10590

Southern Rocky Mountain Pinyon-Juniper Woodland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zone

25

Geographic Range

Southern Rocky Mountain ecological system occurs on semiarid mountains and foothills in southern Colorado east of the Continental Divide; in foothills, mountains, and plateaus of New Mexico; and extends east to limestone breaks in the southeastern Great Plains. Foothills of Sacramento, Oscura, San Andres, Sierra Ladrone, Manzano, and Sandia mountains (steep slopes of Chupadera Mesa).

Biophysical Site Description

This biophysical system typically is found at elevations between 1,800m and 2,400m. These moderately to heavily dense woodlands occur at more mesic and often steeper and rockier sites and ridges compared to pinyon-juniper savannas. Severe climatic event such as frost and drought, and aspect are thought to determine the distribution of pinyon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Soils supporting this system vary in texture from stony, cobbly, and gravelly sandy loams to clay loam or clay.

Vegetation Description

*Pinus edulis* (twoneedle pinyon) and/or *Juniperus monosperma* (oneseed juniper) dominate the tree canopy. *Juniperus scopulorum* (Rocky Mountain juniper) may co-dominate or replace *Juniperus monosperma* at higher elevations. In southern transitional areas between Madrean Pinyon-Juniper Woodland (CES305.797) and Southern Rocky Mountain Pinyon-Juniper Woodland (CES306.835) in southern New Mexico, *Juniperus deppeana* (alligator juniper) becomes common. Understory layers are variable and may be dominated by shrubs and graminoids, or may be absent. Associated species are more typical of southern Rocky Mountains than the Colorado Plateau and include *Artemisia bigelovii*, *Cercocarpus montanus*, *C. breviflorus*, *Mahonia haematocarpa*, *Quercus gambelii*, *Q*. x *undulatum*, *Achnatherum scribneri*, *A. lobatum*, *Bouteloua gracilis* (blue grama), and *Pleuraphis jamesii*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| JUMO | *Juniperus monosperma* | Oneseed juniper |
| PIED | *Pinus edulis* | Twoneedle pinyon |
| QUPA4 | *Quercus pauciloba* | Quercus pauciloba |
| ACSC | *Acacia schottii* | Schott’s wattle |
| ACLO | *Acacia longifolia* | Sydney golden wattle |
| BOGR | *Boerhavia gracillima* | Slimstalk spiderling |

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

Disturbance Description

The fire regime of this ecological system includes mixed low-severity fires every 15-50yrs and stand replacement every 150-250yrs. Some typically less common old-growth stands are thought to have fire return intervals of 500yrs or longer. This variability in estimated fire frequency is common for pinyon-juniper woodlands and is controversial. For example, in the Oscura Mountains, monsoon-season lightning (June-September) is the main ignition source and most often causes fires in adjacent lower (pinyon-juniper) or upper (ponderosa) elevation savannas with fine fuel that can carry upslope or downslope to this biophysical setting (BpS). Lightning strikes in this BpS are not known to produce extensive burns.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 243 | 24 | 20 | 1000 |
| Moderate (Mixed) | 254 | 23 | 20 | 1000 |
| Low (Surface) | 108 | 53 |  |  |
| All Fires | 58 | 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

Pinyon-juniper woodland usually was distributed across the landscape in patches between hundreds of acres and thousands of acres. In particularly dissected topography, this type may have occurred in smaller patches.

Adjacency or Identification Concerns

Pinyon-juniper savanna, chaparral/montane shrubland (e.g., mountain mahogany-scrub oak), and ponderosa woodlands are adjacent vegetation types.

The Southern Rocky Mountain Juniper Woodland and Savanna (BpS 1119) may have been the dominant historical type, with pinyon and juniper in this map zone, but it is now heavily encroached by moderately dense pinyon and juniper trees, and should not be mistaken for this BpS. More exposed sites (e.g., ridgetops and outcrops), steeper slopes, more shallow rocky soils, and more mesic microclimates (e.g., north-facing aspects) help distinguish this BpS (1059) from the historical open pinyon-juniper savanna (1119).

