frequent activities, followed by four-wheel driving, sightseeing, motorcycle/all-terrain vehicle (ATV) riding, and camping. Other activities include visiting cultural sites, picnicking, photography, wildlife and bird watching, target shooting, and hunting. The demand for these types of recreation is likely to increase as the Phoenix metropolitan area experiences accelerated growth over the next several decades. Especially, with the population of Maricopa and Yavapai Counties expected to increase from 3,829,200 in 2005 to 5,923,500 in 2025. Additionally, visitation to the planning areas is expected to increase proportional or higher to the rate of population growth of the two counties, or by 55 percent, by 2025.

No reliable user-day information is available for the planning areas. But, according to the AGFD web site, OHV use increased about 1.5 times faster than the population of Arizona from 1997 to 2003. Additionally, the number of OHVs sold in Arizona increased from 7,964 vehicles in 1997 to 23,568 vehicles in 2002. A 1990 study by Arizona State Parks estimated that there were more than 500,000 OHVs in Arizona. Some of the most rapid population growth is in Maricopa County. According to data collected by Arizona State University (Andereck and others 2002), Maricopa and Yavapai Counties account for about 70 percent of the visitors to the planning areas. The projected increase of more than two million people in the two counties is expected to substantially increase recreation use, especially OHV use, in the planning areas. OHV use is a significant form of recreation on BLM-managed lands. In the Agua Fria National Monument, dispersed camping is allowed in most areas. Popular sites lie along the network of roads and off

spurs. Many sites exist throughout the monument, and all have been established through public use. Many sites exist in illegal zones such as within ¼ mile of water facilities and at archaeological sites.

The substantial environmental concerns reported in the survey were litter, trash dumping, and vandalism. Additionally, social concerns focus on use of unregulated OHVs, target shooting, and residential/commercial development in the Bradshaw-Harquahala Planning Area. Respondents commented that the following are generally insufficient:

- information on the area,
- informational signs,
- drinking water,
- law enforcement, and
- toilet facilities.

In this same ASU West study (Andereck 2003), the Agua Fria National Monument recreation visitor profile showed a greater interest in the following:

- hiking and walking,
- nature study,
- visiting historical and cultural sites,
- dispersed camping, and
- wildlife and bird watching.

There was less interest in motorized activities, mountain biking, and picnicking. However, there was a strong preference for retaining the natural character of the environmental setting while developing visitor support facilities and increasing road maintenance, interpretive programs, and visitor services.

Those surveyed ranked social concerns for the monument accordingly:

1. unregulated OHV use,
2. off-road vehicles,
3. inconsiderate people, and
4. target shooting.

Environmental concerns stated were litter, erosion, vandalism, livestock grazing, trash dumping, and vehicle damage to soils and plants.

Designating Agua Fria National Monument elevated the area, from the perspective of the general population, to a unique status, thus increasing the public interest. Recreation professionals often refer to this as a “designation effect,” which describes the increase in interest of an area once it has been recognized through legislation or executive action as an area that is “special.”

3.9 Wilderness Characteristics

In concert with Agua Fria National Monument and the Bradshaw-Harquahala RMP, BLM has considered certain public lands for the presence of wilderness characteristics, including naturalness, solitude, and opportunities for primitive and unconfined recreation. BLM evaluated lands with wilderness characteristics:

- In response to public comment obtained through scoping,
- Pursuant to Sections 201 and 202 of the Federal Land Policy and Management Act of 1976,
- In applying Washington Office Instruction Memorandum 2003-274, BLM Implementation of the Settlement of Utah v. Norton Regarding Wilderness Study and Instruction Memorandum No. 2003-275, change one, Consideration of Wilderness Characteristics in Land Use Plans (Excluding Alaska) (both of which can be found in Appendix I), and
- In reviewing the 1980 Section 603 wilderness inventory findings--these findings are the wilderness inventory for public lands in the planning areas.

Landscape features associated with the concept of wilderness may be considered in land use planning when BLM determines that those characteristics are:

- reasonably present,
- of sufficient value (condition, uniqueness, relevance, importance) and need (trend, risk), and
- practical to manage.

Also, what must be present are naturalness and outstanding opportunities for solitude, and/or primitive and unconfined recreation wilderness characteristics.

Agua Fria National Monument

All 70,900 acres of Agua Fria National Monument were examined for the presence of wilderness characteristics in August and September 2002. Most of these lands were acquired and placed in public ownership after completion of the 1980 inventory, and have never been examined for the presence of wilderness characteristics. A total of 33,329 acres were determined to have wilderness characteristics.

Wilderness characteristics are found in four geographic areas of the national monument (Map 3-12):

- Agua Fria River Canyon, extending south of Bloody Basin Road to the powerline and pumping station,
- Baby Canyon, extending from Bloody Basin Road to the Agua Fria River confluence,
- Silver Creek/Long Gulch drainage and uplands, including Indian Creek and
- Perry Mesa, centered on Larry, and Lousy Canyons.

The remaining AFNM lands, totaling 33,329 acres, were inventoried for wilderness character and found not to possess wilderness characteristics. The parcels were determined to be unnatural in character, or

they did not possess outstanding solitude and/or primitive or unconfined recreation opportunities.

Bradshaw-Harquahala Planning Area

Public comments and scoping supported assessments of wilderness characteristics in parts of the Harquahala Mountains, the Big Horn Mountains, the Hassayampa River Canyon and Round Mountain area, the Belmont Mountains, Baldy Mountain (west of Lake Pleasant), Black Canyon Creek, and Black Butte. A total of 186,037 acres were determined to have varying degrees of wilderness character. The following areas, formerly Section 603 Wilderness Study Area (WSA) lands, and some lands adjacent to such areas, were determined to have wilderness characteristics (Map 3-12):

- Harquahala Mountains - 56,040 acres,
- Hummingbird Springs – 44,649 acres,
- Big Horn Mountains - 1,645 acres, and
- Hassayampa River Canyon/Round Mountain areas - 13,200 acres

These areas were essentially in the same condition as reported by the Section 603 wilderness inventory in 1980. They also represented important desert tortoise and big horn sheep habitat, general wildlife habitat, and scenic open space values. They were considered landscapes at risk due to increasing OHV use, visitation, and population growth.

