11220

Chihuahuan Gypsophilous Grassland and Steppe

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
| Don Ellsworth | don\_ellsworth@blm.nm.gov | Jackie Poole | Jackie.Poole@tpwd.state.tx.us |
| Jony Cockman | jcockman@blm.gov | None | None |
| Tim Christiansen | tchristiansen@tnc.org | None | None |

**Reviewer:** Tim Christiansen, tchristiansen@tnc.org

Vegetation Type

Steppe/Savanna

Map Zone

26

Geographic Range

In map zone (MZ) 25, this type occurs in southern New Mexico (White Sands, Roswell). Pockets may exist in Arizona.

In MZ26, this type occurs in the foothills of the Guadalupe Mountains, Salt Flats, Rustler Hills, Yeso Hills, Delaware Creek Basin, and other gypsophilous substrates of the Pecos Basin.

Biophysical Site Description

This ecological system is restricted to gypsum outcrops or sandy gypsiferous and/or often alkaline soils that occur in basins and slopes in the Chihuahuan Desert. Elevation range is from 1,100-2,000m. These typically sparse grasslands, steppes, or dwarf-shrublands are dominated by a variety of gypsophilous plants, many of which are endemic to these habitats. Characteristic species include crinklemat (*Tiquilia hispidissima*), fourwing saltbush (*Atriplex canescens*), Hartweg’s sundrops (*Calylophus hartwegii*), Torrey’s jointfir (*Ephedra torreyana*), seaheath (*Frankenia jamesii*), gypsum grama (*Bouteloua breviseta*), blazingstar (*Mentzelia perennis*), fiddleleaf (*Nama carnosum*), lanceleaf moonpod (*Selinocarpus lanceolatus*), gyp dropseed (*Sporobolus nealleyi*), alkali sacaton (*Sporobolus airoides*), and threadleaf glowwort (*Sartwellia flaveriae*). This system does not include the sparsely vegetated gypsum dunes that are included in North American Warm Desert Active and Stabilized Dune (CES302.744).

Vegetation Description

Fourwing saltbush (*Atriplex canescens*), Indian ricegrass (*Achnatherum hymenoides*), black grama (*Bouteloua eriopoda*), hairy grama (*B. hirsuta*), gypsum grama (*B. breviseta*), New Mexico feathergrass (*Hesperostipa neomexicana*), James’ galleta (*Pleuraphis jamesii*), sand dropseed (*Sporobolus cryptandra*), alkali sacaton (*S. airoides*), mesa dropseed (*S. flexuosus*), Torrey’s jointfir (*Ephedra torreyana*), longleaf jointfir (*E. trifurca*), Apache plume (*Fallugia paradoxa*), honey mesquite (*Prosopis glandulosa*), soaptree yucca (*Yucca elata*), Torrey’s yucca (*Y. torreyi*), crinklemat (*Tiquilia hispidissima*), saltbush (*Atriplex* spp.), Hartweg’s sundrops (*Calylophus hartwegii*), lanceleaf moonpod (*Selinocarpus lanceolatus*), gyp dropseed (*Sporobolus nealleyi*), alkali sacaton (*Sporobolus airoides*), seaheath (*Frankenia jamesii*), and threadleaf glowwort (*Sartwellia flaveriae*).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BOER4 | *Bouteloua eriopoda* | Black grama |
| SPAI | *Sporobolus airoides* | Alkali sacaton |
| BOBR | *Bouteloua breviseta* | Gypsum grama |
| ATCA2 | *Atriplex canescens* | Fourwing saltbush |
| SPNE | *Sporobolus nealleyi* | Gyp dropseed |
| ATOB | *Atriplex obovata* | Mound saltbush |
| FOSP2 | *Fouquieria splendens* | Ocotillo |

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

Disturbance Description

Fire is not an issue in this Biophysical Setting (BpS). The process driving this system toward an increased shrub component would be pluvial periods that we have estimated to occur on about a 30yr cycle. Then, extreme droughts drive the system back to the more open class. Human disturbance can be a factor. *Alkali sacoton* can support fire. Livestock grazing may be a disturbance factor.

Fire Frequency

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

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

Highly infrequent patches, 5,000ac in Texas: highly patchy distribution, patch size variable up to 1,000s of acres.

Adjacency or Identification Concerns

Pronghorn grazing probably not an issue in Texas. Shrub invasion.

Issues or Problems

Possible military use. Introduced oryx, buffalo. These issues are not present in Texas. Problems with an increase of erosion may occur if the biocrust is continued to be more disturbed. Climate change will probably not be much of an issue except if there is an increase in intensive storms, which will cause more erosion and less grass cover with an increase of shrub density/cover. If there is less grass cover, then fire conditions will change to less frequent fires.

Native Uncharacteristic Conditions

Comments

MZ26 model adopted the MZ25 model, which was reviewed by John Karges and Lee Elliott. MZ26 model was reviewed by Jackie Poole.

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 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| 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 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | B | B | 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 38 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SPAI | Sporobolus airoides | Alkali sacaton | Low-Mid |
| BOER4 | Bouteloua eriopoda | Black grama | Upper |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| BOBR | Bouteloua breviseta | Gypsum grama | Upper |

Description

Upper-layer lifeform: Herb. Fire plays little to no role in this BpS. Climatic factors dominate. Normal conditions are arid (6-10in annually). Process driving this system toward an increased shrub component would be pluvial period. Shrubs will generally be <0-5% cover in this class. Multiyear pluvial cycles provide sufficient moisture for recruitment and increased vigor of the shrub component. This class lasts several decades under normal weather conditions but transitions to shrub component with increased moisture.

*Maximum Tree Size Class*  
None

Class B 62 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SPAI | Sporobolus airoides | Alkali sacaton | Low-Mid |
| BOER4 | Bouteloua eriopoda | Black grama | Upper |
| BOGR2 | Bouteloua gracilis | Blue grama | Upper |
| BOBR | Bouteloua breviseta | Gypsum grama | Upper |

Description

Upper-layer lifeform: Herb. Same species as listed in A but with increased shrub component in the canopy. Extreme droughts probably have an effect over a multiple-year period when they do occur. These extreme droughts drive the system back to the more open class.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:CLS | 50 |
| Mid1:CLS | 51 | Mid1:CLS | 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 | 0.033 | 30 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:OPN | 0.012 | 83 | Yes | 0 |

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