10950

Apacherian-Chihuahuan Mesquite Upland Scrub

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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Vegetation Type

Shrubland

Map Zones

26, 35

Model Splits or Lumps

This Biophysical Setting (BpS) is lumped with: 2613910.

Geographic Range

Chihuahuan Desert extending into the Sky Island region to the west and the Edwards Plateau to the east.

Biophysical Site Description

Substrates are typically derived from alluvium, often gravelly without a well-developed argillic or calcic soil horizon that would limit infiltration and storage of winter precipitation in deeper soil layers. Mesquite (*Prosopis* spp.) and other deep-rooted shrubs exploit this deep soil moisture, which is unavailable to grasses and cacti.

Vegetation Description

Vegetation is typically dominated by honey mesquite (*Prosopis glandulosa*) or velvet mesquite (*Prosopis velutina*) and succulents. Other desert scrub that may co-dominate or dominate includes viscid acacia (*Acacia neovernicosa*), whitethorn acacia (*A. constricta*), creosotebush (*Larrea tridentata*), oneseed juniper (*Juniperus monosperma*), or redberry juniper (*J. coahuilensis*). Grass species may include sideoats grama (*Bouteloua curtipendula*), purple threeawn (*Aristida purpurea*), bush muhly (*Muhlenbergia porteri*), cane bluestem (*Bothriochloa barbinodis*), streambed bristlegrass (*Setaria leucopila*), and *Vulpia* spp. The deeper soils within this BpS help support good grass cover beneath the shrub canopy. Higher annual rainfall and deeper soils in this BpS, as compared to a Sonoran desert location, allow for a more diverse plant community.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BOUTE | *Bouteloua* | Grama |
| ISMU3 | *Isopterygiopsis muelleriana* | Mueller's isopterygiopsis moss |
| ARIST | *Aristida* | Threeawn |
| MUPO2 | *Muhlenbergia porteri* | Bush muhly |
| ISTE | *Isoetes tegetiformans* | Merlin's grass |
| PRJU3 | *Prosopis juliflora* | Prosopis juliflora |
| ACACI | *Acacia* | Acacia |
| LATR2 | *Larrea tridentata* | Creosote bush |

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

Disturbance Description

Drought is a relatively common occurrence in this BpS, generally occurring every 10-15yrs and lasting 2-3yrs. Occasional long-term drought periods (10-15yr duration) will affect this BpS. Historical natural ignition fires within this BpS were probably 10-15ac in size. Fire helped maintain a general mosaic pattern between open grassland and shrub-dominated areas.

Fire Frequency Results

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

Scale Description

Patch size of this BpS ranges from 50-1,000,000ha (from literature).

Adjacency or Identification Concerns

Similar to Chihuahuan Mixed Desert and Thornscrub (CES302.734) but is generally found at higher elevations where *L. tridentata* and other desert scrub are not co-dominant. It is also similar to Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub (CES302.737) but does not occur on eolian-deposited substrates.

Issues or Problems

This is probably not a BpS but may be a class within semi-desert grassland (BpS 1121). During the last century, the area occupied by this system has increased through conversion of desert grasslands as a result of drought, overgrazing by livestock, and/or decreases in fire frequency. It is believed that this is a system that occurred in very minor amounts and has become widespread as a result of drought, heavy grazing, and other actions.

A climate change that may occur is an increase of intense storms. These storms may increase erosion issues as a major disturbance. Also invasive plant grass species may occur, which can increase fire intensity and frequency.

Native Uncharacteristic Conditions

Comments

For map zone (MZ) 26, the model for BpS 1095/1391 was initiated from the MZ25 BpS 1095 model. Significant changes to the model for MZ26 resulted in a change in the model. BpS 1095 for MZ25 is based on 151095, Mike Babler, Oct 2005. Model 151095 was based on information provided by Heather Schussman, hschussman@tnc.org. The VDDT model is the same as 151121.