Parts of the Belmont Mountains (totaling 31,900 acres), the Black Butte area (totaling 14,310 acres), a public land area south of the Castle Creek Wilderness (totaling 333 acres), and a part of the Hieroglyphic Mountains near Baldy Mountain (totaling 9,080 acres) were also examined for wilderness characteristics in response to public scoping comments (Map 3-12). BLM examined these areas and determined that

they are essentially natural and have wilderness characteristics. These locales also encompass important desert tortoise habitat, big horn sheep habitat, raptor habitat, geologic values, and scenic open space opportunities and values. They were considered landscapes at risk due to increasing OHV use, visitation, and population growth.

One new area was examined for wilderness characteristics in the Black Canyon corridor near Slate Creek. Most of the public lands in this locale were not under public ownership in 1980; hence they were never examined for wilderness character. A total of 14,880 acres were determined to have wilderness character after a meticulous field assessment.

All areas considered to have some measure of wilderness character are depicted on Map 3-12. Other areas submitted by the public for management of wilderness characteristics were determined not to have wilderness character.

3.10 Visual Resources

The planning areas are generally located in the Basin and Range Physiographic Province. Scenery varies greatly. Mesas and deep canyons characterize the terrain of Agua Fria National Monument. The scenery of the Bradshaw-Harquahala Planning Area includes rugged mountains, striking cliff formations, foothills, mesas, washes, bajadas, and broad plains. Major visual intrusions include highways and other vehicle routes, evidence of mining and ranching, and utility rights-of-way.

BLM is required to manage public lands to protect their scenic values. To consistently evaluate its lands within their regional context, BLM developed the Visual

Resource Management (VRM) program. BLM uses the VRM process to manage the scenic quality of the landscape and to reduce the impact of development on the scenery.

The VRM program consists of inventory and analysis components. The inventory is a process through which BLM determines the quality, sensitivity, and management issues of the visual setting of public lands. The analysis component is used to assess the visual impacts of specific projects before they are implemented. The VRM process includes the following steps.

- Evaluate the quality of existing scenery,
- Consider the distance from which that scenery is viewed, and
- Rate the public's sensitivity to changes in the landscape.

The VRM program has not been applied to all of the lands within the planning areas. VRM classes were established in 1982 for all public lands in the Lower Gila North MFP as amended (BLM 2005) area as part of the Lower Gila North Grazing EIS (BLM 1982). A range of Class II, III, and IV classes were established, based on inventories completed in the 1970s. In 1990, Class I standards and objectives were applied to 96,820 acres within five designated wilderness areas. Other parts of the planning areas are managed under an interim Class III standard.

BLM is aware these planning areas contain a wide range of visual features needing protection from degradation in managing and implementing other land uses. Moreover, much development has occurred, and public attitudes about landscapes and open space have changed in the quarter century since the original VRM inventories were completed. BLM's lands, once remote, are now near or within growing urban and rural population centers and are crossed by new paved highways.

The wild, west landscape is rapidly being converted to housing developments as millions of people move to Arizona. This growth has resulted in a vanishing desert landscape. The people moving to Arizona are no longer mainly retired seniors. Growing job markets are attracting a diversity of people; resulting in a wide range of demographics. Phoenix is the fifth largest city in the United States with continuous growth. Because these communities back up to BLM-managed lands, maintaining scenic quality is crucial for social, psychological, and spiritual well-being.

Accordingly, as part of this planning effort, BLM has developed an updated VRM inventory to do the following:

- Examine scenic quality,
- Consider viewing distances, and
- Assess public sensitivity to landscape changes.

The inventory was prepared according to the basic methodology outlined in BLM's Manual H-8410-1. Several of the steps were performed using a geographic information system. The inventory determined that 96,820 acres fit the criteria for Visual Resource Inventory Class I, 593,450 acres fit criteria for Class II, 162,000 acres fit Class III, and 114,730 acres fit Class IV. See Map 3-13, for the results of the VRM inventory.

3.11 Rangeland Management

Grazing on BLM's land in Arizona is managed under Title 43 of the Code of Federal Regulations (CFR), Section 4100, and is based on the following:

- Taylor Grazing Act (TGA) (43 U.S.C. 315, 315a through 315r),
- FLPMA (43 U.S.C. 1701 et seq.), and

- Public Rangeland Improvement Act (43 U.S.C. 1901 et seq.), and other executive and public land orders.

Leases and permits are valid for 10 years, with use reports annually submitted by leaseholders and permittees. BLM typically changes allotment schedules, stocking rates, class of livestock, or other grazing practices if a resource concern arises. BLM evaluates allotments when leases or permits are scheduled for renewal, consistent with the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Land Health Standards).

BLM analyzes rangeland allotments by resource characteristics, ecological potential, opportunities, and needs. Allotments are then managed by the three categories of "Maintain," "Improve," or "Custodial." Agua Fria National Monument has 10 BLM-authorized grazing allotments (11 permittees), totaling 72,587 acres (70,820 BLM acres). These allotments have a permitted carrying capacity of 13,492 animal unit months (AUMs) of forage. An AUM is the amount of forage needed to sustain one cow, or its equivalent, for 1 month. The Bradshaw-Harquahala Planning Area has 91 BLM-authorized grazing allotments, totaling 1,855,738 acres (896,000 BLM acres) and 69,568 AUMs of forage. Appendix O shows allotment names and numbers, permitted AUMs, and livestock numbers and types for the planning areas.

