

# Description of Major Land Resources Areas – Arizona

(AACD Technical Reference #A-10)

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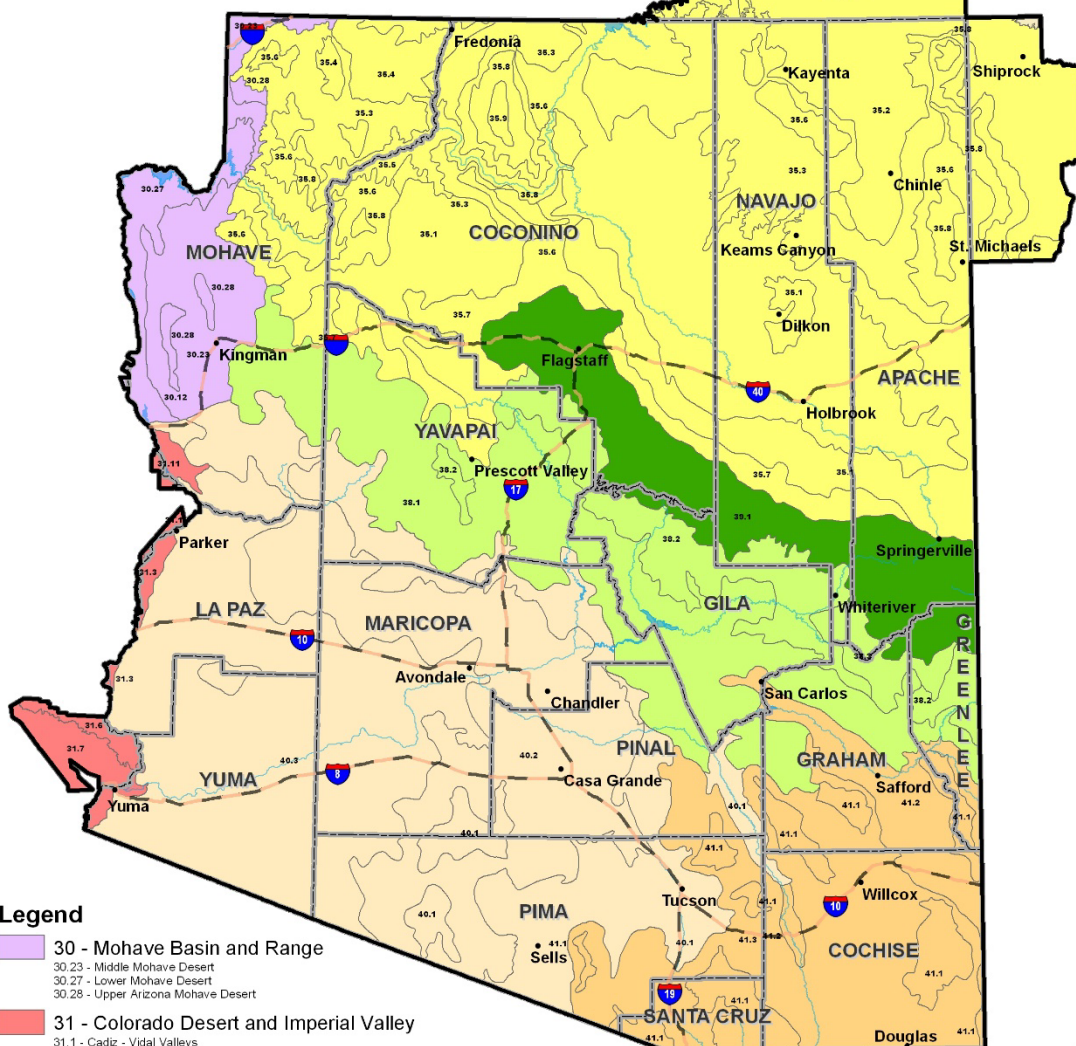
Note: This document is intended to provide a concise description of each Major Land Resource Area that can be used (cut and pasted) in Conservation District Plans, either in Chapter 1 or an Appendix if desired. It is based on information contained in “Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin”, U.S. Dept of Agriculture Handbook 296, published 2006. It can be accessed and downloaded at <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2053624>

(There is a new version of this handbook that will be available soon.)

Descriptions of Common Resource Areas, or environmental zones, within these MLRAs can be found on this website.

The following map shows the Major Land Resource Areas in Arizona and the Common Resource Areas in each. Some of the names on that map are different from the ones used in the ConserveAZ Portal.

