10820

Mojave Mid-Elevation Mixed Desert Scrub

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zones

4, 13

Geographic Range

Mojave Mid-Elevation Desert Scrub (blackbrush is dominant) occurs in the southern Great Basin region, in the Mojave Desert from California through Nevada to Utah and Arizona. Within the Mojave-Colorado plateau ecotone, blackbrush is found on dry slopes and benches above the river canyons of southern Utah and northern Arizona. It is also found midslope on mountain ranges throughout this area.

Biophysical Site Description

This Biophysical Setting (BpS) represents the extensive desert scrub in the transition zone above *Larrea tridentata*-*Ambrosia dumosa* desert scrub and below the lower montane woodlands (700-1,800m elevations) that occurs in the eastern and central Mojave Desert. It is also common on lower piedmont slopes in the transition zone into the southern Great Basin. Blackbrush occurs, therefore, on mesic and thermic soils that are predominantly shallow to a root restrictive layer, on low hills and mountains and broad alluvial fans. Elevation ranges from 2,200-6,500ft. Precipitation ranges from 5-12in, with most occurring from November through April. Summers are hot and dry with many days reaching above 100°.

Vegetation Description

The vegetation in this ecological system is quite variable. Co-dominants and diagnostic shrub species include *Ambrosia dumosa*, *Coleogyne ramosissima* (blackbrush), *Eriogonum fasciculatum*, *Ephedra nevadensis*, *Grayia spinosa*, *Menodora spinescens*, *Opuntia acanthocarpa*, *Salazaria mexicana*, *Viguiera parishii*, *Yucca brevifolia*, or *Yucca schidigera*. The dominant shrub of the Mojave Mid-Elevation Desert Scrub is blackbrush (*Coleogyne ramosissima*). Blackbrush is considered to be one of the most flammable native plant assemblages in the Mojave Desert, although this desert does not have a history of fire. There are many ecological site descriptions for blackbrush in the Mojave Desert and the bioregional transition between the Mojave Desert and Great Basin or Colorado Plateau that describe the various sites by vegetation composition and soils published by the NRCS. In general terms, blackbrush dominates the site with 50-60% of total cover. Although 185 species of vascular plants have been found growing within blackbrush, they are never abundant in the Mojave Desert, except at upper- and lower-elevational ecotones. Desert perennial grasses, including *Achnatherum hymenoides*, *Achnatherum speciosum*, *Boutela eriopoides*, *Muhlenbergia porteri*, *Pleuraphis jamesii*, *Pleuraphis rigida*, or *Poa secunda* dominate the herbaceous layer. Scattered *Juniperus osteosperma* or desert scrub species may also be present. Beatley (1976) stated that "so nearly complete is the dominance of this shrub species that in areas that are not ecotonal there are only a few associated shrubs species, and these occur usually as scattered plants in an otherwise pure stand of Coleogyne."

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CORA | *Coleogyne ramosissima* | Blackbrush |
| ACSP12 | *Achnatherum speciosum* | Desert needlegrass |
| BOER4 | *Bouteloua eriopoda* | Black grama |
| AMDU2 | *Ambrosia dumosa* | Burrobush |

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

Disturbance Description

Low amounts of fine fuel in interspaces probably limited fire spread to only extreme fire conditions, during which high winds, low relative humidity, and low fuel moisture led to high-intensity stand-replacing crown fires. Historical fire return intervals (FRIs) appear to have been on the order of centuries, allowing late seral blackbrush stands to reestablish. Lightning strikes in these dense shrublands of flammable material were the primary source of ignition. A map zone (MZ) 4 reviewer commented that over ecological time scales, ignition frequency has little effect on fire intervals when most ignitions fail to establish fires for lack of fuel (most events <1ac). Increasing ignition rates increase the rate of failures, not the amount of burning.

An MZ04 reviewer added the following discussion: Regional burning rates increase with elevation and productivity. Hence, fires concentrate at places such as Mountain Pass, Cima Dome, the Midhills, as well as in areas of higher rainfall along the west edge of the Mojave and Sonoran deserts. In the recent past (BLM data), burning in southern California deserts was greatest in wet years (1978-85, 1991-95, 1998, 2005-06) and virtually absent during drought episodes (1986-90, 1999-2004). Wet years increase herbaceous fuels, perennial bunchgrasses (*Nessella speciosa*, *Hilaria rigida*), and the cover of subshrubs. Droughts reverse these trends. Over Holocene time scales, fire occurrence was highly aperiodic in response to short-term fluctuations in productivity of subshrubs and flash fuels. Fire mosaic turnover is random and unrelated to previous fire history. Fire intervals were long (<1/century) in wettest deserts (western margin and terrain above 1,400m) and longer in most other deserts. Deserts with <10cm mean annual precipitation were likely fireproof, e.g., Death Valley, Salton Sea trough, terrain above the Colorado River flood plain.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 396 | 100 | 100 | 1700 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 396 | 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

Although the BpS can be extensive (>100,000ac) in the Mojave Desert, the typical scale of common disturbance extent ranges from 100-1,000ac. Exceptions do occur in excess of 1,000s of acres.