In 2002 a total of 36,000 head of cattle were raised in Maricopa and Yavapai Counties, the two counties that include the planning area.

Within the planning areas, grazing allotments can be classed in one of three ways according to the availability of forage: (1) perennial, (2) perennial/ephemeral, or (3) ephemeral.

Perennial allotments produce a fairly dependable amount of forage every year, and the allotment stocking rate is based on that production. Perennial allotments are at the upper elevations of the planning areas, where precipitation is higher and more dependable than at lower elevations.

In the lower deserts, allotments that produce enough perennial forage to support a small herd but periodically produce large amounts of springtime forage from annual plants can be classed as perennial/ephemeral.

Allotments that typically produce little perennial forage and where livestock use depends on forage production from springtime annuals can be classed as ephemeral.

The "Special Ephemeral Rule" was developed to determine when allotments should be classified as either Ephemeral or Perennial/Ephemeral. That rule is described in the Rangeland Management section of Management Common to Both Planning Areas in Chapter 2. There are four Ephemeral permits in the planning areas. All the rest are either Perennial or Perennial/Ephemeral. Sheep are currently authorized on three allotments (one allotment on the monument), goats are authorized on one allotment and all the rest are authorized cattle or horses.

Grazing permits or leases authorize the use of lands for grazing. A grazing permit authorizes grazing on public or other lands administered by BLM within grazing districts under Section 3 of the TGA. A grazing lease authorizes grazing use on public or other lands administered by BLM outside of grazing districts under Section 15 of the TGA.

Within allotments, seasonal grazing may be required in some pastures. Moreover, grazing practices may be managed to achieve resource or grazing objectives, as

described in the allotment grazing permit or lease.

3.12 Mineral Resources

BLM manages the minerals on many lands beyond those where BLM manages the surface. Areas where the land surface and subsurface minerals are under different ownership are referred to as split estate lands. Acreage totals in this section account for the subsurface mineral lands.

BLM administers programs that allow production of three types of minerals and energy resources on public lands. These mineral assets fit into categories of saleable, locatable, and leasable minerals. Saleable minerals include sand, gravel, and other common minerals. Locatable minerals consist of precious metals such as gold, silver, and some industrial minerals such as gypsum and some clay. Fuels such as oil, gas, coal, and certain other substances are leasable minerals.

The minerals' planning area (Map 1-2) extends far to the north and east beyond the boundaries of the planning areas. Map 2-10, provides a more detailed look at current minerals management in the immediate environs of the planning areas.

The minerals planning area is the area with federally administered minerals, where the surface rights are held by BLM, the State of Arizona, or private parties, and located within the administrative boundaries of BLM's Phoenix District but are not being planned for in the Sonoran Desert National Monument RMP and Phoenix South RMP Revision.

The planning areas sit astride three geologic provinces. The Colorado Plateau Province includes the northern third of Arizona, bounded on the south by the Mogollon Rim. Scattered BLM-

administered public lands outside the planning areas are located in this province. Nearly horizontal, stratified, eroded sedimentary rocks characterize this province.

The Transition Zone Province bisects Arizona from northwest to southeast and is present in the central portion of the planning areas. The Transition Zone is a geologically complex area where the monocline and uplift tectonic characteristics of the Colorado Plateau are developed on Precambrian basement rocks and Mesozoic granitic rocks, and complicated by extensive block faulting encompassing and/or overlain by Tertiary volcanic and sedimentary rocks.

Covering the southern portion of the planning areas, the Basin and Range Province features northwest-trending block-faulted mountain ranges separated by deep, alluvium-filled basins. Mountain ranges in the planning area generally consist of Precambrian (Proterozoic) to Tertiary igneous, or metamorphic rocks bounded by block-faulted and folded Mesozoic to Cenozoic sedimentary rocks or Tertiary volcanic rocks. The deep intermontane basins generally contain slightly altered Paleozoic and Mesozoic sedimentary rocks overlain by Tertiary sedimentary and volcanic sequences.

Geologic conditions are suitable for the potential occurrence of leasable fluid minerals, which include the energy minerals oil and gas and the nonenergy mineral carbon dioxide (CO₂). Mature petroleum source rocks are present in Tertiary evaporites in the southern portions of the planning areas. Sandstone and limestone contain reservoir-quality porosity for fluid minerals to accumulate beneath structural and within stratigraphic traps in the northern scattered lands.

Sodium and coal are leasable solid mineral resources. Sodium may be present in deep evaporite deposits in Tertiary basins

throughout the Bradshaw-Harquahala Planning Area, and is extracted near Luke. There are no reported coal resources in the planning areas.

Five areas of potential sodium exist in the planning area subsurface. There has been no significant development of those resources and no indications for future leasing and development. The absence of sodium leasing in the planning area (except in the Luke Basin) is probably due to the limited demand for sodium and the great expense of exploring and developing it. Morton Salt is solution mining salt for industrial purposes from the Luke salt deposit. BLM has one lease with Morton for solution mining on the Luke deposit.

There are no known viable sources of leasable minerals in the Bradshaw-Harquahala Planning Area, but all land in the area is now open to mineral leasing. Sites north of the planning area within the Phoenix District do have some potential for exploration.

Geothermal energy resource potential exists throughout the planning area. A high potential for occurrence exists for using low-temperature geothermal energy in 16 geothermal resource areas. Most of these resource areas are defined by multiple water well fields, but these fields have not been developed. Moderate potential for occurrence of geothermal energy is also present throughout southern Arizona, which has several isolated geothermal wells. The potential for fluid, gaseous, and solid leasables (including geothermal energy) is shown on the Map 3-14.