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 | C | C | C | C | C | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | C | C | D | D | D | UN | UN | UN |
| Shrub | 1.0-3.0 | B | B | C | C | D | D | D | UN | UN | UN |
| Shrub | >3.0 | B | B | C | C | D | D | D | UN | UN | UN |
| Tree | 0-5 | B | B | C | C | D | D | D | 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 12 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOCU | Bouteloua curtipendula | Sideoats grama | Upper |
| MUPO2 | Muhlenbergia porteri | Bush muhly | Upper |
| ARIST | Aristida | Threeawn | Upper |
| IPER | Ipomoea eriocarpa | Morningglory | Lower |

Description

Grasses and forbs. Early-succession post-fire grass and forb community dominated by perennial bunchgrasses, annual grasses, and forbs. Upper layer of shrub canopy cover typically <5%. Short period of duration in this stage effectively precludes disturbance.

*Maximum Tree Size Class*  
None

Class B 66 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BOCU | Bouteloua curtipendula | Sideoats grama | Low-Mid |
| MUPO2 | Muhlenbergia porteri | Bush muhly | Low-Mid |
| PROSO | Prosopis | Mesquite | Upper |
| ACACI | Acacia | Acacia | Upper |

Description

Grasses with some low shrubs; perennial bunchgrasses regenerate and young shrubs begin growing. Species are perennial bunchgrasses and shrubs. Canopy cover of upper layer is typically 5-10%. Drought stress induces high mortality in brush, resetting community to Class A. Surface fires may burn infrequently, but higher fine fuels lead to stand replacement.

*Maximum Tree Size Class*  
None

Class C 16 Mid Development 2 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PROSO | Prosopis | Mesquite | Upper |
| ACACI | Acacia | Acacia | Mid-Upper |
| ISTE2 | Isocoma tenuisecta | Burroweed | Lower |
| MUPO2 | Muhlenbergia porteri | Bush muhly | Lower |

Description

Shrubs continue to increase in size and/or number of individuals; species are perennial bunchgrasses and shrubs. Drought impacts vegetation. Replacement fires very frequent with surfaces fires occurring as well.

*Maximum Tree Size Class*  
None

Class D 6 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PROSO | Prosopis | Mesquite | Upper |
| ACACI | Acacia | Acacia | Upper |
| ISTE2 | Isocoma tenuisecta | Burroweed | Low-Mid |
| MUPO2 | Muhlenbergia porteri | Bush muhly | Lower |

Description

Shrub-dominated landscape with little perennial grass cover; shrub cover and densities are high enough to outcompete perennial grasses resulting in low levels of fine fuels and increased erosion potential. Stand-replacement fires and drought-induced mortality occur.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 2 |
| Mid1:OPN | 3 | Mid2:OPN | 15 |
| Mid2:OPN | 16 | Late1:OPN | 30 |
| Late1:OPN | 31 | 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** |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.03 | 33 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.033 | 30 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.04 | 25 | No | 0 |
| Wind or Weather or Stress | Mid2:OPN | Mid1:OPN | 0.015 | 67 | Yes | 0 |
| Surface Fire | Mid2:OPN | Mid1:OPN | 0.06 | 17 | Yes | 0 |
| Replacement Fire | Mid2:OPN | Early1:ALL | 0.12 | 8 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.01 | 100 | Yes | 0 |

References

Brown, D.E. (editor) 1982. Biotic communities -- southwestern United States and northwestern Mexico. Desert Plants 4(1-4): 1-342.

Brown, J. K., J. K. Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

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

NatureServe. 2006. Descriptions of Ecological Systems for Modeling of LANDFIRE Biophysical Setttings. Ecologcial Systems of locaion MRLC Map Zone 26; From the Landfire East Legend. NatureServe Central Databases. Arlington, VA. Data current as of 18 July 2006.

Powell, A.M. 1994. Grasses of the Trans-Pecos and Adjacent Areas. Univ of Texas Pr; 1st ed edition.

Powell, A.M. 1998. Trees and Shrubs of the Trans-Pecos and Adjacent Areas. University of Texas Press; 1st University of Texas Press Ed edition.

Schmidt, K.M., J.P. Menakis, C.C. Hardy, W.J. Hann and D.L. Bunnell. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 41 pp. + CD.

Swetnam, T.S. and C.H. Baisan. 1994. Historical fire regime patterns in the Southwestern United States since AD 1700. Pages 11-32 in: C.T. Allen, tech ed., Fire Effects in Southwestern Forests, Proceedings of the Second La Mesa Fire Symposium, General Technical Report RM-GTR-286.