

13930

Edwards Plateau Limestone Shrubland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Joseph White	Joseph_D_White@baylor.edu	None	None
Lee Elliott	lelliott@tnc.org	None	None
Charlotte Reemts	creemts@tnc.org	None	None

Reviewers: Tim Christiansen, Charlotte Reemts

Vegetation Type

Shrubland

Map Zones

32, 35

Geographic Range

Occurs throughout map zone (MZ) 35, massive bedded limestone formations in central Texas. Occurs at isolated sites in MZ32, generally on Cretaceous limestone exposures.

Biophysical Site Description

This system occurs as a matrix on relatively thin-soiled surfaces of plateaus of the massive limestones, such as the Edwards limestone, on slopes <15%. These short to tall (0.5-3m) shrublands are variable in density depending on the amount of bedrock. This system tends to occur on shallow soils over massive hard-bedded limestone formations and/or in the western and drier portions of the Edwards Plateau of Texas.

Vegetation Description

These short to tall shrublands are variable in density depending on amount of bedrock. Sandpaper oak (*Quercus vaseyana*) and Mohr's oak (*Q. mohriana*) are common in the western portion, and shortlobe oak (*Q. sinuata* var. *breviloba*) is an important component of the system in the central and east. Some areas are dominated by plateau oak (*Q. fusiformis*). Ashe's juniper (*Juniperus ashei*) is often an important component of this system. Other species may include evergreen sumac (*Rhus virens*), prairie sumac (*R. lanceolata*), Texas redbud (*Cercis canadensis* var. *texensis*), stretchberry (*Forestiera pubescens*), Texas ash (*Fraxinus texensis*), Mexican buckeye (*Ungnadia speciosa*), mescal bean (*Sophora secundiflora*), fragrant sumac (*Rhus aromatica*), Texas persimmon (*Diospyros texana*), algerita (*Mahonia trifoliolata*), and lechuguilla (*Agave lechuguilla*). This system also includes *Q. mohriana*-dominated shrublands that are more common in the southern shortgrass prairie northwest of the Edwards Plateau, often sharing dominance with Pinchot's juniper (*J. pinchotii*).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
JUAS	<i>Juniperus ashei</i>	Ashe's juniper
JUPI	<i>Juniperus pinchotii</i>	Pinchot's juniper
QUVA5	<i>Quercus vaseyana</i>	Sandpaper oak
QUSIB	<i>Quercus sinuata</i> var. <i>breviloba</i>	Bastard oak

QUFU	<i>Quercus fusiformis</i>	Plateau oak
BOER4	<i>Bouteloua eriopoda</i>	Black grama
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

Disturbances such as fire may be important processes maintaining this system. Wind-driven fire events dominate disturbance following dry periods. Fuels include sparse grass and low-growing shrubs.

Fire Frequency Results

Severity	Min FI	Max FI
Replacement	20	100
Moderate (Mixed)		
Low (Surface)		
All Fires		

Scale Description

Patchy shrubs with interspersed grass create discontinuous fuel with open rock and barren ground. Disturbance area limited to mesa tops. Small to large patches (100s to 1,000s of acres).

Adjacency or Identification Concerns

Early-successional vegetation of Edwards Plateau Limestone Savanna and Woodland (CES303.660) may exhibit a composition and structure similar to the vegetation described and classified here, but the temporal dynamics are different. On slopes of >15%, dry-mesic slope forest and mesic canyons can be adjacent. The difference between these two vegetation types needs more clarification. In one reviewer's experience, the savanna/woodland occurs on slightly deeper soils, but these minor differences in soil depth are not usually reflected in soil maps. It may be worthwhile to limit this vegetation type to the western part of the Edwards Plateau and to areas where vegetation growth is limited by precipitation (i.e., where vegetation remains in a shrubland state without fire). Then, the Savanna and Woodland can describe the more eastern expressions, where shrublands are successional stages and will grow into woodlands without fire.

Issues or Problems

Lack of knowledge about historical maintenance of shrubland communities. Requires frequent fire to maintain open nature in the eastern part of the range. In the western part of the range, vegetation growth is limited by the lack of moisture.

Native Uncharacteristic Conditions

Overbrowsing by native and/or exotic ungulate can suppress the more palatable species in this vegetation type. In areas with current or historic overbrowsing (especially areas used as goat pastures), dominant shrubs will be agarita (*Mahonia trifoliolata*), Texas persimmon (*Diospyros texana*), and Texas mountain laurel (*Sophora secundiflora*).

Comments

This model was developed for MZs 32 and 35 by Joseph White, Lee Elliott, and Charlotte Reemts. Suggested reviewers for MZs 32 and 35 include: Dave Diamond and Chuck Sexton (FWS Bacones NWR).

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	A	A	A	A	C	C	C	C	C	C
Shrub	0.5-1.0	A	A	B	B	C	C	C	C	C	C
Shrub	1.0-3.0	B	B	B	B	C	C	C	C	C	C
Shrub	>3.0	B	B	B	B	C	C	C	C	C	C
Tree	0-5	C	C	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 leaf form 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 13 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
RHVI3	Rhus virens	Evergreen sumac	Upper
QUVA5	Quercus vaseyana	Sandpaper oak	Upper
QUSIB	Quercus sinuata var. breviloba	Bastard oak	Upper
BOCU	Bouteloua curtipendula	Sideoats grama	Lower

Description

Dominated by widely scattered resprouting shrubs. Vegetation moves to Class B as the primary succession pathway. Replacement fire occurs rarely.

Maximum Tree Size Class

None

Class B 24 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUVA5	Quercus vaseyana	Sandpaper oak	Upper

QUSIB	Quercus sinuata var. breviloba	Bastard oak	Upper
JUAS	Juniperus ashei	Ashe's juniper	Upper
JUPI	Juniperus pinchotii	Pinchot's juniper	Upper

Description

Resprouting of dominant shrubs can cover grass interspaces in slightly deeper soils; other interspaces remain open in areas with bedrock outcrops (i.e., no/very little soil). Shrub growth and development is limited by shallow soils and limited precipitation. Mixed fires occur due to discontinuous fuels and terrain barriers. Mixed fires maintain class. Stand-replacement fire occurs infrequently as major wind-driven events. Class B moves to Class C through succession.

Maximum Tree Size Class

None

Class C 63 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
JUAS	Juniperus ashei	Ashe's juniper	All
JUPI	Juniperus pinchotii	Pinchot's juniper	All
QUSIB	Quercus sinuata var. breviloba	Bastard oak	All
QUVA5	Quercus vaseyana	Sandpaper oak	All

Description

Established shrubs dominate site, grass cover diminished. Stand-replacement fires and mixed intensity each occur due to lightning ignition in adjacent systems with canopy spread. Mixed fires maintain class. Junipers may increase in dominance.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	10
Mid1:OPN	11	Late1:CLS	30
Late1:CLS	31	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:ALL	Early1:ALL	0.01	100	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.01	100	Yes	0

Mixed Fire	Mid1:OPN	Mid1:OPN	0.05	20	No	0
Mixed Fire	Late1:CLS	Late1:CLS	0.017	59	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.017	59	Yes	0

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