Five low-temperature geothermal resource regions are recognized in the Bradshaw-Harquahala Planning Area. These regions are shown as moderate potential areas on Map 3-14. There has been no significant development of geothermal resources. These low-temperature resources might be used for

small-scale space heating and for resort spas.

The Bradshaw-Harquahala Planning Area has no geothermal energy leases and no indications for future leasing. The absence of geothermal leasing probably results from the limited uses for low-temperature resources and the great expense to explore and develop them.

The potential for oil and gas leasing is low throughout the minerals planning area, the potential for leasing is low. The potential is somewhat higher in the areas north of 35 degrees north latitude.

Oil and gas exploration was active in the Bradshaw-Harquahala Planning Area from 1913 to the 1980s. No oil and gas development has occurred on public lands, and no proven reserves have been documented. There is now no leasing interest. However, areas of moderate oil and gas potential do exist (Map 3-14).

The price of crude oil was a significant driving force for increased oil and gas exploration in the 1970s. The 1980s saw active exploration in the Basin and Range Physiographic Province of Arizona to test the Laramide Overthrust Trend. There has been no drilling since the 1980s. A trend toward increasing exploration is occurring throughout the United States as the active rig count increases with rising crude oil prices. Thus, there is potential for domestic crude demand to stimulate oil and gas exploration in the mineral planning area.

Locatable minerals exist throughout the planning areas, including porphyry copper, volcanic-epithermal, placer, vein, vein/replacement, and alteration of sedimentary rocks. Past mining for metallic minerals has mainly produced gold, silver, copper, lead, zinc, tin, and uranium. There is potential for occurrence of those and other metallic minerals and a high potential for occurrence of nonmetallic minerals. There

are few active locatable mineral operations. The potential for locatable minerals is shown on Map 3-15.

Mineral districts in the Bradshaw-Harquahala Planning Area are regions of known occurrences of and high potential for locatable metallic and nonmetallic minerals (Map 3-15). Most of the mines have been inactive for many years because the cost to mine the commodity exceeds the commodity's market value. Several small-scale locatable mines now operate in the planning area. These mines generally operate on a sporadic basis, depending on market conditions and financial support. These operations focus on placer gold, lode gold, and some industrial minerals.

Saleable mineral materials are found at Precambrian to Tertiary rock outcrops and in extensive Quaternary deposits of alluvial sand and gravel, piedmont alluvium, colluvium, and eolian sand throughout the planning areas. Pits, quarries, and prospects for saleable minerals are mapped to show the potential for occurrence of saleable mineral resources. These saleable minerals have high potential to be found in the planning areas (Map 3-16).

The Bradshaw-Harquahala Planning Area has many locations for saleable mineral resources. Known occurrences (quarries and pits), prospects, and potential locations for saleable material on BLM-administered lands are shown on Map 3-16. Those locations have high potential for saleable mineral resources because they are known to occur. Most of the locations are actively used for dimension stone, decorative rock, or local construction.

BLM managed mineral resources include minerals underlying BLM-managed surface, as well as thousands of acres of mineral estate beneath land surface that is owned by others, including State and private lands.

Minerals development in the Bradshaw-Harquahala Planning Area involves mainly saleable materials, particularly because of the area's closeness to a rapidly urbanizing area that places demands on materials such as sand, gravel, and decorative rock.

3.13 Fire Management

After the devastating wildfire season of 1994, the Federal Government created a single Federal Wildland Fire Management Policy and Program Review (WFMP) (BLM 2001b), establishing uniform Federal policies and programs, which essentially are given the assumption that wildland fire respects no boundaries and firefighting resources, are relatively meager.

The development of these principles and policies, which led to the development of a National Fire Plan (NFP) in 2000, assisted the Secretaries of Agriculture and the Interior in responding to severe wildland fires, reducing fire impacts on rural communities and ensuring effective firefighting in the future.

Implementing the National Fire Plan and its 10-year comprehensive strategy requires action at the national, regional, and local levels. The National Interagency Fire Center (NIFC), in Boise, Idaho, houses seven Federal agencies that work cooperatively to support firefighting and other natural-disaster relief work across the country.

The Southwest Area is one of 11 geographic areas established by NIFC to provide regional management of wildfires. The Southwest Area is managed by the Southwest Area Coordinating Group (SWCG), which consists of Federal and State agencies, including BLM, the U.S. Forest Service, National Park Service, U.S. Fish and Wildlife Service, Bureau of Indian

Affairs, and the States of Arizona/New Mexico. The SWCG has the overall responsibility for the following:

- prioritizing resource allocations during times of multiple incidents,
- overseeing the mobilization of emergency resources as a whole,
- developing incident management teams, and
- coordinating information and intelligence within the area.

The Southwest Area is divided into zones for local management coordination and mobilization of firefighting resources. The two planning areas are within the Central West Zone.

Within both planning areas are within the Phoenix-Kingman Fire Zone. BLM's Phoenix District and the Kingman Field Offices have developed a joint wildfire management strategy, which involves delineating fire management units and devising management strategies based on whether the lands within these units are suitable for wildland fire use for resource benefit (See Map 3-17 and Appendix L, Phoenix/Kingman Zone Fire Management Plan 2004).

Areas suitable for wildland fire use for resource management benefit include, areas where wildland fire is desired, and there are few or no constraints for its use. Where conditions are suitable, unplanned and planned wildfire may be used to achieve desired objectives, such as; to improve vegetation, wildlife habitat or watershed conditions, maintain non-hazardous levels of fuels, reduce the hazardous effects of unplanned wildland fires and meet resource objectives. Where fuel loading is high but conditions are not initially suitable for wildland fire, fuel loads are reduced by mechanical, chemical or biological means to reduce hazardous fuels levels and meet resource objectives (includes WUI areas).