Issues or Problems

Fire regimes are varied and not well known across the large landscape. Fire scars are difficult to read in pinyon-juniper. Information about fire regimes is extrapolated from adjacent systems, and extreme caution is warranted when interpreting these models. Fire season can be inferred more reliably than fire frequency; the former likely is equally or more important than the latter.

The historical extent to adjacent savanna is not clear. The interrelationship of drought, insect damage, and fire regimes singly or in combination is not known.

Native Uncharacteristic Conditions

Canopy coverage >70% is uncharacteristic. Sparse understory as a result of increased canopy closure is characteristic.

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 | B | B | B | B | B | B | B | B | B | B |
| 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 | C | C | C | C | C | C | C | D | D | D |
| Tree | 5-10 | E | E | E | E | E | E | E | E | E | E |
| Tree | 10-25 | E | E | E | E | E | E | E | E | E | E |
| Tree | 25-50 | E | E | E | E | E | E | E | E | E | E |
| Tree | >50 | E | E | E | E | E | E | E | E | E | E |

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 10 Early Development 1 - Open

Upper Layer Lifeform: Shrub

Upper Layer Lifeform Is Not the Dominant Lifeform

Grasses: min, 0%; max, 30%.

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUPA4 | Quercus pauciloba | Quercus pauciloba | Upper |
| MAHA4 | Mahonia haematocarpa | Red barberry | Upper |
| BOGR | Boerhavia gracillima | Slimstalk spiderling | Lower |

Description

Initial post-fire community dominated by oak brush, blue grama and other grasses, barberry, and various forbs. Evidence of past fires may be observed, including charcoal and resprouting woody plants.

Class B 18 Mid Development 1 - Open

Upper Layer Lifeform: Shrub

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUUN | Quercus undulata | Wavyleaf oak | Upper |
| JUMO | Juniperus monosperma | Oneseed juniper | Upper |
| MAHE | Malacothamnus helleri | Heller’s bush mallow | Lower |
| BOGR | Boerhavia gracillima | Slimstalk spiderling | Lower |

Description

Community dominated by young juniper saplings.

Class C 30 Mid Development 1 - Closed

Upper Layer Lifeform: Tree

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUMO | Juniperus monosperma | Oneseed juniper | Upper |
| PIED | Pinus edulis | Twoneedle pinyon | Upper |
| QUUN | Quercus undulata | Wavyleaf oak | Low-Mid |
| MAHE | Malacothamnus helleri | Heller’s bush mallow | Lower |

Description

Site dominated by relatively dense, mature juniper and immature pinyon trees.

Class D 33 Late Development 1 - Closed

Upper Layer Lifeform: Tree

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIED | Pinus edulis | Twoneedle pinyon | Upper |
| JUMO | Juniperus monosperma | Oneseed juniper | Upper |

Description

Mature juniper mixed with maturing pinyon.

Class E 9 Late Development 2 - Closed

Upper Layer Lifeform: Tree

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIED | Pinus edulis | Twoneedle pinyon | Upper |
| JUMO | Juniperus monosperma | Oneseed juniper | Upper |

Description

Old-growth. Closed and overlapping canopies shade forest floor, which results in <5% cover of understory.

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:OPN | 25 |
| Mid1:OPN | 26 | Mid1:CLS | 50 |
| Mid1:CLS | 51 | Late1:CLS | 125 |
| Late1:CLS | 126 | Late2:CLS | 250 |
| Late2:CLS | 251 | Late2: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:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:OPN | 0.0083 | 120 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:OPN | 0.001 | 1000 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.02 | 50 | No | 0 |
| Replacement Fire | Late2:CLS | Early1:OPN | 0.0033 | 303 | Yes | 0 |
| Wind or Weather or Stress | Late2:CLS | Early1:OPN | 0.004 | 250 | Yes | 0 |
| Mixed Fire | Late2:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Surface Fire | Late2:CLS | Late1:CLS | 0.01 | 100 | Yes | 0 |

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