10640

Colorado Plateau Mixed Low Sagebrush 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 |

**Reviewer:** Randy Swaty

Vegetation Type

Shrubland

Map Zones

15, 16, 17, 23, 24, 27, 28

Geographic Range

Biophysical Setting (BpS) occurs in the Colorado Plateau, Tavaputs Plateau, and Uinta Basin. Also extends across northern New Mexico into the southern Great Plains.

Biophysical Site Description

Occurs in canyons, gravelly draws, hilltops, and dry flats at elevations below 1,800m. Soils are often rocky, shallow, and alkaline. Found on limestone ridges in northern New Mexico and southern Great Plains. Black sagebrush (*Artemisia nova*) tends to grow where either a calcareous or volcanic cement layer exists in the soil profile.

Vegetation Description

Open shrublands dominated by *Artemisia nova* or *Artemesia bigelovii* sometimes with *Artemesia tridentata* ssp. *wyomingensis* co-dominant. Generally have relatively low fuel loads with low growing and cushion forbs and scattered semi-arid grasses such as *Achnatherum hymenoides*, *Aristida purpurea*, *Boutela gracilis*, *Hesperostipa comata*, *Pleuraphis jamesii*, or *Poa fendleriana*. Graminoid layer will often have over 25% cover. Forbs often include buckwheats (*Eriogonum* spp.), fleabanes (*Erigeron* spp.), phloxes (*Phlox* spp.), paintbrushes (*Castilleja* spp.), globemallows (*Sphaeralcea* spp.), and lupines (*Lupinus* spp.).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ARNO4 | *Artemisia nova* | Black sagebrush |
| ARBI3 | *Artemisia bigelovii* | Bigelow sage |
| ACHY | *Achnatherum hymenoides* | Indian ricegrass |
| ARPU9 | *Aristida purpurea* | Purple threeawn |
| BOGR2 | *Bouteloua gracilis* | Blue grama |
| HECO26 | *Hesperostipa comata* | Needle and thread |
| PLJA | *Pleuraphis jamesii* | James' galleta |
| ERIOG | *Eriogonum* | Buckwheat |

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

Disturbance Description

Black sagebrush generally supports more fire than other dwarf sagebrushes. This type generally burns with mixed-severity (average fire return interval [FRI] of 100-140yrs) due to relatively low fuel loads and herbaceous cover. Bare ground acts as a micro-barrier to fire between low-stature shrubs. Oils and resins present in the foliage and stems of sagebrush allow fire to spread. Stand-replacing fires (average FRI of 200-240yrs) can occur in this type when successive years of above-average precipitation are followed by an average or dry year. Stand-replacement fires dominate in the late succession class where the herbaceous component has diminished. Fires may or may not be wind driven and only cover small areas. This type fits into Fire Regime Groups IV and III.

Grazing by wild ungulates occurs in this type due to the high palatability of *A. nova* compared to other browse. Native browsing tends to open up the canopy cover of shrubs but does not often change the succession stage.

Prolonged drought may reduce the foliar and basal covers of graminoids but not that of shrubs. Reduced foliar cover of graminoids will affect fire behavior. This effect is assumed minor and not included in the model.

NOTE (Randy Swaty, 25 September 2017): in the original map zone (MZ) 27 model (2710640) the All Fire Interval was 150yrs whereas the All Fire Return Interval for this model is 79yrs. Use of Mixed Fire may be controversial.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 236 | 33 | 100 | 240 |
| Moderate (Mixed) | 118 | 67 | 75 | 140 |
| Low (Surface) |  |  |  |  |
| All Fires | 79 | 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

Disturbance patch size for this type is not well known but is estimated to be 10s to 100s of acres due to the relatively small proportion of the sagebrush matrix it occupies and the limited potential for fire spread.

Adjacency or Identification Concerns

The dwarf sagebrush type tends to occur adjacent to Wyoming big sagebrush. The dwarf sagebrush types create a mosaic within the Wyoming big sagebrush, acting as a fire break that burns only under severe conditions.

Issues or Problems

Native Uncharacteristic Conditions

Comments

In the 2017 BpS Review, MZs 27 and 28, which had some differences from the other MZs, were lumped into this description. The differences included:

* MZ 27 had 2 succession classes; the other 3 succession classes.
* As noted above, the fire regimes are different.
* Added in native grazing at probability.

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 | C | C | C | C | C | C | C | C |
| Shrub | 0.5-1.0 | B | B | C | C | C | C | C | C | C | C |
| Shrub | 1.0-3.0 | B | B | C | C | C | C | C | C | C | C |
| Shrub | >3.0 | B | B | C | C | C | C | C | C | C | C |
| Tree | 0-5 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | >50 | C | C | C | C | C | 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 9 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Lower |
| BOGR2 | Bouteloua gracilis | Blue grama | Lower |
| ARNO4 | Artemisia nova | Black sagebrush | Upper |
| ARBI3 | Artemisia bigelovii | Bigelow sage | Upper |

Description

Early-seral community dominated by herbaceous vegetation; <6% sagebrush canopy cover; up to 24yrs post-disturbance.

Scattered sagebrush recovering. Dominant vegetation is bunchgrasses.

*Maximum Tree Size Class*  
None

Class B 70 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARNO4 | Artemisia nova | Black sagebrush | Upper |
| ARBI3 | Artemisia bigelovii | Bigelow sage | Upper |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Lower |
| BOGR2 | Bouteloua gracilis | Blue grama | Lower |

Description

Mid-seral community with a mixture of herbaceous and shrub vegetation; 6-10% sagebrush canopy cover present; between 20-59yrs post-disturbance.

*Maximum Tree Size Class*  
None

Class C 21 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARNO4 | Artemisia nova | Black sagebrush | Upper |
| ARBI3 | Artemisia bigelovii | Bigelow sage | Upper |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Lower |
| BOGR2 | Bouteloua gracilis | Blue grama | Lower |

Description

Late-seral community with a mixture of herbaceous and shrub vegetation; >10% sagebrush canopy cover present; 75yrs+ post-disturbance.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 1 | Late1:OPN | 24 |
| Late1:OPN | 25 | Late1:OPN | 999 |
| 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 | 0.004 | 250 | Yes | 0 |
| Native Grazing | Early1:ALL | Early1:ALL | 0.05 | 20 | No | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 120 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Native Grazing | Late1:OPN | Late1:OPN | 0.05 | 20 | No | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.007 | 143 | Yes | 0 |
| Native Grazing | Late1:CLS | Late1:CLS | 0.05 | 20 | No | 0 |

References

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