11110

Western Great Plains Mesquite Woodland and Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zone

34

Geographic Range

Southern high plains of Texas, Oklahoma, and New Mexico. At pre-settlement, this Biophysical Setting (BpS) was highly restricted to deep mesic alluvial soils. The EVT has expanded greatly in modern day and occurs over much of the Southern Great Plains. More common on the east side of the model zone (ECOMAP [Cleland et al. 2007] section 315C, and subsections 332Fb and 315Fb), becoming sporadic on the west side (subsection 313Bd and section 315B).

Biophysical Site Description

Deep alluvial soils along drainages in relation to shortgrass or mixedgrass prairie types.

Vegetation Description

Honey mesquite (*Prosopis glandulosa*) canopy with a shortgrass or mixedgrass prairie of little bluestem (*Schizachyrium scoparium*) in the east and sideoats grama (*Bouteloua curtipendula*) in the west. Other species may include lotebush (*Ziziphus obtusifolia*), fourwing saltbush (*Atriplex canescens*), prickly pear (*Opuntia* spp.), blue grama (*B. gracilis*), Texas wintergrass (*Nassella leucotricha*), bush muhly (*Muhlenbergia porteri*), and buffalograss (*Buchloe datyloides*).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PRGL2 | *Prosopis glandulosa* | Honey mesquite |
| SCHIZ4 | *Schizachyrium* | Little bluestem |
| BOCU | *Bouteloua curtipendula* | Sideoats grama |

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

Disturbance Description

Frequent fire is the dominant disturbance type in this BpS with a fire regime group of I. The fire frequency is determined by the fire behavior in the adjacent prairie. Grazing by bison is also a disturbance in the BpS, which would reduce fuel loading and influence the fire intensity and frequency. The modelers assumed grazing was a natural process when setting the mean fire return interval (MFRI).

In a scenario where grass is dominant and woodland is sparse, a widespread regional drought would also reduce fuel loads and could increase the density of the open woodland. If hydraulic lift is generated by the mesquite, then the shallow rooted grasses could survive extended drought.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 15 | 51 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) | 15 | 49 |  |  |
| All Fires | 7 | 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

Linear or small patch. Rarely large patch.

Adjacency or Identification Concerns

This BpS always occurs associated with shortgrass or mixedgrass prairie.

Issues or Problems

This EVT is currently much more widespread on the landscape due to the spread of mesquite with grazing disturbance and lack of fire in the Southern Great Plains.

Native Uncharacteristic Conditions

The spread of mesquite in the Southern Great Plains has reduced the grassland class (A) and has increased the shrubland and woodland class (B).

Comments

For map zone (MZ) 26 and MZ34, this model was created by Lee Elliott and Douglas Zollner and reviewed by Delbert M. Bassett.

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 | C | C | C | C | C | B | B | B | B | B |
| Tree | 0-5 | C | C | C | C | C | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | C | C | C | C | 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 23 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCHIZ4 | Schizachyrium | Little bluestem | Upper |
| BOCU | Bouteloua curtipendula | Sideoats grama | Upper |

Description

This class is an open mixedgrass or shortgrass prairie dominated by little bluestem in the eastern range and sideoats grama in the west. Replacement fire is the dominant disturbance type. Grazing is occurring; however, the modelers assumed this is a natural process when setting the MFRI. Seedling and/or resprouting mesquite should be expected in this class as well.

*Maximum Tree Size Class*  
None

Class B 5 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PRGL2 | Prosopis glandulosa | Honey mesquite | Upper |
| SCHIZ4 | Schizachyrium | Little bluestem | Lower |
| BOCU | Bouteloua curtipendula | Sideoats grama | Lower |

Description

This class is dominated by dense, young mesquite though the canopy itself will remain sparse (only up to 70% closed) due to the fine foliage of mesquite. Replacement fire is the dominant disturbance type.

*Maximum Tree Size Class*  
None

Class C 72 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PRGL2 | Prosopis glandulosa | Honey mesquite | Upper |
| SCHIZ4 | Schizachyrium | Little bluestem | Lower |
| BOCU | Bouteloua curtipendula | Sideoats grama | Lower |

Description

This class is an open woodland with a canopy of 3-5m honey mesquite trees. Both replacement and surface fires occur in this class. Surface fire will maintain the woodland condition. The grass is sparser in this class than in the surrounding grassland and fire less intense.

The effects of drought are uncertain. One consideration of a widespread drought will infrequently be a replacement disturbance. Alternatively, drought could reduce the grass community while increasing the woodland density.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:CLS | 5 |
| Mid1:CLS | 6 | Late1:OPN | 12 |
| Late1:OPN | 13 | 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** |
| Alternative Succession | Early1:OPN | Mid1:CLS | 1 | 1 | Yes | 4 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.14 | 7 | Yes | 0 |
| Alternative Succession | Mid1:CLS | Late1:OPN | 1 | 1 | Yes | 5 |
| Replacement Fire | Mid1:CLS | Early1:OPN | 0.14 | 7 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.05 | 20 | Yes | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.09 | 11 | No | 0 |

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