LANDFIRE Biophysical Setting Model

Biophysical Setting 3111470 Western Great Plains Foothill and Piedmont Grassland

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 2/1/2007

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Vegetation Type
Upland Grassland/Herbaceous

General Model Sources
☑ Literature
☑ Local Data
☑ Expert Estimate

Dominant Species
ANGE
SCSC
HECO26
HENE5
MUMO
PASM
NAVI
BOCU

Map Zone
31

Model Zone
☐ Alaska
☐ California
☐ Great Basin
☐ Great Lakes
☐ Hawaii
☐ Northeast
☑ Northern Plains
☐ N-Cent.Rockies
☐ 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, M331Fg).

This occurs along the Pine Ridge of MZ31.

Biophysical Site Description

This system typically occurs between 1600-2200m 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, 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 per year. It is associated with well-drained soils.

Vegetation Description

Usually occurrences of this system have multiple plant associations that may be dominated by

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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.

A species that is less common but probably present is yellow Indiangrass.

The species listed above will dominate in different areas depending on soil texture. On loams and heavier sites, western wheatgrass and green needlegrass would dominate along with four-wing saltbush and winterfat (but very scattered and not part of shrub systems?). On sandy and shallow rocky sites, tallgrasses would dominate and four-wing and winterfat would be absent.

Disturbance Description

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

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

Burrowing animals occurring are 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 and33 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 and consented.

Less fire occurs in this system today than what occurred 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 (especially, around Aiken Canyon, Colorado Springs due to fire suppression). However, encroachment is poorly understood in this system. It is variable and there seems to be more conifer encroachment, but this poorly understood as well. (Some question the encroachment term as used here and instead consider this as "return of trees" and not encroachment – Harvey Sprock, NRCS, pers comm). There is a mosaic of soils, however, maintaining the systems.

This system is also adjacent to Western Great Plains Shortgrass Prairie, Rocky Mountain Lower Montane Foothill Shrubland, Pinyon-Juniper Woodlands.

This system might be confused with mixedgrass prairie or tallgrass prairie.

There are exotics today such as toadflax, knapweed, smooth brome, Canada bluegrass, some cheatgrass in

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rocky areas and yellow sweetclover.

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

Today, there is much development and fragmentation in this system. There are many small acreage, exurban developments with livestock and weedy exotics.

Also, a 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

Scale Description

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

Fire disturbances occur in 10s-1000s of acres in a patchy environment.

Issues/Problems

Comments

This model for MZ31 was adapted from the model from the same BpS from MZs 27 and 33 created by Terri Schulz, Chris Pague and Harvey Sprock and reviewed by Este Muldavin and Harvey Sprock. No changes were made nor review obtained for MZ31, as it is thought to be on the fringes of this mapzones and mainly in adjacent mapzones.

This model for MZs 27and 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 27and 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 %**

Early Development 1 All Structure

Upper Layer Lifeform

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model

1

Indicator Species and Canopy Position

ANGE Upper
SCSC Upper
PASM Upper
HECO26 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	50 %
Height	Herb 0m	Herb 1.0m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

This class occurs immediate post fire for six years and resprouts during the growing season. Few forbs,

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although it is possible that post-fire forb richness could be higher than class B. Annuals are 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 NM model due to different moisture and gradients.

Other indicators species might be threeawn and sand dropseed.

Indicator species will be soil dependent (see Vegetation 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 which would occur where this system occurs at its dry end.

Native grazers might keep this class in this stage. Drought enhances the grazing effect; therefore 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 %**

Late Development 1 Closed

Upper Layer Lifeform

- [x] Herbaceous
- [ ] Shrub
- [ ] Tree

Fuel Model

1

Indicator Species and Canopy Position

ANGE Upper
SCSC Upper
PASM Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Herb 0m	Herb >1.1m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

This class consists of moderate to dense mid to tallgrass species. Grass, shrubs, forbs and annuals occur dependent upon moisture. Canopy closure is dependent on soils, moisture, grazing, and percent rock.

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

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

Replacement fire occurs every approximately 15-20yrs.

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

Native grazing occurs on .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 Disturbance Description - occurs all the time - this system attracts grazers. This occurs on 80% of the class each year.

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

Class C **0 %**

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class D **0 %**

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class E **0 %**

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

☐ 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

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.

Additional Disturbances Modeled

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

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