

Section 3.0 Affected Environment

The CEQ's regulations implementing NEPA direct agencies to reduce excessive paperwork by incorporating by reference (40 CFR 1500.4(j)). As such, the LUPs to be amended, along with supplements or documents tiered to those original LUPs, frequently present more detailed information on the affected environment of the BLM-administered public lands that the plans represent. In an effort to reduce excessive or unnecessary paperwork, the affected environment sections of those LUPs are incorporated by reference into this document. Those LUPs, supplemental or tiered documents are:

Bureau of Land Management. 1982. Final Environmental Impact Statement, Proposed Grazing Management Program for the Lower Gila North EIS Area. U.S. Dept. of the Interior, Bureau of Land Management Yuma, Mohave, Yavapai, and Maricopa Counties, Phoenix District, Arizona.

Bureau of Land Management. 1983. Lower Gila North Management Framework Plan. U.S. Dept. of the Interior, Bureau of Land Management, Lower Gila North Resource Area, Arizona.

Bureau of Land Management. 1985. Lower Gila South Resource Management Plan and Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Phoenix District, Arizona.

Bureau of Land Management. 1985. Final Yuma District Resource Management Plan and Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Yuma District, Arizona.

Bureau of Land Management. 1988. Proposed Phoenix Resource Management Plan, Draft and Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Phoenix District, Arizona.

Bureau of Land Management. 1989. Final Lower Gila South Resource Management Plan (Goldwater Amendment). U.S. Dept. of the Interior, Bureau of Land Management, Lower Gila South Resource Area, Arizona.

Bureau of Land Management. 1990. Proposed Arizona Strip District Resource Management Plan and Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Arizona Strip District, Arizona (as amended, 1998).

Bureau of Land Management. 1991. Safford District Resource Management Plan and Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Safford District Office, Arizona.

Bureau of Land Management. 1993. Kingman Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Kingman Resource Area, Arizona.

Bureau of Land Management. 1994. Planning Update, Amendment and Environmental Assessment to the Lower Gila North and South Management Plans. U.S. Dept. of the Interior, Bureau of Land Management, Lower Gila Resource Area, Arizona.

Bureau of Land Management. 1994. Rangeland Reform '94, Final Environmental Impact Statement. U.S. Dept. of the Interior, Bureau of Land Management, Department of Agriculture, Forest Service.

Bureau of Land Management. 1998. Resource Management Plan Amendment, Desert Tortoises and Virgin River Fishes. U.S. Dept. of the Interior, Bureau of Land Management.

3.1 Physical Environment

3.1.1 Air Resources

The Clean Air Act (CAA) was first enacted in 1970 (amended in 1990) to limit the emission of pollutants into the atmosphere to protect human health and the environment from the effect of airborne pollution. The CAA authorized the U.S. Environmental Protection Agency (EPA) to achieve this objective by setting air quality standards and regulate emissions of pollutants into the air. EPA has established emission standards for mobile (e.g., automobile) and stationary (e.g., factories) sources for pollutant emissions. These controls are implemented in Arizona through EPA and the Arizona Department of Environmental Quality (ADEQ).

EPA has established National Ambient Air Quality Standards (NAAQS) for six pollutants: particulate matter with diameter of ten microns or less (PM₁₀), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂) Ozone (O₃), and volatile organic

compounds (VOC). The State of Arizona has adopted the EPA standards for the six pollutants. Regulation has afforded the public some protection from toxic levels of these air pollutants. The primary responsibility rests with ADEQ, which must submit a State Implementation Plan (SIP) to achieve and maintain the NAAQS. Pursuant to the SIP, new or modified air emission sources must undergo pre-construction review to determine whether the source will interfere with attainment or maintenance of NAAQS. In addition, some areas that do not attain NAAQS must have a SIP that includes regulatory strategies to control emissions from existing sources.

As **Figure 3.1** and **Table 3.1** illustrate, Arizona currently has ten PM₁₀, six SO₂, two CO, and one O₃ nonattainment areas. The BLM planning areas of the Arizona Strip RMP, the northern region of the Phoenix RMP, the Kingman RMP, Lower Gila South RMP, and the Lower Gila North MFP meet (in-attainment) the NAAQS. The BLM planning areas that do not meet the air quality standards include the Yuma RMP, Safford RMP, and the southern region of the Phoenix RMP. These nonattainment planning areas are described below and presented in **Table 3.2**.

- Land managed by the Yuma Field Office is nonattainment for PM₁₀ in the City of Yuma in Yuma County.
- Land managed by the Havasu Field Office is nonattainment for PM₁₀ in the Bullhead City area in Mohave County.
- Land managed by the Safford Field Office is nonattainment for PM₁₀ and SO₂ in the Douglas area in Cochise County and SO₂ in the Morenci area in Greenlee County.
- Land managed by the Phoenix Field Office is nonattainment for PM₁₀ in the Hayden area in Pinal and Gila Counties, the Phoenix area in Maricopa County, the Nogales area in Santa Cruz County, and the Rillito area in Pima County. Nonattainment for SO₂ occurs in the Hayden area in Pinal and Gila Counties, the Miami area in Gila County, and the San Manuel area in Pinal County. CO nonattainments in the region occur at the Phoenix area in Maricopa County and the Tucson area in Pima County. The Phoenix area in Maricopa County is also nonattainment for ozone.

Additional information on air resources in each BLM Field Office is provided in BLM's existing LUPs,

referenced at the beginning of Section 3.0, and incorporated here by reference.

3.1.2 Soil Resources

The soils on BLM-administered land in Arizona are diverse and associated with a variety of climates, vegetative cover, topography, and geology. Fire-related impacts on soils are largely dependent on the duration and intensity of the fire and its effects on the vegetative cover, the properties of the soils, and the climate and topography (Clark, 2001). The impacts of wild or prescribed fire on soils may be minimal, or may accelerate improvement or degradation of the soil resources beyond what may have occurred without intervention, such as extinguishing a wildfire or conducting a prescribed burn.

There are 11 soil suborders found on BLM-administered land in Arizona (**Figure 3.2**), however approximately 83% of these soils are associated with only 3 suborders: Orthids, Argids and Orthents (**Table 3.3**). These soils developed primarily under hot, dry conditions and are characterized as having thermic or hyperthermic temperature regimes, and aridic or semi-aridic moisture regimes. Orthids and Argids are light-colored soils containing little organic matter and having at least one diagnostic subhorizon. Orthids can be calcereous throughout, but can also have accumulations of carbonates (calcic horizon), cemented carbonates (petrocalcic horizon) or cemented silica (duripan), with limited areas having accumulations of gypsum (gypsic horizon). Argids can have clay (argillic horizon) or sodium (natric horizon) accumulations in the subsurface. On BLM-administered lands, Sonoran and Mohave Desert Scrub in western and southern Arizona are the primary vegetation communities associated with Orthids and Argids soils (71.5% and 63.5%, respectively). Plains and Great Basin Grassland, Great Basin Desert Scrub and Great Basin Pinyon-Juniper Woodland compose most of the remaining vegetative cover for Orthids and Argids soils (26.5% and 15.4%, respectively), with additional areas of Chihuahuan Desert Scrub, Semidesert Grassland, and Interior Chaparral associated with the Argids soils (19.2%). Approximately 1% of the Orthids and Argids soils are in Riparian areas.

Orthents soils are characterized by a lack of horizon development due to a dry climate, and parent materials that are resistant to weathering. Orthents are commonly shallow soils over rock and found on steep slopes or very dry environments. Sonoran and Mohave Desert Scrub are the primary vegetation

Figure 3.1 Arizona Air Quality Nonattainment Areas

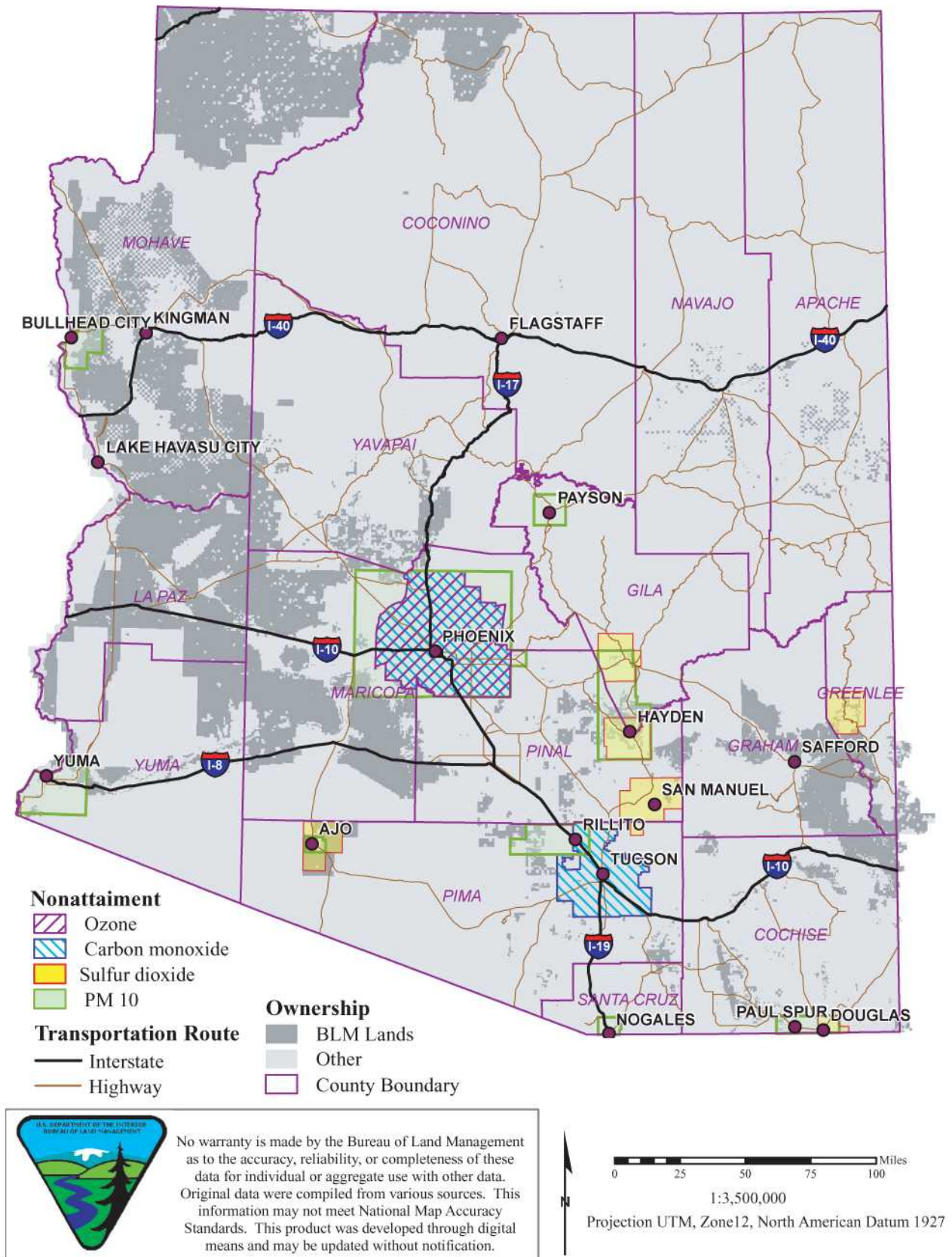


Table 3.1 ñ Arizona NAAQS Nonattainment Areas

Nonattainment Pollutant	Affected Areas and Counties	Sources of Pollutant Emissions in Areas	Status
PM ₁₀	Ajo Area of Pima County	Dry, unstable conditions of the trailing piles northeast of Ajo, paved and unpaved roads, and cleared areas.	ADEQ had developed a maintenance plan and submitted to EPA requesting redesignation to attainment
	Bullhead City Area of Mohave County	Cleared construction areas, unpaved roads, and parking lots.	EPA designated Bullhead City Area a moderate PM ₁₀ nonattainment in 1993. In 2002 EPA determined that the Bullhead City PM ₁₀ nonattainment did attain the 24-hour and annual PM ₁₀ NAAQS. ADEQ had submitted a request for redesignation to attainment.
	Douglas Area of Cochise County	Unpaved roads, parking lots, off road vehicles, and agricultural activities (most of the agricultural activities and associated emissions occur on the Mexico side of the international border.	
	Hayden Area of Gila and Pinal Counties	Crushing and conveying activities at the Ray Unit crushing plant and road dust.	
	Nogales Area of Santa Cruz County	Paved and unpaved road. It was estimated that 94 percent of the PM ₁₀ emissions in the international regions were generated in Nogales, Mexico.	
	Paul Spur Area of Cochise County	Emissions from lime plant, unpaved roads, and border dragging operations.	ADEQ had developed a maintenance plan and submitted to EPA requesting redesignation to attainment
	Payson Area of Gila County	Rock crushers, concrete batch plants, sawmill, wood smoke, and paved/unpaved roads.	ADEQ had developed a maintenance plan and submitted to EPA requesting redesignation to attainment
	Phoenix Area of Maricopa County	A Paved/unpaved road, construction sites disturbed areas on vacant lots, and windblown dusts from agricultural fields.	ADEQ had submitted to EPA a SIP revision of Agricultural PM ₁₀ General Permit.
	Rillito Area of Pima County	Unstabilized river banks and road shoulders unpaved local roads, and the Arizona Portland Cement Company.	
	Yuma Area of Yuma County	Paved/unpaved roads, agricultural tilling and burning, and disturbed areas.	ADEQ anticipates submitting to EPA the Yuma Moderate Area PM ₁₀ Maintenance Plan and request redesignation to attainment by late 2003
SO ₂	Ajo Area of Pima County	The Ajo copper smelter operation. The operation was dismantled in 1995 (Phelps Dodge Ajo, Inc.)	ADEQ had developed a maintenance plan and submitted to EPA requesting redesignation to attainment
	Douglas Area of Cochise County	Douglas copper smelter operation. The operation was dismantled in 1987.	ADEQ had developed a maintenance plan and submitted to EPA requesting redesignation to attainment
	Hayden Area of Gila and Pinal Counties	Hayden and Ray copper smelter operations. Ray operation was closed in 1987.	ADEQ developed the Hayden Moderate Area SO ₂ Maintenance Plan and submitted to EPA and requested redesignation to attainment.
	Miami Area of Gila County	Copper smelter operations.	ADEQ developed the Miami Moderate Area SO ₂ Maintenance Plan and submitted to EPA and requested redesignation to attainment.
	Morenci Area of Greenlee County	Morenci copper smelter operations	ADEQ developed a Maintenance Plan and submitted to EPA and requested redesignation to attainment.
	San Manuel Area of Pinal County	Copper smelter operations.	ADEQ developed a Maintenance Plan and submitted to EPA and requested redesignation to attainment.
CO	Phoenix Area of Maricopa County	On-road and non-road mobile and area sources (fuel combustion, incineration, etc.)	Area is designated as serious CO nonattainment.
	Tuscan Area of Pima County	Vehicular emissions.	
Ozone*	Phoenix Area of Maricopa County	VOC and NOx emissions from point, non road, area, stationary, motor vehicles, and biogenic sources	Area is designated as serious ozone nonattainment.

* VOC and NOx are ozone precursors.

Table 3.2 ñ NAAQS Nonattainment Areas Within The Affected Environment

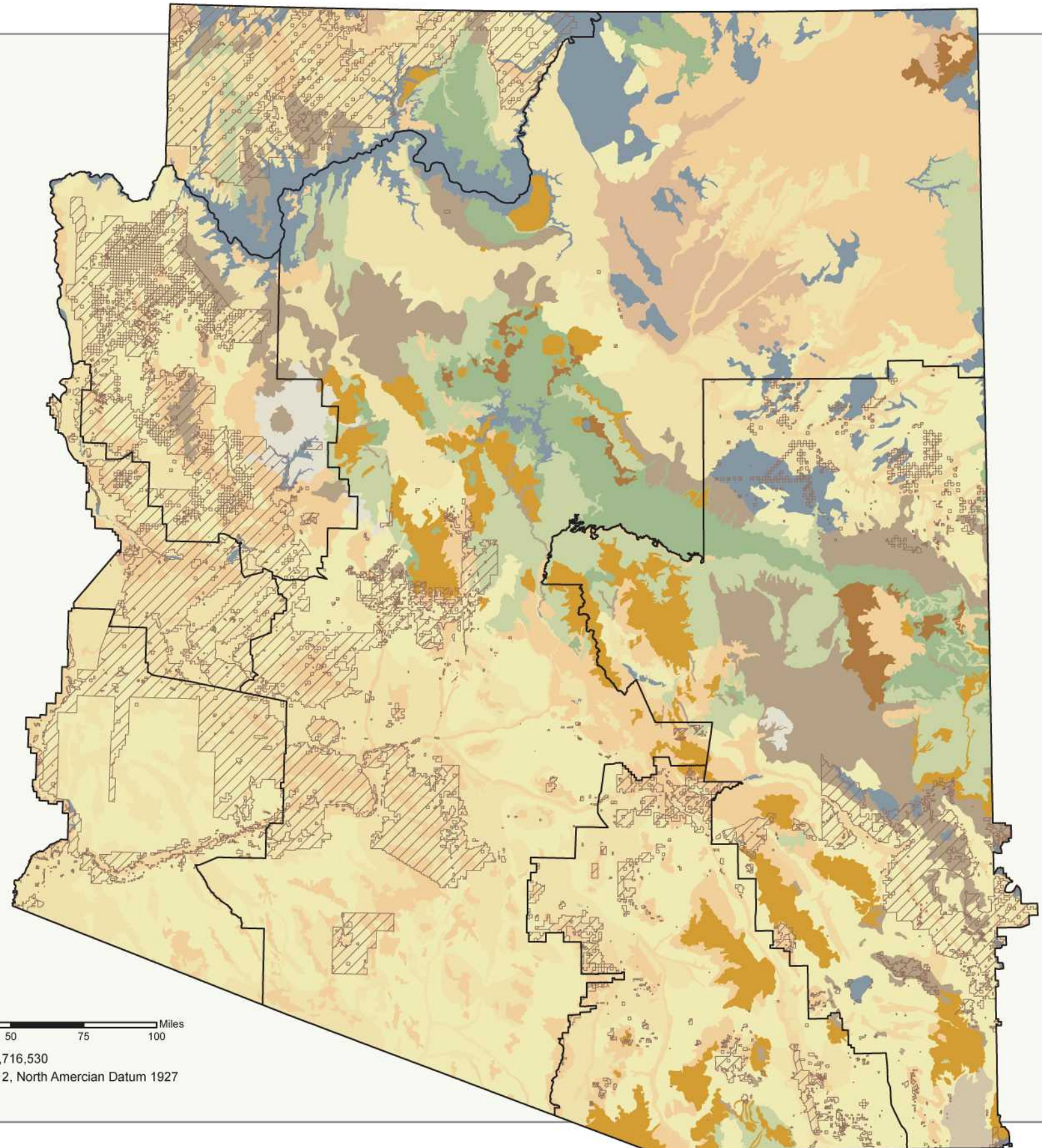
Planning Areas	Nonattainment Air Pollutants And Areas Affected			
	PM ₁₀	SO ₂	CO	Ozone
Yuma RMP	Bullhead City Area (Mohave County)	-	-	-
	Yuma Area (Yuma County)	-	-	-
	Ajo Area (Pima County)	Ajo Area (Pima County)		
Safford RMP	Douglas Area (Cochise County)	Douglas Area (Cochise County)	-	-
	-	Morenci Area (Greenlee County)	-	-
Phoenix RMP (Southern Region)	Hayden Area (Pinal and Gila Counties)	Hayden Area (Pinal and Gila Counties)	Phoenix Area (Maricopa County)	Phoenix Area (Maricopa County)
	Phoenix Area (Maricopa County)	Miami Area (Gila County)	Tucson Area (Pima County)	-
	Nogales Area (Santa Cruz County)	San Manuel Area (Pinal County)	-	-
	Rillito Area (Pima County)	-	-	-

