

LANDFIRE Biophysical Setting Model

Biophysical Setting 3311470

Western Great Plains Foothill and Piedmont Grassland

☒ This BPS is lumped with: 1150

☐ This BPS is split into multiple models: We are also lumping 1150 Tallgrass Prairie into foothill/piedmont grassland. The tallgrass prairie system does not occur here but rather further east due to precipitation patterns. Only tallgrass species might occur in MZ33. Therefore, just consider those species as part of this or the mixedgrass system

General Information

Contributors (also see the Comments field)

Date 2/1/2007

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Vegetation Type

Upland
Grassland/Herbaceous

Dominant Species

ANGE
SCSC

Map Zone

33

Model Zone

☐ Alaska
☐ California

☒ Northern Plains
☐ N-Cent. Rockies

General Model Sources

- ☒ Literature
☒ Local Data
☒ Expert Estimate

HECO26
HENE5
MUMO
PASM
NAVI
BOCU

☐
☐ Great Basin
☐ Great Lakes
☐ Hawaii
☐ Northeast

☐
☐ Pacific Northwest
☐ South Central
☐ Southeast
☐ S. Appalachians
☐ Southwest

Geographic Range

This occurs along the Front Range piedmont alongside the Chalk Bluffs along the CO-WY border, out into the Great Plains on the Palmer Divide, and on piedmont slopes below mesas and foothills in northeastern NM and southern CO. 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 1600-2200m in elevation. It is best characterized as a mixed-grass 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, but extends east on the Front Range piedmont alongside the Chalk Bluffs along the CO-WY border, out into the Great Plains on the Palmer Divide, and on piedmont slopes below mesas and foothills in northeastern NM. A combination of increased precipitation from orographic rain, temperature and soils limits this system to the lower elevation zone with approximately 40cm of precipitation/year. It is associated with well-drained

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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 indiagrass.

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.

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 NM, MZ25 version, fire was modeled with a 15-20yr interval. It is thought that in the CO MZs 27 and 33 version, fire is less frequent - approximately 20yrs+, based on Ponderosa pine savanna CO model. Fire variable across this system in these mapzones - 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 approximately 20-25yr MFRI; this foothill/piemont grassland model retained 20yr interval instead of original 30yr interval. All modelers advised/consented.

Less fire today than historically.

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, pers comm).

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

This system might be confused with mixed grass prairie or tall grass prairie. But sandier, shallow,

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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 coming 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.

Native Uncharacteristic Conditions

see Adj/ID concerns

Scale Description

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

Fire disturbances - 10s to low 1000 of acres. Patchy environment.

Issues/Problems

Comments

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 changed.

This is a new model developed for MZ25, one on one in Boulder CO 8/28/06.

Vegetation Classes

Class A	30 %	<u>Indicator Species and Canopy Position</u>	<u>Structure Data (for upper layer lifeform)</u>												
Early Development 1 All Structure		ANGE	<table><tr><td></td><td><i>Min</i></td><td><i>Max</i></td></tr><tr><td>Cover</td><td>0 %</td><td>50 %</td></tr><tr><td>Height</td><td>Herb 0m</td><td>Herb 1.0m</td></tr><tr><td>Tree Size Class</td><td colspan="2">None</td></tr></table>		<i>Min</i>	<i>Max</i>	Cover	0 %	50 %	Height	Herb 0m	Herb 1.0m	Tree Size Class	None	
	<i>Min</i>	<i>Max</i>													
Cover	0 %	50 %													
Height	Herb 0m	Herb 1.0m													
Tree Size Class	None														
<u>Upper Layer Lifeform</u>		Upper													
☒ Herbaceous		SCSC													
☐ Shrub		Upper													
☐ Tree	<u>Fuel Model</u>	PASM	☐ Upper layer lifeform differs from dominant lifeform.												
	1	Upper													
		HECO26													
<u>Description</u>		Upper													
Immediate post fire for six years, 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.															

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More often, drier years occur, so the cycle would take 7-10yrs+. This is different than the MZ25 NM model due to different moisture, gradients.

Other indicators species might be threeawn, sand dropseed,

Indicator species will be soil dependent (see Veg Description). Blue grama might also be an indicator.

Small mammal soil disturbance occurs on one percent of this class each year (or every 100yrs). Once prairie dog town or other small mammal disturbance gets established, it stays - optional 1. Wind/weather stress also occurs with the same frequency. Wind/weather stress modeled is just maintenance drought - dry weather. Where this system occurs at dry end.

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 about 40% in this class currently.

Class B	70 %	<u>Indicator Species and Canopy Position</u>	<u>Structure Data (for upper layer lifeform)</u>												
Late Development 1 Closed		ANGE	<table><tr><td></td><td><i>Min</i></td><td><i>Max</i></td></tr><tr><td>Cover</td><td>51 %</td><td>100 %</td></tr><tr><td>Height</td><td>Herb 0m</td><td>Herb >1.1m</td></tr><tr><td>Tree Size Class</td><td colspan="2">None</td></tr></table>		<i>Min</i>	<i>Max</i>	Cover	51 %	100 %	Height	Herb 0m	Herb >1.1m	Tree Size Class	None	
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☐ Tree	<u>Fuel Model</u>	PASM	☐ Upper layer lifeform differs from dominant lifeform.												
	1	Upper													

Description

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

Minimum height is probably around 0.2-0.3 meters 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 indiagrass and sideoats grama.

Replacement fire occurs every approx 15-20yrs.

Small mammal disturbance and camped out, herds of elk (optional 1) throwing it all the way back to A. Infrequent. Occurs on 0.2% of this class each year (every 500yrs)

Native grazing on 0.1% of the class (very infrequently) taking the class all the way back to A. However, native grazing also occurs as a dominant process - all described above in Dist Description - occurs all the time - this system attracts grazers. This occurs on 80% of the class each year.

(Long-term) Drought that would cause a transition dramatically all the way back to A would be infrequent - 200-500yrs. Normal drought occurs, but not modeled.

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Class C **0 %**

[Not Used] [Not Used]

Indicator Species and
Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class D **0 %**

[Not Used] [Not Used]

Indicator Species and
Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class E **0 %**

[Not Used] [Not Used]

Indicator Species and
Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

☐ Upper layer lifeform differs from dominant lifeform.

Description

Disturbances

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Fire Regime Group:** II

Historical Fire Size (acres)

Avg 200

Min 10

Max 2000

Sources of Fire Regime Data

- ☐ Literature
☐ Local Data
☐ Expert Estimate

Additional Disturbances Modeled

- ☐ Insects/Disease ☒ Native Grazing ☒ Other (optional 1) small mammal soil disturbance
☒ Wind/Weather/Stress ☐ Competition ☐ Other (optional 2)

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	20	2	30	0.05	100
Mixed					
Surface					
All Fires	20			0.05002	

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

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USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory:
<http://www.fs.fed.us/database/feis/>.

USDA-NRCS Ecological Site/Range Site Descriptions, Section II, Field Office Technical Guides.
<http://www.nrcs.usda.gov/Technical/efotg/>.

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