# Common Resource Areas



## Legend

- 30 - Mohave Basin and Range**
  - 30.23 - Middle Mohave Desert
  - 30.27 - Lower Mohave Desert
  - 30.28 - Upper Arizona Mohave Desert
- 31 - Colorado Desert and Imperial Valley**
  - 31.1 - Cadiz - Vidal Valleys
  - 31.11 - Piute Valley - Sacramento Mountains
  - 31.6 - Chocolate Mountains and Valleys
  - 31.7 - East Mesa - Sand Hills
- 35 - Colorado Plateau**
  - 35.1 - Mixed Grass Plains
  - 35.2 - Shrub - Grasslands
  - 35.3 - Sagebrush - Grasslands
  - 35.4 - Cold Sagebrush - Grasslands
  - 35.5 - Grand Canyon Corridor
  - 35.6 - Pinon-Juniper Sagebrush
  - 35.7 - Woodland Grassland
  - 35.8 - Ponderosa Pine Forests
  - 35.9 - Coniferous Forests
- 36 - Southwestern Plateaus, Mesas, and Foothills**
  - 36.2 - Warm Semiarid Mesas and Plateaus
- 38 - Mogollon Transition**
  - 38.1 - Lower Interior Chaparral
  - 38.2 - Interior Chaparral - Woodlands
  - 38.3 - Interior Chaparral Forests
- 39 - Arizona and New Mexico Mountains**
  - 39.1 - Mogollon Plateau Coniferous Forests
- 40 - Sonoran Basin and Range**
  - 40.1 - Upper Sonoran Desert
  - 40.2 - Middle Sonoran Desert
  - 40.3 - Colorado Sonoran Desert
- 41 - Southeastern Arizona Basin and Range**
  - 41.1 - Mexican Oak - Pine Forest and Oak Savannah
  - 41.2 - Chihuahuan - Sonoran Desert Shrubs
  - 41.3 - Chihuahuan - Sonoran Semidesert Grasslands

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 Data Sources: NRCS / ALRIS  
 Projection: UTM Zone 12 Datum: NAD83  
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## MLRA 30 Mojave Desert



The Mojave Desert MLRA is located mainly in California and Nevada, but there are portions in Mohave County and in southwestern Utah.

This area is in the Basin and Range Province of the Intermontane Plateaus. Most of the MLRA is in the Sonoran Desert Section of this province. Broad basins, valleys, and old lakebeds make up most of the area, but widely spaced mountains trending north to south occur throughout the area. Isolated, short mountain ranges are separated by an aggraded desert plain. The mountains are fault blocks that have been tilted up. Long alluvial fans coalesce with dry lakebeds between some of the ranges. Elevations range from below sea level to 11,000 feet. Elevation in the Arizona portion ranges from about 400 to 8,000 feet.

Precipitation in the Arizona portion ranges from about 3 inches up to about 12 inches depending on elevation primarily. This is somewhat higher than in most of the MLRA. Precipitation comes mainly in winter as low intensity storm from the Pacific, but high intensity convective storms may occur in summer. The Arizona portion of MLRA 30 tends to have somewhat more summer precipitation than that in Nevada and California as it is grading into the Sonoran Desert pattern of bimodal precipitation. Snow may occur but usually only in significant amounts in the higher mountain areas. Temperatures vary depending on elevation.

Soils are mostly Aridisols and Entisols with hyperthermic or thermic temperature regimes and aridic moisture regimes. Vegetation is mainly desert shrub including creosotebush, white bursage, Joshua tree, juniper, yucca, cactus and Mormon tea, with saltbushes on saline soils. Perennial grass cover is generally scant, increasing as rainfall amounts increase. Typical species are big galleta, Indian ricegrass, alkali sacaton, desert needlegrass, and saltgrass on alkali flats. Vegetation in the Arizona portion is intergrading to Sonoran Desert types, so it may include species more typical of the Semi Desert grassland, and Arizona Upland Sonoran Desert than is found in the California and Nevada portions.

In Arizona, MLRA includes three Common Resource Areas:

CRA 30.1 Lower Mohave Desert 3-6" p.z.

CRA 30.2 Middle Mohave Desert 6-9" p.z.

CAR 30.3 Upper Arizona Mohave Desert 9-12" p.z.

