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 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R5BSSA **Bluestem - Saccahuista**

General Information

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Vegetation Type

Grassland

Dominant Species*

SCHIZ4	QUVI
SCSCL	ANTE2
PANIC	ANVI2
SPSP	PAPL3

General Model Sources

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

LANDFIRE Mapping Zones

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Rapid Assessment Model 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 is located along the Gulf Coast and inland varying distances from 50 to 150 miles (80-240 km) from south Texas to Louisiana and the mouth of the Mississippi River. To the north this type is bordered by Oak-Hickory forest (Kuchler type 100) in much of Texas and in east Texas Oak-Hickory-Pine (Kuchler type 111). In Louisiana, it is bordered to the north and east by Southern Floodplain Forest (Kuchler type 112) (Kuchler 1964). To the south and west it also joins with the desert grasslands.

Biophysical Site Description

The bluestem-sacahuista is relatively flat, but is characterized by ridge-swale or mound-intermound microtopography. This type is dissected by numerous rivers and streams which result in highly variable species composition (Johnston 1963, Diamond and Smeins 1985, Drawe 1994).
A topographic and moisture gradient exists as one progresses inland and out of floodplains. The diversity of embedded edaphic conditions and wetlands within the general type is important and interacted with fire to determine wildlife species distributions. Extended inundation in areas referred to as lagunas adds a disturbance element within 25 km of the coast. These areas are subject to a different successional pattern than that following other types of disturbance (Scifres and Mutz 1975).

Vegetation Description

This type has many of the same vegetation elements of tallgrass prairie but also has a number of additional species, including some tropical grasses. Nearly 1,000 plant species have been identified in this type. The forb community tends to be richer in the coastal prairie than in true tallgrass prairie. This type is considered a shrub-grassland complex rather than a prairie (Johnston 1963, Scifres and Mutz 1975, Drawe 1994). This type is highly variable in species composition because of the dissected nature of the terrain and topography caused by numerous rivers and creeks (Johnston 1963, Diamond and Smeins 1985, Drawe 1994). The species composition is dominated by little bluestem (Schizachyrium scoparium), sea coast bluestem (S. c.

var. littoralis) several Panicums and sacahuista, also known as Gulf cordgrass (Spartina spartinae). Sacahuista primarily dominates along floodplains of the numerous rivers and near the coast. Other important species include bushy bluestem (Andropogon glomeratus), other bluestems such as split-beard (A. ternarius), broomsedge bluestem (A. virginicus), silver bluestem (Bothriochloa saccharoides), various Sporobolus, and several tropical grasses of the genera Heteropogon, Paspalum, Trachypogon and the previously mentioned Panicum. Secondary species vary in importance regionally depending on topography and soil moisture relations and include sideoats grama (Bouteloua curtipendula), buffalo grass (Buchloe dactyloides) and threeawns (Aristida spp.). Several grass-likes that are important include Carex spp., Eleocharis spp., Scirpus spp. Conspicuous forbs include the genera Ratibida, Rudbeckia, Liatris, and Sagittaria. Shrubs that are important include honey mesquite (Prosopis glandulosa) and various acacias most notably huicache (Acacia farnesiana) in Texas, also Rosa bracteata, and various oaks (Quercus spp). Eastern baccharis (Baccharis halimifolia) and wax myrltle (Myrica cerifera) are more important to the east. All of these woody plants and others increase in the absence of fire.

Disturbance Description

This type is fire regime group II, with frequent replacement fires, both lightning and anthropogenic in origin (Stewart 1951, Lehmann 1965, Drawe 1980, Stewart 2002; Jurney et al 2004). Likely, this type has one of the most frequent fire regimes in North America. Annual burning was described in references to historic accounts (Stewart 1951, Chamrad and Dodd 1973, Stewart 2002:141-144) and in one instance reference was made to burning twice (summer and winter) in the same year (Lehmann 1965:133). These references do not indicate every acre was burned every year but likely some considerable area was burned every year with most of the type being burned at least biannually and some areas burned twice in a given year. Lehmann (1965) also notes accounts about the patches of unburned vegetation and relative green-up compared to burned areas. Fire was likely possible during most seasons and dependant on the availability of dry fine fuels sufficient to carry a fire. Historic accounts from the 1800's depict large burns, but the terrain is dissected by numerous rivers and creeks bordered by trees (Lehmann 1965, Drawe 1994). Therefore this landscape matrix strongly influenced the probable size of burn. A problem with much of the literature on fire in prairies, and therefore a caution, is that it does not include interaction with herbivory (Engle and Bidwell 2001). Bison (Bison bison) were historically an important source of disturbance that increased heterogeneity of patches on the landscape. Wild horses were established early on and large herds were noted by early explorers in the southern part of this type (Stewart 2002). Pronghorn antelope historically occurred in the southwestern most part of this type (Nelson 1925) where rainfall amounts dropped considerably. Although historical accounts of large groups (1,000's) of bison do occur, bison herds were of smaller size and more dispersed in this system than herds of the central Great Plains. Bison grazing affects fire patterns and thus the landscape patterns in tallgrass prairie (Risser 1990) and assuredly this system as well. Bison and other grazing/browsing wildlife species preferentially seek out the new growth of recently burned areas affecting patch composition (e.g., Coppedge and Shaw 1998, Jackson 1965, Risser 1990, Steuter 1986, Fuhlendorf and Engle 2004). Burn accounts are in agreement with the patch burn model where small burns are preferentially grazed by bison. Using the fire/bison interaction model first proposed by Steuter (1986) recent modifications propose that anywhere from 1/6 to 1/3 of a 20,000 acre (8,094 hectares) tallgrass landscape likely burned (Fuhlendorf and Engle 2004). Likely this figure is less for coastal prairie because of the dissected terrain. Burning causes earlier green-up and increased nutrient content of native grasses and is preferentially selected by grazing animals (Lehmann 1965, Oefinger and Scifres 1977). Typically following green-up, fire is followed by intensive bison grazing pressure to the point that structural classes shifted over the landscape in response to an interaction between bison grazing pressure and fire (Steuter 1986; Fuhlendorf and Engle 2001, 2004). Heavily grazed and trampled areas would not burn in the next year to three years creating a one-way closed path. Following this type disturbance the patches are dominated with forbs and will not burn in the succeeding dormant and growing season because of lack of fuel. Whereas previous years unburned post-grazing re-growth would be the next patch to burn. Bison grazing influenced fire return intervals. Fire occurrence in turn influenced bison grazing distribution. This model depicts a landscape composed of a continuously shifting mosaic of patches with a short time period of duration. The small patch burn and very frequent fire scenario is essential to perpetuate suitable lek sites and brood rearing habitat for Attwater's prairie chicken (Tympanicus cupido attwateri) in this system with long growing seasons, fertile soil and quick recovery time and with habitat requirements (Kessler 1978) similar to other prairie chicken species noted by Sparks and Masters (1996). This species historically occurred as somewhat discrete populations in parts of the blackland prairie and coastal prairie (Lehmann 1965, Chamrad and Dodd 1973, Silvy and Hagen 2004, Silvy et al 2004). Frequent fire is essential to control woody dynamics in this dissected landscape mosaic of rivers and creeks with stringers of bottomland and some upland forests (Denevan 1992; Lehmann 1965, Stewart 1951, 2002) and varying edaphic and moisture conditions (Scifres and Mutz 1975).

