11470

Western Great Plains Foothill and Piedmont Grassland

BpS Model/Description Version: Aug. 2020

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

Herbaceous

Map Zones

27, 33

Model Splits or Lumps

This Biophysical Setting (BpS) is lumped with 1150.

Geographic Range

This occurs along the Front Range piedmont alongside the Chalk Bluffs along the Colorado-Wyoming border, out into the Great Plains on the Palmer Divide, and on piedmont slopes below mesas and foothills in northeastern New Mexico and southern Colorado. This is the Caprock Canyonlands. It also likely extends southward along the eastern front of the Sangre de Cristo Mountains and on breaks and isolated peaks on the plains (ECOMAP subsections M331Bd, M331Fh, 331Bd, and M331Fg).

Biophysical Site Description

This system typically occurs between 1,600-2,200m in elevation. It is best characterized as a mixedgrass to tallgrass prairie on mostly moderate to gentle slopes, usually at the base of foothill slopes, e.g., the hogbacks of the Rocky Mountain Front Range where it typically occurs as a relatively narrow elevational band between montane woodlands and shrublands and the shortgrass steppe. However, it extends east on the Front Range piedmont alongside the Chalk Bluffs along the Colorado-Wyoming border, out into the Great Plains on the Palmer Divide, and on piedmont slopes below mesas and foothills in northeastern New Mexico. A combination of increased precipitation from orographic rain, temperature, and soils limits this system to the lower-elevation zone with ~40cm of precipitation/year. It is associated with well-drained soils.

Vegetation Description

Usually occurrences of this system have multiple plant associations that may be dominated by *Andropogon gerardii*, *Schizachyrium scoparium*, *Muhlenbergia montana* (only at the upper reaches), *Nassella viridula*, *Pascopyrum smithii*, *Sporobolus cryptandrus*, *Bouteloua gracilis*, *Hesperostipa comata*, *Hesperostipa neomexicana*, and *Bouteloua curtipendula*.

Less common but probably present: yellow indiangrass.

Different species listed above will dominate in different areas depending on soil texture. On loams and heavier sites, would have western wheatgrass, green needlegrass as dominants and would also have four-wing saltbush and winterfat (but very scattered and not part of shrub systems?). On sandy and shallow rocky sites, would have more of tall grasses and wouldn't have four-wing or winterfat.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ANGE | *Andropogon gerardii* | Big bluestem |
| SCSC | *Schizachyrium scoparium* | Little bluestem |
| HECO26 | *Hesperostipa comata* | Needle and thread |
| HENE5 | *Hesperostipa neomexicana* | New mexico feathergrass |
| MUMO | *Muhlenbergia montana* | Mountain muhly |
| PASM | *Pascopyrum smithii* | Western wheatgrass |
| NAVI | *Navarretia viscidula* | Sticky pincushionplant |
| BOCU | *Bouteloua curtipendula* | Sideoats grama |

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

Disturbance Description

This system is influenced by fire and small mammal disturbance of soils.

Grazing and browsing occur -- deer, elk, bison, and pronghorn. Currently, deer and elk probably have increased; many small mammals, particularly gophers, prairie dogs, rabbits, and ground squirrels; also grasshoppers.

Burrowing animals -- gophers, prairie dogs, and ground squirrels.

Drought occurs periodically every 20-50yrs. But drought that would cause a dramatic shift would occur very infrequently.

Fire is dependent on adjacent systems. In New Mexico, map zone (MZ) 25 version, fire was modeled with a 15-20yr interval. It is thought that in the Colorado MZs 27 and 33 version, fire is less frequent -- approximately 20yrs+, based on Ponderosa Pine Savanna Colorado model. Fire variable across this system in these MZs -- precipitation, fuel, lightning strikes, adjacent systems variable. So this is poorly understood. This system has more frequent fire than shortgrass -- due to more precipitation, more fuels. Shortgrass model in MZs 27 and 33 modeled with ~20-25yr mean fire return interval; this foothill/piedmont grassland model retained 20yr interval instead of original 30yr interval. All modelers advised/consented.

Less fire today than historically.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 24 | 100 | 2 | 30 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 24 | 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

This is a narrow, linear band system occurring between montane and prairie systems. Small to large patch.

Fire disturbances -- 10s to low 1,000 of acres. Patchy environment.

