

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)

R5XTMB **Cross Timbers**

General Information

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

Modelers

Ron Masters rmsters@ttrs.org

Reviewers

Stacy Clark stacyclark@fs.fed.us
David Engle dme@mail.pss.okstate.edu
Doug Zollner dzollner@tnc.org

Vegetation Type

Forested

General Model Sources

- Literature
- Local Data
- Expert Estimate

Rapid Assessment Model Zones

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

Dominant Species*

QUST
QUMA
SCHIZ
ANGE

LANDFIRE Mapping Zones

32
43

Geographic Range

This PNVG lies in central parts of Texas, Oklahoma and Kansas.

Biophysical Site Description

This PNVG generally has sandy to loam Ustalf soils that are from moderately deep to shallow (NatureServe 2005). Moderate rainfall region with periodic severe drought (Johnson and Risser 1971, 1973). The vegetation occurs in bands across the landscape associated strongly with soil type. Available soil water (dictated by soil depth, texture, and topographic position) also has a major influence on vegetation.

Vegetation Description

Historical accounts describe post-replacement shrub-scrub (early coppice) areas of cross timbers in addition to open and closed canopy conditions. The Cross Timbers is an ecotone between prairie and eastern deciduous forests. The black-capped vireo's historic range was associated with the post-replacement cross timbers vegetation type. Washington Irving and others have described areas of cross timbers that were evidently mid-seral closed and possibly late-seral closed, because of their inability to penetrate the forest on horse back and their description of the branching present in those stands. Yet others describe stands within the cross timbers that were easily traversed via wagon. Based on historical accounts and limited analysis of General Land Office survey data, more closed canopy conditions occurred on the landscape than might be expected for a frequent fire regime.

The vegetation is dominated by Post oak (*Quercus stellata*) and to a lesser extent blackjack oak (*Q. marilandica*). In the eastern extent, hickory (*Carya* spp.) and black oak (*Quercus velutina*) may be a constituent, with occasional elm (*Ulmus americana*) and eastern-red cedar (*Juniperus virginiana*) in protected areas. In open conditions the understory and canopy openings are dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), and various annual and perennial forbs with prevalence dictated by stand density and overstory canopy cover. In closed canopy conditions, groundcover has little to no herbaceous cover and is dominated by oak leaf litter. Other important woody plants include chittamwood (*Bumelia lanuginosa*), roughleaf dogwood (*Cornus drummondii*), greenbriar

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

(Smilax spp.), sumac (Rhus spp.) and poison ivy (Toxicodendron radicans). Dense structure is found from the lower to upper midstory in closed canopy conditions with persistent branches composing much of structure along with numerous small to medium diameter stems. In the eastern extent, Vaccinium spp. may contribute to lower midstory structure in closed canopy stands. The Cross Timbers is generally found within a landscape matrix of tallgrass prairie.

Disturbance Description

This PNVG is fire regime group I, with frequent surface fires. Fire frequency is considered to be similar to adjacent forested ecosystems. The limited information available on fire chronologies is supportive of this assumption. Fire regimes are assumed to be a result of both aboriginal and lightning origin. Fire history studies from southwest Missouri and southeast Oklahoma suggest a mean fire return interval of 3-4 years. Major drought cycles occur at approximately 20 year intervals and may influence periodic stand replacement fire depending on the season of fire. Fires have been reported to occur during and following drought periods. Mosaic fire or mixed severity fire is thought to play some role associated with drought cycles where leaves and grass are the primary fuel for carrying a fire. Surface fires were primarily wind driven fires in open (prairie) conditions over a fuel bed of predominantly grass although occasionally surface fires might have occurred in leaf litter given dry conditions. Historic prairie fires have been noted to slow down or stop at the border of cross timbers vegetation, presumably when leaf moisture was high. Surface fire would penetrate or burn completely through late-seral, open stands.

Adjacency or Identification Concerns

The PNVG occurs adjacent to tallgrass or mixed prairie or within in a landscape matrix with patches of prairie. Oaks will encroach into prairie areas of the crosstimbers without fire. The deep alluvial soils of the bottomlands are not included in this PNVG.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

The size and connectedness of patches varies, from small patches of 200 acres to well over several thousand square miles.

Issues/Problems

Areas of Cross Timbers existed in fire shadows at the juncture of rivers or larger streams. In areas that were rocky these areas may have limited fire influence and were essentially locked up on the landscape in late seral stages (Clark 2003, Clark and Hallgren 2004). These areas varied in canopy closure depending on soil type. Some of these protected areas may have had a high surface rock component with less canopy cover and soil types with less rock may have been more dense with near complete canopy closure. Little information is available on disturbance and successional history in the Cross Timbers region. Also, lack of historical information makes determining the percentage of landscape in each class difficult.

