LANDFIRE Biophysical Setting Model

Biophysical Setting 3714220 Southern Blackland Tallgrass Prairie

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

General Information

Contributors (also see the Comments field) **Date** 4/18/2007

Modeler 1 Jim Eidson **Reviewer**
Modeler 2 Roger Mangham **Reviewer**
Modeler 3 **Reviewer**

Vegetation Type
Upland Grassland/Herbaceous

Dominant Species
SCHIZ4
SONU2
ANGE
TRIPS
PAVI2
SPSI2
TRST2
PAPL3

Map Zone
37

Model Zone
☐ Alaska
☐ California
☐ Great Basin
☐ Great Lakes
☐ Hawaii
☐ Northeast
☐ Northern Plains
☐ N-Cent.Rockies
☐ Pacific Northwest
☑ South Central
☐ Southeast
☐ S. Appalachians
☐ Southwest

General Model Sources
☑ Literature
☐ Local Data
☑ Expert Estimate

Geographic Range

This BpS extends through north central TX from the Red River to near the southern Gulf coast bordered by the Coastal Prairie (Kuchler: bluestem-sacahuista), to the east bordering and mingling with Oak-Hickory forest (savanna), in central portions bounded by eastern and western Cross Timbers, to the west bordered by the mesquite-buffalograss and bluestem-grama vegetation types (Kuchler 1964). [Text from Masters, PRAR6 description.]

Biophysical Site Description

The main belt of the Blackland Prairie is divided into four narrow, geomorphic areas aligned in a north south direction. These include-- from west to east-- the Eagle Ford Prairie, the White Rock Cuesta, the Taylor Black Prairie and the Eastern Marginal Prairie (Montgomery 1993). The soils of the Eagle Ford and Taylor Black Prairies are primarily clays of the order vertisol, while the soils of the White Rock Cuesta are mollisols and the Eastern Marginal Prairie of the order alfisol. Alfisols are the important soil order in the San Antonio prairie, while both Alfisols and Vertisols are important in the Fayette prairie. Microtopography such as gilgai on vertisols and mima mounds on alfisols are important microhabitats. Gilgai are shallow microdepressions one to several meters across formed by pedoturbation of montmorillonitic clays. Mima mounds are small circular hills which are variable in size but may be more than a meter high and 1-14m across. The origins of mima mounds are not clear and are probably of variable origin (Diamond and Smeins 1993). The climate is warm temperate to subtropical and humid. Precipitation ranges from 762mm on the western edge to 1016mm on the east (Eidson and Smeins 2001).

Vegetation Description

Little bluestem (Schizachyrium scoparium) and Indiangrass (Sorghastrum nutans) are frequently dominants on Blackland Prairie alfisols and vertisols. Big bluestem (Andropogon gerardii) is of variable

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importance on vertisols and is frequently a dominant on Blackland Prairie mollisols. Gamagrass-switchgrass (Tripsacum dactyloides-Panicum virgatum) prairies are associated with bottomland sites throughout the region, and are also found on upland sites of the northern main belt vertisols where they are especially associated with gilgai microtopography. Silveanus dropseed- mead's sedge (Sporobolus silveanus-Carex meadii) prairies are found over low pH soils of the northern main belt. Little bluestem-brownseed paspalum (S. scoparium-Paspalum plicatulum) prairie is associated with Fayette Prairie alfisols. Each community differs further in secondary florae. For example, eastern forb species such as prairie blazing star (Liatris pycnostachya) and largeflower tickseed (Coreopsis grandiflora) are largely limited to the alfisols of the Eastern Marginal prairies, while grasses such as hairy grama (Bouteloua hirsuta) and seep muhly (Muhlenbergia reverchonii), as well as a diversity of species in the genus Dalea (prairie clover) are generally found on the mollisols of the White Rock Cuesta (Eidson and Smeins 2001).

