11490

Western Great Plains Shortgrass Prairie

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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| None | None | None | None |

Vegetation Type

Herbaceous

Map Zones

25

Geographic Range

This system is found primarily in the western half of the Western Great Plains Division in the rainshadow of the Rocky Mountains and ranges from the Nebraska Panhandle south into TX and NM, although grazing-impacted examples may reach as far north as southern Canada where it grades into Northwestern Great Plains Mixedgrass Prairie (CES303.674).

Biophysical Site Description

This system occurs primarily on flat to rolling uplands with loamy, ustic soils ranging from sandy to clayey.

Vegetation Description

In much of its range, this system forms the matrix system with Bouteloua gracilis dominating this system. Associated graminoids may include Aristida purpurea, Bouteloua curtipendula, Bouteloua hirsuta, Buchloe dactyloides, Hesperostipa comata, Koeleria macrantha (= Koeleria cristata), Pascopyrum smithii (= Agropyron smithii), Pleuraphis jamesii, Sporobolus airoides, and Sporobolus cryptandrus.Although mid-height grass species may be present, especially on more mesic land positions and soils, they are secondary in importance to the sod-forming short grasses. Sandy soils have higher cover of Hesperostipa comata, Sporobolus cryptandrus, and Yucca elata. Scattered shrub and dwarf-dwarf species such as Artemisia filifolia, Artemisia frigida, Artemisia tridentata, Atriplex canescens, Eriogonum effusum, Gutierrezia sarothrae, and Lycium pallida may also be present. Also, because this system spans a wide range, there can be some differences in the relative dominance of some species from north to south and from east to west.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BOGR2 | *Bouteloua gracilis* | Blue grama |
| BUDA | *Buchloe dactyloides* | Buffalograss |
| PASM | *Pascopyrum smithii* | Western wheatgrass |
| KOMA | *Koeleria macrantha* | Prairie junegrass |
| HECO | *Hedeoma costata* | Ribbed false pennyroyal |
| ARPU | *Arabis puberula* | Silver rockcress |
| SPCR | *Sporobolus cryptandrus* | Sand dropseed |

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

Disturbance Description

Large-scale processes such as climate, fire and grazing influence this system. High variation in amount and timing of annual precipitation impacts the relative cover of cool- and warm-season herbaceous species. In contrast to other prairie systems, fire is less important, especially in the western range of this system, because the often dry and xeric climate conditions can decrease the fuel load and thus the relative fire frequency within the system. However, historically, fires that did occur were often very expansive. Currently, fire suppression and more extensive grazing in the region have likely decreased the fire frequency even more, and it is unlikely that these processes could occur at a natural scale. A large part of the range for this system (especially in the east and near rivers) has been converted to agriculture. Areas of the central and western range have been impacted by the unsuccessful attempts to develop dryland cultivation during the Dust Bowl of the 1930s. The short grasses that dominate this system is drought and grazing-tolerant. These species evolved with drought and large herbivores and, because of their stature, are relatively resistant to overgrazing. This system in combination with the associated wetland systems represents one of the richest areas for mammals and birds. Endemic bird species to the shortgrass system may constitute one of the fastest declining bird populations. Scale and frequency of disturbance needs review by local experts.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 19 | 100 | 4 | 30 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 19 | 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

Subjective because of the small amount in this BpS.

Adjacency or Identification Concerns

Issues or Problems

Minor part of this BpS, at the edge of the range of distribution

Native Uncharacteristic Conditions

Comments

This model should be refined at MZ 27 and 33 workshops. Possible reviewers, McPherson(U of AZ), Laurenoff(CSU), Dan Milchunas(Colo State).

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 | B | B | B | B | B | B | B |
| Herb | 0.5-1.0 | C | C | C | B | B | B | B | B | B | B |
| Herb | >1.0 | C | C | C | B | B | B | B | B | B | B |
| Shrub | 0-0.5 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Shrub | >3.0 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 0-5 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | C | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | C | C | UN | UN | UN | 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 12 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| BUDA | Buchloe dactyloides | Buffalograss | Upper |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |

Description

Perennial grasses resprout the following growing season. Forbs and annual grasses depend on seasonal moisture available to reestablish.

*Maximum Tree Size Class*  
None

Class B 80 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| BUDA | Buchloe dactyloides | Buffalograss | Upper |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |

Description

Dominated by Blue grama. Amount of grass and other species composition highly variable depending upon moisture, native grazing by large and small mammals, and insects.

*Maximum Tree Size Class*  
None

Class C 8 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| YUEL | Yucca elata | Soaptree yucca | Upper |
| ARFR4 | Artemisia frigida | Prairie sagewort | Upper |

Description

Prairie dog complexes and Buffalo wallows. Sparse vegetation on large scale prairie dog town complexes. Higher forb diversity. Species will vary greatly within this class across the MZ. Towns may limit extent of landscape scale fires. Note that Prairie dog complexes may have 0% canopy cover for remote sensing purposes, they may keep it well clipped.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Late1:CLS | 2 |
| Late1:CLS | 3 | Late1:CLS | 999 |
| Late1:OPN | 4 | 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 | Late1:OPN | Late1:CLS | 0.01 | 100 | Yes | 0 |
| Native Grazing | Late1:OPN | Late1:OPN | 0.5 | 2 | No | 0 |
| Native Grazing | Late1:CLS | Late1:OPN | 0.001 | 1000 | Yes | 0 |
| Optional 1 | Late1:CLS | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:OPN | 0.066 | 15 | Yes | 0 |

Optional Disturbances

Optional 1: small mammal soil disturbance

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