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)

R9BKBE **Southeast Gulf Coastal Plain Blackland Prairie and Woodland**

General Information

Contributors *(additional contributors may be listed under "Model Evolution and Comments")*

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Vegetation Type

Grassland

Dominant Species*

SCSC	ANGE
SONU	QUMA
JUVI	TRDA
QUST	SPCO1

General Model Sources

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

LANDFIRE Mapping Zones

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55

Rapid AssessmentModel Zones

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

Geographic Range

Black Belt or Blackland Prairie occurs mainly in the gulf coastal plain of Tennessee, Mississippi and Alabama in a broad arc approximately 450 km long by 40-50 km wide (Subsection 231Ba of Keys et al. 1995; Ecoregion 65a of Griffith et al. 2001). The system also includes the Jackson Prairie region of Mississippi; the Chunnenugee Hills, Red Hills, and Lime Hills of Alabama in Washington, Wilcox, Monroe and Clark counties; and prairie remnants in the Fort Valley Plateau of Bleckley and Houston counties, Georgia (FRCC model, NatureServe 2005).

Biophysical Site Description

Blackland prairie and woodland occurs on eponymous rich, black, circumneutral topsoils formed over clayey, heavy, usually calcareous subsoils with carbonatic or montmorillonitic mineralogy. The system occurs in association with formations of the Tertiary Jackson (Yazoo Clay), Claiborne (Cook Mountain) and Fleming groups; and the Cretaceous Selma group (Selma, Mooreville or Demopolis chalks). The matrix around the blackland prairies is pine-oak forests growing in acidic, sandier soils with less clay (recent STATSCO soils maps).

Floristic similarity among sites across this geographic range generally appears to be 50% or greater, although a number of different alliances within this type have been recognized according to dominant, co-dominant, and diagnostic species. Extant prairies occur in single patches as well as mosaics less than one acre to over several hundred acres in response to soil depth, slope and fire. Mosaics may include virtually treeless patches associated with other patches of widely scattered trees, open deciduous woodlands and evergreen thickets (red cedar "balds").

This PNVG represents a mosaic of Eastern Red cedar Woodland, and Post Oak – Blackjack Oak Woodland, and Little Bluestem – Yellow Indiangrass Herbaceous alliances, as classified by NatureServe (2005). It is a rare and imperiled vegetation type consisting of scattered remnants. Most of the original

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cover has been destroyed or altered by conversion to agriculture and the exclusion of fire.

Vegetation Description

Blackland prairie and woodland is a mosaic of southeastern dry-mesic tallgrass vegetation, deciduous woodlands and red cedar thickets or "balds." The prairies are united by the relative abundance of little bluestem (Schizachyrium scoparium) and yellow Indian grass (Sorghastrum nutans), with other herbs including big bluestem (Andropogon gerardii), eastern gamma grass (Tripsacum dactyloides), composite dropseed (Sporobolus compositus), sideoats grama (Bouteloua curtipendula), white prairie clover (Dalea candida), purple prairie clover (Dalea purpurea), pale purple coneflower (Echinacea pallida), blazing-star (Liatris spp.), and rosin-weed (Silphium). Woody species include post oak (Quercus stellata), blackjack oak (Q. marilandica), chinquapin oak (Q. muhlenbergii), black oak (Q. velutina), southern red oak (Q. falcata), Durand oak (Q. sinuata var. sinuata), American elm (Ulmus americana), green ash (Fraxinus pennsylvanica), smooth sumac (Rhus glabra), winged sumac (Rhus copallina), and eastern red cedar (Juniperus virginiana).

Disturbance Description

For the last 500-1000 years, fires were probably annual in most of the system, many if not most set by aboriginals. Fires were probably used to clear prairies for agricultural planting, to eliminate woody growth, and to aid in hunting. The modern landscape shows a tendency toward erosion, creating shallow-soil areas known as "cedar balds" where soil erosion, presumably from historic agriculture or over-grazing, has reduced topsoil. These areas often show exposures of underlying chalk. Such areas may have resulted (albeit at much lower frequencies) from aboriginal agriculture or overgrazing by native herbivores.

Adjacency or Identification Concerns

Vegetation differences from mosaic pine-oak forests are dramatic, and can be discerned at a glance from the trained eye even in heavily disturbed sites by looking for key dominant woody plant species. Soils maps show higher clay content and lower sand percentages than for surrounding areas (recent STATSCO soils maps).

Scale Description

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

Disturbance occurred at a scale often larger than the size of patches, although a significant portion probably originated in the present system. These prairie-woodland mosaics occurred in a pyric matrix, so fire probably swept in frequently from outside. Patches on the order of 40-50 square miles may have burned following a well planned ignition, assuming nocturnal humidity recovery completely extinguished the fire. Smaller patches would have burned within natural barriers, different ignition parameters, and less extreme weather.