Areas not suitable for wildland fire use for resource benefit include areas where mitigation and suppression are required to prevent direct threats life or property. It includes areas where fire never played a large role, historically, in the development and maintenance of the ecosystem, and some areas where fire return intervals were very long. It also includes areas (including some WUI areas) where unplanned ignition could have negative effects to ecosystem unless some form of mitigation takes place. Mitigation may include mechanical, biological, chemical or prescribed fire means to maintain non-hazardous levels of fuels reducing the hazardous effects of unplanned wildland fires and meeting resource objectives. The allocation of lands is based on the Desired Future Condition of vegetation communities, ecological conditions, and ecological risks. The allocation of lands is determined by contrasting current and historical conditions and ecological risks associated with any changes (Map 3-17). The condition class concept helps describe alterations in key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. BLM's Fire Management Plans include the two allocations and identify areas for including fire use, mechanical, biological or chemical means to maintain non-hazardous levels of fuels, reduce the hazardous effects of unplanned wildland fires and meet resource objectives. Additionally, they identify areas for exclusion from fire (through fire suppression), chemical, mechanical, and/or biological treatments.

3.14 Wild Burros

Upon passage of the 1971 Wild Free-Roaming Horse and Burro Act, BLM became responsible for protecting wild horses and burros and their habitats. Following the act, BLM was directed to delineate herd areas (HAs) where animals were known to occur. Within the Bradshaw-Harquahala Planning Area, two herd areas

were found, ~~to~~ surrounding Lake Pleasant and ~~to occur~~ in the area spanning the Harquahala and Big Horn Mountains. Agua Fria National Monument has no wild horse and burro areas (Map 2-5.).

The Phoenix RMP (BLM 1988a) determined that the herd area around Lake Pleasant was manageable and established a herd management area (HMA). The management of wild horses and burros on public land requires the following:

- removing nuisance animals from adjacent private or State land when requested,
- preparing a herd management plan,
- maintaining a herd inventory, and
- removing and disposing of excess animals through public adoption, if possible.

BLM prepared a herd management (April 1999) plan for the Lake Pleasant HMA.

The Lake Pleasant HMA, containing 80,800 acres, lies 25 miles northwest of Phoenix, partly within the city of Peoria and partly in unincorporated Maricopa and Yavapai Counties. The HMA consists of 80,800 acres of Sonoran Desert, mainly with paloverde and mixed cacti vegetation types. The HMA's overall capacity, referred to as the appropriate management level (AML), is 208 burros. Determined using resource inventory and monitoring information, the AML is used to manage an ecological balance between a viable herd population and a healthy habitat that provides a stable source of forage.

The Harquahala HA, containing 156,255 acres, is located in western Maricopa County within the Harquahala Management Unit. It contains portions of the Harquahala Mountains, Big Horn Mountains, and Hummingbird Springs Wilderness Areas. The herd size in the HA is estimated to be less than 50 animals. Its vegetation is a mix of creosote-bursage, mixed paloverde, and

cacti communities. The Lower Gila North Management Framework Plan (BLM 1983) suggested the removal of all the burros in this herd area. A manageability analysis (Appendix G) concluded that the Harquahala burro herd is not a viable option for a herd management area over the long term because of genetic diversity, limited water sources, forage requirements that result in the animals traveling outside of the area to private farm lands and state managed lands

Both areas had a census in 1999, and herd numbers for the HMA and the HA are as follows:

- Lake Pleasant HMA 206 burros
- Harquahala HA 47 burros

In these areas, no other landowners or managers similarly manage wild horses and burros. No animals are moved from one HMA to another.

3.15 Social and Economic Conditions

3.15.1 Population and Household Characteristics

This section summarizes socioeconomic data collected for the baseline socioeconomic analysis of the planning areas prepared in January 2003, by James Kent Associates (JKA). For purposes of this analysis, Maricopa and Yavapai Counties represent the economic study areas because they include the areas where direct social or economic impacts of planning decisions would likely occur.

BLM contracted separately with JKA to develop more specific socioeconomic information. This more specific data are provided, when suitable, as part of the socioeconomic analysis of the study area. JKA developed data subdivided by human resource units (HRUs) (Map 3-18). HRUs, as defined by JKA, identify the “sense of place or community” with which local residents identify, and in which the many daily routines of everyday life take place. Correlating U.S. Census data with the local human geography (i.e. HRUs) allows for data interpretation that is more meaningful and helps to reveal a region's diversity that might not otherwise be apparent. The planning areas have five HRUs: Wickenburg, Prescott, Lake Pleasant, Phoenix, and Buckeye.

Table 3-5 highlights the changes in population and household levels in the planning areas. Between 1990 and 2000, Maricopa and Yavapai Counties experienced significant population increases.

The Lake Pleasant HRU showed the greatest increase in population of all the HRUs, with a growth rate of 148 percent. The Wickenburg HRU, at 28 percent, experienced the least amount of growth. Combined, the HRUs within the planning areas averaged a 71 percent growth rate between 1990 and 2000. This rate compares with a 40 percent growth rate for the State of Arizona, a 45 percent growth rate in Maricopa County, and a 56 percent growth rate in Yavapai County. This growth trend is also reflected in the total number of households, which increased simultaneously with the population. As shown in Table 3-6, between 1990 and 2000 total housing units increased in all HRUs, with the greatest increase again occurring in the Lake Pleasant HRU. Concurrently, the average value of these housing units increased in all HRUs, with the greatest increase in value also occurring within the Lake Pleasant and Buckeye HRUs.

3.15.2 Employment and Earnings

The U.S. Department of Commerce Bureau of Economic Analysis (BEA) estimates annual employment and earnings for counties throughout the United States. To examine trends in employment by industry over this period, data was obtained from BEA on total annual employment for each county within the study area and Arizona.