Table 3.3 ñ Distribution of Soil Suborders on BLM-Administered Land in Arizona

Soil Type		Area of BLM land	Area of BLM land
Order	Suborder	(Acres)	(%)
Alfisols	Boralfs	950	0.01
	Ustalfs	314,223	2.55
Aridisols	Argids	3,758,250	30.49
	Orthids	4,437,152	36.00
Entisols	Fluvents	462,103	3.75
	Orthents	2,049,837	16.63
	Psammments	44,632	0.36
Inceptisols	Ochrepts	46,415	0.38
Mollisols	Ustolls	790,448	6.41
Vertisols	Torrents	3,036	0.02
	Usterts	50,108	0.41
Rock		369,551	3.00
TOTAL		12,326,704	100.00

Figure 3.2 Arizona Soils

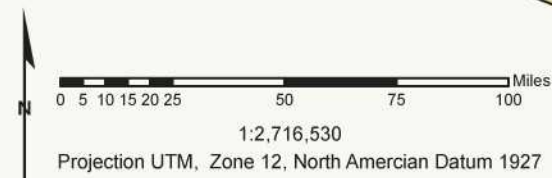
Order	Suborder	BLM Total Acres
Alfisols	Boralfs	950
Alfisols	Ustalfs	314,223
Aridisols	Argids	3,790,986
Aridisols	Orthids	4,484,254
Entisols	Fluvents	500,105
Entisols	Orthents	2,067,806
Entisols	Psaments	56,708
Inceptisols	Ochrepts	46,869
Mollisols	Borolls	0
Mollisols	Ustolls	803,552
Vertisols	Torrets	3,036
Veritsols	Usterts	50,108
Rock, undeveloped soils		399,057
BLM Lands		12,517,653
Field Office Boundary		



Soils data source:
 USDA Natural Resource Conservation Service soils maps for the State Soils Geographic (STATSGO) database



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.



communities associated with Orthents (67.1%), and are scattered throughout western, southern and south central Arizona. Semidesert Grassland, Plains and Great Basin Grassland, Great Basin Desert Scrub, Great Basin Pinyon-Juniper Woodland and Interior Chaparral compose most of the remaining vegetative cover (29.7%), primarily in northeastern Arizona. Approximately 2% of the Orthents soils are in Riparian areas. Approximately 13% of the remaining soils on BLM-administered lands are in the suborders Fluvents, Ustolls and Ustalfs. Fluvents formed in recent loamy or clayey alluvial deposits near stream channels or on piedmont slopes and are associated with Chihuahuan Desert Scrub, Plains and Great Basin Grassland, Great Basin Desert Scrub, and Great Basin Pinyon-Juniper Woodland (68.6%) found mainly in northwestern Arizona and in narrow bands along the river valleys. Over 7% of the Fluvents soils are in riparian areas and approximately 2% are agricultural lands. Ustolls are thick, dark-colored soils that occur at higher elevations in semiarid and subhumid climates with an ustic soil moisture regime and a mesic soil temperature regime. Ustolls can have clay, carbonate or cemented carbonate horizons, and are associated with Semidesert Grassland, Great Basin Pinyon-Juniper Woodland and Interior Chaparral (87.3%) found scattered throughout Arizona. Ustalfs are reddish-colored soils that usually have some accumulations of carbonates in or below the subsoil and can have a high sodium content. Ustalfs are associated almost entirely with Great Basin Pinyon-Juniper Woodland (70.6%), with some Upland Sonoran Desert Scrub, Plains and Great Basin Grassland and Great Basin Desert Scrub (22.7%) found scattered throughout Arizona. Riparian areas are not generally associated with Ustolls or Ustalfs soils.

3.1.3 Water Resources

3.1.3.1 Surface Waters

There is a diversity of surface water types in Arizona, reflecting the varied topography, climate, and human modification of the landscapes in the state. Surface waters occurring within BLM districts of the state have been described in existing planning documents cited in Section 3.1.1; readers are referred to those documents for detailed information about the occurrence and nature of surface water resources in individual districts. Figure 3.3 shows the locations of major rivers in the state, and also shows occurrence of lakes (including impoundments) and other streams.

Figure 3.3 also notes the occurrence of significant riparian areas in the state. The largest contiguous riparian areas occur in the Little Colorado River

basin near Holbrook. Extensive riparian areas also exist along the Virgin River, Paria River, and Kanab Creek and the Gila River; extensive areas are also present in the Kingman district. Many of the latter appear on the map as linear features, reflecting their association with intermittent streams. The occurrence and condition of riparian areas and wetlands on BLM lands (including some lands proposed for acquisition), and management of those lands, has been described in existing management plans. In some plans, riparian areas have been discussed in the context of stream and water resources, in other reports focus on the habitat values of riparian areas and describe management activities to protect and improve the quality of riparian and wetland systems.

3.1.3.2 Groundwater

The occurrence and characteristics of groundwater resources have been described in varying levels of detail in the LUP documents cited at the beginning of Section 3, and incorporated here by reference. There have likely not been significant changes in the occurrence, availability, or chemistry of groundwater from conditions described in those documents. Moreover, potential changes in fire prevention and fire suppression activities on BLM lands in the state are not likely to result in material changes to groundwater resources.

3.1.3.3 Water Quality

A 1988 report by the Arizona Department of Environmental Quality (ADEQ, 1988), cited in the RMP for the Arizona Strip District (1990) indicated that fewer than 10% of waters in the state met standards for beneficial uses, due mostly to impacts from non-point sources, and further indicated that the most significant non-point sources included grazing, hydrologic/habitat modification, recreation, and resource extraction. More recent ADEQ data (Marsh, 2002) indicate significantly better water quality in the state; the state's 2002 water quality assessment found that only 14% of streams and 15 % of the area of lakes included in their analysis were classified as impaired or not attaining water quality standards. Thirty six percent of streams and 62% of lakes, however, were classified as having insufficient data to assess compliance. These water bodies with insufficient data have been placed on a planning list until they can be further evaluated.

To protect outstanding state water resources, the State of Arizona has established a program of Unique Waters. These surface waters are identified as having exceptional recreational or

ecological significance,¹ or have been identified as being essential to the maintenance and propagation of a threatened or endangered species,¹ or as providing critical habitat for a threatened or endangered species (Marsh, 2002). Water quality protections for Unique Waters are more stringent than for other surface waters, and include anti-degradation procedures that prohibit new or expanded discharge of pollutants to these waters. The restrictions include discharges associated with land use activities such as mining, grazing, and agriculture. As of 2002, the state had identified 20 Unique Waters.

3.2 Biological Environment

3.2.1 Vegetation Resources

BLM-administered lands in Arizona support 12 main biotic communities (after Brown, 1994): Chihuahuan Desert Scrub, Mohave Desert Scrub, Great Basin Desert Scrub, Lower Sonoran Desert Scrub, Upper Sonoran Desert Scrub, Great Basin Pinyon-Juniper Woodland, Madrean Evergreen Woodland, Plains and Great Basin Grassland, Semidesert Grassland, Montane Conifer Forest, Riparian, and Interior Chaparral (see **Figure 3.4** and **Table 3.4**; Brown 1982a). These 12 vegetation communities give rise to diversity in plant and wildlife species. The nature of plant communities is often clearly demarcated by climatic, geological, elevation and aspect gradients which in turn influences soil type and soil water holding capacity. At the lower elevations, Arizona is the confluence of the four major North American Deserts: Sonoran Desert, Mojave Desert, Chihuahuan Desert, and Great Basin Desert. These deserts support a mixture of different vegetation communities because of variances in annual precipitation and temperature patterns. As elevation increases, woodland, chaparral, montane conifer forest, subalpine conifer forest, and alpine tundra, respectively, become foremost. The vegetation communities at mid-level and high elevation are influenced by Great Basin Conifer and California Evergreen Woodlands, and Sierra and Rocky Mountain Conifer Forests, respectively. The vegetation communities in each BLM Field Office are described by ecological site¹ in the approved LUPs referenced at the beginning of Section 3.0. Each vegetation community is more fully described by Brown (1982a) and summarized in **Appendix C**.

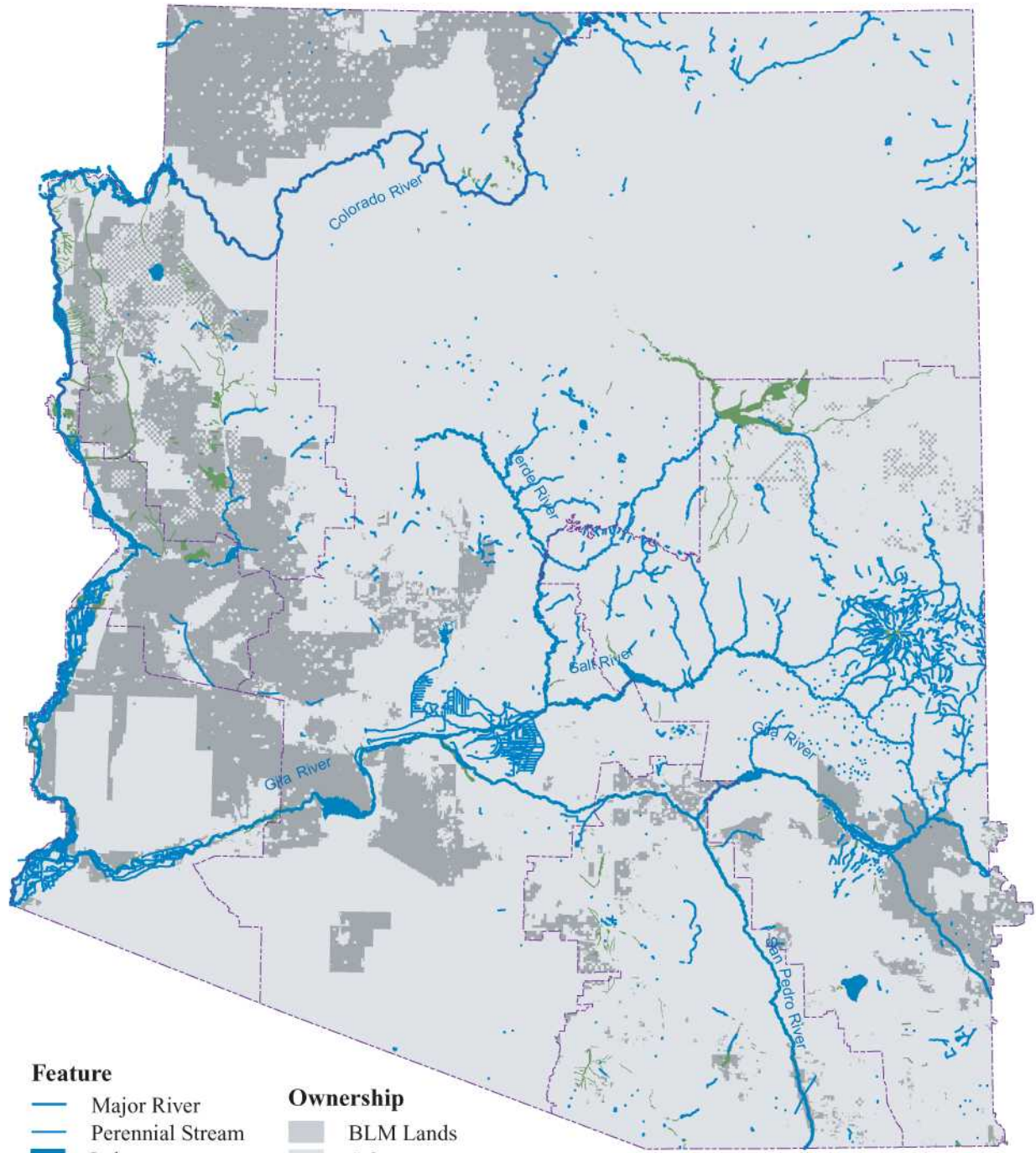
¹ An ecological site is a kind of land defined by physical characteristics such as soil that differs from other kinds of lands in its ability to produce a distinctive mix of vegetation and in its response to management (Pellant et al. 2000).

Each vegetation community varies in annual precipitation and temperature regimes, elevation, and historic fire regimes (Swetnam and Baisan 1996, Paysen et al. 2000). Wildfire in some of these vegetation communities was a normal occurrence with short return intervals that helped to define species composition, structure, and productivity (Brown 2000, Paysen et al. 2000). As such, many plants that make up these communities are adapted to withstand wildfire through a variety of anatomical or physiological mechanisms. Examples of fire-adapted vegetation communities are Interior Chaparral and Montane Forest. On the other hand, some vegetation communities, wildfire may not be part of their normal ecology and many of the plant species are not fire adapted (Roger and Stelle 1980). Lower Sonoran Desert Scrub and Mohave Desert Scrub are examples of vegetation communities with long fire return intervals. Fire in these communities would probably be detrimental because plant succession would require decades to hundreds of years for the vegetation to recover and some species may never recuperate.





3.2.2 Fire Ecology

Prior to European settlement, fire was a common and widespread influence on many landscapes in the Southwest (Paysen et al. 2000). Many of these fires were caused naturally from lightning but some were also started purposefully by Native Americans for a variety of reasons (Swetnam and Baisan 1996, Brown 2000). The historic fire regime of Arizona lands varied in frequency and severity depending on many factors such as vegetation type, climate, and topography (**Figure 3.5**). Wildfire in the different vegetation communities found on BLM land was a normal occurrence and helped define their species composition, structure and standing biomass (Brown 2000). As such, many plants were adapted to withstand wildfire through a variety of anatomical or physiological mechanisms and persisted with frequent fire. Examples of fire-adapted vegetation communities with frequent fire return intervals are Interior Chaparral, Plains and Great Basin Grassland, and Montane Conifer Forest. However, for other vegetation communities, wildfire was not a normal part of their ecology because the return frequencies were hundreds of years (Rogers and Steele 1980, McAuliffe 1995). In these communities, the distance between shrubs is too great for fire to carry unless annual plant growth in the inter-shrub spaces is sufficient to carry fire. Upland Sonoran Desert Scrub and Mohave Desert Scrub are examples of plant communities with long fire return intervals.




Figure 3.3 Arizona Major Surface Water Features



Feature

-  Major River
-  Perennial Stream
-  Lake
-  Riparian Area

Ownership

-  BLM Lands
-  Other
-  Field Office Boundary



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

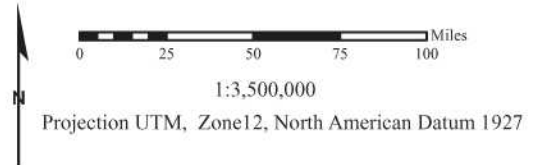
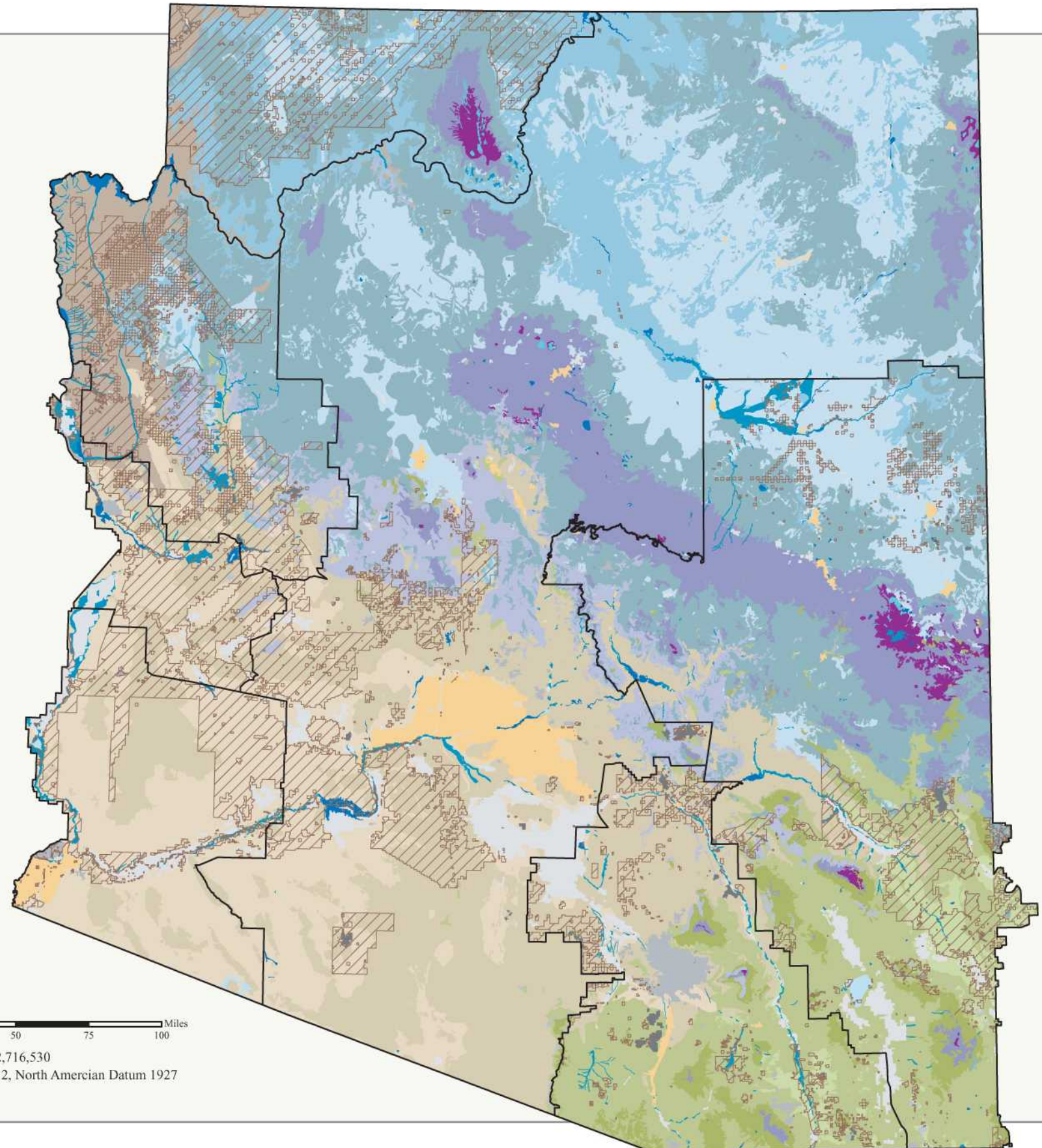


Figure 3.4 Arizona Vegetation Communities

	BLM Total Acres
Lower Sonoran Desert Scrub	2,743,602
Upland Sonoran Desert Scrub	3,280,602
Mohave Desert Scrub	1,163,882
Chihuahuan Desert Scrub	447,381
Semidesert Grassland	757,634
Madrean Evergreen Woodland	67,706
Plains and Great Basin Grassland	747,502
Great Basin Desert Scrub	1,060,725
Great Basin Pinyon-Juniper Woodland	1,532,999
Interior Chaparral	425,287
Montane Conifer Forest	19,067
Sub-Alpine Conifer Forest	0
Sub-Alpine Grassland	0
Mixed	4,715
Water	26,318
Riparian	176,103
Playa	11,676
Agriculture	34,513
Urban	13,817
Industrial	4,125
BLM Lands	12,517,653
Field Office Boundary	



Vegetation data source:
Natural vegetation as mapped for the Arizona, California, and New Mexico Gap Analysis Programs (GAP).