## MLRA 31 – Lower Colorado Desert



MLRA 31 Lower Colorado Desert is shown in the NRCS description of MLRAs and on the map at the front of this fact sheet. The names and numbers of the CRAs in MLRA 31 on that map do not match the ones on the Portal map. The only ecological sites listed for MLRA 31 in EDIT are California site descriptions. The ecological sites mapped in the Portal are all from MLRA 40. According to NRCS, MLRA 31 in Arizona will be joined to MLRA 40 when the new version of Agricultural Handbook 296 is published.

This MLRA is almost all in California with only about 7% of it in Arizona along the Lower Colorado River. It borders MLRA 40 (mostly 40-3) with which it has much in common, i.e., both occur in the Sonoran Desert area.

Landforms consist of mountains, alluvial fans, alluvial fan remnants, and alluvial valleys, including active drainages and fluvial terraces, and internally drained basins, including dry lakes and lake terraces. Elevation ranges from about 90 feet at the Mexican border to about 550 feet on the Colorado River above Lake Havasu. Bajadas and low mountain ranges east of the River may range up to 1200 feet. The Colorado Desert has the lowest annual precipitation and the highest temperature of any MLRA in Arizona. The average annual precipitation is 3 to 7 inches and displays high temporal and spatial variability. Precipitation is bimodal in nature. The winter precipitation is from Pacific storms that are frontal in nature. The summer precipitation is from subtropical convection storms coming from the south. Frost free period may approach 365 days per year.

The public water supply and irrigation water for agriculture are obtained almost entirely from the Colorado River, but wells in river alluvium provide some irrigation water locally.

The dominant soil orders in this MLRA are Entisols and Aridisols. The soils in the area have a hyperthermic soil temperature regime and an extremely aridic soil moisture regime.

The most widespread vegetative type in the area is dominated by creosotebush and white bursage. Other common species include ocotillo, brittlebush, and white ratany. Important perennial grasses include big galleta, California threeawn, and fluffgrass. The most common species along large drainageways are frost-sensitive species, such as smoketree, desert ironwood, desert lavender, blue paloverde, and catclaw acacia. Floodplains occurring along the Colorado and Gila Rivers were formerly occupied by Desert Riparian Forests and woodlands characterized by mesquite or cottonwood depending on the site. Most of that vegetation has been replaced by irrigated crops.

Five Common Resource Areas are identified on the ConserveAZ Portal. They are:

CRA 31.1 Havasu Valley 3-7" p.z.

- CRA 31.2 North Colorado River Corridor 3-7" p.z.
- CRA 31.3 Parker Valley 3-7" p.z.
- CRA 31.6 South Colorado River Corridor 3-7" p.z.
- CRA 31.7 Yuma-Gila Valley 3-7" p.z.

Note: These CRAs all have similar environmental conditions and differ mainly in the proportions of different ecological sites that occur in them.

## MLRA 35 – Colorado Plateau



MLRA 35 – Colorado Plateau occurs on the high plateaus and canyonlands of northern Arizona, southern Utah, southwestern Colorado, and northwestern New Mexico. It is the largest MLRA in Arizona.

This area is an uplifted plateau that has been deeply incised by streams cutting across it, creating spectacular canyons. The surface is composed mainly of sedimentary rock formations including shale, sandstone, limestone, and dolomite, with local areas of volcanic flows and ash. In general, the surface consists of gently sloping to strongly sloping plains. Volcanic plugs that rise abruptly above the plains, steep scarps, or deeply incised canyons interrupt the surface of the plains. In most areas elevation is 4,250 to 4,950 feet. Mt. Trumbull, on the north rim of the Grand Canyon, however, reaches a height of 8,028 feet, and Navajo Mountain, on the Utah-Arizona State line, reaches a height of 10,388 feet.

Average precipitation ranges from 6- 18 inches with about half coming in July- September. April, May, and June are the driest months. Some areas at higher elevation get up to 30 inches of precipitation. Light snow may fall in winter, but does not remain on the ground long. Freeze free period ranges from 105 days to 320 days depending on elevation.

The Little Colorado River drains the largest part of this area, but the San Juan River has the most reliable streamflow. Soils are mainly Alfisols, Andisols, Entisols, and Mollisols. Most have a mesic soil temperature regime and aridic to aridic-ustic soil moisture regime.

