

**11040**

## **Mogollon Chaparral**

BpS Model/Description Version: Aug. 2020

| <b>Modelers</b> |                      | <b>Reviewers</b> |      |
|-----------------|----------------------|------------------|------|
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| None            | None                 | None             | None |
| None            | None                 | None             | None |

### **Vegetation Type**

Shrubland

### **Map Zones**

13, 14, 25

### **Geographic Range**

This ecological system occurs across central Arizona (Mogollon Rim), central to south-central and western New Mexico, southern Utah, and eastern and southeastern Nevada (map zones [MZs] 17, 13, and 14). It often dominates along the mid-elevation transition from the Mojave, Sonoran, and northern Chihuahuan deserts.

### **Biophysical Site Description**

Found in mountains at 1,000-2,200m. It occurs on foothills, mountain slopes, and canyons in drier habitats below the encinal (southwestern oak woodlands) and *Pinus ponderosa* woodlands, and above desert grasslands. Stands are often associated with more xeric and coarse-texture substrates such as limestone, basalt, or alluvium, especially in transition areas with more mesic woodlands. Typical of xeric montane moderate to steep slopes. The soils are generally shallow and derived from granite, basalt, or other igneous rock. These soils occur in mesic (moderately warm) temperature regimes and ustic (moderately moist) moisture regimes with thin, organic surface horizons.

### **Vegetation Description**

The species composition and dominants vary across the range of this biophysical setting (BpS). The moderate to dense shrub canopy includes species such as *Quercus turbinella*, *Quercus toumeyii*, *Quercus undulata*, *Cercocarpus montanus*, *Canotia holacantha*, *Ceanothus greggii*, *Forestiera pubescens* (= *Forestiera neomexicana*), *Garrya wrightii*, *Juniperus deppeana*, *Purshia stansburiana*, *Rhus ovata*, *Rhus trilobata*, and *Arctostaphylos pungens*, with *Arctostaphylos pringlei* at higher elevations. Shrubs resprout rapidly after fire, often making the vegetation impenetrable. Most chaparral species are fire adapted, resprouting vigorously after burning or producing fire-resistant seeds. Stands occurring within montane woodlands are seral and a result of recent fires. Forty percent cover at dry sites to 80% cover at wetter sites comprised of moderately tall (1-2.5m) evergreen woody shrubs with dense crowns.

### **BpS Dominant and Indicator Species**

| <b>Symbol</b> | <b>Scientific Name</b>        | <b>Common Name</b>  |
|---------------|-------------------------------|---------------------|
| CAHO3         | <i>Canotia holacantha</i>     | Crucifixion thorn   |
| ARPU5         | <i>Arctostaphylos pungens</i> | Pointleaf manzanita |

|       |                             |                             |
|-------|-----------------------------|-----------------------------|
| CEGR  | <i>Ceanothus greggii</i>    | Desert ceanothus            |
| CEMO2 | <i>Cercocarpus montanus</i> | Alderleaf mountain mahogany |
| QUTU2 | <i>Quercus turbinella</i>   | Sonoran scrub oak           |
| PUST  | <i>Purshia stansburiana</i> | Stansbury cliffrose         |
| QUPA4 | <i>Quercus pauciloba</i>    | Quercus pauciloba           |

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

### Disturbance Description

Typical fire regime in these systems varies with the amount of canopy closure, organic accumulation, and the fire regimes of adjacent vegetation. The only significant disturbance to the system is stand-replacing fire occurring every 50-100yrs on average.

Fire frequency is highly variable across this BpS. Fire regimes may have greater variability and be less frequent outside the central Mogollon range (e.g., in isolated mountain ranges in south-central New Mexico).

The interior chaparral species recover well following fire, and there is not too much fire range-wide for this vegetation type (although in some places near urban areas it may be, such as above Phoenix and Tucson).

### Fire Frequency

| Severity         | Avg FI | Percent of All Fires | Min FI | Max FI |
|------------------|--------|----------------------|--------|--------|
| Replacement      | 79     | 100                  | 50     | 100    |
| Moderate (Mixed) |        |                      |        |        |
| Low (Surface)    |        |                      |        |        |
| All Fires        | 79     | 100                  |        |        |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

### Scale Description

Vegetation found in small patches of 10ac to whole mountain slopes of 10,000ac.

### Adjacency or Identification Concerns

This BpS is hard to distinguish from BpS 1103 (Great Basin Semi-Desert Chaparral) or 1108 (Sonora-Mojave Semi-Desert Chaparral). In the northern range of MZ25, it may be confused with Southern Rocky Mountain Lower Montane-Foothill Shrubland (BpS 1086).