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

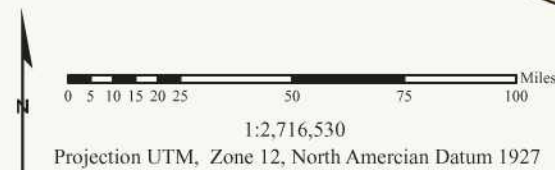


Table 3.4 ñ
General Characteristics of the Various Vegetation Communities on BLM-Administered Land Throughout Arizona (after Brown 1982)

Vegetation Community	BLM Land (%)	Plant Growth Form	Dominant Species	Elevation (Feet)	Climate	Precipitation (inches)
Lower Sonoran Desert Scrub	21.8	Shrubñ microphyllous	Creosotebush (<i>Larrea tridentata</i>), Whitebursage (<i>Ambrosia dumosa</i>), Ocotillo (<i>Fouquieria splendens</i>), Brittlebrush (<i>Encelia farinose</i>), Fourwing saltbush (<i>Atriplex canescens</i>), Palo verde (<i>Parkinsonia florida</i>), Saguaro (<i>Carnegiea gigantean</i>), Mesquite (<i>Prosopis velutina</i>), Ironwood (<i>Olneya tesota</i>), Catclaw acacia (<i>Acacia greggii</i>), Smoketree, Big galleta grass (<i>Pleuraphis rigida</i>)	< 3,445	Subtropical	2ñ9
Upper Sonoran Desert Scrub	26.2	Shrubñ microphyllous	Blue palo verde (<i>Parkinsonia florida</i>), Foothill palo verde (<i>Parkinsonia</i> sp.), Ironwood (<i>Olneya tesota</i>), Creosotebush (<i>Larrea tridentata</i>), White bursage (<i>Ambrosia dumosa</i>), Limber bush (<i>Jatropha dioica</i>), Ocotillo (<i>Fouquieria splendens</i>), Johoba (<i>Simmondsia chinensis</i>), Buckhorn cholla (<i>Opuntia acanthocarpa</i>), Klein cholla (<i>Opuntia kleiniae</i>), Chain fruit cholla (<i>Opuntia fulgida</i>), Devilis club cholla (<i>Opuntia kunzei</i>), Fish-hook pincushion (<i>Mammillaria thornberi</i>), Thornber pincushion (<i>mammillaria viridiflora</i>), Fishñhook barrel cactus (<i>Mammillaria diocia</i>), Compass cactus (<i>Ferocactus acanthodes</i>), Saguaro (<i>Carnegiea gigantean</i>)	984ñ3,280	Subtropical	12ñ16
Great Basin Pinyon-Juniper Woodland	12.2	Treeñconifer	Rocky Mountain juniper, (<i>Juniperus scopulorm</i>) Great Basin juniper (<i>Juniperus occidentalis</i>), Rocky Mountain pinyon pine (<i>Pinus edulis</i>), Big sagebrush (<i>Artemisia tridentata</i>), Snakeweed (<i>Gutierrezia sarothrae</i>), Rabbitbrush (<i>Ericameria</i> spp.), Winterfat (<i>Ceratoides lanata</i>), Blackbrush (<i>Isomeris arborea</i>), Cliffrose (<i>Purshia mexicana</i>), Apache plume (<i>Fallugia paradoxa</i>), Blue gramma (<i>Bouteloua gracilis</i>), Galleta grass (<i>Hilaria jamesii</i>), Indian rice grass (<i>Oryzopsis hymenoidesi</i>), Western wheatgrass (<i>Agropyron smithii</i>), several Muhleys (<i>Muhlenbergia</i> sp.) and Dropseeds (<i>Sporobolus</i> sp.).	6,560ñ9,840	Cold-Temperate	10ñ22
Mohave Desert Scrub	9.3	Shrubñ microphyllous	Creosotebush (<i>Larrea tridentata</i>), Joshua tree (<i>Yucca brevifolia</i>), All-scale atriplex (<i>Atriplex polycarpa</i>), Brittlebush (<i>Encelia farinose</i>), Desert holly (<i>Atriplex hymenelytra</i>), White burrobrush (<i>Hymenolea salsola</i>), Shadscale (<i>Atriplex confertifolia</i>), Blackbrush (<i>Isomeris arborea</i>), Engleman hedgehog (<i>Echinocereus engelmannii</i>), Silver cholla (<i>Opuntia echinocarpa</i>), Mojave pricklypear (<i>Opuntia phaeacantha</i>), Beavertail cactus (<i>Opuntia basilaris</i>), Many-headed barrel cactus (<i>Echinocactus polycephalus</i>), numerous ephemeral forbs	980ñ4,000	Warm-Temperate	2ñ8

Vegetation Community	BLM Land (%)	Plant Growth Form	Dominant Species	Elevation (Feet)	Climate	Precipitation (inches)
Great Basin Desert Scrub	8.5	Shrub	Big sagebrush (<i>Artemisia tridentata</i>), Black sagebrush (<i>Artemisia nova</i>), Bigelow sagebrush (<i>Artemisia bigelovii</i>), Shadscale (<i>Atriplex confertifolia</i>), Fourwing saltbush (<i>Atriplex canescens</i>), Rabbitbrush (<i>Ericameria</i> spp.), Winterfate (<i>Ceratoides lanata</i>), Hopsage (<i>Grayia spinosa</i>), Horsebrush (<i>Tetradymia</i> sp.), Blackbrush (<i>Isomeris arborea</i>), Greasewood (<i>Sarcobatus vermiculatus</i>), Blue gramma (<i>Bouteloua gracilis</i>), Galleta grass (<i>Hilaria jamesii</i>), Indian rice grass (<i>Oryzopsis hymenoides</i>), Western wheatgrass (<i>Agropyron smithii</i>), Junegrass (<i>Koeleria macrantha</i>), several Muhleys (<i>Muhlenbergia</i> sp.) and Dropseeds (<i>Sporobolus</i> sp.)	3,930–7,220	Cold-Temperate	< 10
Plains and Great Basin Grassland	6.0	Grass	Big bluestem (<i>Andropogon gerardii</i>), Little bluestem (<i>Schizachyrium scoparium</i>), Indian grass (<i>Sorghastrum nutans</i>), Switchgrass (<i>Panicum virgatum</i>), Western wheatgrass (<i>Agropyron smithii</i>), Needle and thread grass (<i>Stipa comatai</i>), Galleta (<i>Hilaria</i> sp.), Sand dropseed (<i>Sporobolus crytandrus</i>), Blue gramma (<i>Bouteloua gracilis</i>), Buffalo-grass (<i>Buchloe dactyloides</i>), Indian rice grass (<i>Oryzopsis hymenoides</i>), Prairie grass (<i>Bromus willdenowii</i>), Junegrass (<i>Koeleria macrantha</i>), Plains lovegrass (<i>Eragrostis intermedia</i>), Alkali sacaton (<i>Sporobolus airoides</i>), Fourwing saltbush (<i>Atriplex canescens</i>), Big sagebrush (<i>Artemisia tridentata</i>), winterfat (<i>Ceratoides lanata</i>), Soapweed, Rabbitbrush (<i>Ericameria</i> spp.)	4,920–7,545	Cold-Temperate	12–18
Semidesert Grassland	6.0	Grass	Tobosa (<i>Pleuraphis mutica</i>), Black gramma (<i>Bouteloua hirsute</i>), Side-oats gramma (<i>Bouteloua curtipendula</i>), Slender gramma (<i>Bouteloua repens</i>), Bush muhly (<i>Muhlenbergia porteri</i>), Three awn (<i>Aristida purpurea</i>), Arizona cottontop (<i>Digitaria californica</i>), Vine mesquite (<i>Prosopis</i> sp.), Buffalo-grass (<i>Buchloe dactyloides</i>), Plains lovegrass (<i>Eragrostis intermedia</i>), Wolf tail (<i>Lycurus setosus</i>), Little bluestem (<i>Schizachyrium scoparium</i>), Mesquite (<i>Prosopis</i> sp.), Lotebush (<i>Ziziphus obtusifolia</i>), Allthorn (<i>Koeberlinia spinosa</i>), False mesquite (<i>Prosopis</i> sp.), Catclaw Acacia (<i>Acacia greggii</i>), Desert hackberry (<i>Celtis spinosa</i>), Ocotillo (<i>Fouquieria splendens</i>), Creosotebush (<i>Larrea tridentata</i>)	2,300–4,920	Warm-Temperate	8–12
Interior Chaparral	3.4	Shrub/sclerophyll	Shrub live oak (<i>Quercus turbinella</i>), Birchleaf mountain	3,445–6,070	Warm-	15–25

Vegetation Community	BLM Land (%)	Plant Growth Form	Dominant Species	Elevation (Feet)	Climate	Precipitation (inches)
			mahogany (<i>Rosaceae Cercocarpus betuloides</i>), Skunkbush sumac (<i>Rhus trilobata</i>), Silktassel (<i>Garrya elliptica</i>), Desert ceanothus (<i>Ceanothus greggii</i>), cliffrose (<i>Purshia mexicana</i>), Desert olive (<i>Forestiera pubescens</i>), Sophoras , Arizona rosewood (<i>Vauquelina californica</i>), Sideoats gramma (<i>Bouteloua curtipendula</i>), Hairy gramma (<i>Bouteloua hirsute</i>), Cane bluestem (<i>Bothriochloa barbinodes</i>), Plains lovegrass (<i>Eragrostis intermedia</i>), Wolftail (<i>Lycurus setosus</i>), Single threeawn (<i>Aristida schiedeana</i>)		Temperate	
Chihuahuan Desert Scrub	3.6	Shrub microphyllous	Creosote (<i>Larrea tridentata</i>), Tarbush (<i>Flourensia cernua</i>), Whitethorn acacia (<i>Acacia constrictai</i>), several saltbushes (<i>Atriplex</i> sp.), Guayule (<i>Parthenium argentatum</i>), Ocotillo (<i>Fouquieria splendens</i>), Ratany (<i>Krameria</i> sp.), several Agrave and Yucca, Catclaw (<i>Acacia greggii</i>), Condalia, several Chollas (<i>Opuntia</i> sp.), Prickly pear (<i>Opuntia</i> sp.), and Hedgehog (<i>Echinocereus</i> sp), Turkis head (<i>Echinocactus horizionthalonius</i>), Pin cushion (<i>Mamillaria vivipara</i>), and Fish-hook cacti (<i>Sclerocactus polyancistrus</i>).	2,300ñ4,900	Warm-Temperate	8ñ12
Riparian	1.4	Treeñdeciduous	Pacific willow (<i>Salix lasiandra</i>), Bigtooth maple (<i>Acer grandidentatum</i>), Narrowleaf cottonwood (<i>Populus angustifolia</i>), Box elder (<i>Acer negundo</i>), Black cherry (<i>Prunus serotina</i>), Arizona walnut (<i>Juglans major</i>), Velvet ash (<i>Fraxinus velutina</i>), Western soapberry (<i>Sapindus saponaria</i>), Red willow (<i>Salix laevigata</i>), Mesquite (<i>Prosopis</i> sp.), Gooddings willow (<i>Salix gooddingii</i>), Netleaf hackberry (<i>Celtis reticulata</i>), Wrightis sycamore (<i>Ficus</i> sp.)	Various	Various	Various
Madrean Evergreen Woodland	0.5	Treeñmixed	Emory oak (<i>Quercus emoryi</i>), Arizona white oak (<i>Quercus arizonica</i>), Alligator juniper (<i>Juniperus deppeana</i>), One-seeded Juniper (<i>Juniperus monosperma</i>), Mexican pinyon (<i>Pinus cembroides</i>), Apache pine (<i>Pinus engelmannii</i>), Arizona pine (<i>Pinus ponderosa</i> var. <i>arizonica</i>), Pino triste (<i>Pinus lumholtzii</i>), Durango pine (<i>Pinus</i> sp.)	3,940ñ7,220	Warm-Temperate	> 15
Montane Conifer Forest	0.2	Treeñconifer	Ponderosa pine (<i>Pinus ponderosa</i>), Douglas-fir (<i>Pseudotsuga menziesii</i>), White pine (<i>Pinus strobus</i>), Limber pine (<i>Pinus flexilis</i>), Aspen (<i>Populus</i> sp.)	6,560ñ9,840	Cold-Temperate	18ñ30

The historic nature of wildfire in Arizona changed with the onset of European settlement. As such current-day fire regimes for many vegetation communities have changed (**Figure 3.6**) in comparison with historic patterns (**Figure 3.5**). Livestock grazing and land cultivation caused fuel loads (i.e., the amount of standing live and dead vegetation) to be reduced and fragmented into smaller landscape units. Furthermore, the introduction of organized fire suppression caused a drastic decrease in fire occurrence and size (Brown 2000). The exclusion of fire as a dominant ecological factor on many sites has caused significant changes in the character of vegetation communities such as species composition, structure, and standing biomass. Ironically, these changes have, in some instances, caused the vegetation community to be more fire prone. Plant successional pathways that have occurred on some sites would probably not have occurred prior to European settlement, where frequent fires suppressed woody vegetation establishment (Brown 2000). The increases in the density of woody species that have occurred on some sites, as well as the invasion of woody species onto sites where frequent fire used to preclude their establishment is probably a consequence of the alteration of historic fire regimes. Perhaps a change in the historic fire regime is, in part, responsible for the invasion of tarbush, whitethorn acacia, and creosotebush into Semidesert Grassland (Brown 1982b).

Wildfires can have significant environmental impacts on soils, fish, wildlife, timber resources, recreation, air and water quality, visual resources, archeological sites, homes and structures, utility corridors and facilities, and human welfare. The Wildland-Urban Interface (WUI) occurs where wildland vegetation and human structures interface or intermix with each other (Arno and Wakimoto 1987). The buildup of flammable vegetation including woody perennial (trees, shrubs), vegetation, forbs and annual weeds to hazardous levels is a concern in many areas of the state. Therefore, fire management and fuels reduction in the WUI is a priority. The creation of fuels breaks, infrastructure improvements, identifying communities at risk, fire suppression, and community outreach to encourage creation of defensible space around structures are some ways BLM attempts to reduce the risk of WUI fire.

Considerable resources are required to mitigate the effects of wildfire on ecological resources and human welfare. The invasion of woody plants into new areas, and total exclusion of fire have increased fuel loadings, and the buildup of dead plant material. Increased fuel loadings, will influence and have an










effect on wildfire severity and intensity. Wildfire intensity is related to flame length and the amount of heat released per second during a wildfire. Severity refers to post fire assessments of upward (intensity) and downward (heat per unit area) heat pulses. Various fuel treatments, including prescribed fire, mechanical, chemical, and biological treatments can be used to improve vegetation management for control of woody plant invasion and the buildup of fuels. The effectiveness of fuels control on BLM land is being weighed along with environmental concerns and consequences in a programmatic Environmental Impact Statement analysis, *Environmental Impact Statement for Vegetation Treatments, Watersheds and Wildlife Habitats on Public Lands Administered by the BLM in the Western United States, Including Alaska (Vegetation EIS)*. After fuels reduction treatments such as a prescribed fire or mechanical treatment, proper rehabilitation is often essential to deter the establishment of weeds and reduce soil erosion. Encouraging the growth and productivity of desirable vegetation will most likely inhibit the re-establishment of invasive weeds and minimize soil erosion.