This area supports desert shrub and woodland vegetation. At high elevations, pinyon-juniper woodland and sagebrush have an understory of galleta, blue grama, black grama, and western wheatgrass. Galleta grass, alkali sacaton, Indian ricegrass, bottlebrush squirreltail, and needlegrasses intermixed with

fourwing saltbush and winterfat are at the lower elevations. Greasewood and shadscale are part of the plant community on salty soils. Blackbrush may be dominant at the lower elevations

Common Resource Areas that occur in MLRA 35 in Arizona are:

- CRA 35.1 – Colorado Plateau Mixed Grass Plains – 10-14” p.z.
- CRA 35.2 – Colorado Plateau Shrub-Grassland - 6-10” p.z.
- CRA 35.3 – Colorado Plateau Sagebrush – Grasslands – 10-14” p.z.
- CRA 35.4 – Colorado Plateau Cold Sagebrush -Grassland -7-11” p.z.
- CRA 35.5 - Grand Canyon Corridor – 6-10” p.z.
- CRA 35.6 – Colorado Plateau Pinyon-Juniper – Sagebrush 13-17” p.z.
- CRA 35.7 - Colorado Plateau Woodland- Grassland 14-18” p.z.
- CRA 35.8 – Colorado Plateau Ponderosa Pine Forests 17-25” p.z.
- CRA 35.9- Colorado Plateau Coniferous Forests 25-33” p.z.

## MLRA 38 – Mogollon Transition



MLRA 38 occurs in the transition zone between the Colorado Plateau to the north and the basin and range areas to the south, below the Mogollon Rim. It extends into New Mexico.

This area is in the Mexican Highland Section of the Basin and Range Province of the Intermontane Plateaus. The area consists of canyons and structural troughs and valleys. Examples of the many mountain ranges in the area are the Pinal, Sierra Ancha, and Mazatzal Mountains. Elevation ranges from 3,000 to 5,500 feet in most areas and from 5,100 to 7,500 feet in the mountains. The Verde, Black, and Salt Rivers are tributaries to the Gila River in this MLRA. Most of this area is covered by deep alluvium washed in from the adjacent mountains. This MLRA is an area of intensive volcanism. The average annual precipitation is 10 to 37 inches in most of this area. More than half of the precipitation occurs as high-intensity, convective thunderstorms during July, August, and September. Because of Pacific frontal storms, a second rainy season occurs from December to March. Snow falls occasionally in winter. Several of the larger streams and a few of their larger tributaries are perennial streams. Much of the water is stored in reservoirs near or below the southern edge of the area and is used for irrigation and for municipal water supplies in the Sonoran Basin and Range MLRA to the south. A high load of suspended sediment is one of the primary water quality issues in this MLRA. Ground water is limited and generally occurs at great depth in alluvial deposits along some of the larger streams in this area. The

dominant soil orders in this MLRA are Aridisols, Alfisols, and Mollisols. The soils dominantly have a thermic or mesic soil temperature regime and an aridic or ustic soil moisture regime.

This area supports forest, savanna, desert shrub, and grassland vegetation. Pine-oak woodlands are at the higher elevations, where ponderosa pine, Douglas-fir, live oak, New Mexico locust, Mexican pinyon, buckbrush, and manzanita grow with an understory of muhlys, bluegrasses, sedges, pine dropseed, and squirreltail. Evergreen woodland savannas are at intermediate elevations, where Mexican blue oak, Emory and Arizona white oaks, alligator and one-seed junipers, jojoba, and turbinella oak are the dominant species and cone beardgrass, sideoats grama, blue grama, Texas bluestem, plains lovegrass, sprucetop grama, threeawns, and needlegrass characterize the understory. Whitethorn, soaptree yucca, fourwing saltbush, mesquite, and ocotillo grow on the drier soils at the lower elevations. The understory at these elevations consists of Rothrock grama, blue grama, black grama, alkali sacaton, curly mesquite, plains bristlegrass, bush muhly, and lemongrass.

There are 3 Common Resource Areas (Environmental Zones) in this MLRA:

- 38-1 Lower Mogollon Transition 12-16" p.z.
- 38-2 Middle Mogollon Transition 16-20" p.z.
- 38-3 Upper Mogollon Transition 20-27" p.z.

## MLRA 39 – Arizona and New Mexico Mountains



MLRA 39 includes the mountains that rise above the Colorado Plateau (MLRA 35) running from near Flagstaff through the White Mountains into New Mexico. It lies mostly above the Mogollon Transition (MLRA 38).

