Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R5PRBL **Blackland Prairie**

General Information

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Vegetation Type

Grassland

Dominant Species*

SCHIZ	PAVI2
SORG	SPSI2
ANGE	CAME
TRIPS	PAPL3

General Model Sources

- [x] Literature
- [ ] Local Data
- [x] Expert Estimate

LANDFIRE Mapping Zones

32
35

Rapid AssessmentModel Zones

- [ ] California
- [ ] Great Basin
- [ ] Great Lakes
- [ ] Northeast
- [ ] Northern Plains
- [ ] N-Cent.Rockies
- [ ] Pacific Northwest
- [x] South Central
- [ ] Southeast
- [ ] S. Appalachians
- [ ] Southwest

Geographic Range

This PNVG extends through north central Texas 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 1 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 to 14 meters 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 762 mm on the western edge to 1,016 mm on the east. [Text from 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 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

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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 Liatris pycnostachya and Coreopsis grandiflora are largely limited to the alfisols of the Eastern Marginal prairies, while grasses such as Bouteloua hirsuta and Muhlenbergia reverchonii, as well as a diversity of species in the genus Dalea are generally found on the mollisols of the White Rock Cuesta. [Text from 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 antelope. 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 5 to 10 years (Wright and Bailey 1982). The majority of fires were stand-replacement fires, with surface fires occurring infrequently due to reduced fuels loads. Both natural (i.e. lightning strike) and anthropogenic ignition sources are recognized. Bison herds, though reported for the Blackland Prairie, were far smaller than those found further west in the mixed and shortgrass prairies (Strickland and Fox, 1993). Their impact was probably local with long intervals between grazing episodes. Bison were probably extirpated from the region by the 1850's. [Text from Eidson and Smeins, 2001.]

Adjacency or Identification Concerns

Short-grass prairie borders to the west and Cross Timbers to the east. Most riparian areas were described as having timber prior to modern land conversions. Widely scattered oak groves also were noted through upland areas of the type. The modern landscape has been converted to croplands, tame pasture, and urban areas. Natural Heritage surveys suggest only two percent of PNVG cover may have survived to the 21st Century. Some tame pastures may contain native species or warm season grasses that give similar signatures from remote sensing.

Scale Description

Sources of Scale Data ☑ Literature ☐ Local Data ☑ Expert Estimate

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-1800's descriptions, allowing for more widespread growth of fires. One could estimate this dominant fire type 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 antelope, 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 a eastern extension of Blackland Prairie that occurs in southern Arkansas and in Mississippi into Alabama. 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 Texas prairies.

Model Evolution and Comments

Dave Diamond at MORAP in Columbia, MO.

Succession Classes**

Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 30 %

Early1 All Struct

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.

Dominant Species* and Canopy Position

SCHIZ4 Upper

Upper Layer Lifeform

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Herb Short <0.5m	Herb Short <0.5m
Tree Size Class	no data	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class B 39 %

Mid1 Closed

Description

Moderate development of grass and forb vegetation with some thatch in the absence of recent disturbances. Less annual vegetation and better expression of long-lived perennial species. Dominant and characteristic species vary across major soil types.

Dominant Species* and Canopy Position

SCHIZ4 Upper

Upper Layer Lifeform

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	70 %	100 %
Height	Herb Short <0.5m	Herb Medium 0.5-0.9m
Tree Size Class	no data	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class C 20 %

Mid2 Closed

Description

Well developed and diverse mix of grass and forbs with thatch layer well developed. Typically occurs 2-4 years after fire without disturbances to the fuel bed/ thatch layer. Dominant and characteristic species vary across major soil types.

Dominant Species* and Canopy Position

SCHIZ4 Upper
ANGE Upper
SORGH Upper

Upper Layer Lifeform

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	70 %	100 %
Height	Herb Short <0.5m	Herb Medium 0.5-0.9m
Tree Size Class	no data	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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Class D 10 %

Mid3 Open

Description

Open herbaceous vegetation with variable heights resulting from animal grazing and other uses. Broken fuels beds alter fire behavior locally and regionally. Herbaceous response variable depending upon type, intensity, and timing of herbivory. Annuals and other disturbance favored species common. Dominant and characteristic species vary across major soil types.

Dominant Species* and Canopy Position

SCHIZ4 Upper
SORGH Upper
ARIST Upper

Upper Layer Lifeform

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

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	70 %
Height	Herb Short <0.5m	Herb Medium 0.5-0.9m
Tree Size Class	no data	

- [ ] Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class E 1 %

Late1 Closed

Description

Closed herbaceous vegetation with heavily developed thatch layer. Annuals and diminutive perennial species suppressed. Generally unfavored by grazing animals, compared to other cover types. Over time, two or more fire cycles, woody vegetation invades. Dominant and characteristic species vary across major soil types.

Dominant Species* and Canopy Position

SCHIZ4 Upper
ANGE Upper
QUERC All
PRGL2 All

Upper Layer Lifeform

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

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	70 %	100 %
Height	Herb Short <0.5m	Tree Short 5-9m
Tree Size Class	no data	

- [x] Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Prairie grass dominant, but in later years of woody invasion, oak trees would grow into this height class. In the western portions of this area, mesquite may have grown into a shrub height.

Disturbances

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Disturbances Modeled

- [x] Fire
- [ ] Insects/Disease
- [ ] Wind/Weather/Stress
- [x] Native Grazing
- [ ] Competition
- [ ] Other:
- [ ] Other

Historical Fire Size (acres)

Avg: 2000
Min: 100
Max: 100000

Sources of Fire Regime Data

- [x] Literature
- [x] Local Data
- [x] Expert Estimate

Fire Regime Group: **2**

I: 0-35 year frequency, low and mixed severity
II: 0-35 year frequency, replacement severity
III: 35-200 year frequency, low and mixed severity
IV: 35-200 year frequency, replacement severity
V: 200+ year frequency, replacement severity

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. All values are estimates and not precise.

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	4			0.25	96
Mixed					
Surface	100			0.01	4
All Fires	4			0.26001	

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