At higher elevations, chaparral vegetation may blend into pinyon-juniper woodlands, ponderosa pine woodlands, or oak woodlands (encinal). At lower elevations, desert grasslands can be encroached by chaparral, where fire suppression and livestock grazing have increased fire return intervals. Stand-replacement fire periodically removes these trees.

There is some evidence dating back to Aldo Leopold's observations that interior chaparral has moved downslope into historical grasslands, and some evidence that coniferous forests have moved downslope into interior chaparral stands, both potentially due to there being too little fire on the landscape. How much departure this represents is hard to tell. In areas in the upper and lower ecotones, it may be assumed there is a lot of departure (i.e., Fire Regime Condition Class

[FRCC] 3), but in the heart of its range, away from ecotones with grasslands and forest, it is probably more along the lines of FRCC 1.

### Issues or Problems

There is very little research or evidence to support the estimated historical fire regimes in this BpS.

### Native Uncharacteristic Conditions

In the upper and lower elevational gradient, this BpS may have expanded into the ponderosa pine forest and lower grasslands due to the influence of fire suppression.

### Comments

## Succession Classes

### Mapping Rules

| Upper Layer Lifeform | Height (m) | Canopy Cover (%) |       |       |       |       |       |       |       |       |        |
|----------------------|------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
|                      |            | 0-10             | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |
| Herb                 | 0-0.5      | A                | A     | A     | A     | A     | A     | A     | A     | A     | A      |
| Herb                 | 0.5-1.0    | A                | A     | A     | A     | A     | A     | A     | A     | A     | A      |
| Herb                 | >1.0       | A                | A     | A     | A     | A     | A     | A     | A     | A     | A      |
| Shrub                | 0-0.5      | A                | A     | A     | A     | A     | A     | A     | A     | A     | A      |
| Shrub                | 0.5-1.0    | A                | A     | A     | A     | A     | A     | A     | A     | A     | A      |
| Shrub                | 1.0-3.0    | B                | B     | B     | B     | B     | B     | B     | B     | B     | B      |
| Shrub                | >3.0       | B                | B     | B     | B     | B     | B     | B     | B     | B     | B      |
| Tree                 | 0-5        | B                | B     | B     | B     | B     | B     | B     | B     | B     | B      |
| Tree                 | 5-10       | B                | B     | B     | B     | B     | UN    | UN    | UN    | UN    | UN     |
| Tree                 | 10-25      | B                | B     | B     | B     | B     | UN    | UN    | UN    | UN    | UN     |
| Tree                 | 25-50      | B                | B     | B     | B     | B     | UN    | UN    | UN    | UN    | UN     |
| Tree                 | >50        | B                | B     | B     | B     | B     | UN    | UN    | UN    | UN    | UN     |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

### Description

**Class A      11      Early Development 1 - All Structures**

### Indicator Species

| Symbol | Scientific Name        | Common Name                 | Canopy Position |
|--------|------------------------|-----------------------------|-----------------|
| QUTU2  | Quercus turbinella     | Sonoran scrub oak           | Upper           |
| ARPU5  | Arctostaphylos pungens | Pointleaf manzanita         | Upper           |
| CEGR   | Ceanothus greggii      | Desert ceanothus            | Upper           |
| CEMO2  | Cercocarpus montanus   | Alderleaf mountain mahogany | Upper           |

### Description

After fire, some shrubs resprout strongly from roots or from the base of plants. Shrubs can cause stands to become impenetrable.

### Maximum Tree Size Class

None

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|                |           |                                   |
|----------------|-----------|-----------------------------------|
| <b>Class B</b> | <b>89</b> | <b>Mid Development 1 - Closed</b> |
|----------------|-----------|-----------------------------------|

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### Description

Dense shrubs with grasses present in the few openings. Shrub composition same as in Class A.

### Maximum Tree Size Class

None

## **Model Parameters**

### **Deterministic Transitions**

| From Class | Begins at (yr) | Succeeds to | After (years) |
|------------|----------------|-------------|---------------|
| Early1:ALL | 0              | Mid1:CLS    | 9             |
| Mid1:CLS   | 10             | Mid1:CLS    | 999           |

### **Probabilistic Transitions**

| Disturbance Type | Disturbance occurs In | Moves vegetation to | Disturbance Probability | Return Interval (yrs) | Reset Age to New Class Start Age After Disturbance? | Years Since Last Disturbance |
|------------------|-----------------------|---------------------|-------------------------|-----------------------|-----------------------------------------------------|------------------------------|
| Replacement Fire | Early1:ALL            | Early1:ALL          | 0.013                   | 77                    | Yes                                                 | 0                            |
| Replacement Fire | Mid1:CLS              | Early1:ALL          | 0.013                   | 77                    | Yes                                                 | 0                            |

## **References**

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