10780

Colorado Plateau Blackbrush-Mormon-tea Shrubland

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Mike Behrens | Mike\_Behrens@blm.gov | None | None |
| Kara Paintner | Kara\_Paintner@nps.gov | None | None |
| None | None | None | None |

Vegetation Type

Shrubland

Map Zones

16, 23, 24, 25

Geographic Range

Occurs in the Southwest, southern Great Plains, Great Basin, Colorado Plateau, and California geographic areas.

Biophysical Site Description

This ecological system occurs in the Colorado Plateau on benchlands, colluvial slopes, pediments, or bajadas. Elevation ranges from 560-1,600m. Precipitation is generally <12in. Substrates are shallow, typically calcareous, non-saline, and gravelly or sandy soils over sandstone or limestone bedrock, caliche, or limestone alluvium.

Vegetation Description

The vegetation is characterized by an extensive open shrublands dominated by *Coleogyne ramosissima* often with *Ephedra viridis*, *Ephedra torreyana*, or *Grayia spinosa*. Sandy portions may include *Artemisia filifolia* as co-dominant. The herbaceous layer is sparse (usually <10% but may reach 15% in wet years) and composed of graminoids such as *Achnatherum hymenoides*, *Pleuraphis jamesii*, or *Sporobolus cryptandrus*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CORA | *Coleogyne ramosissima* | Blackbrush |
| EPVI | *Ephedra viridis* | Mormon tea |
| EPTO | *Ephedra torreyana* | Torrey's jointfir |
| GRSP | *Grayia spinosa* | Spiny hopsage |

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

Disturbance Description

Fire Regime Group III. The mean fire interval is generally ~75yrs with high variability due to annual variation in drying of shrub foliage, shrub mortality, and grass and forb production related to drought and moisture cycles. There is also high variation in ignitions and associated fire weather. Fire years are typically correlated with high spring moisture years in geographic areas dominated by cool season moisture and high summer moisture in areas dominated by monsoon season rains. Fire intervals would have been much longer in the drier geographic areas, with return intervals on the order of 200yrs+. Fire size would have been small because of the discontinuous fuel. Topographic breaks dissect the landscape, and isolated pockets of vegetation are separated by rock walls or steep canyons.

Blackbrush is fire-intolerant and does not resprout following fire. Blackbrush may be slow to reestablish following fire, and grasses may dominate immediately following fire. Invasion of non-native grasses following fire is likely under current conditions (see also Adjacency/ Identification Concerns).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 146 | 53 |  |  |
| Moderate (Mixed) | 162 | 47 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 77 | 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

Large areas of this Biophysical Setting (BpS) are represented by the driest portions of the Mohave, Sonoran, and Chihuahuan deserts. Smaller areas of cold desert would be located on the Colorado Plateau. The patch sizes created by fire would be small (10s to 100s of acres) because of the discontinuous fuels. Drought stress, however, would create large patches (100,000+ac).

Adjacency or Identification Concerns

Following fires, the invasion of non-native annual grasses is likely. Invasion of exotic annual grasses has drastically altered the fire regime in these areas. Where non-native annual grasses have invaded, fire may be much more frequent than the reference condition and can cause a rapid decline in ecological function (and a higher Fire Regime Condition Class).

This model may be similar to the following Ecological Systems: 1074 -- Chihuahuan Creosotebush Xeric Basin Desert Scrub; 1076 -- Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub; 1077 -- Chihuahuan Succulent Desert Scrub; 1087 -- Sonora-Mojave Creosotebush-White Bursage Desert Scrub; 1090 -- Sonoran Granite Outcrop Desert Scrub; 1091 -- Sonoran Mid-Elevation Desert Scrub; and 1109 -- Sonoran Paloverde-Mixed Cacti Desert Scrub.

Issues or Problems

Native Uncharacteristic Conditions

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 | C | B | B | B | B | B | B | B | B |
| Shrub | 0.5-1.0 | A | C | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | A | C | B | B | B | B | B | B | B | B |
| Shrub | >3.0 | A | C | B | B | B | B | B | B | B | B |
| Tree | 0-5 | B | B | B | B | B | UN | UN | UN | UN | UN |
| 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 6 Early Development 1 - All Structures

Upper-layer lifeform is not the dominant lifeform. Grasses may dominate immediately following fire but will generally have <15% cover.

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CORA | Coleogyne ramosissima | Blackbrush | Upper |
| EPVI | Ephedra viridis | Mormon tea | None |
| EPTO | Ephedra torreyana | Torrey's jointfir | None |
| GRSP | Grayia spinosa | Spiny hopsage | None |

Description

Dominated by grasses, shrub seedlings, and post-fire-associated forbs. This type typically occurs where fires burn relatively hot. Shrubs will generally be reestablished after 20-30yrs.

*Maximum Tree Size Class*  
None

Class B 27 Late Development 2 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CORA | Coleogyne ramosissima | Blackbrush | Upper |
| EPVI | Ephedra viridis | Mormon tea | Upper |
| EPTO | Ephedra torreyana | Torrey's jointfir | Upper |
| GRSP | Grayia spinosa | Spiny hopsage | Upper |

Description

Greater than 15% shrub cover and 10-20% herb cover; generally associated with more productive soils. Effects of cumulative drought can cause a shift.

*Maximum Tree Size Class*  
None

Class C 67 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CORA | Coleogyne ramosissima | Blackbrush | None |
| EPVI | Ephedra viridis | Mormon tea | None |
| EPTO | Ephedra torreyana | Torrey's jointfir | None |
| GRSP | Grayia spinosa | Spiny hopsage | None |

Description

Less than 15% shrub cover and <10% herb cover generally associated with less productive cobbly and gravelly soils. Effects of cumulative drought can cause a shift to this class.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Late1:OPN | 29 |
| Late2:CLS | 25 | Late2:CLS | 999 |
| Late1:OPN | 30 | 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 | Early1:ALL | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.005 | 200 | No | 0 |
| Alternative Succession | Early1:ALL | Late2:CLS | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Replacement Fire | Late1:OPN | Late1:OPN | 0.005 | 200 | No | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.006 | 167 | No | 0 |
| Alternative Succession | Late1:OPN | Late2:CLS | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Late2:CLS | Late2:CLS | 0.003 | 333 | No | 0 |
| Replacement Fire | Late2:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Late2:CLS | Late2:CLS | 0.007 | 143 | No | 0 |
| Wind or Weather or Stress | Late2:CLS | Late1:OPN | 0.05 | 20 | Yes | 0 |

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