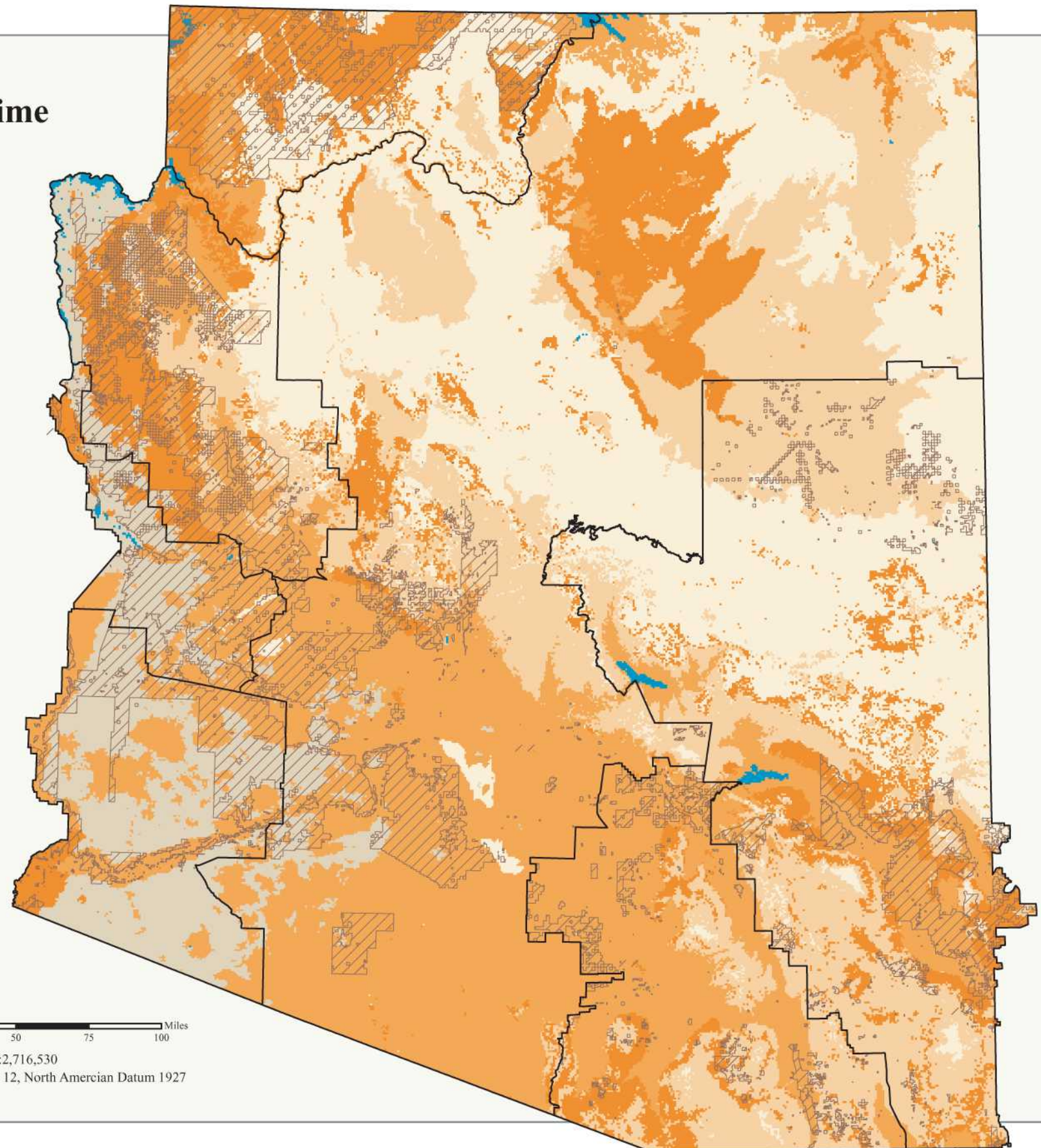
3.2.3 Invasive and Noxious Weeds

Invasive and noxious weeds are an increasing problem on BLM lands. Invasive and noxious weeds rapidly displace desirable plants that provide habitat for wildlife and food for people and livestock. Some weeds are poisonous to wildlife, livestock, and people. Invasive and noxious weeds are plants that are not native to Arizona vegetation and were introduced accidentally or intentionally. Noxious weeds are listed by state and federal law and are generally considered those that are exotics and negatively impact agriculture, navigation, fish, wildlife, or public health (Howery and Ruyle 2002). **Table 3.5** lists the Arizona regulated and restricted noxious weeds. However, there are other invasive weeds such as spotted knapweed, leafy spurge, cheatgrass, buffelgrass, red brome, and saltcedar that are not listed as noxious but still can be problematic on Arizona rangelands. These plants are considered invasive weeds because they displace and reduce the normal composition and productivity of native rangeland vegetation. In addition, they may raise the risk of wildland fire because of increased flammability and biomass accumulation in rangeland vegetation communities.

Many noxious weeds were originally brought by European settlers inadvertently to the United States in grain seed, livestock feed and ship ballasts (Harvey and Ruyle 2002). Weeds slowly spread across the

Figure 3.5 Arizona Historical/Natural Fire Regime

	Fire Regime I 0-35 year frequency, low severity	1,214,648
	Fire Regime II 0-35 year frequency, stand replacement severity	1,044,818
	Fire Regime III 35-100+ year frequency, mixed severity	5,291,465
	Fire Regime IV 35-100+ year frequency, stand replacement severity	2,959,291
	Fire Regime V 200+ year frequency, stand replacement severity	0
	Barren	1,998,832
	Water	8,598
	BLM Lands	12,517,653
	Field Office Boundary	



Fire regime data source:
 Course-scale Spatial Data for Wildland Fire and Fuel Management. November 1999. Produced by the Prescribed Fire and Fire Effects Research Work Unit, Rocky Mountain Research Station. Available at www.fs.fed.us/fire/fuelman



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

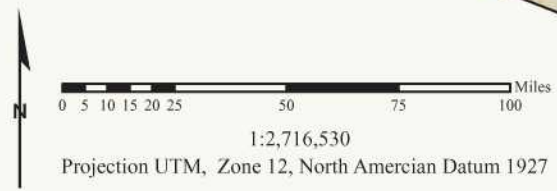


Figure 3.6 Arizona Current Condition Fire Regime

Condition Class 1

Fire regime within or near historical range. Risk of key ecosystem component loss low. Departed from historical fire frequency by not more than one return interval. Vegetation attributed (species composition and structure) intact and functioning within historical range.

Condition Class 2

Fire regime moderately altered from historical range. Risk of key ecosystem component loss moderate. Departed from historical fire frequency by more than one interval. Moderate change to fire size, frequency, intensity, severity, and/or landscape pattern, and to vegetation.

Condition Class 3

Fire regime significantly altered from historical range. Risk of key ecosystem component loss high. Departed from historical fire frequency by multiple return intervals. Dramatic changes to fire size, frequency, intensity, severity, and/or landscape pattern, and to vegetation.

Non-vegetation, Agriculture, Urban Development

Water

BLM Lands

Field Office Boundary

BLM Total Acres

6,738,178

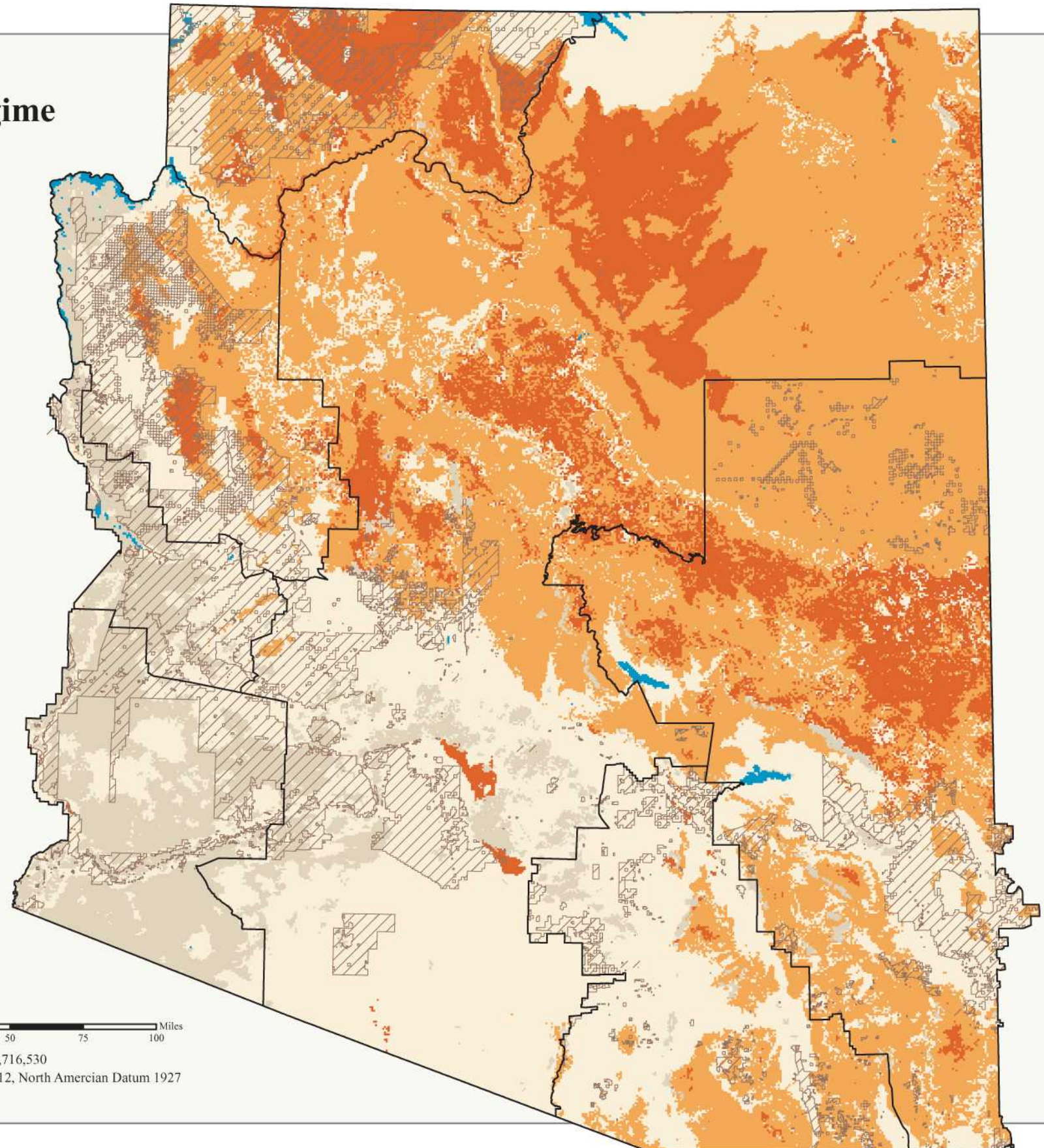
2,468,623

1,198,836

2,103,418

8,598

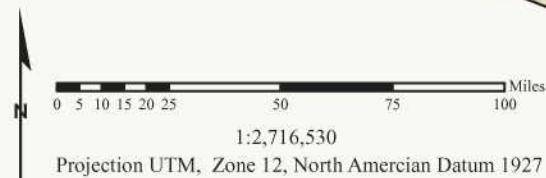
12,517,653



Fire regime data source:
 Course-scale Spatial Data for Wildland Fire and Fuel Management. November 1999. Produced by the Prescribed Fire and Fire Effects Research Work Unit, Rocky Mountain Research Station. Available at www.fs.fed.us/fire/fuelman



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.



country as different parts were settled. Accidental introductions have occurred, for example, through contaminated crop seed or livestock forage and include species such as cheatgrass and halogeton. Some invasive weeds were introduced for specific purposes such as livestock forage, horticultural or soil stabilization and they escaped into natural vegetation communities. Examples include buffelgrass and saltcedar. Invasive and noxious weeds are likely spread through a variety of mechanisms including: cross-country travel (Off Highway Vehicles (OHV), hiking, and camping activities and through the movement of wildlife and/or livestock. Invasive and noxious weeds my readily establish in highly disturbed areas (for instance, where the cumulative impacts of fire, grazing, and recreation activities are compounded). The spread of invasive weeds poses a hazard to vegetation communities on BLM rangelands because weeds can displace native plants as they compete for space, sunlight, water, and nutrients. As such, weeds can cause drastic changes in the composition, structure and productivity of vegetation communities. Also, weeds can alter the mix of native vegetation and reduce ungulate forage quality and quantity and some may even be poisonous to livestock. Finally, weeds high growth rate and flammability tend to increase the risk of wildfire to the vegetation community and structures in the WUI (Arno and Wakimoto 1987). Invasive weeds such as cheatgrass, red brome, and buffelgrass can alter fire regimes and cause fire re-occurrence to increase when they outcompete more fire-resistant native vegetation and provide flammable fuel between the interspaces among shrubs that allows the fire to carry in an unnatural manner (McAuliffe 1995, Brown 2000).

The Great Basin Desert Scrub is divided into a sagebrush, shadscale, and blackbrush series which vary in fire ecology (McAuliffe 1995, Brown 2000). Wildfire in sagebrush communities has become important in recent years (Brown 2000). Historic fire in the shadscale and blackbrush communities was infrequent and years were required for the natural process to restore these communities after its occurrence. However, fire behavior in sagebrush communities is different. Sagebrush communities are usually heavily grazed by domestic and wild ungulates. The sagebrush plants themselves are often not grazed but associated palatable plants such as bunchgrasses and forbs are heavily grazed. Since the 1900s, weedy annuals such as cheatgrass, Russian thistle, filaree, and tumble mustard have become

established in areas where grazing has greatly reduced the native vegetation. Historic fire has been considered to be a minor component of sagebrush communities before settlement. But in the last half of the 1900s, fire became a dominant force in sagebrush communities where cheatgrass provides significant fuel to carry fire. In addition, sagebrush is also flammable because of volatile leaf oils. The highly flammable cheatgrass increases in response to overgrazing and fire and provides sufficient competition to reduce perennial bunchgrass cover. This cycle is repeated with successive fire and with each cycle cheatgrass and other weeds usually become more abundant and colonize new sites. Sagebrush usually does not recover sufficiently after fire because it re-establishes from seed and rootñ sprouting species such as rabbitbrush, horsebrush, and snakeweed become established more quickly.

Invasive weed control to reduce fire hazard can occur by a variety of ways including chemical, prescribed fire, biological, and mechanical or a combination of techniques (Howery and Ruyle 2002). The control of noxious weeds on BLM lands is being evaluated in *Environmental Impact Statement for Vegetation Treatments, Watersheds and Wildlife Habitats on Public Lands Administered by the BLM in the Western United States, Including Alaska (Vegetation EIS)*. After any weed control treatment such as a prescribed fire or mechanical treatment, proper rehabilitation is essential to deter the re-establishment of weeds. Encouraging the growth and productivity of desirable vegetation will most likely inhibit the re-establishment of invasive weeds. The degree and type of rehabilitation management required will depend of the nature and severity of the weed control treatment. Changes in grazing practices may be all that is needed on rangelands where minimal weed control has been implemented. However, rangelands where wildfire or prescribed burns have occurred will need aggressive rehabilitation practices to reduce the chances of weed domination before desirable plants can become established. Implementation may include soil erosion control and the seeding of desirable native and non-native perennial grasses and perhaps shrubs and forbs. Appropriate seed mixtures of native and non-native plants seeded at appropriate times are effective in becoming quickly established and not allowing weed seedlings to take root.

Table 3.5 ñ Arizona Regulated and Restricted Noxious Weeds

Species	Common Name	State Designation
<i>Cenchrus echinatus</i>	Southern sandbur	Regulated
<i>Cenchrus incertus</i>	Field sandbur	Regulated
<i>Convolvulus arvensis</i>	Field bindweed	Regulated
<i>Medicago polymorpha</i>	Burclover	Regulated
<i>Portulaca oleracea</i>	Common purslane	Regulated
<i>Tribulus terrestris</i>	Puncturevine	Regulated
<i>Acroptilon repens</i>	Russian knapweed	Restricted
<i>Aegilops cylindrica</i>	Jointed goatgrass	Restricted
<i>Alhagi maurorum</i>	Camelthorn	Restricted
<i>Cardaria draba</i>	Globed-podded hoary cress (Whitetop)	Restricted
<i>Centaurea diffusa</i>	Diffuse knapweed	Restricted
<i>Centaurea maculosa</i>	Spotted knapweed	Restricted
<i>Centaurea solstitialis</i>	Yellow starthistle	Restricted
<i>Cuscuta spp</i>	Dodder	Restricted
<i>Eichhornia crassipes</i>	Floating waterhyacinth	Restricted
<i>Elymus repens</i>	Quackgrass	Restricted
<i>Halogeton glomeratus</i>	Halogeton	Restricted
<i>Helianthus ciliaris</i>	Texas blueweed	Restricted
<i>Ipomoea triloba</i>	Three-lobed morning glory	Restricted
<i>Linaria dalmatica</i>	Dalmation toadflax	Restricted
<i>Onopordum acanthium</i>	Scotch thistle	Restricted

3.2.4 Wild Free-Roaming Horses and Burros

Wild horses and burros are protected by the Wild and Free-Roaming Horse and Burro Act of 1971 (P.L. 92-195), as amended by the FLPMA and the Public Rangelands Improvement Act of 1978 (P.L. 95-514). After the passage of the 1971 Wild Free-Roaming Horse and Burro Act, BLM became the managing agency responsible for protecting the wild burros and their habitat. The first wild burros were gathered in Arizona in 1977 around Alamo Lake in west central Arizona. Since 1977, more than 12,000 wild burros have been captured and removed from the public rangelands in western Arizona. In order to maintain their population around 2,000 animals (a level that their desert habitat can support), BLM continues its population control program by rounding up excess burros and offering them to the public through the Adopt-A-Burro Program.

The BLM manages two small wild horse herds in Arizona, one in the Cerbat Mountains, located northwest of Kingman (within the Kingman Field Office), and one between the Cibola National Wildlife Refuge and the U.S. Army's Yuma Proving Ground (within the Yuma Field Office). There are 4

Herd Areas (HS) and 7 Herd Management Areas (HMA) managed by BLM in Arizona, containing 210 wild horses and 2,500 wild burros. These areas are the Tassi-Gold Butte HMA (Arizona Strip FO); Big Sandy HMA, Black Mountain HMA and Cerbat HA (Kingman FO); Harquahala HA, Lake Pleasant HMA, and Painted Rock HA (Phoenix FO); Alamo HMA and Havasu HMA (Lake Havasu FO); and Cibola-Trigo HMA and Little Harquahala HA (Yuma FO). Five of the areas are described in the Affected Environment section of current Land Use Plans. Descriptions of these five areas are incorporated here by reference and descriptions for the remaining HMAs are included in **Appendix E**.

3.2.5 Fish And Wildlife Resources

General Wildlife Habitat

Arizona sits at the junction of several physiographic provinces, including the four American deserts (Chihuahan, Great Basin, Mohave, and Sonoran), Colorado plateau, Rocky Mountains, and Sierra Madre. This diversity in habitat types creates tremendous wildlife diversity on public lands within the state. BLM manages 12 million acres of both big

and small game habitat, 30,000 acres of waterfowl and wetland habitat, 813 miles of streams, and 21,890 acres of riparian vegetation within Arizona. These habitats provide a wide range of variability in vegetation species composition, structural components, and food quality and availability, thereby hosting abundant wildlife. More than 800 species of fish, amphibians, birds, reptiles and mammals occur in Arizona as year-round residents, seasonal residents, or migrants. This diversity has strong ecological value and attraction for the public.

Within these broad habitats are relatively small amounts of wetland/riparian habitat. Although riparian areas make up less than two percent of the public lands in Arizona, they are one of the most productive and important habitats, providing for an even greater diversity of wildlife species. Much of the native riparian habitats on public lands within Arizona have been severely fragmented, degraded or otherwise substantially altered from a variety of causes, thereby affecting the wildlife populations and species that inhabit them. In some cases, upland portions of watersheds have also been degraded, exacerbating impacts at lower elevations, especially on streams, rivers and riparian habitats. Many riparian-obligate wildlife species, as well as many native fish species, are either Federally listed or are considered special status species by the Federal government (USFWS and BLM) or state wildlife agencies in Arizona and California (for public lands in California managed by the Yuma and Lake Havasu Field Offices).

The structure, composition, and condition of the various habitat types directly influence the fish and wildlife species assemblages that inhabit them. Fire-adapted vegetation communities comprise approximately 40 percent of wildlife habitats on BLM-administered lands in Arizona. These habitats and their availability on public lands are: Great Basin Pinyon-Juniper Woodland (12.2%), Great Basin Desert Scrub (8.5%), Plains and Great Basin Grassland (6.0%), Semi-desert grassland (6.0%), Interior Chapparral (3.4%), Madrean Evergreen Woodland (0.5%), and Montane Conifer Forests (0.2%). Many of these fire-adapted vegetation communities are overgrown with dense shrubs and young trees because they have been subjected to a regime of aggressive fire suppression and fire exclusion. Non-fire adapted communities comprise approximately 60 percent of habitats on BLM-administered lands, including Lower Colorado River (21.8%) and Upland Sonoran Desert Scrub (26.2%), Mohave Desert Scrub (9.3%), Chihuahuan Desert Scrub (3.6%), and riparian habitats (1.4%).

