10940

Western Great Plains Sandhill Steppe

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| John Morlock | John\_Morlock@nps.gov | John Morlock | John\_Morlock@nps.gov |
| Richard Gatewood | Richard\_Gatewood@nps.gov | None | None |
| Joseph White | Joseph\_D\_White@baylor.edu | None | None |

Vegetation Type

Shrubland

Map Zone

26

Model Splits or Lumps

This Biophysical Setting (BpS) is lumped with 2611330.

Geographic Range

This system is found mostly in southcentral areas of the Western Great Plains Division ranging from the Nebraska Sandhills region south to central Texas, although some examples may reach as far north as the Badlands of South Dakota.

Biophysical Site Description

The climate is semi-arid to arid for much of the region in which this system occurs. This system is found on somewhat excessively to excessively well-drained, deep sandy soils that are often associated with dune systems and ancient floodplains. In some areas today, this system may actually occur as a result of overgrazing in Western Great Plains Tallgrass Prairie (CES303.673) or Western Great Plains Sand Prairie (CES303.670).

Vegetation Description

This system is characterized by a sparse to moderately dense woody layer dominated by sand sagebrush (*Artemisia filifolia*). Associated species can vary with geography, amount and season of precipitation, disturbance, and soil texture. Several graminoid species such as sand bluestem (*Andropogon hallii*), little bluestem (*Schizachyrium scoparium*), sand dropseed (*Sporobolus cryptandrus*), giant sandreed (*Calamovilfa gigantea*), needle-and-thread grass (*Hesperostipa comata*), and grama grass (*Bouteloua* spp.) can be connected with this system. Other shrub species may also be present, including soapweed yucca (*Yucca glauca*), mesquite (*Prosopis glandulosa*), skunkbush sumac (*Rhus trilobata*), and chickasaw plum (*Prunus angustifolia*). In the southern range of this system, havard oak (*Quercus havardii*) may also be present and represents one succession pathway that develops over time following a disturbance. *Q. havardii* is able to resprout following a fire and thus may persist for long periods of time once established.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ARFI2 | *Artemisia filifolia* | Sand sagebrush |
| YUGL | *Yucca glauca* | Soapweed yucca |
| BOUTE | *Bouteloua* | Grama |
| QUHA3 | *Quercus havardii* | Havard oak |
| SCSC | *Schizachyrium scoparium* | Little bluestem |
| CAGI3 | *Calamovilfa gigantea* | Giant sandreed |
| SPCR | *Sporobolus cryptandrus* | Sand dropseed |

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

Disturbance Description

Fire and grazing are the most important dynamic processes for this type, although drought stress can impact this system significantly in some areas. Overgrazing can lead to decreasing dominance of some of the grass species such as *A. hallii*, *C. gigantean*, and *S. scoparium*.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 22 | 100 | 10 | 40 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 22 | 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

NatureServe classifies this type as "Large Patch."

Adjacency or Identification Concerns

In some areas today, this system may actually occur as a result of overgrazing in Western Great Plains Tallgrass Prairie (CES303.673) or Western Great Plains Sand Prairie (CES303.670).

Issues or Problems

Native Uncharacteristic Conditions

Comments

This BpS subsumes 261133 as grasslands not necessarily mappable and considered peripheral to the establishment of the shinnery. Grasslands considered the initial community.

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 | B | B | B | B | B | B | B | B |
| Shrub | 0.5-1.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | >3.0 | B | B | B | B | B | B | B | B | B | B |
| Tree | 0-5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | UN | 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 8 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SPCR | Sporobolus cryptandrus | Sand dropseed | Upper |
| CAGI3 | Calamovilfa gigantea | Giant sandreed | Upper |

Description

Initial open dunes with tops stabilized by grass such as sand dropseed (*Sporobolus cryptandrus*) and giant reed grass (*Arundo donax*).

*Maximum Tree Size Class*  
None

Class B 92 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUHA3 | Quercus havardii | Havard oak | Upper |
| ARFL2 | Arnoglossum floridanum | Florida cacalia | Mid-Upper |
| SCSC | Schizachyrium scoparium | Little bluestem | Low-Mid |
| SPCR | Sporobolus cryptandrus | Sand dropseed | Low-Mid |

Description

Stabilized dunes from previous stage become colonized by animal dispersed seeds, primarily sand sage and shinnery (*Quercus havardii*). Fire disturbance is stand replacement (>75% shrub topkill) that is wind-driven. This replacement fire does not return B to the open dune stage; instead, it actually maintains B. Ignition from lightning. Decline of community caused by excessive drought which occurs every century or two.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Late1:OPN | 30 |
| Late1:OPN | 31 | 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 | 0.02 | 50 | No | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:OPN | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Late1:OPN | Late1:OPN | 0.05 | 20 | No | 0 |

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