This MLRA is characterized by volcanic fields and gently dipping sedimentary rocks eroded into plateaus, valleys, and deep canyons. Elevation ranges from 4,000 to 7,000 feet in the southern half of the area. North of the Mogollon Rim, it rises to more than 7,500 feet and drops northward to 5,000 or 6,000 feet. Included in this area are the two highest points in Arizona, Baldy Peak at 11,403 feet and Humphreys Peak at 12,670 feet. The Black, Blue, and Little Colorado Rivers are the major rivers in this MLRA. Volcanic rocks are common in this area including both basalt flows and volcanic ash. Sedimentary rocks are also present. Relief is caused more by the cutting of deep canyons into moderately flat terrain than by the deformation of mountains and valleys. The average annual precipitation is 15 to 30 inches in most of this area. Although it can be as low as 9 inches and as high as



40 inches in some locations. Precipitation comes as monsoon convectional storms in summer and frontal storms in winter.

This area has important watersheds that provide water to the central part of Arizona. Several of the larger streams, such as the Black, White, Verde, and Salt Rivers, and a few of their larger tributaries maintain perennial flow. Much of the water is stored in reservoirs near or below the southern edge of the area and is used for irrigation or municipal water supply in the MLRAs to the south. Limited amounts of ground water for livestock and domestic use generally are only in faulted and fractured bedrock in areas of this MLRA. The dominant soil orders in this MLRA are Inceptisols, Mollisols, Alfisols, and Entisols. Most of the soils in the area have a frigid or mesic soil temperature regime, depending mainly on elevation, but the soils at the highest elevations have a cryic temperature regime. This area includes grasslands on the deeper soils; mixed shrub-grasslands on shallow, rocky soils; and timber on soils that are shallow to bedrock. Ponderosa pine occurs in the largest portion of the intermediate elevations in the area. At the higher elevations, spruce and fir dominate. Areas at the highest elevations, above 11,000 feet (3,350 meters), support alpine vegetation. At the lower elevations, ponderosa pine grades into stands of pinyon-juniper on north-facing slopes and woodland of mixed oak, pine, and juniper on south-facing slopes. The principal grasses are fescues, bluegrasses, brome grass, and muhly at the higher elevations; needlegrass, western wheatgrass, bottlebrush squirreltail, and muttongrass at intermediate elevations; and grama grasses, spike muhly, junegrass, cane bluestem, and needlegrass at the lower elevations.

This MLRA has only one Common Resource Area (Environmental Zone):

39-1 Mogollon Coniferous Forests 20-35" p.z.

## MLRA 40 – Sonoran Basin and Range



MLRA 40 is almost entirely within Arizona. It occupies the low elevation basin and range deserts of southwest Arizona. It lies below the Mogollon Transition (MLRA 38) and west of the Southeastern Arizona Basin and Range (MLRA 41).

This area is in the Sonoran Desert Section of the Basin and Range Province of the Intermontane Plateaus. Many short, fault-block mountain ranges trending southeast to northwest rise abruptly from the smooth or gently sloping desert valley floors. Elevation ranges from 980 to 3,600 feet in most of this area, but it is as high as 4,590 feet in the mountains. The Salt River intersects the Gila River south of Phoenix. The Gila River then flows west across the southern part of the MLRA to the Colorado River. Most of this area is covered by deep alluvium washed in from the adjacent mountains. This MLRA is an area of intensive volcanism with outcrops of sedimentary formations and granite. The average annual precipitation is 3 to 10 inches in most of this area. Rainfall can average 22 inches per year in the

mountain ranges. Most of the rainfall occurs as high-intensity, convective thunderstorms, mainly from July to September, and as Pacific frontal storms from December to March. Snowfall is rare. Most of the population in Arizona lives in this MLRA, and a little over 90 percent of all the water used in the State is used in this area. Water for irrigation and other uses is stored in a reservoir system on the Salt River. No perennial streams originate or run through the area because the water of the larger drainages is impounded by reservoirs upstream from the cultivated lands. The alluvial aquifers in this area are the most productive in Arizona. Water for irrigation is pumped from deep wells in the alluvial aquifers, and the ground water table continually drops. The quality of the ground water varies considerably, depending on the composition, location, and depth of the alluvium. The dominant soil orders in the MLRA are Aridisols and Entisols. The soils in the area dominantly have a thermic or hyperthermic soil temperature regime and an aridic soil moisture regime. This area supports desert shrub vegetation. The giant saguaro cactus is a major species. Bursage, desert wolfberry, ocotillo, cholla, desert saltbush, mesquite, brittlebush, burroweed, pricklypear, desert broom, and creosotebush are the dominant desert shrubs. Bush muhly, Arizona cottontop, threeawns, and fluffgrass are the main understory plants. Winter annuals can grow in some areas, depending on the amount of winter precipitation. Joshua-tree and littleleaf paloverde mixed with some honey mesquite are on stony or rocky sites. These sites have an understory of Mormon tea, pricklypear, cholla, ocotillo, desert saltbush, and grasses, such as tridens, bush muhly, tobosa, Arizona cottontop, and desert needlegrass. At the lower elevations, creosotebush, ironwood, mesquite, burroweed, and catclaw are associated with an understory of threeawns and annuals, such as red fescue, bluegrasses, fiddleneck, indianwheat, globemallow, and filaree. This area contains most of the irrigated farmland in the state.