Disturbance Description

The Blackland Prairie was a disturbance maintained system. Prior to European settlement (pre-1825 for the southern and pre-1845 for the northern half) important natural landscape-scale disturbances included fire and periodic grazing by large herbivores, primarily bison and, to a lesser extent, pronghorn (Antilocapra americana). Infrequent but intense fire combined with short duration grazing suppressed woody species and invigorated herbaceous prairie species. The latter were adapted to fire and grazing by virtue of maintaining perenniating tissues below ground. It has been suggested that second only to climate, fire has been the most important determinant of the spread and maintenance of grasslands (Anderson 1990). Fire frequency in the presettlement blackland prairie is unclear, but may have occurred at intervals of 1-3yrs (Pyne). The majority of fires in grasslands were stand-replacement fires (top-killing greater than 75% of the grass), with surface fires and mixed fires occurring more frequently in woody stands. Both natural (i.e. lightning strike) and anthropogenic ignition sources are recognized. Bison were probably extirpated from the region by the 1850s (Eidson and Smeins 2001).

Adjacency or Identification Concerns

The modern landscape has been converted to croplands, tame pasture and urban areas. Natural Heritage surveys suggest only two percent of this BpS cover may have survived to the 21st Century. Some pastures may contain native species or warm season grasses that give similar signatures from remote sensing.

Native Uncharacteristic Conditions

Scale Description

Stand replacement fires identified by early settlers are described as ranging over wide areas. It is worth noting that bison impacts to fuel beds would have been eliminated by those mid-1800s descriptions, allowing for more widespread growth of fires. One could estimate this dominant fire type (in the grasslands) to regularly spread from thousands to tens of thousands of acres, moving through uplands between riparian areas. Grazing disturbances likely varied widely with short duration, high impact bison herds moving through thousands of acres at a time, but less frequently than in other areas of the Great Plains. Numerous other grazers were noted, including deer and pronghorn, that would have had more widespread but less intense impacts. Fires through grazed areas would not have spread extensively, unless able to break out into heavier, ungrazed prairie fuels.

Issues/Problems

There is an eastern extension of blackland prairie that occurs in southern AR and in MS into AL. This eastern blackland type is in a higher rainfall area and is smaller in contiguous extent and adjacent to southern woodland cover types. This model type focuses on the contiguous TX prairies.

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Comments

Dave Diamond at MORAP in Columbia, MO.

This model was added from a pre-delivery version of MZs 32 and 35 models 8/17/07 by Brendan Ward.

Vegetation Classes

Class A 90 %

Early Development 1 All Structure

Upper Layer Lifeform

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

Fuel Model

3

Indicator Species and Canopy Position

SCHIZ4 Upper
ANGE Upper
SONU2 Upper
SPAS Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Herb 0m	Herb 1.0m
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Post replacement herbaceous vegetation with open structure and minimal thatch. Diverse expression of forbs and annual species in the open herbaceous structure. Dominant and characteristic species vary across major soil types.

Class B 5 %

Mid Development 1 Closed

Upper Layer Lifeform

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

Fuel Model

3

Indicator Species and Canopy Position

PRRI Upper
CRATA Upper
ULCR Upper
CELA Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	40 %
Height	Shrub 0.6m	Shrub 3.0m
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Without fire, fire missed for 10yrs. Sugarberry (C. laevigata), cedar elm (U. crassifolia), honey locust (Gleditsia triacanthos), creek plum (P. rivularis) and hawthorn (Crataegus spp). (Note: these are tree species but are in their shrubby form).

Class C 5 %

Mid Development 1 Open

Upper Layer Lifeform

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

Fuel Model

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Indicator Species and Canopy Position

CELA Upper
ULCR Upper
GLTR Upper
SMBO Lower

Structure Data (for upper layer lifeform)

	Min	Max
Cover	41 %	100 %
Height	Tree 5.1m	Tree 10m
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

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Woodland to forest community. Forms closed mottes scattered throughout the grassland. Replacement fire is a rare event (every 50yrs). Mixed and low intensity fires are more likely at 15yrs and three years, respectively.

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

Fire Regime Group:** II

Historical Fire Size (acres)

Avg 2000
Min 100
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	3			0.33333	91
Mixed	170			0.00588	2
Surface	35			0.02857	8
All Fires	3			0.36779	

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

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