11350

Inter-Mountain Basins Semi-Desert Grassland

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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Reviewer: Kori Blankenship

Vegetation Type

Herbaceous

Map Zones

15, 28

Geographic Range

Occurs throughout the Intermountain western United States on dry plains and mesas. This particular model and description focuses on the Arizona/New Mexico plateau ecoregion.

Biophysical Site Description

Ecological systems found at ~1,450-2,320m (4,750-7,610ft) elevation. These grasslands occur in lowland and upland areas and may occupy swales, playas, mesa tops, plateau parks, alluvial flats, and plains, but sites are typically xeric. Substrates are often well-drained sandy or loamy-textured soils derived from sedimentary parent materials but are quite variable and may include fine-textured soils derived from igneous and metamorphic rocks. These grasslands typically occur on xeric sites. When they occur near foothill grasslands, they will be at lower elevations. These grasslands occur on a variety of aspects and slopes. Sites may range from flat to moderately steep. Annual precipitation is usually from 20-40cm (7.9-15.7in).

Vegetation Description

Grasslands within this system are typically characterized by a sparse to moderately dense herbaceous layer dominated by medium-tall and short bunchgrasses, often in a sod-forming growth. The dominant perennial bunchgrasses and shrubs within this system are all very drought-resistant plants. These grasslands are typically dominated or co-dominated by *Achnatherum hymenoides*, *Aristida* spp., *Bouteloua gracilis*, *Hesperostipa comata*, *Muhlenbergia* spp., or *Pleuraphis jamesii* and may include scattered shrubs and dwarf-shrubs of species of *Artemisia*, *Atriplex*, *Coleogyne*, *Ephedra*, *Gutierrezia*, or *Krascheninnikovia lanata*. *Muhlenbergia*-dominated grasslands that flood temporarily, combined with high evaporation rates in this dry system, can have accumulations of soluble salts in the soil. Soil salinity depends on the amount and timing of precipitation and flooding.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BOGR2 | *Bouteloua gracilis* | Blue grama |
| ACHY | *Achnatherum hymenoides* | Indian ricegrass |
| HECO26 | *Hesperostipa comata* | Needle and thread |
| PLEUR12 | *Pleuraphis* | Galleta grass |
| ARIST | *Aristida* | Threeawn |
| MUHLE | *Muhlenbergia* | Muhly |

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

Disturbance Description

This system is maintained by frequent fires and sometimes associated with specific soils, often well-drained clay soils. Fire most often occurred in these sites when adjacent shrublands burned. Fires were typically patchy or continuous and stand-replacing. Most species respond favorably to fire. Rabbitbrush tends to increase with spring and summer fires.

These sites were prone to flooding during high precipitation, resulting in erosion of topsoil and some short-term loss of vegetative cover. In cases of 500yr+ flooding event, the site could downcut, thus lowering the water table, and favored woody species in an altered state.

Infrequent native grazing has occurred, which may have resulted in heavy defoliation, but was confined to small acreage and generally temporary in nature.

Drought cycles likely resulted in a reduction in vegetative cover, production, and acreage of these sites. Drought negatively affected woody species.

Native American's likely used these sites for camping and some vegetation collection while hunting and gathering in adjacent wetlands. Humans likely caused heavy impacts to soils and vegetation in small campsites, but overall impact was light and transitory in nature.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 76 | 33 | 20 | 110 |
| Moderate (Mixed) | 37 | 67 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 25 | 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

These sites are generally small and often moist. Fire in these systems is usually introduced from adjacent shrublands or native burning to improve herbaceous understory.

Adjacency or Identification Concerns

Found adjacent to wet meadows, wetlands, sagebrush uplands, and salt desert shrublands. Sites adjacent to sagebrush uplands tended to burn more frequently than sites adjacent to wet or salt desert shrub.

Many of these sites were impacted by introduced grazing animals post-European settlement and have been converted to shrub-dominated systems with soil compaction problems that tend toward an increase in tap-rooted forb species. Class D is found more frequently now, due to altered disturbance regimes with livestock grazing, changes in fire frequency, altered water flow, and climate change.

Issues or Problems

The scale of historic fire is unknown, and numbers provided are a guess.

Native Uncharacteristic Conditions

Comments

During the 2017 Review, Kori Blankenship changed the class-maintaining mixed fires in every class from mixed to replacement severity to comply with LANDFIRE fire severity definitions; transition probabilities were not changed. LANDFIRE defines replacement severity fire as a fire that topkills >75% of the upper-layer lifeform. Because most major species listed for this Biophysical Setting (BpS) are topkilled by fire (according to their respective Fire Effects Information System species reviews), Blankenship assumed that the modelers used mixed fire to represent a very patchy fire, but because where fire occurred it probably topkilled most plants, it met LANDFIRE’s replacement fire criteria.

