11350

Inter-Mountain Basins Semi-Desert Grassland

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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| None | None | None | None |
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Reviewer: Kori Blankenship

Vegetation Type

Herbaceous

Map Zone

22

Geographic Range

Occurs throughout the inter-mountain western United States on dry plains and mesas. This might occur in the southwestern portions of map zone (MZ) 22. However, all reviewers and modelers for MZ22 were confused by this system and why it was occurring in this MZ and at such a high frequency. Most did not think it occurred in this MZ. However, upon inspection of a LANDFIRE National draft Environmental Site Potential map, experts understood a bit more as to why it was occurring in this MZ.

Biophysical Site Description

Ecological systems found at approximately 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-texture soils derived from igneous and metamorphic rocks. These grasslands typically occur on xeric sites. When they occur near foothill grasslands, they are 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

The semi-desert grassland indicator species are common, widespread species.

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*, or *Pleuraphis jamesii*. For MZ22, *P. jamesii* occurs only in the southern part. The species does not occur, or at least is very rare, north of Interstate Hwy 80. *Muhlenbergia* spp. are also present and may include scattered shrubs and dwarf shrubs of species of *Artemisia*, *Atriplex*, *Gutierrezia*, or *Krascheninnikovia* *lanata*, *Coleogyne* (not in MZ22), and *Ephedra* (not in MZ22). *Muhlenbergia*-dominated grasslands (which 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 |
| 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 fire and is sometimes associated with specific soils – often, well-drained clay soils. Fire most often occurred in these sites when adjacent shrubland burned. Fires were typically either patchy or nearly 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. (It is doubtful, at least in MZ22, whether most of the sites are prone to flooding. This may be true of lowland sites, but it seems highly unlikely for swales, mesa tops, plateau parks, and plains.) In cases of 500+-yr flooding events, the site could downcut, thus lowering the water table, and favor woody species in an altered state. However, only on playas, stream terraces, and floodplains would there be a water table that could be lowered. On upland sites, which the site description suggests constitute the majority of sites for this type, there is no water table.

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

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 25 | 100 | 20 | 110 |
| Moderate (Mixed) |  |  |  |  |
| 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 shrubland or caused by Native American ignitions 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 shrublands.

Many of these sites were impacted by the introduction of grazing animals post-European settlement and have been converted to shrub-dominated systems with soil compaction problems that tend toward an increase in taproot 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.

Distinguishing these grasslands by floristics alone is challenging because semi-desert grassland indicator species are common, widespread species. In addition indicator species for the other grassland systems (*Carex duriuscula*, *Carex filifolia*, *Danthonia intermedia*, *Danthonia parryi*, *Festuca arizonica*, *Festuca campestris*, *Festuca idahoensis*, *Festuca thurberi*, *Leucopoa kingii*, *Muhlenbergia filiculmis*, *Muhlenbergia montana*, *Nassella viridula*) may be absent in degraded stands.

After inspection of a LANDFIRE National draft Environmental Site Potential map for MZ22, the intermingling of the 1135 and 1139 plots was suspect. However, it is thought that perhaps 1139 lies at higher elevations than 1135.

Issues or Problems

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

All MZ22 modelers and reviewers were confused by this system and thought it did not occur in this MZ and that it certainly did not occur with the frequency to which it was assigned in this MZ. Most did not think this type occurred in MZ22.

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 top-kills >75% of the upper layer lifeform. Because most major species listed for this BpS are top-killed by fire (according to their respective Fire Effects Information System species reviews), Blankenship assumed the modelers used mixed fire to represent a very patchy fire; but, because where fire occurred it probably top-killed most plants, it met LANDFIRE’s replacement fire criteria.

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 |

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*  
None

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 |

Description

Mostly stable and resilient system. Bare ground is <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 affects this system in three different ways: (1) recurring drought thins vegetation and keeps it open, (2) the site is scoured but not downcut, and (3) rare flooding events cause a downcut and alteration of the site toward a more permanent woody condition.

*Maximum Tree Size Class*  
None

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 |

Description

This system 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%. Drought and native grazing thin shrubs.

*Maximum Tree Size Class*  
None

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 |

Description

This is a combination of a Mid and Late Closed stage. (This class starts at age 1yr because Class A can transition to this class.) This system 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*  
None

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 | Yes | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.013 | 77 | Yes | 0 |
| Replacement 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 |
| Replacement 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 |
| Replacement 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 |
| Replacement Fire | Late1:OPN | Mid1:OPN | 0.027 | 37 | Yes | 0 |

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