

11110

Western Great Plains Mesquite Woodland and Shrubland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zones

32, 35

Geographic Range

Southern high plains of Texas, Oklahoma, and New Mexico. Pre-settlement, this Biophysical Setting (BpS) was highly restricted to deep, mesic alluvial soils. This cover type has expanded greatly today 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; subsections 332Fb, 315Fb), becoming sporadic on the west side (ECOMAP subsection 313Bd, section 315B).

Biophysical Site Description

Deep alluvial soils along drainages in relation to short grass or mixed-grass prairie types.

Vegetation Description

Honey mesquite (*Prosopis glandulosa*) canopy with a short- or mixed-grass 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*), sweet acacia (*Acacia farnesiana*), Texas wintergrass (*Nassella leucotricha*), bush muhly (*Muhlenbergia porteri*), and buffalograss (*Buchloe datyloides*).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PRGL2	<i>Prosopis glandulosa</i>	Honey mesquite
SCHIZ4	<i>Schizachyrium</i>	Little bluestem
BOCU	<i>Bouteloua curtipendula</i>	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. Fire frequency is determined by fire behavior in the adjacent prairie. Grazing by bison is also a disturbance in the BpS that would reduce fuel loading and influence fire intensity and frequency. The modelers assumed grazing was a natural process when setting the mean fire return interval (MFRI).

For a scenario in which grass is dominant and woodland is sparse, then 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.

Climate change predictions include an increase in intense rainstorms in this region. If grasses decrease under shrublands, then water holding will decrease, with an increase in severe erosion.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	13	54		
Moderate (Mixed)	38	18		
Low (Surface)	24	28		
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 short- or mixed-grass prairie.

Issues or Problems

This BpS 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 and has increased the shrubland and woodland class.

Comments

For map zone (MZ) 35, this model was adapted from the same BpS in MZ26 and MZ34 by Joseph White and Jon Thomas in consultation with Lee Elliott and Douglas Zollner. The VDDT model was quantitatively changed to represent conditions in MZ35.

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	D	D	D	D	D

Tree	0-5	C	C	C	C	C	D	D	D	D	D
Tree	5-10	C	C	C	C	C	D	D	D	D	D
Tree	10-25	C	C	C	C	C	D	D	D	D	D
Tree	25-50	C	C	C	C	C	D	D	D	D	D
Tree	>50	C	C	C	C	C	D	D	D	D	D

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 mixed- or short-grass 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.

Maximum Tree Size Class

None

Class B 23 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 honey mesquite, although the canopy itself remains sparse due to the fine foliage of mesquite. Replacement fire temporarily reduces shrub cover, although quickly reestablishes due to rapid resprouting in the more mesic climate typical of this ecoregion.

Maximum Tree Size Class

Pole 5-9" DBH

Class C 46 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 3-10m honey mesquite trees. Both replacement and surface fire occur in this class. Surface fire maintains the woodland condition. The grass is sparser in this class than in the surrounding grassland and fire is less intense.

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

Maximum Tree Size Class

Large 21-33" DBH

Class D	8	Late Development 1 - Closed
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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

In mesic locations of the Edwards, there are isolated stands of dense, tall honey mesquite that develop in the absence of major disturbances.

Stand-replacement fire is infrequent due to low fine fuel/ladder fuel accumulation. Small herbaceous layer exists. Mixed fire occurs more frequently. Drought conditions result in death of individual trees, reverting to a more open canopy (modeled as wind/weather stress). This class persists in the absence of disturbance.

Maximum Tree Size Class

Large 21-33" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:OPN	0	Mid1:CLS	5
Mid1:CLS	6	Late1:CLS	20

Late1:OPN	21	Late1:OPN	999
Late1:CLS	21	Late1: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
Replacement Fire	Early1:OPN	Early1:OPN	0.14	7	Yes	0
Replacement Fire	Mid1:CLS	Mid1:CLS	0.1	10	No	0
Mixed Fire	Mid1:CLS	Late1:OPN	0.1	10	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
Replacement Fire	Late1:CLS	Early1:OPN	0.01	100	Yes	0
Wind or Weather or Stress	Late1:CLS	Late1:OPN	0.02	50	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.04	25	Yes	0

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