However, because of the proliferation of non-native plants, many of the non-fire adapted communities, such as Sonoran Desert Scrub, Mohave Desert Scrub, and riparian habitats, are threatened by wildfires. The altered conditions of both the fire-adapted and non-fire adapted vegetation communities have left these communities, and their fish and wildlife inhabitants, at high risk of unnatural, high-intensity wildfire events.

The Arizona Game and Fish Department (AGFD) is responsible for managing wildlife populations throughout Arizona. The BLM coordinates closely with the AGFD to manage the diverse habitats that sustain these wildlife populations². Many of the Arizona BLM Field Offices have developed Habitat Management Plans (HMPs), or other interdisciplinary activity plans, in cooperation with the AGFD, that outline the goals and actions for managing wildlife habitats and populations on public lands in the state. Wildlife habitats and priority wildlife species within the management areas of the BLM Field Offices in Arizona are discussed in these HMPs and the LUPs listed at the beginning of Section 3, and are incorporated here by reference.

Game Species, Predators, and Furbearers

Big game species are an important aesthetic and economic resource in Arizona (Silberman 2003). On BLM administered lands, 12 big game species (or subspecies) occupy a variety of habitat types. Habitat management is achieved cooperatively between the BLM and the AGFD. One or more small game species occur in virtually all vegetation types throughout Arizona. Small game species commonly found in many Arizona habitats include upland game birds (*e.g.*, pigeons, doves, quail, etc.), cottontail rabbits, and squirrels, as well as a wide variety of waterfowl species. Waterfowl species, including ducks, geese, coots, and gallinules, nest in Arizona, are found primarily in the natural and modified marshes found above the Mogollon Rim and in the White Mountains. Many waterfowl species also migrate through or winter in wetland habitats on public lands in Arizona. There are an additional 16 mammals which are classified as predators and/or furbearers. These game species, predators, and furbearers inhabit the variety of both fire-adapted and

² Master Memorandum of Understanding (MOU) Between the State of Arizona, Arizona Game and Fish Commission and the Department of the Interior, Bureau of Land Management. Effective date March 18, 1987. 10 pp.

fire-threatened habitats on public lands in Arizona. Habitat information for these species is summarized in **Appendix C**.

Nongame Wildlife

Arizona has a diverse, abundant mammalian fauna, including 134 species of mammals native to the state, and 11 more species that have successfully been introduced. While the distribution, ecology, and habitat needs of many of the nongame mammals, are poorly understood, these species occupy a variety of habitats on public lands in Arizona (AGFD 2001). Many of these species have small, local populations that face a variety of threats, and some are tied to the severely altered riparian or native grassland communities (AGFD 2001).

Over 500 native bird species occupy the diverse habitats of Arizona, of which approximately 470 are nongame species. An additional 7 non-native species have also become established here. At least 296 native and 11 non-native bird species have been documented breeding at least once within the state (AGFD Nongame Branch, pers. comm.). Arizona provides habitats for roughly 240 species of neotropical migratory birds, which breed in the United States and/or Canada and winter from Mexico to South America, of which 165 nest in the state regularly or irregularly (AGFD 2001). Forty-one raptor and owl species have been documented in Arizona, 33 of which occur year-round or breed in the state. An additional two vulture species and the re-introduced California condor also occur in the state. The greatest variety of species, and often numbers, of birds in Arizona occurs in the riparian and wetland habitats, which often provide oases within the upland habitats.

Many Arizona amphibians and reptiles are abundant and seasonally conspicuous, especially the desert-dwelling species. Among them are such commonly encountered species as spadefoot toads; whiptail lizards; side-blotched, tree, and desert spiny lizards; gopher and king snakes; and western diamondback and Mojave rattlesnakes. Two non-native species, the bullfrog and softshell turtle, have also become widespread and locally abundant. The distribution and status of many of the rest of Arizona's 26 species of native amphibians and 103 species of native reptiles is not well known (AGFD 2001). Many of the desert-dwelling species occupy the desert scrub habitats that are not fire-adapted, but now support wildfires that burn hotter and farther than their historical fire regime.

Fish

The number and variety of streams, rivers, lakes and reservoirs occurring on public lands support a quality sportfishing experience in Arizona, including providing habitat for approximately 27 species of sportfish (see **Appendix C**). Of the species commonly sought by Arizona anglers, eight are cool or coldwater fish, and 19 are warmwater species. Arizona has more than 160 stream management reaches that have a combined length of nearly 1,500 miles, as well as 3,000 acres in 64 lakes that are managed, primarily, for trout. Ten other lakes and an additional 34 miles in stream length (within four rivers) are managed primarily for warmwater species and secondarily for trout (AGFD 2001). Activities occurring on upland terrestrial habitats can affect the water quality and other attributes of these diverse aquatic habitats.

The 32 native fishes of Arizona include 30 freshwater and two saltwater species (AGFD 2001). Of these fish species, one is extinct and almost 75 percent are Federally protected by the Endangered Species Act, as amended, or are listed as Wildlife of Special Concern by the AGFD. Occurrences of the two saltwater species, machete (*Elops affinis regan*) and striped mullet (*Mugil cephalus linnaeus*), vary with flows of the lower Colorado River as dams, water management, and floods permit.

3.2.6 Special Status Plant and Wildlife Species

Special status species include Federally listed (endangered or threatened), proposed, and candidate species, and designated or proposed critical habitat; species of concern managed under Conservation Agreements or Management Plans; state-listed species; and BLM-sensitive species. Several special status species occurring within the management areas of the BLM Field Offices in Arizona are discussed in the LUPs referenced at the beginning of Section 3.0, and are incorporated here by reference. However, additional species and critical habitats have been added to or have changed Federal status under the Endangered Species Act since the time these plans were written. These additional species are now considered special status species to BLM.

For species with Federal status under the ESA (iFederally protected species), 30 endangered species, 12 threatened species, one species proposed for listing, and five species that are candidates for listing inhabit either BLM-administered lands in Arizona or adjacent Federal, state, reservation, or

private lands that could be affected by fire management activities (see **Table 3.6**). Of these 48 species, 9 are known to occur only on lands adjacent to BLM-administered lands, and three species (northern aplomado falcon, ocelot, and black-tailed prairie dog) are currently extirpated from Arizona, but may re-establish within the state either naturally or through reintroductions within the next 10-15 years. These Federally protected species can be grouped as follows: two amphibians, 10 birds, 14 fish, 12 flowering plants, eight mammals, and two reptiles.

Three species (Flat-tailed horned lizard, Paradine plains cactus, and Virgin spinedace) occurring on public lands in Arizona do not have Federal status under the ESA, but are Federal species of concern managed under Conservation Agreements that BLM participates in. The Sonoran population of the desert tortoise has no Federal status, but is a species of concern managed by BLM under the *Management Plan for the Sonoran Desert Population of the Desert Tortoise in Arizona* (Arizona Interagency Desert Tortoise Team 1996). In addition, 202 plant and wildlife species that are either state species of concern in Arizona, state-listed in California (for lands in the Lake Havasu and Yuma Field Offices), or BLM-sensitive species also occur on or near BLM-administered lands within the action area of the proposed Statewide Land Use Plan Amendment (see **Table 3.7**). BLM considers these additional plant and animal species as priority species in management of public lands.

Brief descriptions of each of the Federally listed, proposed, and candidate species, as well as the Conservation Agreement and Management Plan species, are provided in **Appendix F**.

3.3 Social and Economic Environment

3.3.1 Cultural and Paleontological Resources

Cultural resources are locations of human activity, occupation or use. They include archeological, historic, and architectural sites with important public and scientific uses. They also include places of traditional cultural or religious importance to Native Americans and other cultural groups. Numerous authorities provide a basis for making decisions on actions that could affect cultural resources, including (but not limited to) the National Historic Preservation Act (NHPA), as amended, the American Indian

Religious Freedom Act, the Archaeological Resources Protection Act, and Executive Order 13007, Indian Sacred Sites.

Section 106 of the NHPA and its implementing regulations (36 CFR 800) require Federal agencies to take into account the effects of their undertakings on historic properties. As defined in 36 CFR 800.14, a historic property is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places... The term also encompasses artifacts, records, and remains related to such properties. Compliance with Section 106 of the NHPA will be completed on a project-specific basis before decisions are made to carry out fire management activities that could affect cultural resources.

Identification and context for cultural resources are included in the Land Use Plans referenced at the beginning of Section 3.0, and are incorporated herein by reference. The following updates those discussions and provides a general overview of the wide range of prehistoric, historic, and traditional cultural/religious sites that occur on BLM-managed lands throughout Arizona. **Appendix G** describes the site types known to occur within the state and on BLM-managed land, and also provides a chronology of human occupation in the state.

The BLM manages approximately 11.6 million acres of land in Arizona. Over 700,000 acres have been inventoried for cultural resources, with over 10,500 sites recorded. Nineteen Areas of Critical Environmental Concern (ACECs) encompassing 297,483 acres have been designated entirely or partly to provide management and protection of cultural resources. Three National Conservation Areas (NCAs) contain numerous cultural resources, including the Lehner Mammoth Kill Site, a National Historic Landmark. Lands administered by the BLM in Arizona State Office currently include nineteen National Register of Historic Places (NRHP) listings containing 362 historic properties. These properties are listed in **Table 3.8**.

BLM's existing LUPs describe site types and general distribution throughout the individual planning areas. It is important to note that these represent *known* sites only, given that relatively small portions of the planning areas have been subjected to cultural resource surveys. A general listing of selected cultural resource localities on BLM-managed lands not discussed in this section is provided in **Appendix G**. Individual fire management activities carried out

**Table 3.6 ñ
 Federally Listed, Proposed, and Threatened Species in Arizona Considered in the Affected Environment for
 the Proposed Statewide Land Use Plan Amendment**

Common Name	Scientific Name	Status ^a	Vegetation Community	County ^b	BLM Field Office(s) ^c
Amphibians (2 species)					
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	Threatened	Riparian/Aquatic within Montane Conifer Forest, Madrean Evergreen Woodland, Great Basin Pinyon-Juniper Woodland	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	Arizona Strip, Phoenix, Safford, Tucson
Relict leopard frog	<i>Rana onca</i>	Candidate	Riparian/Aquatic within Mohave Desert scrub	Mohave	Arizona Strip
Birds (10 species)					
Cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorum</i>	Endangered, Proposed Critical habitat	Upper Sonoroan Desert Scrub, Riparian	Maricopa, Pima, Pinal, Santa Cruz, Yuma	Phoenix, Tucson, Yuma
California brown pelican	<i>Pelecanus occidentalis californicus</i>	Endangered	Riparian/Aquatic	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Arizona Strip, Lake Havasu, Kingman, Phoenix, Safford, Tucson, Yuma
California condor	<i>Gymnogyps californianus</i>	Endangered, 10(j) species	Great Basin Desert Scrub, Great Basin Pinyon-Juniper Woodland	Apache, Coconino, La Paz, Mohave, Navajo	Arizona Strip, Phoenix
Masked bobwhite	<i>Colinus virginianus ridgewayi</i>	Endangered	Semidesert Grassland	Pima	Phoenix

Common Name	Scientific Name	Status ^a	Vegetation Community	County ^b	BLM Field Office(s) ^c
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	Endangered	Semidesert Grassland	Cochise, Santa Cruz, Yuma	Safford, Tucson, Yuma
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Riparian	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Arizona Strip, Lake Havasu, Kingman, Phoenix, Safford, Tucson, Yuma
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	Endangered	Riparian	La Paz, Maricopa, Mohave, Pinal, Yuma	Lake Havasu, Phoenix, Yuma
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Upper Sonoran Desert Scrub, Riparian	Apache, Cochise, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Arizona Strip, Lake Havasu, Kingman, Phoenix, Safford, Tucson, Yuma
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened, Critical habitat	Great Basin Desert Scrub, Great Basin Pinyon-Juniper Woodland, Madrean Evergreen Woodland, Montane Conifer Forest	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	Arizona Strip, Kingman, Phoenix, Safford, Tucson
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Candidate	Riparian	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Arizona Strip, Lake Havasu, Kingman, Phoenix, Safford, Tucson, Yuma

Common Name	Scientific Name	Status ^a	Vegetation Community	County ^b	BLM Field Office(s) ^c
Fish (14 species)					
Bonytail chub	<i>Gila elegans</i>	Endangered, Critical habitat	Riparian/Aquatic within Sonoran Desert Scrub	La Paz, Mohave	Lake Havasu, Kingman
Desert pupfish	<i>Cyprinodon macularius</i>	Endangered, Critical habitat	Riparian/Aquatic within Upper Sonoran Desert scrub	Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	Lake Havasu, Phoenix, Safford, Tucson
Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	Endangered	Riparian/Aquatic within Upper Sonoran Desert Scrub	Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	Lake Havasu, Phoenix, Safford, Tucson
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered, Critical habitat	Riparian/Aquatic within Mohave Desert Scrub, Lower Sonoran Desert Scrub, Great Basin Desert Scrub, Semi-desert Grassland	La Paz, Maricopa, Mohave	Lake Havasu, Kingman, Phoenix
Virgin River chub	<i>Gila seminuda</i>	Endangered, Critical habitat	Riparian/Aquatic within Mohave Desert Scrub, Great Basin Desert Scrub, Great Basin Pinyon-Juniper Woodland	Mohave	Arizona Strip
Woundfin	<i>Plagopterus argentissimus</i>	Endangered, Critical habitat. Future 10(j) populations.	Riparian/Aquatic within Mohave Desert Scrub, Great Basin Desert Scrub, Great Basin Pinyon Juniper Woodland	Mohave	Arizona Strip
Yaqui chub	<i>Gila purpurea</i>	Endangered, Critical habitat	Riparian/Aquatic within Semidesert Grassland, Chihuahuan Desert Scrub	Cochise	Safford
Yaqui topminnow	<i>Poeciliopsis occidentalis sonoriensis</i>	Endangered	Riparian/Aquatic within Semidesert Grassland, Chihuahuan Desert Scrub	Cochise	Safford
Beautiful shiner	<i>Cyprinella formosa</i>	Threatened, Critical habitat	Riparian/Aquatic within Semidesert Grassland, Chihuahuan Desert Scrub	Cochise	Safford
Little Colorado spinedace	<i>Lepidomeda vittata</i>	Threatened, Critical habitat	Riparian/Aquatic within Plains and Great Basin Grassland, Great Basin Pinyon Juniper Woodland	Apache, Coconino, Navajo	Phoenix

Common Name	Scientific Name	Status ^a	Vegetation Community	County ^b	BLM Field Office(s) ^c
Loach minnow	<i>Tiaroga cobitis</i>	Threatened, Critical habitat	Riparian/Aquatic within Sonoran Desert Scrub, Chihuahuan Desert Scrub, Semidesert Grassland	Apache, *Cochise, Graham, Greenlee, Gila, *Pima, Pinal, Navajo, *Yavapai	Phoenix, Safford, Tucson
Spikedace	<i>Meda fulgida</i>	Threatened, Critical habitat	Riparian/Aquatic within Sonoran Desert Scrub, Chihuahuan Desert Scrub, Semidesert Grassland	*Apache, *Cochise, Graham, Greenlee, *Gila, *Pima, Pinal, Yavapai	Phoenix, Safford, Tucson
Yaqui catfish	<i>Ictalurus pricei</i>	Threatened, Critical habitat	Riparian/Aquatic within Semidesert Grassland, Chihuahuan Desert Scrub	Cochise	Safford
Gila chub	<i>Gila intermedia</i>	Proposed Endangered, Proposed Critical habitat	Riparian/Aquatic within Semidesert Grassland, Interior Chaparral	Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	Phoenix, Safford, Tucson
Flowering Plants (12 species)					
Arizona cliffrose	<i>Purshia subintegra</i>	Endangered	Upper Sonoran Desert Scrub	Graham, Maricopa, Mohave, Yavapai	Kingman, Phoenix, Safford
Brady pincushion cactus	<i>Pediocactus bradyi</i>	Endangered	Great Basin Desert Scrub	Coconino	Arizona Strip
Holmgren (Paradox) milk vetch	<i>Astragalus holmgreniorum</i>	Endangered	Great Basin Desert Scrub	Mohave	Arizona Strip
Huachuca water umbel	<i>Lilaeopsis schaffneriana ssp. recurva</i>	Endangered, Critical habitat	Riparian/Aquatic	Cochise, Pima, Santa Cruz	Safford, Tucson
Kearney's blue-star	<i>Amsonia kearneyana</i>	Endangered	Madrean Evergreen Woodland, Interior Chaparral, Riparian/Aquatic	Pima	Phoenix
Nichol Turkis head cactus	<i>Echinocactus horizonthalonius var. nicholii</i>	Endangered	Upper Sonoran Desert Scrub	Pima, Pinal	Tucson
Peebles Navajo cactus	<i>Pediocactus peeblesianus var. peeblesianus</i>	Endangered	Plains and Great Basin Grassland, Great Basin Desert Scrub	Navajo	Safford

Common Name	Scientific Name	Status ^a	Vegetation Community	County ^b	BLM Field Office(s) ^c
Pima pineapple cactus	<i>Coryphantha scheeri</i> var. <i>robustispina</i>	Endangered	Upper Snoran Desert Scrub, Semidesert Grassland	Pima, Santa Cruz	Tucson
Jones cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>	Threatened	Great Basin pinyon-Juniper Woodland, Great Basin Desert Scrub	Mohave	Arizona Strip
Siler pincushion cactus	<i>Pediocactus sileri</i>	Threatened	Plains and Great Basin Grassland, Great Basin Pinyon Juniper Woodland	Coconino, Mohave	Arizona Strip
Acuna cactus	<i>Echinomastus erectocentrus</i> var. <i>acunensis</i>	Candidate	Lower Sonoran Desert Scrub, Upper Sonoran Desert Scrub	Pima, Pinal	Tucson
Fickeisen plains cactus	<i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	Candidate	Plains and Great Basin Grassland, Great Basin Desert Scrub	Coconino, Mohave	Arizona Strip

Mammals (8 species)					
Black-footed ferret	<i>Mustela nigripes</i>	Endangered, 10(j) species	Plains and Great Plains Grassland	Apache, Coconino, Navajo	Phoenix
Hualapai Mexican vole	<i>Microtus mexicanus hualpaiensis</i>	Endangered	Great Basin pinyon-Juniper Woodland, Interior Chaparral	Mohave, Coconino, Yavapai	Kingman, Phoenix
Jaguar	<i>Panthera onca</i>	Endangered	Madrean Evergreen Woodland, Semi-desert Grassland, Montane Conifer Forest, Sonoran Desert Scrub	Cochise, Santa Cruz, Pima	Tucson, Safford
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	Endangered	Semidesert Grassland, Sonoran Desert Scrub, Chihuahuan Desert Scrub	Cochise, Gila, Graham, Pima, Pinal, Maricopa, Santa Cruz	Phoenix, Safford, Tucson
Mexican gray wolf	<i>Canis lupus baileyi</i>	Endangered, 10(j) species	Madrean Evergreen Woodland, Montane Conifer Forest	Apache, Cochise, Coconino, Greenlee, Pima, Santa Cruz	Phoenix, Safford, Tucson
Ocelot	<i>Leopardus (=Felis) pardalis</i>	Endangered	Chaparral, Desert Scrub, Riparian	Cochise, Pima, Santa Cruz	Safford, Tucson
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	Endangered	Sonoran Desert Scrub	Pima, Maricopa, Yuma	Phoenix, Yuma
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	Candidate	Plains and Great Basin Grassland	Cochise, Graham, Pima	Safford, Tucson
Reptiles (2 species)					
Desert tortoise, Mojave population	<i>Gopherus agassizii (xerobates)</i>	Threatened	Mohave Desert Scrub, Lower Sonoran Desert Scrub	Mohave (AZ), San Bernardino, Riverside, Imperial (CA)	Arizona Strip, Lake Havasu, Yuma
New Mexico ridgenose rattlesnake	<i>Crotalus willardi obscurus</i>	Threatened	Madrean Evergreen Woodland, Montane Conifer Forest	Cochise	Safford
Conservation Agreement and Management Agreement Species					
Flat-tailed horned lizard	<i>Phrynosoma mcallii</i>	Conservation Agreement	Lower Sonoran Desert Scrub	Yuma	Yuma
Paradine (Kaibab) plains cactus	<i>Pediocactus paradinei</i>	Conservation Agreement	Great Basin Desert Scrub, Great Basin Pinyon-Juniper Woodland, Plains and Great Basin Grassland, Montane Conifer Forest	Coconino	Arizona Strip

Virgin spinedace	<i>Lepidomeda mollispinis mollispinis</i>	Conservation Agreement	Riparian/Aquatic, Mohave Desert Scrub	Mohave	Arizona Strip
Desert tortoise, Sonoran population	<i>Gopherus agassizii (xerobates)</i>	Management Agreement	Sonoran Desert Scrub	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	Lake Havasu, Kingman, Phoenix, Safford, Tucson, Yuma

^a Species listed as 10(j) species are designated experimental/non-essential populations under Section 10(j) of the Endangered Species Act, as amended. This designation provides greater management flexibility. For BLM, 10(j) populations of Federally listed species are equivalent to a proposed status.