Model Evolution and Comments

Suggested reviewers: Dr. David M. Engle and Dr. Terry Bidwell, Oklahoma State University. Dr. Bruce Hoagland, Natural Heritage Inventory, University of Oklahoma. Dr. Stacy Clark, Post-Doc University of Tennessee and also (USFS) Alabama A&M (?). PNVG description was expanded upon review.

Succession Classes**

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

Class A 15 %

Early1 All Struct

Description

Oak reproduction (often coppice) to 15' tall. Community of forbs and perennial grasses. More persistent on shallow soils. Openings may be small to extensive and have scattered live trees. Early on bluestems will be in the upper canopy but will be overtaken by the coppice oak sprouts. 0-19 years of age

Dominant Species* and Canopy Position

QUST Upper
QUMA Mid-Upper
SCHIZ4 Lower
ANGE

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	80 %
Height	Tree Regen <5m	Tree Short 5-9m
Tree Size Class	Sapling >4.5ft; <5"DBH	

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

Initially grasses will be dominant life form but will rapidly be overtaken and shaded out (to some extent) by coppice regeneration.

Fuel Model 3

Class B 20 %

Mid1 Closed

Description

Mid-seral with closed canopy (Cover >60%) sapling to pole-sized oak with little or no herbaceous understory. Often coppice origin. Dense structure is found from the lower to upper midstory in closed canopy conditions with persistent branches composing much of structure along with numerous small to medium diameter stems. In the eastern extent, *Vaccinium* spp. may contribute to lower midstory structure in closed canopy stands. 20-79 years of age.

Dominant Species* and Canopy Position

QUST Upper
QUMA Mid-Upper

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	60 %	100 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Pole 5-9" DBH	

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

There is a east to west decline in average tree height and diameter corresponding to a decreasing moisture gradient. Figures given reflect the central part of the range. As one goes further west, trees may actually drop a height and size class for min and max height and size class. Trees will not move up a class going to the east.

Fuel Model 9

Class C 30 %

Mid1 Open

Description

Mid-seral woodland/savanna overstory with perennial grasses (Cover <60%). Open and somewhat park-like, this class may have some smaller mid-story trees but overall understory is dominated with little and big bluestem. More mesic sites may have switchgrass or other panic grass component.

Dominant Species* and Canopy Position

QUST Upper
QUMA Mid-Upper
SCHIZ4
ANGE

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	60 %
Height	Tree Medium 10-24m	Tree Medium 10-24m
Tree Size Class	Pole 5-9" DBH	

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

There is a east to west decline in average tree height and diameter corresponding to a decreasing moisture gradient. Figures given reflect the central part of the range. As one goes further west, trees may actually drop a

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20-79 years of age.

height and size class for min and max height and size class. Trees will not move up a class going to the east.

Fuel Model 2

Class D 25 %

Late I Open

Description

Mid-seral woodland/savanna oak overstory with perennial grasses (Cover <60%). This class is open and park-like with a tallgrass component of little and big bluestem. More mesic sites may have switchgrass or other panic grass component. 80+ years of age.

Dominant Species* and Canopy Position

QUST Upper
QUMA Mid-Upper
SCHIZ4 Lower
ANGE Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	60 %
Height	Tree Short 5-9m	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:

There is a east to west decline in average tree height and diameter corresponding to a decreasing moisture gradient. Figures given reflect the central part of the range. As you go further west may actually drop a height and size class for min and max height and size class. You will not move up a class going to the east.

Fuel Model 2

Class E 10 %

Late I Closed

Description

Late-seral, closed canopy (Cover >60%) oak dominated overstory community. Little to no herbaceous cover and some shrub component. Varying from east to west. Dense structure is found from the lower to upper midstory in closed canopy conditions with persistent branches composing much of structure along with numerous small to medium diameter stems. In the eastern extent, Vaccinium spp. may contribute to lower midstory structure in closed canopy stands. 80+ years of age.

Dominant Species* and Canopy Position

QUST Upper
QUMA Mid-Upper

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	60 %	100 %
Height	Tree Short 5-9m	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:

There is a east to west decline in average tree height and diameter corresponding to a decreasing moisture gradient. Figures given reflect the central part of the range. As one goes further west, trees may actually drop a height and size class for min and max height and size class. Trees will not move up a class going to the east.

Fuel Model 9

Disturbances

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

Disturbances Modeled

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

Historical Fire Size (acres)

Avg: 200
 Min: 10
 Max: 2000

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.

	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
<i>Replacement</i>	170			0.00588	3
<i>Mixed</i>	250			0.004	2
<i>Surface</i>	6			0.16667	94
<i>All Fires</i>	6			0.17655	

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