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):

R5GCPU **West Gulf Coastal Plain Pine-Hardwood Woodland/Forest Upland**

General Information

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

Modelers		Reviewers	
Maria Melnechuk	mseamon@tnc.org	Doug Zollner	dzollner@tnc.org
Mike Melnechuk	mmelnechuk@tnc.org		

Vegetation Type

Forested

Dominant Species*

PIEC
PITA
QUERC
ANDRO2

General Model Sources

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

LANDFIRE Mapping Zones

37
44
45

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 lies in Arkansas, Louisiana, Texas, and SE Oklahoma. The West Gulf Coastal Plain Pine-Hardwood Forest type is found over a large area of the South Central model zone. It is the predominate vegetation system over most of the Upper West Gulf Coastal Plain ecoregion with smaller incursions into the southern Interior Highlands. (Ecological Classification CES203.378)

Biophysical Site Description

This PNVG was historically present on nearly all uplands in the region except on the most edaphically limited sites (droughty sands, calcareous clays, and shallow soil barrens/rock outcrops). Such sites are underlain by loamy to fine-textured soils of variable depths. These are upland sites on ridgetops and adjacent side slopes, with moderate fertility and moisture retention. (Ecological Classification CES203.378).

Vegetation Description

This PNVG consists of forests and woodlands dominated by Pinus echinata and/or Pinus taeda in combination with a host of dry to dry-mesic site hardwood species at lesser prevelance (e.g., Quercus spp., Liquidambar styraciflua, Carya spp.). Overall this system may have supported relatively low levels of vascular plant species diversity. This system has undergone major transformations since European settlement of the region (e.g., conversion of PNV to pine plantations) (Ecological Classification CES203.378).

Disturbance Description

This PNVG is fire regime group 1. Naturally this system had frequent fire dominated by low intensity surface fire with occasional mixed fire in drought years and rare stand replacement fires in extreme dry years. Drought and moist cycles play a strong role interacting with both fire frequency and intensity. Other disturbance factors that played a smaller role included ice storms, wind events, and insect infestations.

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

Adjacency or Identification Concerns

The PNVG meets the oak-hickory-pine type PNV along the southwestern edge of the Interior Highlands ecoregion (map zone 44), and there may be some integration of this type into the lower areas of the Ouachita Mountains. Along the eastern border, the PNVG also integrates with the bottomland hardwood systems of the MSRAP ecoregion (map zone 45). Southern areas of the PNV may need to be reclassified as a separate longleaf pine-dominated PNV.

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. Historically this PNVG covered a very large and relatively contiguous area broken by smaller areas of pine flatwoods, bottomland sloughs and swamps, blackland prairies, saline barrens, and river systems (e.g., Red River floodplain).

Issues/Problems

The area was not mapped for the coarse scale or by Kuchler. This PNVG should be separated from the lower West Gulf Coastal Plain forest types, which tend to be longleaf pine-dominated systems. Many ecologically significant systems are present in the PNVG that are not large enough to map at this scale (sandhills, saline prairies, blackland prairies, nepheline-syenite glades and outcrops, etc.).

Model Evolution and Comments

Tom Foti, Doug Zollner, Roger Fryar, Ron Masters, East Texas

Succession Classes

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

Class A 20 %

Early1 All Structures

Description

0-15 years. Pine/oak regeneration with grass/forb regrowth. Pinus taeda, Pinus echinata, Quercus spp., mixed hardwood shrubs, various Andropogon spp., Carex spp., and forbs with weedy component.

Indicator Species* and Canopy Position

Piec	All
Pita	All
QUERC	Middle
ANDRO2	Lower

Upper Layer Lifeform

☐ Herbaceous
☑ Shrub
☐ Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Shrub Medium 1.0-2.9m	Tree Regen <5m
Tree Size Class	Seedling <4.5ft	

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

Class B 5 %

Mid1 Closed

Description

15-40 years. Mid-development class dominated by Pinus spp and mixed hardwood trees and shrubs. Dense overstory and midstory. Sparse understory with little to no herbaceous component.

Indicator Species* and Canopy Position

piec	All
pita	All
querc	Middle

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☑ Tree

Fuel Model 7

Structure Data (for upper layer lifeform)

	Min	Max
Cover	70 %	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:

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

Class C 25 %

Mid1 Open

Description

15-40 years. Open mid-development class. Open canopy dominated by Pinus spp and fire-tolerant oak species. Open overstory and limited midstory. Continuous herbaceous component.

Indicator Species* and Canopy Position

piec	Upper
pita	Upper
querc	Mid-Upper
andro2	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	70 %
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:

Class D 45 %

Late1 Open

Description

40-500 years. Mature open canopy mixed pine/mixed hardwood woodland to savanna. Depending on soil properties, pine or oak may be dominant canopy species. Very limited midstory (mixed hardwoods, little pine regen). Well developed herbaceous understory governed by percent canopy closure. Made up of diverse grass and forb species.

Indicator Species* and Canopy Position

piec	Upper
pita	Upper
querc	Upper
andro2	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	75 %
Height	Tree Tall 25-49m	Tree Giant >50m
Tree Size Class	Very Large >33"DBH	

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

Class E 5 %

Late1 Closed

Description

40-500 years. Mature closed canopy loblolly pine/mixed hardwood forest. Dense midstory (mixed hardwoods, with some pine regen). Sparse shade-tolerant herbaceous understory. Mesic, seepage, and swale areas.