Table 3-7 and Table 3-8 on the following page, summarize, by industry, the percentage of employment and earnings for 2000 for the economic study area.

The categories of Services, Retail/Wholesale Trade, and Manufacturing provided the largest contributions to both employment and earnings. Services, Retail, and Wholesale Trade, Construction, and the combined Finance, Insurance, and Real Estate (FIRE) category showed large increases in earnings from 1990–2000.

Sector	Maricopa County	Yavapai County
Farm, Agricultural Services, Forestry, and Other	1.7	2.4
Mining	0.6	2.2
Construction	7.5	10.3
Manufacturing	9.0	5.8
Transportation and Public Utilities	4.9	2.6
Retail and Wholesale Trade	22.0	22.6
Finance, Insurance, and Real Estate	11.0	8.8
Services	33.4	33.1
Government	9.9	12.2
Total Employment	1,896,035	71,985
Source: U.S. Department of Commerce Bureau of Economic Analysis		

Farm and Agricultural-Related Services and Mining had very small increases in earnings during the same period and represented relatively low earnings during 2000.

The services category includes professional/technical services, management services, education, accommodations/food service, entertainment/recreation services, and health care/social assistance. Trade includes businesses involved directly with wholesale/retail enterprise. Both the Services/Retail and Wholesale Trade categories reflect economic activity related to growth, tourist, and visitor activity in both Maricopa and Yavapai Counties. The FIRE and Construction categories include businesses and employment that would be expected to increase as a result of the high rate of population growth experienced in both Maricopa and Yavapai Counties over the past decade.

The average earnings per job in Maricopa County increased from \$32,456 in 1970 to \$35,744 in 2000. The figures for Yavapai County showed a decline in earnings from \$28,493 in 1970 to \$22,925 in 2000 (Sonoran Institute 2003).

Earnings from mining in the two counties in the planning areas increased from \$444,623,000 in 1992 to \$727,712,000 in 2000. Mining employment has also increased by 74 percent during the same period. However, mining employment and earnings represent a relatively low percentage for the planning areas (Employment is 0.2 percent; earnings are 0.2 percent).

3.15.3 Unemployment

Changes in the labor force and unemployment rates can provide information on the status of the local economy. Average unemployment rates are shown in Table 3-9. Unemployment rates have generally declined in both counties within the study area and are consistent with rates for Arizona as a whole.

3.15.4 Property Valuation

Table 3-10 summarizes property valuations for each county. The Arizona Department of Revenue assigns values to utilities, airlines, railroads, mines, communications, and pipelines. These are referred to as "Centrally Valued Properties." Counties are responsible for assessing other classes of property, including residential, commercial, industrial, and agricultural properties, which are referred to as "Locally Assessed Properties." For tax year 2003, the net valuation of property assessed by the State of Arizona was \$7,158,828,578 for the two counties. Also, total net local assessments for tax year 2003 equaled \$19,805,829,810 for the two counties.

A source of local government revenue directly attributable to the public lands in each of the counties consists of payments in lieu of taxes (PILT). BLM administers

Sector	Maricopa County	Yavapai County
Farm, Agricultural Services, Forestry, and Other	1.0	1.9
Mining	0.1	2.7
Construction	7.7	14.6
Manufacturing	13.9	7.6
Transportation and Public	6.1	3.5
Retail and Wholesale Trade	17.6	16.9
Finance, Insurance, and	11.4	5.9
Services	31.0	28.8
Government	11.2	18.1
Total Earnings	\$67,771,606	\$1,650,234

Source: U.S. Department of Commerce Bureau of Economic Analysis

PILT payments, which are provided by the Federal Government to offset tax revenues lost because of tax-exempt Federal land in their jurisdictions. PILT payments are used for a number of purposes, to include; support community services such as firefighting and police protection, and to provide health care in rural communities.

Congress appropriates funds for PILT

		County		Human Resource Unit (HRU)				
Arizona		Maricopa	Yavapai	Wickenburg	Prescott	Lake Pleasant	Phoenix	Buckeye
1990								
Number	123,902	64,742	2,655	282	1,845	2,019	61,133	907
Percent	7.1	4	3	4	2	2	4	6
2000								
Number	133,368	70,931	3,616	175	1,614	4,651	64,567	925
Percent	3.4	3	3	2	2	2	3	3

Note: HRUs represent distinct areas and do not necessarily coincide with jurisdictional boundaries.
Source: U.S. Census Bureau and JKA.

payments to eligible units of local government each year. BLM calculates the amount of payments using a formula based on population and the amount of Federal land in a particular local jurisdiction.

These payments are in addition to Federal revenues transferred to local governments under other programs, such as income generated from timber harvests, mineral receipts, and the use of Federal land for livestock grazing.

tourism and recreation sector (American Recreation Coalition 2001). Recreation use of BLM's lands is correspondingly expected to increase at a significant rate (Cabe and Coupal 2001). Understanding the economic importance of recreation use in this area is critical to proper planning for resource protection, economic sustainability, and quality of life.

Employment provided by recreation and tourism is typically classed within the Service and Trade sectors. These sectors

Table 3-10. 2002 Primary Property Tax Levies

County	Net Assessed Valuation	State	County	Cities & Towns	Community Colleges	Schools	All Other	Total	Primary Rate
Maricopa	\$24,457,047,282	\$0	\$31,721,521	\$175,207,012	\$36,526,312	\$603,369,737	\$113,194,334	\$960,018,916	3.93
Yavapai	\$1,450,497,580	\$0	\$3,072,096	\$1,667,615	\$5,735,780	\$12,506,662	\$18,727,476	\$41,709,629	2.88

Source: Arizona Department of Revenue, 2002 Annual Report

Table 3-11 shows the PILT payments to Maricopa and Yavapai Counties from BLM during for the period of 1999-2003.