Adjacency or Identification Concerns

Interspersed within this BpS are foothill shrublands, Ponderosa Pine Savanna, gambel-oak, pinyon pine, mountain-mahogany, and junipers. In some areas, these other systems may have encroached around Aiken Canyon, Colorado Springs -- due to fire suppression. However, encroachment is variable in areas. There is more conifer encroachment but poorly understood. There is a mosaic of soils, however, maintaining the systems. Encroachment is poorly understood in this system. (Some question the encroachment term as used here and instead consider this as "return of trees" and not encroachment -- Sprock, personal communication).

This system is also adjacent to Western Great Plains Shortgrass Prairie, RM Lower Montane Foothill Shrubland, PJ Woodlands.

This system might be confused with mixedgrass prairie or tallgrass prairie. But sandier, shallow, gravelly sites -- taller grasses. If on loam, clay, upland sites -- mixed grass and this BpS.

There are exotics today -- toadflax, knapweed, smooth brome, Canada bluegrass, some cheatgrass in rocky areas, yellow sweetclover.

Due to long-term continuous grazing, there have been species shifts -- more blue grama and fewer mid- and tallgrasses and shrubs. Overgrazing might also encourage *Aristida purpurea longiseta* and other grazing increasers.

Today, there is much development/fragmentation in this area/system. There is also much small acreage, exurban development with livestock affecting this system today. This is where most of weedy, exotics come in.

Also long-term lack of ungulate grazing could lead to a decadent state. This is confounded with invasives. This system evolved with ungulate grazing.

Issues or Problems

Native Uncharacteristic Conditions

See Adj/ID concerns.

Comments

For LANDFIRE National, this model for MZs 27 and 33 was adapted from the model from the same BpS from MZ25 created by Mike Babler and Terri Schulz and reviewed by Tim Christiansen and Keith Schulz. Quantitative and descriptive changes made for MZs 27 and 33; therefore, modeler names were changed.

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 | B | B | B | B | B |
| Herb | 0.5-1.0 | A | A | A | A | A | B | B | B | B | B |
| Herb | >1.0 | A | A | A | A | A | B | B | B | B | B |
| Shrub | 0-0.5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | UN | UN | UN | UN | 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 29 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ANGE | Andropogon gerardii | Big bluestem | Upper |
| SCSC | Schizachyrium scoparium | Little bluestem | Upper |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |
| HECO26 | Hesperostipa comata | Needle and thread | Upper |

Description

Immediate post-fire resprouts during growing season. Few forbs, although it is possible that post-fire forb richness could be higher than Class B. Annuals dependent upon moisture (as are the other species). If there were a wet year, this class might cycle out within 2-3yrs. However, that would be the quickest response. More often, drier years occur, so the cycle would take 7-10yrs+. This is different than the MZ25 New Mexico model due to different moisture, gradients.

Indicator species will be soil-dependent (see Veg Description). Other indicator species might be threeawn, sand dropseed, and blue grama.

Native grazers might keep this class in this stage. Drought enhances the grazing effect. So it wouldn't move out of this class as quickly.

Currently, today there would probably be more in Class A than historically, due to continuous grazing and issue identified above. There's probably ~40% in this class currently.

*Maximum Tree Size Class*  
None

Class B 71 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ANGE | Andropogon gerardii | Big bluestem | Upper |
| SCSC | Schizachyrium scoparium | Little bluestem | Upper |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |

Description

Moderate to dense mid- to tallgrass species. Grass, shrubs, forbs, and annuals dependent upon moisture. Canopy closure dependent on soils, moisture, grazing, and percent rock.

Minimum height is probably around 0.2-0.3m in dry years.

On heavier soils -- western wheatgrass, green needlegrass, four-wing saltbush, winterfat. On sandy, shallow, rocky sites -- big bluestem, little bluestem, switchgrass, yellow indiangrass, and sideoats grama.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Late1:CLS | 6 |
| Late1:CLS | 7 | 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** |
| Wind or Weather or Stress | Early1:ALL | Early1:ALL | 0.01 | 100 | No | 0 |
| Optional 1 | Early1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Native Grazing | Early1:ALL | Early1:ALL | 0.2 | 5 | No | 0 |
| Native Grazing | Late1:CLS | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Optional 1 | Late1:CLS | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.0588 | 17 | Yes | 0 |
| Native Grazing | Late1:CLS | Late1:CLS | 0.8 | 1 | No | 0 |

Optional Disturbances

Optional 1: small mammal soil disturbance

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