There are 3 Common Resource Areas (Environmental Zones):

- 40-1 Upper Sonoran Desert 10-13" p.z.
- 40-2 Middle Sonoran Desert 7-10" p.z.
- 40-3 Lower Sonoran Desert 3-7" p.z.

## MLRA 41 – Southeastern Arizona Basin and Range



MLRA 41 occurs in the southeastern corner of Arizona and extends partly into New Mexico. It is east of the Sonoran Basin and Range (MLRA40) and south of the Mogollon Transition (MLRA 38). It differs from MLRA 40 by having somewhat higher percentage of summer rainfall typical of the Chihuahuan Desert. It is also known as Madrean Basin and Range.

Most of this area is in the Mexican Highland Section of the Basin and Range Province of the Intermontane Plateaus. This MLRA has mountain ranges that trend southeast to northwest and has

relatively smooth valleys between the mountains. Examples of the many mountain ranges are the Chiricahua, Dragoon, Swisshelm, and Pedregosa Mountains. In the vicinity of Willcox, there is a distinct closed basin called the Willcox Playa. Elevation ranges from 2,620 to 4,590 feet in most areas. It generally ranges from 4,920 to 5,900 feet in the mountains. On some peaks, however, it can reach almost 8,900 feet. On Mt. Graham, in Arizona, it reaches 10,717 feet. The Gila River runs through the northern end of this area. The San Francisco, San Simon, and San Pedro Rivers are tributaries to the Gila River in this MLRA. Most of this area is covered by deep alluvium washed in from the adjacent mountains. This MLRA is an area of intensive volcanism, with outcrops of granite, sedimentary and metamorphic rocks. The average annual precipitation is 9 to 20 inches in most of this area, but it is as much as 45 inches at the higher elevations. More than half of the precipitation occurs as high-intensity, convective thunderstorms during July, August, and September. Because of Pacific frontal storms, a second rainy season occurs from December to March. There are no lakes or reservoirs of consequence in this area. Small artesian flows occur along parts of the San Pedro River. Water for irrigation generally is obtained by pumping ground water from deep wells in the alluvial aquifers. There has been a noticeable decline in the level of the ground water in all of these aquifers. The quality of the ground water varies considerably, depending on the composition, location, and depth of the alluvium. The dominant soil orders in this MLRA are Aridisols, Entisols, Alfisols, and Mollisols. The soils in the area dominantly have a thermic soil temperature regime and an aridic or ustic soil moisture regime. This area supports forest, savanna, and desert shrub vegetation. Pine-oak woodlands are at the higher elevations, where ponderosa pine, Douglas-fir, live oak, New Mexico locust, Mexican pinyon, buckbrush, and manzanita grow along with an understory of muhlys, bluegrasses, sedges, pine dropseed, and squirreltail. Evergreen woodland savannas are at intermediate elevations, where Mexican blue oak, Emory oak, and turbinella oak are the dominant species and cane beardgrass, sideoats grama, blue grama, Texas bluestem, plains lovegrass, sprucetop grama, threeawns, and needlegrass characterize the understory. Whitethorn, soaptree yucca, fourwing saltbush, mesquite, and ocotillo grow on the drier soils at the lower elevations. The understory on these sites consists of Rothrock grama, black grama, alkali sacaton, curly mesquite, plains bristlegrass, bush muhly, and lemongrass.

There are 3 Common Resource Areas (Environmental Zones) in this area:

- 41-1 Mexican Oak-Pine Forest and Oak Savannah 16-30" p.z.
- 41-2 Chihuahuan-Sonoran Desert Shrubs 8-12" p.z.
- 41-3 Chihuahua-Sonoran Semidesert Grasslands 12-16" p.z.