11020

Colorado Plateau Pinyon-Juniper Shrubland

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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| None | None | None | None |
| None | None | None | None |

Vegetation Type

Shrubland

Map Zones

13, 15, 16, 23, 24

Geographic Range

This ecological system is characteristic of the rocky mesa tops and slopes on the Colorado Plateau and western slope of Colorado.

Biophysical Site Description

Substrates are shallow/rocky and shaley soils at lower elevations (1,200-2,000m). These stunted tree shrublands may extend farther upslope along the low-elevation margins of taller pinyon-juniper woodlands.

Vegetation Description

The vegetation is dominated by dwarfed (usually <3m tall) *Pinus edulis* and/or *Juniperus* *osteosperma* trees forming extensive tall shrublands in the region along low-elevation margins of pinyon-juniper woodlands. Other shrubs, if present, may include *Artemisia nova*, *Artemisia tridentata* ssp*. wyomingensis*, *Chrysothamnus viscidiflorus*,or *Coleogyne ramosissima*. Herbaceous layers are sparse to moderately dense and typically composed of xeric graminoids.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PIED | *Pinus edulis* | Twoneedle pinyon |
| JUOS | *Juniperus osteosperma* | Utah juniper |
| ARTR2 | *Artemisia tridentata* | Big sagebrush |

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

Disturbance Description

Fire regime was primarily determined by fire occurrence in the surrounding matrix vegetation. Lightning-ignited fires were common but typically did not affect more than a few individual trees. Replacement fire was uncommon to rare (average fire return interval [FRI], 100-500yrs) and occurred primarily during extreme fire behavior conditions. Mixed-severity fire (average FRI, 100-500yrs) was characterized as a mosaic of replacement and surface fires distributed through the patch at a fine scale (<0.1ac). Surface fire could occur in stands where understory grass cover was high and provided adequate fuel. Surface fire was primarily responsible for producing fire scars on juniper or pinyon trees (average FRI, 100yrs).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 336 | 19 | 100 | 1000 |
| Moderate (Mixed) | 223 | 29 | 100 | 1000 |
| Low (Surface) | 128 | 52 | 100 | 100 |
| All Fires | 65 | 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

Juniper/pinyon-juniper shrubland was usually distributed across the landscape in patches that range from tens to hundreds of acres. In areas with very broken topography and/or mesa landforms, this type may have occurred in patches of several hundred acres. In Utah and Nevada, pinyon and juniper landscape patches tended to be tens to hundreds of acres.

Adjacency or Identification Concerns

Sites are drier than Colorado Plateau Pinyon-Juniper Woodland (1016).

These stunted tree shrublands may extend farther upslope along the low-elevation margins of taller pinyon-juniper woodlands.

Issues or Problems

Information was scarce on this ecological system. It appears that this model is a hybrid between the Colorado Plateau Pinyon-Juniper Woodland (1016) and Inter-Mountain Basins Juniper Savanna (1115). Due to the shallow/rocky soils of mesa tops, the Inter-Mountain Basins Juniper Savanna model for map zone 16 (161115) is very similar.

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 | B | B | B | B | B | B | B | B | B | B |
| 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 | D | E | E | E | E | E | E | E |
| Tree | 5-10 | C | C | D | E | E | E | E | E | E | E |
| Tree | 10-25 | C | C | D | E | E | E | E | E | E | E |
| Tree | 25-50 | C | C | D | E | E | E | E | E | E | E |
| Tree | >50 | C | C | D | 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 2 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| Forbs | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Upper |
| CRYP | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Lower |

Description

Initial post-fire community dominated by annual forbs. Later stages of this class contain greater amounts of perennial grasses and forbs. Low shrubs may be present.

*Maximum Tree Size Class*  
None

Class B 5 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARTEM | Artemisia | Sagebrush | Upper |
| CHVI8 | Chrysothamnus viscidiflorus | Yellow rabbitbrush | Upper |
| BOGR2 | Bouteloua gracilis | Blue grama | Middle |

Description

Dominated by shrubs, perennial forbs, and grasses. Total cover remains low due to shallow, unproductive soil.

*Maximum Tree Size Class*  
None

Class C 13 Mid Development 2 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARTEM | Artemisia | Sagebrush | Upper |
| CHVI8 | Chrysothamnus viscidiflorus | Yellow rabbitbrush | Upper |
| JUOS | Juniperus osteosperma | Utah juniper | Upper |
| PIED | Pinus edulis | Twoneedle pinyon | Upper |

Description

Shrub-dominated community with young juniper and pinyon seedlings emerging from the shrub layer and becoming established.

*Maximum Tree Size Class*  
Seedling <4.5ft

Class D 36 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUOS | Juniperus osteosperma | Utah juniper | Upper |
| PIED | Pinus edulis | Twoneedle pinyon | Upper |
| ARTEM | Artemisia | Sagebrush | Middle |
| BOGR2 | Bouteloua gracilis | Blue grama | Lower |

Description

Community dominated by young and stunted juniper and pinyon of mixed age. Juniper and pinyon becoming competitive onsite and beginning to affect understory composition.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class E 44 Late Development 2 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUOC | Juniperus occidentalis | Western juniper | Upper |
| JUOS | Juniperus osteosperma | Utah juniper | Upper |
| PIED | Pinus edulis | Twoneedle pinyon | None | |
| PIMO | Pinus monophylla | Singleleaf pinyon | None | |

Description

Site dominated by widely spaced, old, stunted juniper and pinyon. Understory depauperate, with high amounts of bare ground and rock present. Grasses present on microsites sites with deeper soils (>20in) with restricting clay subsurface horizon.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:OPN | 9 |
| Mid1:OPN | 10 | Mid2:OPN | 29 |
| Mid2:OPN | 30 | Late1:OPN | 99 |
| Late1:OPN | 100 | Late2:OPN | 399 |
| Late2:OPN | 400 | Late2: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** |
| Mixed Fire | Early1:OPN | Early1:OPN | 0.003 | 333 | No | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Mid2:OPN | Early1:OPN | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid2:OPN | Mid2:OPN | 0.01 | 100 | No | 0 |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.002 | 500 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.005 | 200 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Mixed Fire | Late2:OPN | Late2:OPN | 0.002 | 500 | No | 0 |
| Replacement Fire | Late2:OPN | Early1:OPN | 0.002 | 500 | Yes | 0 |
| Surface Fire | Late2:OPN | Late2:OPN | 0.01 | 100 | No | 0 |

References

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