

10750

Chihuahuan Mixed Salt Desert Scrub

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Shrubland

Map Zone

26

Geographic Range

Occurs throughout the eastern portion of the southwestern United States. This Biophysical Setting (BpS) occupies sites east from the Delaware Basin to the Permian Basin and south to the Volcanic Highlands. In map zone (MZ) 34, if this exists, it occurs in the Permian Basin (subsections 315Bb and 315Cd).

Biophysical Site Description

This type occurs from lower slopes to valley bottoms ranging in elevation from 2,300-3,500ft. Soils are often alkaline or calcareous. Soil permeability ranges from high to low, with more impermeable soils occurring in valley bottoms. Water ponds on alkaline bottoms. Texture is variable, becoming finer toward valley bottoms. Many soils are derived from alluvium. Average annual precipitation ranges from 5-10in. Summers are hot and dry with many days reaching 100° F. Late summer precipitation from monsoons provides most seasonal moisture for growth. Freezing temperatures are rare but may occur from November through April.

Vegetation Description

This ecological system includes low (<3ft) and medium-sized shrubs found widely scattered (often 20-30ft apart) to high-density (3-4 plants/sq. m) shrubs interspersed with low to mid-height bunch grasses. Common shrubs are fourwing saltbush (*Atriplex canescens*), ephedra (*Ephedra* spp.), horsebrush (*Tetradymia* spp.), javelina bush (*Condalia ericoides*), rabbitbrush (*Chrysothamnus* spp.), and broom snakeweed (*Gutierrezia sarothrae*). Some of these will dominate more than others depending on the site. Common bunch grass species are Indian ricegrass (*Achnatherum hymenoides*), purple threeawn (*Aristida purpurea*), grama (*Bouteloua* spp.), and buffalo grass (*Buchloe dactyloides*). Globe mallows (*Sphaeralcea parvifolia*) are the most common and widespread forbs. The understory grasses and forbs are salt-tolerant, not particularly drought-tolerant, and variably abundant. The relative abundance of species may vary in a patchwork pattern across the landscape in relation to subtle differences in soils and reflect variation in disturbance history. Total cover rarely exceeds 25%, and annual precipitation is closely linked to prior 12 months' precipitation. Stand-replacing disturbances (extended wet periods and drought) shift dominance between shrub and grass species. Following drought, the

system will tend more toward Class C (more shrub prevalence). Following fire and extended wet periods, the system will tend more toward Class A (greater grass prevalence).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ATCA2	<i>Atriplex canescens</i>	Fourwing saltbush
LATR2	<i>Larrea tridentata</i>	Creosote bush
KRLA2	<i>Krascheninnikovia lanata</i>	Winterfat
PRGL		
EPHED	<i>Ephedra</i>	Jointfir
SPAI	<i>Sporobolus airoides</i>	Alkali sacaton
ARIST	<i>Aristida</i>	Threeawn
GRSP	<i>Grayia spinosa</i>	Spiny hopsage

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

Disturbance Description

Under reference conditions, disturbances were unpredictable, but flooding, drought, insects, and fire may all occur in these systems. Extended wet periods were modeled as occurring every 35yrs and drought periods every 35yrs. Extended wet periods tended to favor perennial grass development. Fire was rare and limited to more mesic sites (and moist periods) with high grass productivity. Mixed-severity fire was modeled as occurring with a mean fire return interval of 500-1,000yrs. Native American manipulation of salt desert shrub plant communities was minimal. Grass seed may have been one of the more important salt desert shrub crops. It is unlikely that Native Americans manipulated the vegetation to encourage grass seed.

Fire Frequency Results

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

Scale Description

Disturbance scale was variable during pre-settlement. Droughts and extended wet periods could be region-wide or more local. A series of high-water years or drought could affect whole basins. Most fires were rare and <1ac but may exceed 100s of acres with a good grass crop.

Adjacency or Identification Concerns

This BpS contains the typical Chihuahuan desert shrub communities. A wide range of salt desert shrubs can occur in this group. Upland salt desert shrub communities are currently easily invaded and, in the short term at least, replaced by Russian thistle (*Salsola kali*), buffleggrass (*Pennisetum ciliare*), and Johnson grass (*Sorghum halepense*).

Issues or Problems

One small issue would be that the change in climate could affect the soil crust biomass because of potential increases in intense storms, which could damage the soil crust. The loss of soil crust by either storms or by longer-term drought could increase erosion potential.

Fire would not be affected by a change in biocrust.

Native Uncharacteristic Conditions

Comments

For MZ26, this model was adapted from the BpS 1081 as modeled in MZ25. Model 251081 adopted from MZs 15, 23, 24, and 16 created by Annie Brown, Jolie Pollet, and Stan Kitchen on 10/18/05. Significant changes to the model and description for MZ26 1075 resulted in a change in authorship. Douglas Zollner and Delbert M. Bassett reviewed 1075 model for MZ26.

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	UN	UN	UN	UN	UN	UN
Shrub	0.5-1.0	B	B	C	C	UN	UN	UN	UN	UN	UN
Shrub	1.0-3.0	B	B	C	C	UN	UN	UN	UN	UN	UN
Shrub	>3.0	B	B	C	C	UN	UN	UN	UN	UN	UN
Tree	0-5	UN	UN	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	23	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ATCA2	Atriplex canescens	Fourwing saltbush	Upper

Description

Dominated by widely scattered shrubs. Over time, vegetation moves to Class B as the primary succession pathway. Replacement fire occurs and resets age to zero. Extended wet periods will also have a stand-replacing effect. An alternate succession pathway to Class C may occur infrequently.

Maximum Tree Size Class

None

Class B	47	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ATCA2	Atriplex canescens	Fourwing saltbush	Upper

Description

Discontinuous grass patches and higher shrub canopy cover than in Class A. Extended wet periods will cause a stand-replacing transition to Class A. During extended drought periods, vegetation will shift to Class C. Replacement fire is rare. Class B will be maintained in the absence of disturbance.

Maximum Tree Size Class

None

Class C	30	Mid Development 2 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ATCA2	Atriplex canescens	Fourwing saltbush	All

Description

Grass is lacking, and shrub canopy cover is even higher than Class B. During extended wet periods, vegetation will transition to Class A. Over time, vegetation moves back to Class B through succession. Drought will maintain vegetation in Class C. Fire would not carry in this class and is not modeled.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	9
Mid1:OPN	10	Mid1:OPN	999
Mid2:OPN	10	Mid1:OPN	29

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	0.003	333	Yes	0
Alternative Succession	Early1:ALL	Mid2:OPN	0.03	33	Yes	0
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.03	33	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.002	500	Yes	0
Wind or Weather or Stress	Mid1:OPN	Mid2:OPN	0.03	33	Yes	0
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.03	33	Yes	0
Wind or Weather or Stress	Mid2:OPN	Early1:ALL	0.03	33	Yes	0
Wind or Weather or Stress	Mid2:OPN	Mid2:OPN	0.035	29	No	0

References

Blaisdell, J.P. and R.C. Holmgren. 1984. Managing intermountain rangelands-salt-desert shrub ranges. General Technical Report INT-163. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 52 pp.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.