3.15.5 Recreation and Tourism

Increased interest in recreation over the past decade combined with a large increase in population in the Phoenix metropolitan area and within the planning areas; has resulted in heavy use of BLM's lands for recreation. Currently BLM collects data on visitation to BLM-managed lands through visitor registers at trailheads and recreation sites, and with vehicle counters at a few key locations. BLM's staff noted an increase in the recreation use of public lands through analysis of the data and through personal observation.

National trends in recreation and tourism show a continued expansion of the

also provide diversification to the local economy. They typically reflect the following:

- a growing population involved in retail and commercial businesses,
- a visitor population that uses local services, and
- increasing numbers of retirees as a segment of the population that brings money into the economy through transfer payments and local spending.

During 2000, total service and trade earnings in Maricopa and Yavapai Counties were \$33 billion. During 2000, about 1.1 million workers in the service and trade sectors earned an average of \$32,000. Recreation in the planning areas will continue to increase due to State and regional population growth, as well as an aging population that may demand increased opportunities for leisure and recreation.

County	1999	2000	2001	2002	2003
Maricopa	\$969,069	\$1,019,264	\$1,465,414	\$1,539,003	\$1,725,495
Yavapai	\$879,521	\$973,796	\$1,417,178	\$1,473,737	\$1,359,624
Source: U.S. Bureau of Land Management					

OHV use constitutes a rapidly growing recreation use of BLM's lands. Between 1997 and 2002, the number of OHVs sold in Arizona increased from 7,964 to 23,568 vehicles. The direct economic impact to Yavapai County from OHV recreation is an estimated \$183 million per year and to Maricopa County exceeds \$1.358 billion per year (Silberman 2003).

The following are facts concerning OHV use in Yavapai and Maricopa Counties (Arizona State Parks 2003):

- A total of 27 percent of Yavapai County households are OHV users, compared to 21 percent statewide.
- A total of 19 percent of Maricopa County households are OHV users.
- OHV use supports more than 15,000 jobs in both counties.
- OHV recreation accounts for more than two billion dollars per year in the two counties.

The equestrian industry, including self-housed, self-boarded, and commercially boarded horses, represents a significant contribution to the economic base of the planning areas. Estimated annual direct expenditures in the above activities, using calculations from "A Partial Economic Impact Analysis of Arizona's Horse Industry" (Beattie and others 2001), is \$8.5 million for the Wickenburg area alone. Impact on the broader Wickenburg area economy is about \$14 million. Equestrian use, boarding stables, and retail have strong roots throughout the greater Phoenix area and in adjacent towns and communities that use BLM's lands for recreation.

3.15.6 Ranching-Agriculture

Farming and ranching have historically been significant contributors to the Arizona economy. In recent years, extensive population growth within the planning areas have resulted in loss of agricultural land and increased conflicts with farm and ranch operations.

The United States Department of Agriculture (USDA) National Agricultural Statistics Service reports livestock production statistics for all counties. Data for Maricopa and Yavapai Counties for livestock receipts during 1999 through 2002 shows that inventories of cattle remained fairly constant during this four year period (see Figure 3-1). In 2002, a total of 36,000 head of cattle were raised in these two counties. The period from 1999 to 2002 experienced the following:

- Cattle inventories remained fairly constant,
- Cash receipts for livestock averaged \$500,000 per year, and
- Total agricultural product receipts averaged \$900,000 per year.

Cash receipts from crops were relatively low in Yavapai County (about one percent of the total for the two counties). Receipts from cattle represented a more significant portion of the receipts (nine percent of the total for the two counties).

Total net income from farming and ranching in Maricopa County rose from 1970 to 1985,

and then dropped steadily to the year 2000. In Yavapai County, net income dropped from \$9 million (1970) to \$2.8 million (1986), and then rose to \$9.7 million in 2000.

3.16 Environmental Justice

In 1994, the President of the United States issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." The objectives of the executive order include the following:

- develop Federal agency implementation strategies,
- identify minority and low-income populations where proposed Federal actions could have disproportionately high and adverse human health and environmental effects, and
- encourage the participation of minority and low-income populations in the NEPA process.

Two types of data must be reviewed to evaluate environmental justice effects: minority populations and income levels. Minority and income level data for the HRUs were obtained from the 2000 census data.

3.16.1 Minority Populations within the Planning Areas

According to U.S. Census Bureau for 2000, the combined minority population of the planning areas averaged 23.9 percent of the population. Arizona has a similar minority population rate of 24.4 percent. Table 3-12 which is located in the additional tables sections of the document,

shows minority populations by different areas in the planning areas.

The planning areas were analyzed at a block-group level to determine where higher-than-average minority populations lived. Minority populations were identified in the Bradshaw-Harquahala Planning Area but not within Agua Fria National Monument. The largest minority population was located to the west and southwest of Wickenburg. Other portions of the Bradshaw-Harquahala Planning Area with significant minority populations included the following:

- a small parcel of tribal land just outside Prescott,
- an area extending along Interstate 60 near the towns of Circle City and Wittmann, and
- several populations scattered throughout the northwest Phoenix metropolitan area.

Using the county averages for comparisons, each Human Resource Unit (HRU) and Community Resource Unit (CRU) was evaluated to determine whether the percentage of minority population was greater than the county average. If HRU or CRU percentages exceeded the county averages, they were evaluated for environmental justice effect on the basis of their minority population and income levels.

Table 4-9 shows HRUs and CRUs whose percentage of Hispanic populations and percentage of populations living below the federally mandated poverty level exceed those of their counties. Minority populations and poverty are the two criteria for an environmental justice analysis.

