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)

R5GCPP **West Gulf Coastal Plain Pine -- Uplands + Flatwoods**

General Information

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

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Vegetation Type

Forested

Dominant Species*

PITA
PIEC
QUER
ANDR

General Model Sources

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

LANDFIRE Mapping Zones

37
44
45

Rapid AssessmentModel 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). The flatwoods communities represent predominately dry flatwoods of limited areas of the inland portions of West Gulf Coastal Plain. (Ecological Classification CES203.278)

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). The flatwoods PNVG is usually found on nonriverine, Pleistocene high terraces. Soils are fine-textured and hardpans may be present in the subsurface. The limited permeablility of these soils contributes to shallowly perched water tables during portions of the year when saturated to very dry, a conditions sometimes referred to elsewhere as xerohydric. Saturation occurs not from overbank flooding but typically whenever precipitation events occur. Local topography is a complex of ridges and swales, often in close proximity to one another. Ridges tend to be much drier than swales, which may hold water for varying periods of time (Ecological Classification CES203.278). Lower levels are flooded at varying frequencies. These terraces are often topographically flat. Clayey subsoils lead to formation of permanent and semi-permanent wetlands. Mima mounds are also present in some situations. The Deweyville Terrace Pine Flatwoods (DPFW) also lie within this type. Pine flatwoods generally occur on the middle and highest Deweyville terraces in the study area, on Guyton and Pheba soils. The lower (and younger) Deweyville surfaces that occur below 26 m (87 ft.) mean sea level (msl) are subject to Ouachita or Saline River flooding at least once every ten years, on average, but their wetland character is primarily maintained by

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

precipitation. Above 26 m msl, precipitation is the sole source of wetland hydrology in the pine flatwoods. Guyton soils occur in units of 10 to 400 ha. These soils are level and poorly drained. Guyton silt loam soils have water tables within 30 cm of the surface during the winter and early spring. Topographically lower areas of Guyton also experience periodic flooding during the winter and spring. On the higher Deweyville terraces, pine flatwoods occur primarily on Pheba silt loam, which has a seasonal water table perched above the fragipan during periods of high rainfall. The fragipan restricts water movement and root penetration. Since higher Deweyville sublevels are flatter and more poorly drained than the lower sublevels, they are marginal for pine flatwoods except on topographically higher rises of Pheba soil. This is in contrast to the Prairie Terrace Pine Flatwoods, where the higher sublevels are more dissected and better drained.

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., coversion of PNV to pine plantations). (Ecological Classification CES203.378). Within both ridges and swales there is a vegetation variability relating to soil texture and moisture and disturbance history. Driest ridges support Pinus taeda and Quercus stellata; more mesic ridges have Pinus taeda with Quercus alba and species of Symplocus tinctoria and Viburnum dentatum. (Ecological Classification CES203.278) The vegetation of the flatwoods is dominated by loblolly pine with willow oak in wetter flats and southern red oak (Quercus falcata) and post oak (Quercus stellata) on well-drained surfaces. Shortleaf pine (Pinus echinata) can occupy some part of the canopy and sub-canopy in the northern part of range, while longleaf pine (Pinus palustris) can occupy some part of the canopy and sub-canopy in the southern part of the range. In a few places, such as near Goldonna, Louisiana, these three pines will co-occupy the canopy. Depending on disturbance history, sub-canopy species can include recruitment species from the canopy, as well as mockernut hickory (Carya alba), black hickory (Carya texana), sweetgum (Liquidambar styraciflua), slippery elm (Ulmus rubra) sassafras (Sassafras albidum), white ash (Fraxinus americana), and black gum (Nyssa sylvatica). Mid-story and shrub species include those listed above as well as flowering dogwood (Cornus florida), red maple (Acer rubrum), Mexican plum (Prunus mexicana), sourwood (Oxydendrum arboreum), wax myrtle (Myrica cerifera), French mulberry (Callicarpa americana), rusty blackhaw (Viburnum rufidulum), various hawthorns (Crataegus spp.), Maleberry (Lyonia ligustrina), various blueberries and huckleberries (Vaccinium spp.), various hollies (Ilex spp.), winged sumac (Rhus copallina), and sweetleaf (Symplocos tinctoria). Vines include poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), yellow jasmine (Gelsemium sempervirens), and greenbriars (Smilax spp.). The ground layer flora of the PPFW is dramatically different from that of the DPFW, with a large number of prairie species occurring only in PPFW. Frequency of herbs and graminoids is directly correlated with disturbance, especially fire. In the presence of fire this diverisity can be very high. Common herbs and grasses include little bluestem (Andropogon scoparius), broomsedge (Andropogon virginicus), big bluestem (Andropogon gerardi), split-beard bluestem (Andropogon ternarius), spangle-grasses (Chasmanthium laxum and C. sessiliflorum), three-awn grasses (Aristida spp.), panic grasses (Dichanthilium acuminatum, D. boscii, D. commutatum, Panicum virgatum, P. anceps, D. rigidulum and others), sunflowers (Helianthus hirsutus, H. angustifolius, and others), goldenrods (Solidago rugosa, Solidago odora, and others), blazingstars (Liatris spicata, L. pycnostachya, L. squarrosa, L. squarrulosa, L. aspera and others), rosinweeds (Silphium integrifolium, S. asteriscus), partridge berry (Mitchella repens), beggarticks (Desmodium glutinosum, D. paniculatum, D. rotundifolium, D. marilandicum, D. viridiflorum and others), and Lespedeza (Lespedeza procumbens).

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. Infrequent, mild surface fires would occur in the system; however, they would not alter species

composition or structure. Drought and moist cycles play a strong role interacting with both fire frequency and intensity. Native ungulate grazing plays a small role in replacement where buffalo herds concentrated, but generally maintained systems. Insect outbreaks (southern pine beetle), ice storm damage and windthrow are also important disturbance factors.

Adjacency or Identification Concerns

The PNVG meets the oak-hickory-pine type PNV along the southwestern edge of the Interior Highlands ecoregion (map zone44), and there may be some integration of this type into the lower areas of the Ouachita Mountains. Also integrates with the bottomland hardwood systems of the MSRAP ecoregion (map zone45) along the eastern border of the PNV. 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. The landscape was historically 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. The PNVG may need to be separated into two PNVGs: a Pine Flatwoods community which occurs on Pleistocene river terraces throughout the coastal plain and an Upland Pine/hardwood community. We have combined them for this PNVG because it may be difficult to map them separately. The PNVG is separate 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 15 %

Early1 All Struct

Description

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

Dominant Species* and Canopy Position

andro2	Lower
pita	Upper
piec	Upper
querc	Middle

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:

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

Class B 10 %

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.

Dominant Species* and Canopy Position

pita	Upper
piec	Upper
querc	Mid-Upper

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:

Class C 25 %

Mid1 Open

Description

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

Dominant 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 40 %

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 canopy closure. Made up of diverse grass and forb species.

Dominant 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 %	70 %
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:

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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 **10 %**

Late1 Closed

Description

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

Dominant Species* and Canopy Position

PITA	Upper
qual	Upper
cornu	Low-Mid
carex	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Structure Data (for upper layer lifeform)

	Min	Max
Cover	70 %	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

Disturbances Modeled

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

Historical Fire Size (acres)

Avg: 10000
Min: 1000
Max: 50000

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	100	50	200	0.01	4
Mixed	100	50	75	0.01	4
Surface	4	4	10	0.25	93
All Fires	4			0.27	

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