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):

R5OAHIdy **Interior Highlands Oak-Hickory (Pine)**

General Information

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

Modelers		Reviewers	
Steve Osborne	steve_osborne@fws.gov	Roger D. Fryar	rfryar@fs.fed.us
Amy Keister	Amy_keister@fws.gov	Paul Nelson	pwnelson@fs.fed.us
Douglas Zollner	dzollner@tnc.org	David H. Jurney	djurney@fs.fed.us

Vegetation Type

Woodland

Dominant Species*

QUAL QUMA3
QUST PIEC2
QURU
QUVE

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 potential natural vegetation group (PNVG) is common in the Interior Highlands. More specifically, it is located in Arkansas, Oklahoma and Missouri, within the Ouachita and Boston Mountains, Arkansas River Valley, and the Salem and Springfield Plateaus. It typically occupies dry to xeric sites at elevations between 500 and 2500 feet.

Biophysical Site Description

This PNVG is found exclusively on drier sites primarily on south and west aspects or ridgetops. It is dominated by oaks and hickories, approximately 75% with a lesser component of shortleaf pine. Open conditions describe a single canopy structure with no developed midstory. Closed conditions are multiple canopy usually late-seral forests.

Vegetation Description

Upland woodlands dominated by white oak (Quercus alba), post oak (Quercus stellata), red oaks, and shortleaf pine (Pinus echinata). Dogwood, small oaks, grasses, blueberries dominate the understory. Small, stand replacement fires, oak decline, and wind throw are the major, large-scale, stand replacement agents. Shortleaf pine is restricted to sites within its natural range on more acidc soils within the oak-hickory-pine forests. Historically, forest types with a shortleaf pine component within this region included more than about 50 percent of the landscape, about 20 percent scrub forests, and 30 percent in open condition (Batek et al. 1999). Wind and mortality maintain gaps over
about 0.7 percent of the landscape. Shortleaf pine however, is only able to capture about half of these gaps (Stambuagh et al. 2002). Shortleaf pine is drought and low temperature sensitive (Stambaugh and Guyette 2004). On a pre-European landscape basis shortleaf pine was positively associated with fire frequency (Batek et al. 1999) and negatively associated with topographic roughness (Guyette and Kabrick 2003, Guyette and Stambaugh, in press).

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

Disturbance Description

Fire is the primary disturbance process in this type. The fire regime is group 1, with high frequency, low intensity surface fires. Replacement fires are infrequent, every 100 to 150 years. Mixed fire is very infrequent in open canopy conditions, but occurs more frequently in closed canopy (every 80 years in closed states). Seasonality helps define surface, mixed fire and stand replacement fire types. Mixed fires are slightly more frequent in closed late-seral stages. Stand replacement fires occurred mostly under drought conditions during the growing season. Late growing season fires under normal moisture conditions were for the most part surface fires. Anthropogenic fire contributes significantly to all fire occurrence. Additional disturbance factors include wind/weather/stress, within stand competition and maintenance, and insect/disease outbreaks. The absence of disturbance, is also significant in movement to classes with closed canopy conditions. Within stand competition and maintenance is most common in closed condition classes, although this disturbance does not significantly alter model results, it was included for consistency with two of the previous FRCC models. Native ungulate grazing may have played a small role in replacement where buffalo and elk concentrated, but fire generally maintained systems. Drought and moist cycles play a strong role interacting with both fire and native grazing.

Adjacency or Identification Concerns

The PNVG was defined using NatureServe - Central Interior and Appalachian (202), CES202.306 Ouachita Montane Oak Forest, CES202.708 Ozark-Ouachita Dry-Mesic Oak Forest, CES202.043 Ozark-Ouachita Mesic Hardwood Forest, CES202.692 Central Interior Dry Acidic Glade and Barrens, Ozark-Ouachita Shortleaf Pine-oak Forest and Woodland, CES202.312 Arkansas Valley Prairie and Woodland. Also identified as Ouachita Mixed Forest and Eastern Broadleaf Forest (R8 Old Growth Guidance).