Indicator Species* and Canopy Position

pita	Upper
qual	Upper
cornu	Middle
carex	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Structure Data (for upper layer lifeform)

	Min	Max
Cover	76 %	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

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

Historical Fire Size (acres)

Avg: 10000
Min: 1000
Max: 50000

Sources of Fire Regime Data

- [x] Literature
- [ ] Local Data
- [x] 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 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.

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	100	20	200	0.01	3
Mixed	100			0.01	3
Surface	3	3	5	0.33333	94
All Fires	3			0.35333	

References

Foti, T.L. 1974. Natural Divisions of Arkansas. In Arkansas Natural Area Plan. Arkansas Department of Planning, Little Rock. Pp 11-34.

Jurney, D., R. Evans, J. Ippolito, and V. Bergstrom. 2004. The role of wildland fire in portions of southeastern North America. Pages 95-116 in R. T. Engstrom and W. J. de Groot (eds). 22nd Tall Timbers Fire Ecology Conf. Proceedings. Kanaskas, Alberta.

Klimas, C.V. (1999). Classification and Functions of Arkansas Wetlands. Arkansas Multi-Agency Wetland Planning Team (file report).

Masters, R. E. 1991. Effects of fire and timber harvest on vegetation and cervid use on oak -pine sites in Oklahoma Ouachita Mountains. Pages 168-176. In S. C. Nodvin and T. A. Waldrop, (eds.). Fire and the environment: ecological and cultural perspectives. Proc. Of an international symposium. USDA For. Serv. Gen. Tech. Rep. SE-69. Southeast For. Exp. Sta., Asheville, N.C.

Masters, R. E. 1991. Effects of timber harvest and prescribed fire on wildlife habitat and use in the Ouachita Mountains of eastern Oklahoma. Ph.D. Thesis, Oklahoma State Univ. Stillwater. 351 pp.

Masters, R. E., and D. M. Engle. 1994. BEHAVE-evaluated for prescribed fire planning in mountainous oak-shortleaf pine habitats. Wildlife Society Bulletin 22:184-191.

Masters, R. E., D. M. Engle, and R. Robinson. 1993. Effects of timber harvest and periodic fire on soil chemical properties in the Ouachita Mountains. Southern Journal of Applied Forestry 17:139-145.

Masters, R. E., R. L. Lochmiller, and D. M. Engle. 1993. Effects of timber harvest and periodic fire on white-tailed deer forage production. Wildlife Society Bulletin 21:401-411.

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

Masters, R. E., R. L. Lochmiller, S. T. McMurry, and G. A. Bukenhofer. 1998. Small mammal response to pine-grassland restoration for red-cockaded woodpeckers. Wildlife Society Bulletin 28:148-158.

Masters, R. E., J. E. Skeen, and J. A. Garner. 1989. Red-cockaded woodpecker in Oklahoma; an update of Wood's 1974-77 Study. Proc. Okla. Acad. Sci. 69:27-31.

Masters, R. E., J. E. Skeen, and J. Whitehead. 1995. Preliminary fire history of McCurtain County Wilderness Area and implications for red-cockaded woodpecker management. Pages 290-302 in D. L. Kulhavy, R. G. Hooper, and R. Costa. (eds.). Red-cockaded woodpecker: Species recovery, ecology and management. Center for Applied Studies, Stephen F. Austin University, Nacogdoches, TX.

Masters, R. E., C. W. Wilson, D. S. Cram, G. A. Bukenhofer, and R. L. Lochmiller. 2002. Influence of ecosystem restoration for red-cockaded woodpeckers on breeding bird and small mammal communities. Pages 73-90 in W. M. Ford, K. R. Russell, and C. E. Moorman, editors. In The role of fire in non-game wildlife management and community restoration: traditional uses and new directions: proceedings of a special workshop. Annual Meeting of The Wildlife Society, Nashville, Tenn. USDA For. Ser. Northeast Research Station. General Technical Report NE- 288.

NatureServe. 2005. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA USA Data current as of January 13, 2005.

Reynolds, E.T., Allen, E.T., May, T.L., and Weems, T.A., USDA, Soil Conservation Service, (1985). Soil Survey of Morehouse Parish, Louisiana. pp 24-168.

Saucier, R.T. 1994. Geomorphology and Quaternary geologic history of the Lower Mississippi Valley, Volume 1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. 364 p.

Saucier, R.T. and L.M. Smith. 1986. Geomorphic mapping and Landscape classification of the Ouachita and Saline River valleys, Arkansas. Archeological Assessments Report No. 51. 11 p. plus maps.

Smith, E.B. 1988. An atlas and annotated list of the vascular plants of Arkansas. Privately published. 489 p.

Wackerman, A.E. 1929. Why prairies in Arkansas and Louisiana? Jour. For. 27: 726-734.

Personal Communication

Foti, Tom, Arkansas Natural Heritage Commission, personal communication.

Zollner, Douglas, The Nature Conservancy-Arkansas Field Office, personal communication.