10910

Sonoran Mid-Elevation Desert Scrub

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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Vegetation Type

Shrubland

Map Zones

13, 14

Geographic Range

This transitional desert scrub system occurs along the northern edge of the Sonoran Desert in an elevational band along the lower slopes of the Mogollon Rim/Central Highlands region. Stands occur in the Bradshaw, Hualapai, and Superstition mountains among other desert ranges in Arizona. It is infrequent in map zone (MZ) 13.

Biophysical Site Description

Found at elevations between 750-1,300m. Sites range from a narrow strip on steep slopes to very broad areas such as the Verde Valley. Climate is too dry for chaparral species to be abundant, and freezing temperatures during winter are too frequent or prolonged for many of the frost-sensitive species that are characteristic of the Paloverde Mixed-Cacti Desert Scrub, such as *Carnegia gigantea*, *Parkinsonia microphylla*, *Prosopis* spp., *Olneya tesota*, and *Opuntia bigelovii*. Substrates are generally rocky soils derived from parent materials such as limestone, granitic rocks, or rhyolite.

Vegetation Description

The vegetation is typically composed of an open shrub layer of *Eriogonum fasciculatum* and *Opuntia* spp. or less commonly *Ericameria linearifolia* or with taller shrub such as *Fouquieria splendens* (Ocotillo), *Acacia* spp., *Ferocactus*, *Canotia holacantha* (limestone or granite), or *Simmondsia chinensis* (rhyolite). *Larrea tridentata* may be locally abundant at lower elevations. *Parkinsonia florida* is known to dominate some stands in this system. The herbaceous layer is generally sparse.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SICH | *Simmondsia chinensis* | Jojoba |
| ERFAP | *Eriogonum fasciculatum var. polifolium* | Eastern mojave buckwheat |
| FEROC | *Ferocactus* | Barrel cactus |
| FOSP2 | *Fouquieria splendens* | Ocotillo |
| ACACI | *Acacia* | Acacia |
| LORI3 | *Lotus rigidus* | Shrubby deervetch |

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

Disturbance Description

This system is not thought to have supported fuel loads to sustain large fires prior to European habitation of the region. Fires would have been associated with dry lightning coincident with monsoonal storms during years when previous winter precipitation was sufficient to create a thick fine-fuel bed of annual plants. Fires probably were associated with dry lightning and very patchy due to heavier fuel in patchy microsites or linear when high winds were associated with convection storms. Although fuel loads were low and fire was infrequent in this Biophysical Setting (BpS), the importance of resprouting species suggests a fire regime similar to that of Mogollon Chaparral (BpS 1104).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 104 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 104 | 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

Patch size from 100-5,000 acres. The BpS can extend for long distances on mountain slopes, and patch size will vary with aspect and elevation. Burn size is small, much smaller than observed in Mogollon Chaparral. Depending on weather factors, fire size can be 10-1,000ac.

Adjacency or Identification Concerns

Found above Sonoran Paloverde-Mixed Cacti Desert Scrub (CES302.761) and below Mogollon Chaparral (CES302.741).

Exotic species have changed the species composition fire regime. *Bromus rubens* is the main exotic species responsible for these changes.

This system transitions to/integrates with others fairly rapidly.

Issues or Problems

There is not a lot of data on this BpS.

Native Uncharacteristic Conditions

Shrub cover >60% is uncharacteristic.

Comments

MZ13 and MZ14 were combined during 2015 BpS Review.

Sensitivity analysis was done on fire by trying 75yr and 100yr fire return interval (FRI). Results did not change more than 2%. Therefore, 100yr FRI was chosen as it was longer than for Mogollon Chaparral.

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 | UN | UN | UN | UN | UN | UN | UN |
| Herb | 0.5-1.0 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Herb | >1.0 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0-0.5 | B | B | B | B | B | B | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | B | B | B | B | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | C | C | C | C | C | C | UN | UN | UN | UN |
| Shrub | >3.0 | C | C | C | C | C | C | UN | UN | UN | UN |
| Tree | 0-5 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | C | C | UN | UN | UN | 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 4 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| LORI3 | Lotus rigidus | Shrubby deervetch | Upper |
| CAER | Calliandra eriophylla | Fairyduster | Upper |
| ARPU9 | Aristida purpurea | Purple threeawn | Upper |
| SPAM2 | Sphaeralcea ambigua | Desert globemallow | Upper |

Description

Dominant plants are half-shrubs: *Calliandra eriophylla*, *Ericameria linearifolia*, and *Lotus rigidus*; grasses: *Aristida purpurea*; and forbs: *Sphaeralcea ambigua* and *Eriogonum fasciculatum*. Cover does not exceed 30%.

*Maximum Tree Size Class*  
None

Class B 13 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SICH | Simmondsia chinensis | Jojoba | Upper |
| ACACI | Acacia | Acacia | Upper |
| OPUNT | Opuntia | Pricklypear | Low-Mid |
| LORI3 | Lotus rigidus | Shrubby deervetch | Low-Mid |

Description

Shrubs are co-dominant with half-shrubs. Species of shrubs include *Acacia* spp., *Opuntia* spp., *Simmondsia chinensis*, and *Canotia holacantha*. Half-shrubs are *Calliandra eriophylla*, *Ericameria linearifolia*, and *Lotus rigidus*. Ocotillo seedlings start to appear if climatic conditions are favorable.

*Maximum Tree Size Class*  
None

Class C 83 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| FOSP2 | Fouquieria splendens | Ocotillo | Upper |
| ACACI | Acacia | Acacia | Mid-Upper |
| SICH | Simmondsia chinensis | Jojoba | Mid-Upper |
| FEROC | Ferocactus | Barrel cactus | Lower |

Description

Dominant species are *Acacia*, *Ocotillo,* and *Simmondsia chinensis*. *Ferocactus* will establish more slowly.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 4 |
| Mid1:OPN | 5 | Late1:OPN | 19 |
| Late1:OPN | 20 | Late1:OPN | 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 | Mid1:OPN | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.01 | 100 | Yes | 0 |

References

Alford, E. 2001. Effects of fire on Sonoran desert plant communities. Dissertation of Arizona State University, Tempe, AZ. 111 pp.

Cave, G G. and D.T. Patten. 1984. Short-term vegetation responses to fire in the Upper Sonoran desert. Journal of Range Management 37: 491-496.

DeBano, L.F., D.G. Neary and P.F. Ffolliot. 1998. Fire's effects on ecosystems. John Wiley & Sons. New York, NY.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.