^b Counties with an asterisk (*) have designated critical habitat, but presently contain no known existing populations of the fish species.

^c Species within the BLM Field Office management boundaries may be on BLM-administered lands or on adjacent lands within the Affected Environment.

Table 3.7 ñ
BLM and State species of concern in Arizona and California considered in the planning area for
the Proposed Statewide Land Use Plan Amendment¹

Common Name	Scientific Name	Status
Mammals		
Allenís (Mexican) big-eared bat	<i>Idionycteris phyllotis</i>	BLM
Arizona myotis	<i>Myotis lucifugus occultus</i>	BLM
Arizona shrew	<i>Sorex arizonae</i>	AZSc
Big free-tailed bat	<i>Myctinomops macrotis</i>	BLM, CASc
California leaf-nosed bat	<i>Macrotus californicus</i>	BLM, AZSc, CASc
Camp Verde Arizona cotton rat	<i>Sigmodon arizonae arizonae</i>	AZSc
Cave myotis	<i>Myotis velifer</i>	BLM, CASc
Chihuahuan pronghorn	<i>Antilocapra americana mexicana</i>	AZSc
Fringed myotis	<i>Myotis thysanodes</i>	BLM
Houserock Valley chisel-toothed kangaroo rat	<i>Dipodomys microps leucotis</i>	BLM, AZSc
Long-eared myotis	<i>Myotis evotis</i>	BLM
Long-legged myotis	<i>Myotis volans</i>	BLM
Meadow jumping mouse	<i>Zapus hudsonius</i>	AZSc
Merriamís elk	<i>Cervus elaphus merriami</i>	AZSc
Mexican long-tongued bat	<i>Choeronycteris mexicana</i>	BLM, AZSc, CASc
Navajo Mexican vole	<i>Microtus mexicanus navaho</i>	AZSc
New Mexico banner-tailed kangaroo rat	<i>Dipodomys spectabilis baileyi</i>	AZSc
Occult little brown bat	<i>Myotis lucifugus occultus</i>	BLM, CASc
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	BLM, CASc
Sanbornís long-nosed bat	<i>Leptonycteris sanborni</i>	AZSc
Southwestern river otter	<i>Lontra canadensis sonora</i>	AZSc
Western small-footed myotis	<i>Myotis ciliolabrum</i>	BLM
Southern yellow bat	<i>Lasiurus ega</i>	AZSc
Spotted bat	<i>Euderma maculatum</i>	BLM, AZSc, CASc
Underwoodís mastiff bat	<i>Eumops underwoodi</i>	BLM
Water shrew	<i>Sorex palustris</i>	AZSc
Western red bat	<i>Lasiurus blossevillii</i>	AZSc
Western yellow bat	<i>Lasiurus xanthinus</i>	AZSc
Yuma mountain lion	<i>Puma concolor browni</i>	AZSc, CASc
Birds		
American bittern	<i>Botaurus lentiginosus</i>	AZSc
American redstart	<i>Setophaga ruticilla</i>	AZSc
American peregrine falcon	<i>Falco peregrinus anatum</i>	CAE
Arizonaís bell vireo	<i>Vireo belli arizonae</i>	CAE
Bairdís sparrow	<i>Ammodramus bairdii</i>	AZSc
Belted kingfisher	<i>Ceryle alcyon</i>	AZSc
Black-bellied whistling-duck	<i>Dendrocygna autumnalis</i>	AZSc
Black-billed magpie	<i>Pica hudsonia</i>	AZSc
Black-capped gnatcatcher	<i>Polioptila nigriceps</i>	AZSc
Burrowing owl	<i>Athene cunicularia</i> (burrow sites)	CASc
California black rail	<i>Laterallus jamaicensis coturniculus</i>	AZSc, CAT
Bobolink	<i>Dolichonyx oryzivorus</i>	AZSc
Buff-breasted flycatcher	<i>Empidonax fulvifrons</i>	AZSc
Clarkís grebe	<i>Aechmophorus clarki</i>	AZSc
Common black-hawk	<i>Buteogallus anthracinus</i>	AZSc
Crested caracara	<i>Buteogallus anthracinus</i>	AZSc
Elegant trogon	<i>Trogon elegans</i>	AZSc
Elf owl	<i>Micrathene whitneyi</i>	CAE

Common Name	Scientific Name	Status
Ferruginous hawk	<i>Buteo regalis</i>	AZSc
Fulvous whistling duck	<i>Dendrocygna bicolor</i>	BLM
Gila woodpecker	<i>Melanerpes uropygialis</i>	CAE
Gilded flicker	<i>Colaptes chrysoides</i>	CAE
Great egret	<i>Casmerodius albus</i>	AZSc
Great sandhill crane	<i>Grus Canadensis tabida</i>	CAT
Grey catbird	<i>Dumetella carolinensis</i>	AZSc
Grey hawk	<i>Buteo nitidus</i>	AZSc
Large-billed savannah sparrow	<i>Passerculus sandwichensis rostratus</i>	BLM, CASc
Least bittern	<i>Ixobrychus exilis</i>	AZSc
Le Conte's thrasher	<i>Toxostoma lecontei</i>	CASc
Loggerhead shrike	<i>Lanius ludovicianus</i>	BLM
Mississippi kite	<i>Ictinia mississippiensis</i>	AZSc
Northern goshawk	<i>Accipiter gentiles</i>	AZSc
Northern greyhawk	<i>Buteo nitidus maximus</i>	BLM
Osprey	<i>Pandion haliaetus</i>	AZSc
Peregrine falcon	<i>Falco peregrinus</i>	AZSc
Pine grosbeak	<i>Pinicola enucleator</i>	AZSc
Rose-throated becard	<i>Pachyramphus agliae</i>	AZSc
Snowy egret	<i>Egretta thula</i>	AZSc
Snowy plover	<i>Charadrius alexandrinus</i>	AZSc
Sprague's pipit	<i>Poliophtila nigriceps</i>	AZSc
Swainson's hawk	<i>Buteo swainsoni</i>	CAT
Thick-billed kingbird	<i>Tyrannus crassirostris</i>	AZSc
Thick-billed parrot	<i>Rhynchopsitta pachyrhyncha</i>	AZSc
Tropical kingbird	<i>Tyrannus melancholicus</i>	AZSc
Veery	<i>Catharus fuscescens</i>	AZSc
Violet-crowned hummingbird	<i>Amazilia violiceps</i>	AZSc
Western burrowing owl	<i>Athene cunicularia hypugea</i>	BLM
White-faced ibis	<i>Plegadis chihi</i>	BLM, CASc
Amphibians and Reptiles		
Arizona ridge-nosed rattlesnake	<i>Crotalus willardi willardi</i>	AZSc
Arizona skink	<i>Eumeces gilberti arizonensis</i>	BLM, AZSc
Arizona toad	<i>Bufo microscaphus</i>	CAProt
Banded Gila monster	<i>Heloderma suspectum cinctum</i>	BLM
Barking frog	<i>Eleutherodactylus augusti</i>	AZSc
Brown vine snake	<i>Ocybelis aeneus</i>	AZSc
Canyon spotted whiptail	<i>Cnemidophorus burti</i>	BLM
Chuckwalla	<i>Sauromalus ater</i>	BLM
Giant spotted whiptail	<i>Cnemidophorus burti stictogrammus</i>	BLM
Great Plains narrow-mouthed toad	<i>Gastrophryne olivacea</i>	AZSc
Lowland burrowing treefrog	<i>Pternohyla fodiens</i>	AZSc
Lowland leopard frog	<i>Rana yavapaiensis</i>	AZSc, CASc, CAProt
Massasauga	<i>Sistrurus catenatus</i>	AZSc
Mexican garter snake	<i>Thamnophis eques</i>	AZSc
Mojave fringe-toed lizard	<i>Uma scoparia</i>	AZSc
Narrow-headed garter snake	<i>Thamnophis rufipunctatus</i>	AZSc
Northern casque-headed frog	<i>Pternohyla fodiens</i>	AZSc
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	BLM
Northern leopard frog	<i>Rana pipiens</i>	AZSc
Plains leopard frog	<i>Rana blairi</i>	AZSc
Redback whiptail	<i>Cnemidophorus burti xanthonotus</i>	BLM

Common Name	Scientific Name	Status
Rosy boa	<i>Charina trivirgata</i>	BLM
Sonoran desert fringe-toed lizard	<i>Uma notata</i>	AZSc
Tarahumara frog	<i>Rana tarahumarae</i>	AZSc
Texas horned lizard	<i>Phrynosoma corutum</i>	BLM
Yuma desert fringe-toed lizard	<i>Uma notata rufopunctata</i>	BLM, AZSc
Fish		
Arizona stoneroller	<i>Campostoma ornatum pricei</i>	AZSc
Desert sucker	<i>Cotostomus clarki</i>	BLM
Little Colorado sucker	<i>Catostomus</i> sp.	BLM, AXSc
Longfin dace	<i>Agosia chrysogaster</i>	BLM
Mexican stoneroller	<i>Campostoma ornatum</i>	AZSc
Quitobaquito desert pupfish	<i>Cyprinodon eremus</i>	AZSc
Santa Cruz pupfish	<i>Cyprinodon arcuatus</i>	AZSc
Sonora sucker	<i>Cotostomus insignis</i>	BLM
Speckled dace	<i>Rhinichthys osculus</i>	BLM
Invertebrates		
Arizona giant sand treader cricket	<i>Daihinibaenetes arizonensis</i>	BLM
Cheese-weed moth lacewing	<i>Oliarces clara</i>	BLM
Chirihua water scavenger beetle	<i>Cymbiodyta arizonica</i>	BLM
Cockerellis striate disc (snail)	<i>Discus shemeki cockerelli</i>	BLM
Ydrobiid springsnails	All species in genus <i>Pyrgulopsis</i>	BLM
MacNeill sooty wing skipper	<i>Hesperopsis graciellae</i>	BLM
Maricopa Jerusalem cricket	<i>Stenopelmatus navajo</i>	BLM
Niobrara ambersnail	<i>Oxyloma haydeni haydena</i>	BLM
Santa Rita Mountains chlorachoroan bug	<i>Chlorochroa rita</i>	BLM
Succineid snails	All species in the family Succineidae	BLM
Plants		
<i>Agave</i> sp.	<i>Agave delamateri</i>	AZNPL
<i>Agave</i> sp.	<i>Agave schottii</i> var. <i>treleasei</i>	AZNPL
Algodones Dunes sunflower	<i>Agave schottii</i> var. <i>treleasei</i>	CAE
Aquarius milkvetch	<i>Astragalus newberryi</i> var. <i>aquarii</i>	BLM
Aravaipa sage	<i>Savia amissa</i>	BLM
Aravaipa woodfern	<i>Thelypteris puberula</i> var. <i>sonorensis</i>	BLM
Arizona leatherflower	<i>Clematis hirsutissima</i> var. <i>arizonica</i>	AZNPL
Arizona Sonoran rosewood	<i>Vauquelinia californica</i> ssp. <i>sonorensis</i>	BLM
Balloonvine	<i>Cardiospermum corundum</i>	BLM
Balsamroot sp.	<i>Balsamorhiza hookeri</i> var. <i>hispidula</i>	BLM
Bartram stonecrop	<i>Graptopetalum bartramii</i>	BLM
Beath milk-vetch	<i>Astragalus beathii</i>	BLM
Beaver dam surf pea	<i>Pediomelum castoreum</i>	BLM
Black rock daisy	<i>Townsendia smithii</i>	BLM
Blue sand lily	<i>Triteleopsis palmeri</i>	BLM
California copperleaf	<i>Acalypha californica</i>	BLM
California flannelbush	<i>Fremontodendron californica</i>	BLM
Cerbat beardtongue	<i>Penstemon bicolor</i> ssp. <i>roseus</i>	BLM
Chiricahua Mountain tansy-aster	<i>Machaeranthera riparia</i>	BLM
Chisos Mountains coralroot	<i>Hexalectris revoluta</i>	BLM
Cliff milkvetch	<i>Astragalus cremnophylax</i> var. <i>myriorrhaphus</i>	BLM

Common Name	Scientific Name	Status
Clifton rock daisy	<i>Perityle ambrosiifolia</i>	BLM
ĉCrestedí or ĉFan-toppedí Saguaro	<i>Carnegiea gigantean</i>	AZNPL
Dallhouse spleenwort	<i>Asplenium (Ceterach) dalhousiae</i>	BLM
Desert cassia	<i>Senna armata</i>	BLM
Desert moonpod	<i>Selinocarpus diffuses</i>	BLM
Death Valley Mormon tea	<i>Ephedra funerea</i>	BLM
Diamond Butte milkvetch	<i>Astragalus toanus</i> var. <i>scidulus</i>	BLM
Encinillas	<i>Croton fruticosus</i>	BLM
False grama	<i>Cathestecum erectum</i>	BLM
Fish Creek fleabane	<i>Erigeron piscaticus</i>	BLM
Fragrant bursera	<i>Bursera fagaroides</i>	AZNPL
Gentry indigo bush	<i>Dalea tentaculoides</i>	BLM, AZNPL
Giant sedge	<i>Carex spissa</i> var. <i>ulta</i>	BLM
Goosfoot moonpod	<i>Ammocodon chenopodioides</i>	BLM
Green puccoon	<i>Lithospermum viride</i>	BLM
Grand Canyon rose	<i>Rosa stellata</i> var. <i>abyssa</i>	BLM
Huachuca golden aster	<i>Heterotheca rutteri</i>	BLM
Huachuca groundsel	<i>Senecio huachucanus</i>	AZNPL
Kaibab pincushion cactus	<i>Pediacactus paradinei</i>	BLM
Kearney sumac	<i>Rhus kearneyi</i> spp. <i>kearneyi</i>	BLM
Kofa Mt. Barberry	<i>Berberis harrisoniana</i>	BLM
Longleaf sandpaper plant	<i>Petalonyx linearis</i>	BLM
Mohave thistle	<i>Cirsium mohavense</i>	BLM
Mt. Trumbell beardtongue	<i>Penstemon distans</i>	BLM
Murphey agave	<i>Agave murpheyi</i>	BLM, AZNPL
Nevin birdís-beak	<i>Cordylamthus nevinii</i>	BLM
Orange pipe cactus	<i>Stenocereus thurberi</i>	BLM
Owens Valley cotton thorn	<i>Tetradymia stenolepis</i>	BLM
Parish onion	<i>Allium parishii</i>	BLM
Parish alkali grass	<i>Puccinellia parishii</i>	AZNPL
Parish phacelia	<i>Phacelia parishii</i>	BLM
Peebles bluestar	<i>Amsonia peeblesii</i>	BLM
Purple-spike coralroot	<i>Hexalectris warnockii</i>	BLM, AZNPL
Pygmy sagebrush	<i>Artemisia pygmaea</i>	BLM
Redflower onion	<i>Allium rhizomatum</i>	BLM
Round-leaf broom	<i>Errazuriza rotundata</i>	BLM
<i>Rumex</i> sp.	<i>Rumex orthoneurus</i>	AZNPL
Sand food	<i>Pholisma sonora</i>	BLM, AZNPL
Santa Cruz beehive cactus	<i>Coryphantha recurvata</i>	BLM, AZNPL
Santa Cruz striped agave	<i>Agave parviflora</i> ssp. <i>parviflora</i>	BLM, AZNPL
Santa Rita yellowshow	<i>Amoreuxia gonzalezii</i>	AZNPL
Scaly-stemmed sand plant	<i>Pholisma arenaria</i>	BLM, AZNPL
Scheerís strong-spined cory cactus	<i>Coryphantha scheeri</i>	AZNPL
Schott wire-lettuce	<i>Stephanomeria schottii</i>	BLM
Sheep Range beardtongue	<i>Penstemon petiolatus</i>	BLM
Shiny-leaved sandpaper plant	<i>Petalonyx nitidus</i>	BLM
Silver buffaloberry	<i>Shepherdia argentea</i>	BLM
Silver felt thorn	<i>Tetradymia argyraea</i>	BLM
Silverleaf sunray	<i>Enceliopsis argophylla</i>	BLM
Slender evening primrose	<i>Camissonia exilis</i>	BLM
Texas globeberry	<i>Ibervillea tenuisecta</i>	BLM
Three hearts	<i>Tricardia watsonii</i>	BLM
Three-nerved scurfpea	<i>Pediomelum trinervatum</i>	BLM
Tumamoc globeberry	<i>Tumamoca macdougalii</i>	BLM

Common Name	Scientific Name	Status
Variegated beardtongue	<i>Penstemon discolor</i>	AZNPL
Waxy bitterbush	<i>Purshia glandulosa</i>	BLM
Whick fern	<i>Psilotum nudum</i>	AZNPL
White-margined penstemon	<i>Penstemon albomarginatus</i>	BLM
Yellow lady's slipper	<i>Cypripedium calceolus</i>	AZNPL

¹ Species already represented as federally listed, proposed, candidate, or Conservation Agreement/Management Plan species are not repeated here.