The only HRU in Yavapai County with minority populations that exceed the county average is the Wickenburg HRU. The percent of Hispanics in the Wickenburg

HRU (11 percent) exceeds the Yavapai County percentage of Hispanics (10 percent) by only 1 percent. In the Wickenburg HRU, the percentage of Hispanics in the Aguila CRU (16 percent) exceeds the Yavapai County percentage of Hispanics by six percent.

The percentage of Hispanics in the Phoenix HRU (27 percent) exceeds the Maricopa County percentage of Hispanics (25 percent) by two percent. In the Phoenix HRU, the percentage of Hispanics in the community of Tolleson (78 percent) exceeds the Maricopa County percentage of Hispanics by 53 percent.

The percentage of Hispanics in the Buckeye HRU (26 percent) exceeds the Maricopa County percentage of Hispanics (25 percent) by 1 percent. In the Buckeye HRU, the percentage of Hispanics in the Buckeye

CRU (28 percent) exceeds the Maricopa County percentage of Hispanics by three

percent, and the West Tonopah CRU (32 percent) exceeds the Maricopa County percentage of Hispanics by 7 percent.

3.16.2 Low-Income Populations within the

Planning Areas

According to U.S. Census Bureau for 2000, 11.4 percent of the total population within the planning areas was below the poverty level. Within Arizona, 13.9 percent of the total population was below the poverty level. The entire population within Agua Fria National Monument was statistically below the poverty level. Additionally, most of the west, northwest, and northeast portions of the Bradshaw-Harquahala Planning Area were classified as below the poverty level. Table 3-13 shows populations below poverty level by county and HRU.

Using the county averages for comparisons, the percentage of persons living below the poverty level for each HRU and CRU was compared to the county average. If HRU or CRU percentages exceeded the county averages, they were evaluated for environmental justice effect on the basis of their income levels.

Table 4-9 shows HRUs and CRUs whose percentage of Hispanic populations and percentage of populations living below the federally mandated poverty level exceed those of their counties.

The Wickenburg HRU (14 percent) exceeds Yavapai County (12 percent) by 2 percent.

Persons Below Poverty Level (BPL)	Arizona	Maricopa County	Yavapai County	Wickenburg	Prescott	Lake Pleasant	Phoenix	Buckeye
1990 Population BPL	564,362	257,359	14,308	1,370	8,999	9,424	239,334	5,330
% of population BPL	**16	12	13	16	15	8	12	24
2000 Population BPL	698,669	355,668	19,552	1,484	9,286	13,700	332,297	6,153
% of population BPL	**14	12	12	14	10	4	12	15

Notes: ** Percentage of persons living below the poverty level was determined by dividing population below poverty level by total population of county or HRU as appropriate.

HRUs represent distinct areas and do not necessarily coincide with jurisdictional boundaries.

Source: U.S. Census Bureau and JKA.

In the Wickenburg HRU, both the Aguila CRU (20 percent) and Yarnell CRU (16 percent) exceed the county level by eight percent and four percent, respectively. While the Prescott HRU is lower than that of the county's, in the Prescott HRU, the Agua Fria CRU (15 percent) exceeds the county level by three percent.

The Phoenix HRU (13 percent) exceeds the Maricopa County level (12 percent) by one percent. The Buckeye HRU (17 percent) exceeds the Maricopa County level by 5 percent.

3.17 Health and Safety

BLM has several programs that guide management to protect public health, safety, and property. These responsibilities include such activities as identifying abandoned mine lands (AML), protecting lands from illegal dumping of solid and hazardous materials, preventing theft of Federal property or misuse of resources, and managing wildfire. The proximity of the AFNM and Bradshaw-Harquahala Planning Area to metropolitan Phoenix, along with the accelerated growth of Maricopa County over the past two decades, has put considerable user pressure on these lands, emphasizing the need for BLM to develop and implement additional strategies for protecting the health and safety of visitors.

3.17.1 Abandoned Mine Lands

Due to the high level of mining in and around the Bradshaw Mountains, thousands of abandoned mines are potentially within the planning areas. Most of these mines are unmarked, unfenced, and pose serious or fatal risks to humans who may accidentally come upon them or deliberately seek them.

In addition, hazardous materials are present at some of the abandoned mines.

Since 1992, BLM has teamed with the Arizona State Mine Inspector and Federal/State agencies, to evaluate the need for clean-up and closure of abandoned mine sites that pose safety risks to visitors; or are causing environmental damage. Since that time, about 9,000 sites throughout the State have been inventoried and mapped (Arizona State Mine Inspector 2002). Additionally, BLM has joined an aggressive program to heighten public awareness of the safety and environmental hazards of abandoned mine lands.

A total of 957 abandoned mines were documented and mapped within the the planning areas. Map 3-19 shows the distribution of these mines. Through the Abandoned Mine Lands program, the following mines were fenced (Arizona State Mine Inspector 2001):

- New River-Black Canyon Mines in June 2000,
- Mayer Shafts in Yavapai County in November 2000,
- Prescott and Humboldt Mines in March 2001, and
- King Midas and Morgan Butte Mines in June 2001.

3.17.2 Hazardous Materials

BLM's Hazardous Materials program addresses both solid and hazardous wastes, in accordance with the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). These acts provide comprehensive guidance to BLM for performing required assessments, monitoring, pollution prevention, recordkeeping, reporting, response actions, and training on a timely basis. BLM is also

inventory can be found on maps 3-21, 3-22, 3-23, 3-24 3-25, 3-26.

Upon completion of the Resource Management Plans, the route network that will continue to be managed by BLM will be determined using a structured route

evaluation process such as that described in Appendix D - Route Evaluation and Designation Process. Decisions of which specific routes will be open, closed, or somehow limited to continued vehicular use are implementation actions that will be made through a separate process.

