11490

Western Great Plains Shortgrass Prairie

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

Herbaceous

Map Zone

26

Geographic Range

This system is found primarily in the western half of the Western Great Plains Division and ranges from the Nebraska Panhandle south into Texas and New Mexico, 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 blue grama (*Bouteloua gracilis*) dominating this system. Associated graminoids may include purple threeawn (*Aristida purpurea*), sideoats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), buffalo grass (*Buchloe dactyloides*, now *Bouteloua dactyloides*), needle-and-thread grass (*Hesperostipa comata*), prairie junegrass (*Koeleria macrantha* = *Koeleria cristata*), western wheatgrass (*Pascopyrum smithii* = *Agropyron smithii*), James’ galleta (*Pleuraphis jamesii*), alkali sacaton (*Sporobolus airoides*), and sand dropseed (*S. 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 shortgrasses. Sandy soils have higher cover of *H. comata*, *S. cryptandrus*, soapweed yucca (*Yucca glauca*), and soaptree yucca (*Y. elata*). Scattered shrub and dwarf-shrub species such as sand sagebrush (*Artemisia filifolia*), prairie sagewort (*A. frigida*), big sagebrush (*A. tridentata*), fourwing saltbush (*Atriplex canescens*), spreading buckwheat (*Eriogonum effusum*), broom snakeweed (*Gutierrezia sarothrae*), honey mesquite (*Prosopis glandulosa*), jointfir (*Ephedra* spp.), and pale desert-thorn (*Lycium pallidum*) may also be present.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BUDA | *Buchloe dactyloides* | Buffalograss |
| BOGR2 | *Bouteloua gracilis* | Blue grama |
| SPCR | *Sporobolus cryptandrus* | Sand dropseed |
| BOCU | *Bouteloua curtipendula* | Sideoats grama |
| YUEL | *Yucca elata* | Soaptree yucca |
| GUSA2 | *Gutierrezia sarothrae* | Broom snakeweed |
| PLJA | *Pleuraphis jamesii* | James' galleta |

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.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 5 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 5 | 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

10m acres

Adjacency or Identification Concerns

In Texas, this system occurs on the Llano Estacado and ranges to but does not include the Stockton Plateau. This system is found primarily in the western half of the Western Great Plains Division east of the Rocky Mountains and ranges from the Nebraska Panhandle south into the panhandles of Oklahoma and Texas and into New Mexico, although some examples may reach as far north as southern Canada where it grades into Northwestern Great Plains Mixedgrass Prairie (CES303.674).

Issues or Problems

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 shortgrasses that dominate this system are extremely 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.

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 | B | B | B | B | B | B | UN | UN |
| Herb | 0.5-1.0 | A | A | B | B | B | B | B | B | UN | UN |
| Herb | >1.0 | A | A | B | B | B | B | B | B | UN | UN |
| Shrub | 0-0.5 | A | A | B | B | B | B | B | B | UN | UN |
| Shrub | 0.5-1.0 | C | C | C | C | C | C | C | C | UN | UN |
| Shrub | 1.0-3.0 | D | D | D | D | D | D | D | D | UN | UN |
| Shrub | >3.0 | D | D | D | D | D | D | D | D | UN | UN |
| Tree | 0-5 | D | D | D | D | D | D | D | D | UN | UN |
| Tree | 5-10 | D | D | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | D | D | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | D | D | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | D | D | 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 55 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| BUDA | Buchloe dactyloides | Buffalograss | Middle |
| BOCU | Bouteloua curtipendula | Sideoats grama | Upper |

Description

Initial phase is described as a sparse canopy with mostly grass and herbaceous species. Canopies small and low cover. Fine fuel may be discontinuous. Wind erosion may affect recovery (coupled with drought) on a multi-decadal cycle. Surface fires are considered replacement fires and occur frequently. Grazing influences recovery and may reset community depending on climate.

*Maximum Tree Size Class*  
None

Class B 35 Mid Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| BUDA | Buchloe dactyloides | Buffalograss | Middle |
| BOCU | Bouteloua curtipendula | Sideoats grama | Upper |
| GUSA2 | Gutierrezia sarothrae | Broom snakeweed | Upper |

Description

Development of the community proceeds with increased spring and summer precipitation. Fire disturbance frequency may increase with higher fuel loads depending on climate. Wind erosion may affect recovery (coupled with drought) every few decades. Winter precipitation can lead to shrub development. Grazing influences recovery and may reset community to the early stage depending on climate.

*Maximum Tree Size Class*  
None

Class C 3 Late Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| GUSA2 | Gutierrezia sarothrae | Broom snakeweed | Upper |
| BUDA | Buchloe dactyloides | Buffalograss | Middle |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |

Description

With increased winter precipitation, broom snakeweed (*Gutierrezia sarothrae*) may co-dominate with established grasses. Wind erosion may affect recovery (coupled with drought). Grazing influences recovery and may reset community to the early stage depending on climate.

*Maximum Tree Size Class*  
None

Class D 7 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| GUSA2 | Gutierrezia sarothrae | Broom snakeweed | Upper |

Description

With increased winter precipitation, broom snakeweed (*Gutierrezia sarothrae*) may dominate with exclusion-established grasses. Wind erosion may affect recovery (coupled with drought).

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:ALL | 2 |
| Mid1:ALL | 3 | Mid1:ALL | 999 |
| Late1:ALL | 4 | Late1:OPN | 8 |
| Late1:OPN | 9 | 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 | Early1:OPN | 0.025 | 40 | No | 0 |
| Native Grazing | Early1:OPN | Early1:OPN | 0.15 | 7 | No | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.2 | 5 | Yes | 0 |
| Optional 1 | Mid1:ALL | Late1:ALL | 0.03 | 33 | Yes | 0 |
| Wind or Weather or Stress | Mid1:ALL | Early1:OPN | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Mid1:ALL | Early1:OPN | 0.2 | 5 | Yes | 0 |
| Native Grazing | Mid1:ALL | Early1:OPN | 0.3 | 3 | Yes | 0 |
| Native Grazing | Late1:ALL | Late1:OPN | 0.01 | 100 | Yes | 0 |
| Wind or Weather or Stress | Late1:ALL | Early1:OPN | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Late1:ALL | Early1:OPN | 0.15 | 7 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:OPN | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.04 | 25 | Yes | 0 |

Optional Disturbances

Optional 1: Winter precipitation

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