Status Definitions:

US Bureau of Land Management (2000 Animals, 2000 Plants; <http://www.az.blm.gov>)

BLM BLM Sensitive species

State Wildlife Species of Concern

AZSc Wildlife of Special Concern in Arizona (AGFD, Draft 1996; <http://www.azgfd.com>)

CAE California State Endangered

CAT California State Threatened

CASc California Species of Special Concern

CAProt California Protected

Arizona Native Plant Law, Highly Safeguarded Species

AZNPL

The Arizona Department of Agriculture maintains a list of native plants that are protected under the State of Arizona Native Plant Law. The list includes five categories of protection as follows:

HS Highly Safeguarded ñ no collection allowed

SR Salvage Restricted ñ collection only with permit

ER Export Restricted ñ transport out of State prohibited

SA Salvage Restricted ñ permits required to remove live trees

HR Harvest Restricted ñ permits required to remove plant by-products

For the purposes of this Environmental Assessment, only species identified on the Highly Safeguarded list (HS) are included in the table above. These species of native plants and parts of plants, including the seeds and fruits, represent species believed to be in jeopardy of extinction within Arizona.

**Table 3.8 ñ
National Register Of Historic Places Listings On BLM-Managed Land In Arizona**

County	NRHP Property	County	NRHP Property
Cochise	Lehner Mammoth Kill Site	Pima	Santa Ana del Chiquiburitac Mission Site
Cochise	Santa Cruz de Terrenate	Pinal	McClellan Wash Archeological District
Graham	Kearny Campsite and Trail	Riverside County	Blythe Intaglios
La Paz	Eagletail Petroglyph Site	Yavapai	Perry Mesa Archeological District
La Paz	Harquahala Mountain Smithsonian Solar Observatory Historic District	Yuma/La Paz	Earth Figures of California-Arizona
Maricopa	Painted Rocks	Yuma	El Camino del Diablo
Mohave	Antelope Cave	Yuma	Martinez Lake Site
Mohave	Bighorn Cave	Yuma	Ripley Intaglios
Pima	Corcoraque Butte Archeological District	Yuma	Sears Point Archeological District
Pima	Empire Ranch		

under this plan will be preceded by a complete review of known resources and field survey, as appropriate, to identify cultural resources that might be affected by the proposed activities.

3.3.1.1 Prehistoric Resources

Thousands of archeological sites representing over 13,000 years of human occupation have been recorded on BLM-managed land in Arizona. Prehistoric sites tend to concentrate near seeps and springs in mountain ranges, and along perennial streams such as Burro and Big Sandy Creeks and the Gila and Colorado Rivers. They include properties as diverse as Paleoindian mammoth kill sites, Archaic hunting camps, giant ground figures (intaglios), pueblo ruins and rock art. A few of these sites have been developed for public access, such as the Murray Springs Clovis Site, a Paleoindian mammoth and bison kill site, as well as the Little Black Mountain Rock Art Site.

3.3.1.2 Historic Resources

Historic resources in Arizona pertain primarily to Spanish, Mexican, and Anglo-American activities since the mid-1500s. They include ghost towns, historic ranches, and numerous historic trails and wagon roads such as the Butterfield Overland Stage Route. Some historic trails, such as the 1776 Dominguez and Escalante Trail and the Juan Bautista de Anza National Historic Trail along the Gila River date to the period of Spanish/Mexican exploration. Resources pertaining to mining, timber cutting, and Anglo-American settlement date from the 1870s, and numerous ghost towns (i.e., abandoned settlements) occur throughout the state. Many resources, such as the National Register-listed Empire Ranch (dating from 1876), the 1920s Harquahala Peak Smithsonian Observatory, the 1776 Spanish Presidio Santa Cruz de Terrenate, the Gold King Mansion (1929), and the turn-of-the-century historic mining town of Swansea, are considered historically significant and are accessible to the public. Roads and structures constructed by the Civilian Conservation Corps (CCC) are also present.

3.3.1.3 Places of Traditional Cultural Importance

Places of traditional cultural importance provide a sense of spiritual and social continuity to Native Americans and other cultural groups. Some places may have religious significance. Others may be used for the observance of traditional ceremonial activities, or for hunting or gathering plants for food or medicinal use.

Within the context of the NHPA, a traditional cultural property (TCP) is a property that may be eligible for inclusion on the National Register of Historic Places due to its association with the cultural practices or beliefs of a living community when those practices or beliefs have been passed down through the generations and are important in maintaining the cultural identity and integrity of that group. Because they are not usually recognizable to an outsider through archeological or historical investigations, the existence and locations of TCPs may often only be identified through consultation with members of the groups who ascribe value to those places.

The BLM is consulting specifically with Indian tribes to provide an opportunity for tribes to identify any places of traditional religious or cultural importance relevant to the proposed land use plan amendment. In addition, tribal consultation will also take place for individual fire management actions undertaken under the proposed LUP amendment, when applicable. Many Native American belief systems require that the identity and location of traditional religious and cultural properties not be divulged. BLM has a commitment to keep specific information regarding such resources confidential to the fullest extent allowed by law.

3.3.2 Paleontological Resources

Paleontology is the study of flora and fauna (vertebrate and invertebrate) from past geological eras. Paleontological resources are fossils, or recognizable remains of past life, which have been preserved through various processes. The most typical process involves deposition of the organism in sediment which has either preserved the form of the organic material through replacement of the organic material by sediment, or through preservation of the form of the organism by impression in sediment. In some dry climates, preservation of organic material may occur.

Paleontological resources are discussed in somewhat more detail in the LUPs referenced at the beginning of Section 3.0, and are incorporated herein by reference. Significant fossil sites on BLM-managed land in Arizona include Bear Springs Badlands and the 111 Ranch, both located in Graham County and designated as ACECs due to the significance of their paleontological resources. Fossils on these lands date from the late Pliocene, approximately 2.5 million years ago, and contain representative remains of numerous land mammals now extinct in North America. A 25-mile long Pliocene lake near Wikieup also contains fossils of birds, horses, camels, and

other species. Mammoth remains have recently been found near Golden Shores, along the Colorado River.

Some prehistoric archeological sites, such as the Lehner Mammoth Kill Site and the Murray Springs Clovis Site, also contain paleontological resources indicating the exploitation of mammoth and bison by early human inhabitants of the area.

BLM also manages land adjacent to the Petrified Forest National Park in Navaho County, which contains petrified wood and other fossils.

3.3.3 Visual Resources

Visual resources on BLM-administered lands are identified, evaluated, and classified following management guidelines in BLM Manual Section 8400, Information Bulletin No. 98-135, and Instruction Memorandum No. 98-164. Systematic inventory procedures are described in BLM Handbook H-8410-1, Visual Resource Inventory. Accordingly, Visual Resource Management (VRM) land classifications have been established in LUPs referenced in Section 3. The four VRM classes (I-IV) are based on determinations of scenic quality or visual appeal of the area, distance zones from which the landscape of interest is viewed, and public sensitivities to change in the existing landscape character. Overall VRM quality is managed on the basis of the objectives for Classes I through IV described below:

Class I ñ The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; it does not, however, preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II ñ The objective of this class is to retain the character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III ñ The objective of this class is to partially retain the existing character of the landscape. The level of activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV ñ The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Class I VRM areas, the most scenic and most sensitive of the four VRM classes, are typically special designation management areas such as wilderness or Areas of Critical Environmental Concern (ACECs). Management in these areas is generally consistent with VRM objectives. Class II areas may include special designation areas not managed as Class I areas and, in addition, include canyon and mountain vistas of particular interest. Class III VRM management areas are established along some major highway corridors or may have been established adjacent to higher level VRM classes to buffer management impacts near more sensitive areas or broad vistas. Class IV areas are those lands not included in Classes I-III. Management activities in all of these areas are assessed on a project-by-project basis through a process described in BLM Handbook H-8431-1, Visual Resource Contrast Rating, to assure that impacts to visual quality are minimized or mitigated. Potential impacts, analyzed for the basic elements of form, line, texture, and color, can be managed through the application of various design techniques.

3.3.4 Special Designation Areas

Special designation or Special Management Areas are lands that contain natural features that have been recognized by law, Presidential Proclamation, or have been recognized in prior plans or reports as being unique, important and deserving of some form of special management. There are five types of such special designation areas on BLM-managed lands in Arizona: wilderness areas, Wild and Scenic Rivers, National Monuments, National Conservation Areas, and Areas of Critical Environmental Concern (ACECs). Special designation areas are discussed in more detail in the LUPs referenced at the beginning of Section 3.0, and are incorporated herein by reference. The following are brief descriptions of special designation areas.

Table 3.9 ñ Wilderness Areas and Acreage Amount per BLM Field Office

Phoenix Field Office		Kingman Field Office	
Big Horn Mountains Wilderness	21,000 ac	Arrastra Mountain Wilderness	129,800 ac
Harquahala Mountains Wilderness	22,880 ac	Aubrey Peak Wilderness*	15,400 ac
Hassayampa River Canyon Wilderness*	11,840 ac	Mount Nutt Wilderness*	27,600 ac
Hells Canyon Wilderness*	9,900 ac	Mount Tipton Wilderness*	30,760 ac
Hummingbird Springs Wilderness	31,200 ac	Mount Wilson Wilderness*	23,900 ac
North Maricopa Mountains Wilderness*	63,200 ac	Tres Alamos Wilderness*	8,300 ac
Sierra Estrella Wilderness*	14,400 ac	Upper Burro Creek Wilderness	27,440 ac
Signal Mountain Wilderness*	13,350 ac	Wabayuma Peak Wilderness*	40,000 ac
South Maricopa Mountains Wilderness*	60,100 ac	Warm Springs Wilderness*	112,400 ac
Table Top Wilderness*	34,400 ac	Safford Field Office	
Woolsey Peak Wilderness*	64,000 ac	Aravaipa Canyon Wilderness*	19,410 ac
Lake Havasu Field Office		Baker Canyon Wilderness Study Area	4,810 ac
Cactus Plain Wilderness Study Area	59,100 ac	Dos Cabezas Mountains Wilderness*	11,700 ac
East Cactus Plain Wilderness*	14,630 ac	Fishhooks Wilderness	1,500 ac
Gibraltar Mountain Wilderness*	18,790 ac	North Santa Teresa Wilderness	5,800 ac
Harcuvar Mountains Wilderness	25,050 ac	Peloncillo Mountains Wilderness*	19,400 ac
Rawhide Mountains Wilderness	38,470 ac	Redfield Canyon Wilderness*	6,600 ac
Swansea Wilderness	16,400 ac	Yuma Field Office	
Arizona Strip Field Office		Eagletail Mountains Wilderness*	100,600 ac
Beaver Dam Wilderness*	19,600 ac	Muggins Mountains Wilderness*	7,711 ac
Cottonwood Point Wilderness*	6,860 ac	New Water Mountains Wilderness*	24,600 ac
Grand Wash Cliffs Wilderness*	37,030 ac	Trigo Mountains Wilderness	30,300 ac
Kanab Creek Wilderness*	75,300 ac	Tucson Field Office	
Mount Logan Wilderness*	14,650 ac	Baboquivari Peak Wilderness	2,065 ac
Mount Trumbull Wilderness*	7,880 ac	Coyote Mountains Wilderness	5,080 ac
Paiute Wilderness*	87,900 ac	Needle's Eye Wilderness	8,760 ac
Paria Canyon-Vermilion Cliffs Wilderness*	112,500 ac	White Canyon Wilderness	5,800 ac

* A Wilderness Management Plan has been approved for this area.

3.3.4.1 Wilderness

The BLM in Arizona is responsible for 49 wilderness areas totaling over 1.5 million acres. Congress established these areas through the Arizona Wilderness Act of 1984 and the Arizona Desert Wilderness Act of 1990. **Table 3.9** list wilderness areas by the Field Office that manages each area.

3.3.4.2 Wild & Scenic Rivers

The Verde River in central Arizona is a designated Wild and Scenic River, which is characterized by a

rich riparian area. Indeed, *Verde* is the Spanish term for the color green. Many people visit the Verde for its outstanding recreational opportunities including boating, hunting, fishing, birding, hiking, picnicking and photography. The Verde River heads at Sullivan Lake in the Big Chino Valley (south of Paulden) in Yavapai County, and flows generally south for 170 miles through private, state, tribal and National Forest System lands to the confluence with the Salt River.

3.3.4.3 National Monuments

BLM manages five National Monuments within the State of Arizona. These five monuments are:

Agua Fria National Monument - Adjacent to rapidly expanding communities, the 71,000-acre monument is approximately 40 miles north of central Phoenix. The monument encompasses two mesas and the canyon of the Agua Fria River. Elevations range from 2,150 feet above sea level along the Agua Fria Canyon to about 4,600 feet in the northern hills. This expansive mosaic of semi-desert area, cut by ribbons of valuable riparian forest, offers one of the most significant systems of prehistoric sites in the American Southwest. In addition to the rich record of human history, the monument contains outstanding biological resources. This monument is managed by the BLM Phoenix Field Office.

Grand Canyon-Parashant National Monument ñ Situated on the Colorado Plateau in northwestern Arizona within the Colorado River drainage, the Grand Canyon-Parashant National Monument borders the Grand Canyon National Park to the south and the state of Nevada to the west, encompassing a portion of Lake Mead National Recreation Area. The Grand Canyon-Parashant National Monument is under joint management of the BLM Arizona Strip Field Office and the NPS. Covering 1,054,264 acres of remote and unspoiled public lands, this monument is a scientific treasure, containing many of the same values that have long been protected in the Grand Canyon National Park. Deep canyons, mountains and lonely buttes testify to the power of geological forces and provide colorful vistas. Here Paleozoic and Mesozoic sedimentary rock layers are relatively undeformed and unobscured by vegetation, offering a clear view to understanding the geologic history of the Colorado Plateau. The monument encompasses the lower portion of the Shivwits Plateau, an important watershed for the Colorado River and the Grand Canyon. Beyond the phenomenal geological resources, the monument also contains countless biological and historical values

Ironwood Forest National Monument ñ The Ironwood Forest National Monument is located 25 miles northwest of Tucson, and about one hour by highway south of Phoenix. This 129,000-acre national monument contains a significant system of cultural and historical sites covering a 5,000 year period. Possessing one of the richest stands of Ironwood trees in the Sonoran Desert, the monument also encompasses several desert mountain ranges including the Silver Bell, Waterman and Sawtooth, with desert valleys in between. Elevation ranges from

1,800 to 4,261 feet. Three areas within the monument, the Los Robles Archeological District, the Mission of Santa Ana del Chiquiburitac and the Cocoraque Butte Archeological District are listed on the National Register of Historic Places. This monument is managed by the BLM Tucson Field Office.

Sonoran Desert National Monument ñ This monument is located approximately 60 miles southwest of the Phoenix metropolitan area, straddling U.S. Interstate 8. The outer boundaries encompass approximately 496,337 acres. The monument contains magnificent examples of untrammeled Sonoran Desert landscape. The Sonoran Desert is the most biologically diverse of the North American deserts, and the monument captures a significant portion of that diversity. The most striking aspect of the plant community within the monument is the extensive saguaro cactus forest. The monument contains three distinct mountain ranges, the Maricopa, Sand Tank and Table Top Mountains, as well as the Booth and White Hills, all separated by wide valleys. The monument also contains three congressionally designated wilderness areas and many significant archeological and historic sites, and remnants of several important historic trails. This monument is managed by the BLM Phoenix Field Office.

Vermilion Cliffs National Monument ñ This remote and unspoiled 294,000-acre monument is a geologic treasure, containing the Paria Plateau, Vermilion Cliffs, Coyote Buttes, and Paria Canyon. Elevations range from 3,100 to 6,500 feet. It is located in north central Arizona bordering the State of Utah on the north, and the Colorado River to the east. This monument is managed by the BLM Arizona Strip Field Office.

3.3.4.4 National Conservation Areas

BLM manages three national conservation areas. These include the following sites:

Gila Box Riparian National Conservation Area ñ On November 28, 1990, Congress created the Gila Box Riparian National Conservation Area (RNCA) in section 201 of the Arizona Desert Wilderness Act, Public Law 101-628. As stated in the Act, the principle objective for establishing the RNCA was to conserve, protect, and enhance the riparian and associated values of the area. Four perennial waterways—the Gila River, Bonita Creek, Eagle Creek, and San Francisco River—are the lifeblood of this remarkable place. Not only does the RNCA hold one of the most significant riparian zones in the

Southwest, it offers tremendous scientific, cultural, scenic, recreational, and other associated values. It is one of only two Riparian National Conservation Areas in the Nation.

A 15-mile segment of Bonita Creek and 23 miles of the Gila River have been included in this special natural area designated by Congress. Bonita Creek, popular for birding and picnicking, is lined with large cottonwoods, sycamores, and willows. Cliff dwellings, historic homesteads, Rocky Mountain bighorn sheep, and over 200 species of birds make this cool year-round desert oasis worth the short drive from Safford. The Gila River section, known as the Gila Box, is comprised of patchy mesquite woodlands, mature cottonwood trees, sandy beaches, and grand buff colored cliffs.

Las Cienegas National Conservation Area ñ President Clinton signed a bill creating the Las Cienegas National Conservation Area (NCA) and Acquisition Planning District in southeastern Arizona on December 6, 2000. The designation was the result of Congress' passage of H.R. 2941 (Congressman Jim Kolbe). The new 42,000-acre NCA consists entirely of public lands managed by the BLM's Tucson Field Office. The NCA is bordered on the north and east by lands within the Acquisition Planning District.

These lands are located about 50 miles southeast of Tucson. Combined, the NCA and Acquisition Planning District total 142,800 acres of public, private, county, and state trust lands. They form a scenic landscape of vast desert grasslands and rolling oak-studded hills connecting several isky island ñ mountain ranges. Cienega Creek, with its perennial flow and lush riparian corridor, forms the lifeblood of the NCA. The area is home to a great diversity of plant and animal life, including several threatened or endangered species. Protection of this regionally significant open space safeguards a network extending south of Interstate 10 to protected lands in northern Sonora, Mexico. The BLM Tucson Field Office manages the NCA, which includes the Empire-Cienega Resource Conservation Area. Lands within the Acquisition Planning District are owned and managed by Pima County, National Audubon Society, the State of Arizona, and numerous private landowners.

San Pedro National Conservation Area ñ The San Pedro riparian area, containing about 40 miles of the upper San Pedro River, was designated by Congress as a National Conservation Area (NCA) on November 18, 1988. The primary purpose for the designation is to protect and enhance the desert riparian ecosystem, a rare remnant of what was once

an extensive network of similar riparian systems throughout the Southwest.