Adjacency or Identification Concerns

On the upper elevation, adjacent ecological systems include black sagebrush, big sagebrush semi-desert and woodlands communities, and at lower elevations creosotebush and bursage communities in the Mojave Desert. Within the upper and lower limits exist adjacent problem areas of blackbrush that are characterized by burned patches with early seral characteristics that have been degraded by overgrazing and prescribed burning in the mid-1900s. There is increased cover of early seral shrubs such as *Chrysothamnus* spp., *Gutierrezia* spp., and *Eriogonum fasciculatum*, early seral herbaceous perennials such as *Sphaeralcea ambigua* and *Astragalus* spp., and alien annual plants such as *Bromus rubens*, *Bromus tectorum*, and *Erodium cicutarium*. Burned stands can also have a large perennial grass component. Other areas are annual grasslands dominated by *Bromus rubens* and *Bromus tectorum* from repeated burning.

For all practical purposes, BpS 1082 and BpS 1078 are essentially undistinguishable in most aspects relevant to LANDFIRE. Species composition differences may exist due to the presence of monsoonal rains on the Colorado Plateau.

Issues or Problems

We don't have much data on this community.

Native Uncharacteristic Conditions

Native shrub cover >50% (remote sensing) is considered uncharacteristic.

Comments

For MZ04, the model was reviewed by Minnich, Safford, and Schmidt. In MZ13, it was reviewed by Nachlinger.

The FRI of this BpS was an average between the creosote (BpS 171087) and the big sagebrush semi-desert (BpS 171080). A FRI of 1,000yrs was judged too long because this BpS experiences many lightning strikes and blackbrush is very flammable. Moreover, fire from BpS from higher precipitation zone will enter this system. The maximum fire size of 1,000s of acres was determined by large fires (>5,000 acres) in Owens Valley, California.

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 | UN | UN | UN | UN | UN |
| Herb | 0.5-1.0 | A | A | A | A | A | UN | UN | UN | UN | UN |
| Herb | >1.0 | A | A | A | A | A | UN | UN | UN | UN | UN |
| Shrub | 0-0.5 | A | A | A | A | A | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | >3.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| 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 26 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| GUSA2 | Gutierrezia sarothrae | Broom snakeweed | Upper |
| MESP2 | Menodora spinescens | Spiny menodora | Upper |
| EPNE | Ephedra nevadensis | Nevada jointfir | Upper |
| TETRA3 | Tetradymia | Horsebrush | Upper |

Description

Historically, fire was relatively uncommon in this vegetation. When burned, the fire-tolerant/crown-sprouting shrubs such as spiny menodora, horsebrush, and snakeweed will dominate the site. At higher elevations of mesic blackbrush, a big sagebrush-desert bitterbrush community typically replaces blackbrush for a protracted period. This class can express itself for more than 100 years, with varying amounts of blackbrush gradually establishing after decades. A few examples of this that have been observed in the field are believed to be over 60yrs+. The ground cover varies by elevation and moisture regime with mesic sites being generally 10-35%, with some sites only capable of 10% cover. The thermic sites are generally 10-15% ground cover, with exception going as high as 35%.

*Maximum Tree Size Class*  
None

Class B 74 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CORA | Coleogyne ramosissima | Blackbrush | Upper |
| EPNE | Ephedra nevadensis | Nevada jointfir | Upper |
| YUSC2 | Yucca schidigera | Mojave yucca | Upper |
| LATR2 | Larrea tridentata | Creosote bush | Upper |

Description

This community class seems to be stable and occurs after a threshold is crossed. Composition is 50-70% blackbrush-dominated. Other species are perennial grasses of desert needlegrass, Indian ricegrass, galleta grass, fluff grass, and threeawn. Lesser shrub composition includes Nevada ephedra, turbinella oak, desert bitterbrush, fourwing saltbush, and Anderson's wolfberry in mesic sites and Nevada ephedra, creosotebush, Mojave buckwheat, snakeweed, prickly pear, white bursage, and spiny menodora in thermic sites. There are other shrubs as well. *Yucca brevifolia* might also be present.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Late1:CLS | 119 |
| Late1:CLS | 120 | Late1: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 | 0.0025 | 400 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.0025 | 400 | Yes | 0 |

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