Scale Description

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

Landscape is adequate in size to contain natural variation in vegetation and disturbance regime. Topographically complex areas can be relatively small (< 1000 acres). Larger landscapes can be up to several thousand acres in size.

Issues/Problems

Type includes glades and barrens as inclusions within the oak-hickory/pine matrix. It is believed by experts that the fire regime is similar enough between these three types that they can be modeled together. The historic range of pine defines where it occurs within the type.

Model Evolution and Comments

This type is a result of combining three FRCC PNVG (OKHK2 ,OKPN2, SEOK4) and excludes areas shown in these models within the West Gulf Coast Plain. Coverage is limited within the Arkansas River Valley. Review should include authors of the above listed FRCC models along with collaboration and suggested edits from Doug Zollner, Paul Nelson, Tom Foti, Susan Hooks, Bruce Davenport, John Andre and others. The disturbance description and frequency of mixed fire in closed states was altered 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 14 %

Early1 All Structures

Description

Pine and oak reproduction to 15' tall. Community of forbs and perennial grasses. More persistent on dry sites. Openings tend to be small and have scattered live trees. < 25% tree canopy cover (Missouri is in the northern extent of the range of shortleaf pine, in the northern areas of this pnvg there will not be a pine component of this group)

Indicator Species* and Canopy Position

QUERC Upper
CARYA Upper
PIEC2 Upper
ANDRO2 Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Herb Short <0.5m	Tree Regen <5m
Tree Size Class	Sapling >4.5ft; <5"DBH	

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

Class B 4 %

Mid1 Closed

Description

Mid-seral with closed canopy oak and shortleaf pole-sized trees with little or no herbaceous understory. Some woody understory development. > 50% canopy cover (crown closure estimate). (Missouri is in the northern extent of the range of shortleaf pine, in the northern areas of this pnvg there will not be a pine component of this group)

Indicator Species* and Canopy Position

QUERC Upper
CARYA Upper
PIEC2 Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 9

Structure Data (for upper layer lifeform)

	Min	Max
Cover	61 %	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:

Class C 30 %

Mid1 Open

Description

Mid-development, open canopy. Woodland/savanna with herbaceous understory. Oak-pine predominate overstory < 50% canopy cover (Missouri is in the northern extent of the range of shortleaf pine, in the northern areas of this pnvg there will not be a pine component of this group)

Indicator Species* and Canopy Position

QUERC
CARYA
PIEC2
ANDRO2

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 9

Structure Data (for upper layer lifeform)

	Min	Max
Cover	26 %	60 %
Height	Tree Medium 10-24m	Tree Tall 25-49m
Tree Size Class	Medium 9-21"DBH	

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

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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 D 49 %

Late1 Open

Description

Late-development, open canopy oak-pine to pine-oak in composition. Late-seral woodland/savanna pine and oak overstory with perennial grasses and limited shrub community. < 50% canopy cover (Missouri is in the northern extent of the range of shortleaf pine, in the northern areas of this pnvg there will not be a pine component of this group)

Indicator Species* and Canopy Position

QUERC
CARYA
PIEC2
ANDRO2

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	26 %	60 %
Height	Tree Medium 10-24m	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:

Class E 3 %

Late1 Closed

Description

Late-seral, closed canopy, oak dominated overstory community. Some herbaceous cover and "rank" woody shrub understory layer. Canopy gaps with non-oak regeneration. > 50% canopy cover (crown closure estimate) (Missouri is in the northern extent of the range of shortleaf pine, in the northern areas of this pnvg there will not be a pine component of this group)

Indicator Species* and Canopy Position

QUERC Upper
CARYA Upper
PIEC2 Upper
ANDRO2

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 9

Structure Data (for upper layer lifeform)

	Min	Max
Cover	61 %	100 %
Height	Tree Medium 10-24m	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:

Disturbances

Non-Fire Disturbances Modeled

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

Historical Fire Size (acres)

Avg: 500
Min: 50
Max: 2000

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 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.

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

Sources of Fire Regime Data

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

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	150	100	300	0.00667	3
Mixed	1000	50	2000	0.001	0
Surface	4	2	10	0.25	97
All Fires	4			0.25767	

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