The word riparian refers to an area where plants and animals thrive because of an availability of water, either at or near the soil surface. Riparian areas are the shores of lakes and reservoirs, the banks and floodplains of intermittent or perennial (year-round) streams, rivers and springs. Managed by the Tucson Field Office, the San Pedro Riparian NCA contains over 58,000 acres of public land in Cochise County, Arizona, between the international border (United States and Mexico) and St. David, Arizona.

3.3.4.5 Areas of Critical Environmental Concern (ACECs)

BLM manages 50 Areas of Critical Environmental Concern (ACEC) in Arizona encompassing some 638,110 acres of public lands (see **Table 3.10**). ACEC designations highlight areas where special management attention is needed to protect, and prevent irreparable damage to, important historic, cultural, or scenic values; fish or wildlife resources; or other natural systems or processes. ACECs may also be designated to protect human life and safety from natural hazards. The ACEC designation indicates that the BLM recognizes that an area has significant values and has established special management measures to protect those values. For more information on the designation of ACECs, see BLM Manual 1613, Areas of Critical Environmental Concern.

3.3.4.6 The Arizona Trail

The Arizona Trail will eventually be a 790-mile non-motorized trail that traverses Arizona from the borders with Mexico and Utah. The Arizona Trail is intended to be a primitive, long distance trail that highlights the State's topographic, biologic, historic, and cultural diversity. The primary users are hikers, equestrians, and mountain bicyclists (outside of wilderness or other specially managed areas). Opportunities will also exist for cross-country skiers, snowshoers, joggers, and packstock users. More than 600 miles of the Arizona Trail have been officially designated and signed. In 1993, an Intergovernmental Agreement was established between Arizona State Parks, U.S. Forest Service, National Park Service, and the BLM (known as the Arizona Trail Partners) that allows these agencies to cooperatively plan for the development and completion of the Arizona Trail. An estimated 8 percent of the trail is on BLM-administered public lands.

Table 3.10 ñ Areas of Critical Environmental Concern (ACEC) in Arizona

ACEC Name	Size (Acres)	Reason for Designation	Field Office
Virgin River Corridor	8,100	Fish, Riparian, Scenic	Arizona Strip
Beaver Dam Slope	51,400	Wildlife, Desert Tortoise	Arizona Strip
Little Black Mountain	200	Cultural Resources	Arizona Strip
Fort Pierce	900	Botanical, Watershed	Arizona Strip
Lost Spring Mountain	9,800	Cultural Resources, Botanical	Arizona Strip
Moonshine Ridge	5,500	Cultural Resources, Botanical	Arizona Strip
Witch Pool	260	Cultural Resources	Arizona Strip
Nampawcap	550	Cultural Resources	Arizona Strip
Marble Canyon	10,700	Botanical	Arizona Strip
Johnson Spring	2,400	Cultural Resources, Botanical	Arizona Strip
Virgin Slope	41,410	Desert Tortoise	Mojave Desert EA
Pakoon	76,350	Desert Tortoise	Mojave Desert EA
Perry Mesa	9,440	Cultural Resources	Phoenix
Coffee Pot Botanical	9,600	Botanical	Lower Gila South
Vekol Valley Grasslands	3,520	Botanical	Lower Gila South
Larry Canyon	80	Riparian, Botanical	Phoenix
Joshua Tree Forest/Grand Wash Cliffs	39,060	Vegetation, Scenic, Cultural Resources	Kingman
Black Mtns. Ecosystem Mgmt.	114,242	Bighorn Sheep Habitat, Plants, Scenic, Cultural Resources	Kingman
Wright-Cottonwood Creek Riparian & Cultural	27,285	Riparian, Cultural Resources	Kingman
Hualapai Mtn. RNA	3,303	Vole Habitat, Riparian	Kingman
White-Margined Penstemon Reserve	17,489	White-Margined Penstemon Habitat	Kingman
Carrow-Stephens Ranches	542	Historic, Paleontological	Kingman
McCracken Desert Tortoise Habitat	21,740	Desert Tortoise Habitat, Scenic	Kingman
Poachie Desert Tortoise Habitat	32,752	Desert Tortoise Habitat, Scenic	Kingman
Aubrey Peak Bighorn Sheep Habitat	3,460	Bighorn Sheep Habitat, Scenic	Kingman
Burro Creek Riparian & Cultural	22,682	Riparian, Cultural Resources, T&E, Bald Eagle Habitat	Kingman
Clay Hills RNA	1,114	Arizona Cliffrose Habitat	Kingman

ACEC Name	Size (Acres)	Reason for Designation	Field Office
Three Rivers Riparian	32,043	Riparian, T&E, Bald Eagle Habitat	Kingman
Tanner Wash	950	Botanical	Phoenix
Table Mountain RNA	1,220	RNA, Botanical	Safford
Turkey Creek Riparian	2,326	Riparian	Safford
Bear Springs Badlands	2,927	Paleontological, Scenic	Safford
Swamp Springs/Hot Springs	10,838	Riparian, T&E Species, Cultural Resources	Safford
111 Ranch RNA	2,688	RNA, Paleontological	Safford
Bowie Mountain	4,190	Scenic	Safford
Guadalupe Canyon ONA	2,159	ONA, Riparian, Botanical	Safford
Willcox Playa NNL	2,475	Botanical, National Natural Landmark	Safford
Dos Cabezas Peaks	25	Scenic, Cultural Resources	Safford
Eagle Creek Bat Cave	40	Critical Bat Maternity Cave	Safford
Desert Grasslands RNA	530	Relict Desert Grasslands	Safford
Gila River Cultural Area	1,150	Cultural Resources	Lower Gila South
Big Marias	5,280	Cultural Resources, Botanical	Yuma
St. David Cienega RNA	350	RNA, Botanical	Safford
San Rafael RNA	370	RNA,, Botanical, Riparian	Safford
San Pedro River RNA	1,340	RNA, Botanical, Riparian	Safford
Appleton Whittell RNA	3,141	RNA, Botanical	Phoenix
Waterman Mountains	1,960	Botanical	Phoenix
White Canyon	300	Scenic, Wildlife, Cultural Resources	Phoenix
Baboquivari Peak	2,070	Scenic, Wildlife, Botanical, Cultural Resources	Tucson
Empire-Cienega	45,859	Riparian, T&E Species, Wildlife, Cultural	Tucson

Common Abbreviations: ONA = Outstanding Natural Area; RNA = Research Natural Area; NNL = National Natural Landmark

3.3.5 Land Uses

The BLM administers 11.6 million surface acres of public lands, along with another 17.5 million subsurface acres within Arizona (Arizona BLM 2003). The land use planning process adapted by BLM allows the public to be involved from the very beginning. Uses of these public lands are diverse and include livestock grazing, recreation, and forestry. The Arizona BLM also issues leases, rights-of-way and a wide variety of use permits, including parks, power transmission lines and roads. BLM offices in Arizona are currently processing right-of-way applications for fiber optic projects which cross public land in Arizona. Additionally, BLM administers both mining claim records and mineral leases, which are on lands managed by other federal agencies.

3.3.5.1 Grazing Management

Livestock grazing is permitted on nearly 12 million acres of public lands in Arizona. Approximately 847 livestock operators graze more than 56,000 cattle and 2,000 sheep on more than 800 grazing allotments (Arizona BLM 2003). Livestock grazing on BLM rangeland is administered through the Taylor Grazing Act of 1934, which called for grazing management through the use of permits. Livestock grazing is an important use of BLM-administered rangeland in Arizona. Livestock grazing is sometimes managed through allotment management plans referenced in exiting LUPs. Grazing management practices adhere to the *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration* (BLM 1997). The goals of grazing management are to maintain and, where necessary, improve rangeland health. BLM is initiating the 'Sustaining Working Landscape' concept, to improve rangeland health through changes to rangeland grazing policy based on partnerships with ranchers.

3.3.5.2 Recreation

Arizona BLM rangelands are a popular destination for recreationists that are drawn to open spaces, diverse landscapes, and freedom from the restrictions of urban areas (Arizona BLM 2003). There are a wide variety of high quality outdoor recreational opportunities on BLM rangeland including camping, hiking, off-highway vehicle (OHV) travel, bird watching, wildlife viewing, photography, mountain biking, hunting, nature study, mining/prospecting, and horseback riding. BLM provides approximately 50 established trails for hiking and 15 trails/by ways set aside for OHV travel. The San Pedro Riparian National Conservation Area is internationally

renowned for birdwatching. Hundreds of birdwatchers annually visit the area to observe over 250 migratory and wintering birds. There are approximately 15 areas set aside by BLM to observe wildlife including Bonita Creek, Muleshoe Ranch, and the Painted Rock Petroglyph Site.

3.3.5.3 Forestry

Forested lands include ponderosa pine forests, pinyon and juniper woodlands, and mixed conifer and deciduous woodlands (Arizona BLM 2003). Forest products include mainly firewood and fence posts. The collection of firewood and fence posts can lead to human-caused wildfire if permittees are not careful. Sparks from chain saws and parking vehicles over dried vegetation are ways to inadvertently start wildfires. To alleviate these problems, spark arrestors are required on chain saws and vehicles must not park over dried vegetation.

3.3.5.4 Minerals

The Arizona BLM administers approximately 17.5 million subsurface acres, and supervises about 72,900 acres of Indian and mineral leases in Arizona (Arizona BLM 2003). The minerals program includes locatable, leasable and salable minerals. In locatable minerals, there are 24,135 active mining claims, which are recorded on Arizona's public lands. Mining claim activity includes exploration and development of gold, silver, copper and other hard rock minerals. Arizona's public lands also provide a good source for salable minerals, such as sand, gravel, stone and clay. Oil and gas leases fall under the leasable minerals program. Approximately 100 separate oil and gas leases are located on 160,000 acres in Arizona. The only oil and gas production in Arizona comes from leases located on the Navajo Indian Reservation. There are approximately 11 leases, containing 49 producing wells on 42,550 reservation acres. The BLM New Mexico Farmington District manages these producing leases. The BLM also manages the Indian mineral leasing program. The major minerals leased on Indian land in Arizona are coal, copper, sand and gravel. Currently, there are 15 Indian leases under BLM's supervision.

3.3.6 Socio-economic Conditions

The economy of Arizona is highly diversified, and the state is home to a culturally rich population. During the 2000 census, residents of Arizona reported their ethnic heritage to be: 76% white, 25% white of Hispanic or Latino origin, 5% American Indian and Alaska native, 4% Black or African American, 2% Asian, 0.1% Native Hawaiian and

Other Pacific Islander, with 12% reporting some other race and 3% reporting two or more races.

Between 1970 and 2000, the state's population grew by 3.6% per year, compared to the U.S. annual growth rate of 1.1% over the same time period. Between 1990 and 2000, the state of Arizona experienced a 40% increase in population. Pinal, Yavapai, and Mohave Counties experienced population increases of 54.4, 55.5, and 65.8%, respectively. Greenlee and Apache Counties grew much slower with a growth rate of 6.7 and 12.7%, respectively. In 2000, 88.2% of Arizona residents live within urban areas, while 11.8% live in rural areas. In Mohave, Yuma, Pima, and Maricopa Counties, 75.3, 86.9, 91.6, and 97.1% of the population lives in urban areas. Apache County has the lowest portion of residents living in urban areas at 24%. The number of residents living in urban areas has steadily increased, from 79.6% of the state's population in 1970 to over 88% in 2000.

In 2001, Yuma County had the highest unemployment rate at 24.4%, followed by Santa Cruz, Apache and Navajo counties at 13%, 12%, and 11%, respectively. Yavapai County had the lowest unemployment rate at 2.9%, followed by Pima and Maricopa Counties at 3.5% and 3.9%, respectively.

Between 1990 and 2000, employment in all industries grew by 629,000 workers. The percentage of total employment has increased in the service industries (finance, insurance, real estate, entertainment, recreation, education and other services) from about 42% of all workers to about 51% of all workers. Industries that have decreased as a percentage of total employment include manufacturing, wholesale and retail trade, agriculture, forestry, and mining. The importance of federal rangelands to livestock production can be measured by rancher dependency on federal forage. Average dependency of permittees on federal forage is highest in Arizona compared to other western states with BLM-administered public lands (U.S. Census Bureau).

In 2002, a total of 88,458 wildland fires were reported nationwide. These fires burned some 6.9 million acres, burned 815 structures, and cost an estimated \$1.6 billion in fire suppression (Federal agencies only). This was an increase from the 2001 fire season, which saw 84,079 wildland fires that burned about 3.6 million acres and 731 structures, and cost approximately \$542 million for fire suppression. In 2000, there were 122,827 wildland fires that burned 8.4 million acres, burned 861 structures, and cost \$1.3 billion for Fire Suppression.

Over 200 wildfires occur annually on BLM-administered lands within Arizona, with the recent ten year average of 235 wildland fires for 24,241 acres burned per year. Between 1998 - 2000, Arizona BLM responded to an average of 704 fires per year which burned approximately 148,35 acres. The cause of the wildland fires varies from year to year. From 1998 to 2000 67% of the fires were caused by humans, accounting for 75% of the acres burned. This has increased from the previous five years (1993-1997) in which only 42% of the fires were human caused accounting for 25% of the acres burned (NIFC).

The economic cost of suppressing large, catastrophic wildland fires varies widely. All wildland fires start small and initial or extended attack operations usually put them out. When the initial attack will not stop the fire, another level of firefighting response is activated—the Incident Management Team (IMT). Headed by an experienced Incident Commander (IC), an IMT may manage over 2,000 people and hundreds of pieces of equipment on a large wildland fire. The costs for these fires can run millions of dollars. A 2002 study from the National Academy of Public Administration³ on Wildfire suppression costs studied six fires, and found that suppression costs ranged from \$26 per acre at the 83,673-acre Sheep fire to \$2,975 per acre at the 4,470-acre Green Knoll fire.

The costs of fuels treatment can also vary widely. A June 2000 survey from the U.S. Forest Service, Southern Research Station, found few sources of data on the per-acre costs of prescribed burns. The total cost of prescribed burning includes components incurred during planning and layout, fire-line construction and burn preparation, ignition, and mop-up. Fixed costs include burn plan preparation, NEPA analysis and public involvement, compliance with other laws, smoke management precautions, postfire evaluation, and general overhead. Per-acre planning costs can vary depending on operational efficiency and unit size. Project costs include firebreak construction, igniting and conducting the burn, mopping up, postfire monitoring, and contractor costs. Costs may differ from unit to unit because of differences in topography, weather conditions, and other factors. Different burning objectives also cause variations in planning, personnel and equipment needs, and the precautions that are necessary. Overall cost will reflect differences in timber types and fuels treated, safety precautions, the objectives of the burn

³ Fairbanks, Frank A, November 2002. *Wildfire Suppression: Strategies for Containing Costs*, National Academy of Public Administration.

program, overall efficiency, and cost-collection methods.

Unit size is one of the most important factors in per-acre costs: larger burns have smaller per acre costs. Costs also vary with the shape and configuration of the treatment area, especially in slashreduction/site-preparation burns. Irregularly shaped units are more difficult to burn and monitor than more geometric units of the same size. Small and irregularly shaped units usually cost more to treat, although they may be more

environmentally and aesthetically desirable. The survey found reported a U.S. Forest Service-wide mean cost of \$78.13 per acre, but ranged from \$22.80 per acre in Region 8 to \$223.38 per acre in Region 5. The Arizona BLM reports the mean cost of prescribed fire to be \$22.58 per acre; the cost of chemical treatments to be \$80.00 per acre; and the cost of mechanical treatment to be \$179.00 per acre. **Table 3.11** details the average annual number of wildland fires on BLM lands in Arizona.

Table 3.11 Average Annual Number of Wildland Fires on BLM-Administered Lands in Arizona

Year (annual average)	Human Caused Fires (HCF)	Acres Burned by HCF	Lightning Caused Fires (LCF)	Acres Burned by LCF	Percent of Fires Human Caused	Percent of Acres Burned by HCF
1983-1987	73	3,453	67	8,429	51%	31%
1988-1992	87	3,160	91	3,747	50%	41%
1993-1997	104	7,228	147	23,969	42%	25%
1998-2002	108	7,685	121	8,451	48%	54%

The social and economic impacts from wildland fires in Arizona can be measured by estimated property losses from wildland fires, fire suppression costs, and watershed restoration costs. Economic impacts arise both directly from fire damage and indirectly from changes in local economic activity, such as a drop in tourism. Both direct and indirect effects of wildfires have exacted a heavy economic toll on many communities. In addition to these types of direct, out-of-pocket impacts on communities and government agencies, it is likely that losses in resource values will total many millions of dollars. The consequences of recent wildfires on Arizona's natural resources are as vast as they are varied. Wildland fires burned both public and private lands over a broad spectrum of rangeland and forested ecosystems, often encompassing entire watersheds critical to community water supplies. Compared to historic fire events, recent fires have burned with such intensity that the ecosystems of many of these extensively burned areas have been drastically changed. Without intervention, these burned lands will recover slowly and be susceptible to undesirable changes in vegetation composition. For example, plant species such as cheatgrass often become established in burned areas, creating additional fire risks and disrupting natural systems. The cost to

eradicate unwanted invasive species such as cheatgrass, although unquantified, is very large. It is also difficult to quantify the costs or benefits of wildland fires in terms of lands, lives, and other values lost or saved from the fire. Resource benefits can include restoring the health of natural ecosystems, enabling native species to thrive, and preserving the many natural and cultural resources located on Federal lands.

3.3.7 Environmental Justice

Title VI of the Civil Rights Act and Executive Order 12898 (Environmental Justice) require Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Environmental justice means ensuring that low-income populations and minority populations are not exposed to disproportionately high or adverse environmental impact. In December 1997 the Council on Environmental Quality (CEQ) issued guidance on environmental justice. In addition, Executive Order 13045 (Protection of Children from Environmental Health Risks) requires that actions be evaluated to identify and assess environmental

health risks and safety risks that may disproportionately affect children.

As discussed previously in this section, Arizona is home to a culturally rich population, including many minority populations. In accordance with CEQ Environmental Justice Guidelines, minority populations should be identified when 1) the minority population of the affected area exceeds 50 percent; or 2) the minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate use of geographic analysis. Although the population of Hispanics, Latinos, or American Indians does not exceed 50 percent, their population in portions of the analysis area is meaningfully greater than the minority population in the general population (State of Arizona). Therefore, for the purposes of screening for environmental justice concerns, a minority population exists within the planning area.

The portion of Arizona residents living below the poverty level was 13.9% in 1999 (latest data available), compared to the U.S. average of 12.4%. Several counties had large portions of their residents living below the poverty level: Apache County (37.8%), Navajo County (29.5%), Santa Cruz County (24.5%), Graham County (23.0%), La Paz County (19.6%), Yuma County (19.2%), and Cochino County (18.2%; U.S. Census Bureau).