During LANDFIRE National, one reviewer suggested deleting mixed-severity fire. Other reviewers stated that mixed fire should remain.

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 | B | B | B | B | B | B | B | B |
| Herb | 0.5-1.0 | A | A | B | B | B | B | B | B | B | B |
| Herb | >1.0 | A | A | B | B | B | B | B | B | B | B |
| Shrub | 0-0.5 | C | C | C | C | C | C | C | C | D | D |
| Shrub | 0.5-1.0 | C | C | C | C | C | C | C | C | D | D |
| Shrub | 1.0-3.0 | C | C | C | C | C | C | C | C | D | D |
| Shrub | >3.0 | C | C | C | C | C | C | C | C | D | D |
| Tree | 0-5 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | 5-10 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | 10-25 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | 25-50 | D | D | D | D | D | UN | UN | UN | UN | UN |
| Tree | >50 | D | D | D | D | D | 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 4 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Upper |
| HECO26 | Hesperostipa comata | Needle and thread | Upper |
| PLEUR12 | Pleuraphis | Galleta grass | Upper |

Description

Post-fire, -flood, or -drought early seral community. Bare ground is 10-30%. Total vegetative canopy cover is 0-25%. Relative forb cover is 10-40%. Relative graminoid cover is 60-90%. Shrub cover is minimal or nonexistent. Rare flood events move the vegetation to a more shrubby condition after downcutting.

*Maximum Tree Size Class*  
No Data

Class B 74 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Upper |
| HECO26 | Hesperostipa comata | Needle and thread | Upper |
| PLEUR12 | Pleuraphis | Galleta grass | Upper |

Description

Mostly stable and resilient system. Bare ground is less than 10%. Total canopy cover is 25-80%. Relative cover of grasses is >85%. Relative cover of forbs is 0-5%. Relative cover of shrubs is 0-10%. Weather and flooding affect this system in three different ways: 1) Recurring drought will thin vegetation and keep it open; 2) The site will be scoured, but not downcut, by flood events; and 3) Rare flooding event will cause a downcut and alteration of the site toward a more permanent woody condition.

*Maximum Tree Size Class*  
No data

Class C 20 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Lower |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Lower |
| HECO26 | Hesperostipa comata | Needle and thread | Upper |
| PLEUR12 | Pleuraphis | Galleta grass | Upper |

Description

This class differs from mid-open by an increase in the shrub cover component. Bare ground is <10%. Total canopy cover is 50-80%. Relative cover of grasses is 25-50%. Relative cover of forbs is 0-5%. Relative cover of shrubs (most frequently rubber rabbitbrush and basin big sagebrush) is 10-75%.

*Maximum Tree Size Class*  
No data

Class D 2 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Lower |
| ACHY | Achnatherum hymenoides | Indian ricegrass | Lower |
| HECO26 | Hesperostipa comata | Needle and thread | Upper |
| PLEUR12 | Pleuraphis | Galleta grass | Upper |

Description

This class differs from mid-open by a significant increase in the shrub cover component. Bare ground is <20%. Total canopy cover can exceed 100% due to shrub dominance. Relative cover of grasses is <25%. Relative cover of forbs is 0-5%. Relative cover of shrubs (most frequently rubber rabbitbrush and Basin big sagebrush) is >75%.

*Maximum Tree Size Class*  
No data

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:OPN | 2 |
| Mid1:CLS | 1 | Mid1:CLS | 999 |
| Mid1:OPN | 3 | Late1:OPN | 37 |
| Late1:OPN | 38 | 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** |
| Wind or Weather or Stress | Early1:OPN | Mid1:CLS | 0.002 | 500 | No | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.013 | 77 | Yes | 0 |
| Mixed Fire | Early1:OPN | Early1:OPN | 0.027 | 37 | No | 0 |
| Wind or Weather or Stress | Mid1:OPN | Mid1:CLS | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:OPN | 0.013 | 77 | Yes | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.027 | 37 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:OPN | 0.013 | 77 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Late1:OPN | 0.027 | 37 | Yes | 0 |
| Native Grazing | Late1:OPN | Mid1:OPN | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.013 | 77 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Mid1:OPN | 0.02 | 50 | Yes | 0 |
| Mixed Fire | Late1:OPN | Mid1:OPN | 0.027 | 37 | Yes | 0 |

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