Issues/Problems

This model is inclusive, with related systems such as Jackson Prairie and Georgia outliers added to the typical Black Belt type. This makes description of the system less definitive and possibly confusing. The characterization of the type as a woodland - prairie mosaic rather than a simple prairie (as was done in the original PNVG) is truer to what probably occurred pre-historically, but makes the system more difficult to model and describe.

Model Evolution and Comments

PNVG Code: BKBE. Hodges borrowed heavily from McDearman's PNVG description, but changed McDearman's VDDT model to include woodland mosaic from the beginning, and to include an optional disturbance, erosion of topsoil to form red cedar balds (Optional 1 disturbance).

One anonymous review was completed for this model. The reviewer stated the model and description should be accepted as is.

Succession Classes**

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

Class A 70 %

Early1 Open

Description

Fire is almost annual in Class A. Large patches of prairie grasslands are the dominant ecotype, covering an estimated 50-90% of the landscape. Mosaics of prairie, thicket and woodland are dominated by prairies in uplands, in a complex, dendritic landscape, with heterogeneous age classes in woodlands and interconnected grassland patches. Red cedar at the edges of bald thickets are scorched or killed by fire. With no fire, Class A disappears within 5 years in this model, when it succeeds to Class B.

Dominant Species* and Canopy Position

SCSC	Lower
SONU2	Lower
ANGE	Lower
TRDA3	Lower

Upper Layer Lifeform

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	60 %
Height	Herb Short <0.5m	Herb Tall > 1m
Tree Size Class	no data	

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

Class B 25 %

Mid1 Open

Description

Fire has been excluded for 5 years. Large patches of prairie are uncommon to rare, covering about 25-50% of the landscape. Mosaics tend toward dominance by deciduous woodlands, with some prairie patches interconnected and some isolated within woodlands. Forests are rare. With no fire, Class B disappears within 25 years in this model, succeeding to Class C. With fire, Class B still has enough fuels to cycle back to Class A; I postulate no closed loop perpetuating Class B.

Dominant Species* and Canopy Position

SCSC	Lower
JUVI	Middle
QUST	Mid-Upper
SONU2	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	60 %
Height	no data	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

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

Grasses remain growing under the tree cover in this transitional class.

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

Class C 0 %

Mid1 All Structu

Description

Fire has been excluded for 25 years. Woodlands are the dominant cover type, with prairie patches generally isolated or small, covering about 5-25% of the landscape. The woodland canopy cover is taller, with trees tending toward maturity. Some patches of forest are present. Species within forests tend toward a mix of fire tolerant and intolerant. With no fire, Class C disappears within 50 years in this model, succeeding to Class D. Class C might have persisted in somewhat isolated situations with occasional fire (25-50-year return interval).

Dominant Species* and Canopy Position

QUST	Upper
JUVI	Middle
QUMA	Middle
SCSC	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	30 %	100 %
Height	no data	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

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

Class D 0 %

Late1 Closed

Description

Fire has been excluded for 50+ years. Forests are dominant, with patches of woodland and rare prairie remnants surviving only in edaphically controlled conditions in less than 5% of the landscape. Forests are mixed, with fire-intolerant species achieving dominance in many areas. With no fire, Class D dominates the landscape, with 95% coverage after 50 years, according to this model. This could happen in a forest patch isolated by wetlands.

Dominant Species* and Canopy Position

QUST	Upper
CELA	Upper
FRVI	Upper
JUVI	Mid-Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Structure Data (for upper layer lifeform)

	Min	Max
Cover	60 %	100 %
Height	no data	Tree Tall 25-49m
Tree Size Class	Large 21-33"DBH	

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

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

Class E 5%

Late2 All Structu

Description

Erosion has removed most or all topsoil from subsoils or Cretaceous chalk. Eastern red cedar occurs in patches of varying size, from individuals through small groups to large thickets. The canopy is variable, with patches of trees interspersed with bare ground or sparse herb cover. Outcroppings of chalk occur. Fire may remove some or all red cedars in a patch, but the class depends on lack of soil, so the presumption is that it will reseed and replace itself. This Class may have resulted from aboriginal agriculture or via overgrazing by native grazers. I assume that if left alone, soils will form as plants colonize the patch, and that Class E will eventually succeed to Class A. A default of 500 years is used for this transition, but this is a guess.

Dominant Species* and Canopy Position

JUVI	Low-Mid
RHGL	Low-Mid
RHCO	Lower
SCSC	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model 4

Structure Data (for upper layer lifeform)

	Min	Max
Cover	25 %	85 %
Height	no data	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

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

Disturbances

Disturbances Modeled

- ☑ Fire
- ☐ Insects/Disease
- ☐ Wind/Weather/Stress
- ☐ Native Grazing
- ☐ Competition
- ☑ Other: Aboriginal agric. & grazing
- ☐ Other:

Historical Fire Size (acres)

Avg: no data
Min: no data
Max: no data

Sources of Fire Regime Data

- ☐ Literature
- ☐ Local Data
- ☑ Expert Estimate

Fire Regime Group: 1

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	7			0.14286	24
Mixed	2.2			0.45455	76
Surface					
All Fires	2			0.59741	

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