LANDFIRE Biophysical Setting Model

Biophysical Setting 2611490 Western Great Plains Shortgrass Prairie

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

General Information

Contributors (also see the Comments field) **Date** 9/7/2006

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Vegetation Type
Upland Shrubland

General Model Sources
☐ Literature
☐ Local Data
☑ Expert Estimate

Dominant Species
BODA2
BOGR2
SPCR
BOCU
YUEL
GUSA2
PLJA

Map Zone
26

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 system is found primarily in the western half of the Western Great Plains Division and ranges from the Nebraska Panhandle south into TX and NM, although grazing-impacted examples may reach as far north as southern Canada where it grades into Northwestern Great Plains Mixed Grass Prairie (CES303.674).

Biophysical Site Description

This system occurs primarily on flat to rolling uplands with loamy, ustic soils ranging from sandy to clayey.

Vegetation Description

In much of its range, this system forms the matrix system with blue grama (Bouteloua gracilis) dominating this system. Associated graminoids may include purple threeawn (Aristida purpurea), sideoats grama (B. curtipendula), hairy grama (B. hirsuta), buffalo grass (Buchloe dactyloides), needle-and-thread grass (Hesperostipa comata), prairie junegrass (Koeleria macrantha = Koeleria cristata), western wheatgrass (Pascopyrum smithii = Agropyron smithii), James' galleta (Pleuraphis jamesii), alkali sacaton (Sporobolus airoides) and sand dropseed (S. cryptandrus). Although midheight grass species may be present, especially on more mesic land positions and soils, they are secondary in importance to the sod-forming short grasses. Sandy soils have higher cover of H. comata, S. cryptandrus, soapweed yucca (Yucca glauca) and soaptree yucca (Y. elata). Scattered shrub and dwarf-dwarf species such as sand sagebrush (Artemisia filifolia), prairie sagewort (A. frigida), big sagebrush (A. tridentata), fourwing saltbush (Atriplex canescens), spreading buckwheat (Eriogonum effusum), broom snakeweed (Gutierrezia sarothrae), honey mesquite (Prosopis glandulosa), jointfir (Ephedra spp) and pale desert-thorn (Lycium pallidum) may also be present.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Disturbance Description

Large-scale processes such as climate, fire and grazing influence this system. High variation in amount and timing of annual precipitation impacts the relative cover of cool and warm-season herbaceous species in contrast to other prairie systems. Fire is less important, especially in the western range of this system, because the often dry and xeric climate conditions can decrease the fuel load and thus the relative fire frequency within the system. However, historically, fires that did occur were often very expansive. Currently, fire suppression and more extensive grazing in the region have likely decreased the fire frequency even more, and it is unlikely that these processes could occur at a natural scale.

Adjacency or Identification Concerns

In TX, this system occurs on the Llano Estacado and ranges to but does not include the Stockton Plateau. This system is found primarily in the western half of the Western Great Plains Division east of the Rocky Mountains and ranges from the Nebraska Panhandle south into the panhandles of OK and TX and NM, although some examples may reach as far north as southern Canada where it grades into Northwestern Great Plains Mixedgrass Prairie (CES303.674).

Native Uncharacteristic Conditions

Scale Description

10 to 10x10^6 acres.

Issues/Problems

A large part of the range for this system (especially in the east and near rivers) has been converted to agriculture. Areas of the central and western range have been impacted by the unsuccessful attempts to develop dryland cultivation during the Dust Bowl of the 1930s. The short grasses that dominate this system are extremely drought and grazing-tolerant. These species evolved with drought and large herbivores and, because of their stature, are relatively resistant to overgrazing. This system in combination with the associated wetland systems represents one of the richest areas for mammals and birds. Endemic bird species to the shortgrass system may constitute one of the fastest declining bird populations.

Comments

Vegetation Classes

Class A **55 %**

Early Development 1 Open

Upper Layer Lifeform

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

Fuel Model

1

Indicator Species and Canopy Position

BOGR2
Upper
BODA2
Middle
BOCU
Upper

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	20 %
Height	Herb 0m	Herb 0.5m
Tree Size Class	None	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

0-2yrs. Initial phase is described as a sparse canopy with mostly grass and herbaceous species. Canopies small and low cover. Fine fuel may be discontinuous. Wind erosion may affect recovery (coupled with drought) on a 35yr cycle. Surface fires are considered replacement fires and occur between 3-7yrs. Grazing (probability = 0.15) influences recovery and may reset community depending on climate. Community may

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remain in this state for 1-2yrs.

Class B 35 %

Mid Development 1 All Structures

Upper Layer Lifeform

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

Fuel Model

1

Indicator Species and Canopy Position

BOGR2
Upper
BODA2
Middle
BOCU
Upper
GUSA2
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	21 %	80 %
Height	Herb 0m	Herb 0.5m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Three years plus. Development of the community proceeds with increased spring and summer precipitation. Fire disturbance frequency may increase with higher fuel loads depending on climate with return frequency of 3-7yrs. Wind erosion may affect recovery (coupled with drought) on a 35yr cycle. Winter precipitation (probability = 0.03) causes a transition to class C. Grazing (probability = 0.3) influences recovery and may reset community to class A depending on climate.

Class C 5 %

Late Development 1 All Structures

Upper Layer Lifeform

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

Fuel Model

1

Indicator Species and Canopy Position

GUSA2
Upper
BODA2
Middle
BOGR2
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	21 %	80 %
Height	Shrub 0m	Shrub 0.5m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

4-8yrs. With increased winter precipitation, broom snakeweed (Gutierrezia sarothrae) may codominate with established grasses. Stand replacing fire will reset community to class A, at a frequency of 8-15yrs. Wind erosion may affect recovery (coupled with drought) on a 35yr cycle. Grazing (probability = 0.01) influences recovery and may reset community to class A depending on climate.

Class D 5 %

Late Development 1 Open

Upper Layer Lifeform

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

Fuel Model

2

Indicator Species and Canopy Position

GUSA2
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	21 %	60 %
Height	Shrub 0.6m	Shrub 1.0m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Nine years plus. With increased winter precipitation, broom snakeweed (Gutierrezia sarothrae) may dominate

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with exclusion established grasses. Stand replacing fire will reset community to class A, but with a reduced frequency of 10-25yrs. Wind erosion may affect recovery (coupled with drought) on a 35yr cycle.

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

Fire Regime Group:** **II**

Historical Fire Size (acres)

Avg 1000
Min 10
Max 100000

Sources of Fire Regime Data

☐ Literature
☐ Local Data
☑ Expert Estimate

Fire Intervals	*Avg FI*	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	5			0.2	100
Mixed					
Surface					
All Fires	5			0.20002	

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) Winter precipitation
☑ Wind/Weather/Stress
☐ Competition
☐ Other (optional 2)

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