11330

Chihuahuan Sandy Plains Semi-Desert Grassland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Herbaceous

Map Zone

25

Geographic Range

Central, south-central New Mexico

Biophysical Site Description

Gently sloping, undulating piedmont slopes or plains; elevation 3,500-5,000ft. Mean annual ppt 8-10.5in. Rainfall highly variable, from 2-20in. Half of the precipitation typically falling during summer monsoonal events. Annual frost-free season exceeds 200 days.

Spring southwesterly winds are important factor for soil/sand distribution.

Vegetation Description

This site may exist as a finely scaled mosaic with the Shallow Sandy site depending on local variation to the depth of caliche. This site may also intergrade with the Deep Sand and Gravelly Sand sites. Frequently, the mesquite shrubland state of this site, including the development of coppice dunes, has been associated with the Deep Sand ecological site (cf. soil series in Hennessy et al. 1983). The Deep Sand site is a distinct ecological site harboring soils and vegetation that developed long before the coppice dunes. The historic plant community type of the Sandy site is dominated by black grama (*Bouteloua eriopoda*) and other grasses, especially dropseeds (*Sporobolus flexulosus* and *S. cryptandrus*). Natural spatial variation in the vegetation of this ecological site may be governed by slight variations in soil texture. For example, dropseeds may dominate on loamy sands. Variation in the depth to a restrictive horizon, such as caliche, may also drive variation in grass cover. Black grama is a key plant of this site due to its dominance under pristine conditions, its high forage value, and its consequent sensitivity to grazing. Shifts away from black grama dominance are thought to be due to overgrazing and/or multi-year periods of summer or spring drought or due to the introduction of honey mesquite (*Prosopis glandulosa*) seeds with or without grazing. With continuous heavy grazing, the proportional representation of black grama declines because it is preferred by cattle over dropseeds, threeawns, and snakeweed (*Gutierrezia* spp.; Paulsen and Ares 1962). Dropseeds are more palatable than threeawns, so dropseeds may also decline relative to threeawns and snakeweed. Under climatic conditions that are not conducive to black grama reproduction or due to the loss of components of the soil biota, demographic limitations may lead to persistent absence of black grama, even without shrub invasion. Shrub invasion is, however, very common. Loss of soil stability and/or a reduction in black grama cover may permit either the survival or establishment mesquite seedlings due to reduced competition or fire frequency. Subsequent grazing by livestock and native herbivores, competition from shrubs, erosion, and concentration of nutrients under adult shrubs eventually lead to persistent reductions of grass cover and mesquite-dominated coppice dunes with bare or snakeweed-dominated interdunal areas.

A substantial number of studies exist that document states and potential causes of transitions. There are multiple competing and complementary explanations for individual transitions that have not been formally tested. If the operation of these mechanisms is case-contingent, it may be especially problematic to define the causes of transitions quantitatively (e.g., a threshold cover of black grama). Nonetheless, careful monitoring of black grama health should be a key feature of management in SD-2. Overall, the high palatability of black grama during times of year when most other species are less palatable, coupled with the limited capacity of this grass to regenerate under current climatic conditions (Nielson 1986), leads to a relatively high probability of transition with poor range management. It is also possible that changes in climate over the last several hundred years have created an SD-2-wide transition from the presumed historic plant community type and that good management can only delay the inevitable shift to mesquite shrubland.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BOER4 | *Bouteloua eriopoda* | Black grama |
| SPFL2 | *Sporobolus flexuosus* | Mesa dropseed |
| PRGL2 | *Prosopis glandulosa* | Honey mesquite |
| GUSA2 | *Gutierrezia sarothrae* | Broom snakeweed |
| ARIST | *Aristida* | Threeawn |

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

Disturbance Description

Wind is dominant disturbance. Highly sensitive to grazing and frequent drought. Fire is relatively infrequent but can result in significant change of dominant vegetation.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 904 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 904 | 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

Relatively linear features ranging from 1-100,000ac+.

Adjacency or Identification Concerns

Issues or Problems

Current species dominance is sand-sage and broom dalea in the northern extent and mesquite and broom snakeweed in the southern extent of these grasslands. A significant proportion of the extent of these grasslands has been converted to dune shrubland with mesquite dominance and soil redistribution by wind erosion in the southern portion.

Lack of research regarding thresholds in response to disturbance and restoration techniques.

Native Uncharacteristic Conditions

As degradation occurs, grasses are replaced by shrubs (mesquite in the south and sand sagebrush in the north) and subshrubs (dalea in the north and snakeweed in the south) and grasses decline in cover and productivity. There is limited evidence that either Class A or Class B are widespread enough to be of interest.

Comments

The model is most commonly used to represent grassland or simple shrubland systems.

Below-normal precipitation (<7in) lasting more than 2-3yrs was modeled in this class as "Option 1." Wind/Weather/Stress was modeled to represent wind that redistributes soil.

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 | B | B | B | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | B | B | B | A | A | A | A | A | A | A |
| Herb | >1.0 | B | B | B | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | A | A | 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 43 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOER4 | Bouteloua eriopoda | Black grama | Lower |
| SPCR | Sporobolus cryptandrus | Sand dropseed | Lower |
| PRGL2 | Prosopis glandulosa | Honey mesquite | Upper |

Description

Black-grama, sand-dropseed-dominated semi-desert grassland, with scattered medium-large mesquite. Shrub cover <10%.

*Maximum Tree Size Class*  
None

Class B 57 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOER4 | Bouteloua eriopoda | Black grama | Upper |
| SPCR | Sporobolus cryptandrus | Sand dropseed | Lower |
| PRGL2 | Prosopis glandulosa | Honey mesquite | Upper |

Description

Black-grama, sand-dropseed-dominated semi-desert grassland, with smaller scattered mesquite. Shrub cover <10%.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Late1:OPN | 5 |
| Late1:OPN | 6 | 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** |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.002 | 500 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:OPN | 0.05 | 20 | Yes | 0 |
| Optional 1 | Late1:OPN | Early1:OPN | 0.1 | 10 | Yes | 0 |

Optional Disturbances

Optional 1: Drought

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