Adjacency or Identification Concerns

Scale Description

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

We (Lee, Judy & Susanne) reviewed maps showing the large rivers to help derive average fire size which would be limited by breaks in fuel (i.e. rivers).

Issues/Problems

Model Evolution and Comments

Lee Elliott (TNC) also assisted with the model development. We combined the live oak savanna, saline prairie communities with this PNVG. In the model we used alternative succession to account for the small percentage of the landscape that would contain live oak savanna. For class C, grazing in combination with drought (wind/weather/stress) moves a small percentage of Class C to class E, through reduced competition between oak and grass. Drought in class E can reduce a small percentage of the oaks thus pushing those areas to class B.

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 Structures

Description

Post fire community that is short duration (often weeks-depending on time of burning) before transitioning into one of the other community stages. Succession post inundation with water proceeds in a different manner through a sedge then bunchgrass stage.

Indicator Species* and Canopy Position

SCHIZ4	Upper
SCSCL	Upper
PANIC	Upper
SPSP	Upper

Upper Layer Lifeform

☑ Herbaceous
☐ Shrub
☐ Tree

Fuel Model 1

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	55 %
Height	no data	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 B 45%

Mid2 Closed

Description

Mixed forb and grass community either somewhat recovered from bison grazing, or inundation with water or continuing post burn development. Can be somewhat forb dominated with a woody component in areas.

Indicator Species* and Canopy Position

SCHIZ4	Upper
SCSCL	Upper
PANIC	Upper
SPSP	Upper

Upper Layer Lifeform

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

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	55 %	100 %
Height	Herb Medium 0.5-0.9m	Herb Tall > 1m
Tree Size Class	no data	

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

Class C 20%

Mid1 Open

Description

Forb dominated site with sparse bunchgrass clumps, derived from heavy bison grazing and trampling pressure, wallowing and horning, or inundation with water.

Indicator Species* and Canopy Position

RATIB	Upper
RUDBE	Upper
SCHIZ4	Upper
SCSCL	Upper

Upper Layer Lifeform

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

Fuel Model 1

Structure Data (for upper layer lifeform)

	Min	Max
Cover	30 %	55 %
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 D 2%

Late1 Closed

Description

Tallgrass dominated but with a persistent woody component, tillering and overall plant vigor reduced by mulching effect from accumulation of ungrazed, unburned plant litter. Over short periods of fire exclusion woody encroachment will rapidly occur. The woody element will also increase following drought and over-utilization of herbaceous plants. Can go from tree seedling/sapling to large trees.

Indicator Species* and Canopy Position

SCHIZ4	Middle
SCSCL	Middle
PRGL2	Upper
ACFA	Upper

Upper Layer Lifeform

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

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	55 %	100 %
Height	Herb Medium 0.5-0.9m	Tree Short 5-9m
Tree Size Class	Medium 9-21"DBH	

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

This class is composed of tall grass species with thatch buildup and reduced tillering and plant vigor, but the class also has a persistent woody component which initially in this class would be shrub size but quickly growing to small tree sized.

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*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

Class E **3 %**

Late1 Open

Description

Oak mottes/live oak savanna found in areas of sand. Species of live oak changes depending on location in PNVG, Quercus virginiana, north of Brazos River and Q. fusiformis, south of Brazos River. Vegetation can range from tree seedling/sapling to large trees.

Indicator Species* and Canopy Position

QUVI Upper
SCSCL Lower
QUFU Upper
ILVO Middle

Upper Layer Lifeform

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

Fuel Model 9

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	40 %
Height	Tree Regen <5m	Tree Medium 10-24m
Tree Size Class	Large 21-33"DBH	

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

Disturbances

Non-Fire Disturbances Modeled

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

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

Historical Fire Size (acres)

Avg: 100000
Min: 100
Max: 300000

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 the 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.

Sources of Fire Regime Data

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

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	3.6			0.27778	68
Mixed	7.7			0.12987	32
Surface					
All Fires	2			0.40766	

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