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)

R9WPSAat Atlantic Wet Pine Savanna

General Information

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

Modelers		Reviewers
Mike Schafale	michael.schafale@ncmail.net	
Carl Nordman	carl_nordman@natureserve.org	

Vegetation Type

Woodland

Dominant Species*

ARST5 CTAR
PIPA2
ILGL
SPTE4

General Model Sources

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

LANDFIRE Mapping Zones

58
55
60

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

Atlantic wet pine savannah occurs from southeastern Virginia to South Carolina or Georgia.

Biophysical Site Description

This PNVG occurs as wet woodlands or savannas that occur on wet mineral soils.

Vegetation Description

The canopy is dominated by longleaf pine (Pinus palustris), sometimes mixed with pond pine (Pinus serotina). There is generally little or no understory in the reference condition, but a variety of hardwoods may occur with infrequent fire. The ground cover is dense and generally diverse. Grasses such as wiregrass (Aristida stricta), dropseed (Sporobolus pinetorum), toothache grass (Ctenium aromaticum), and dropseed (Sporobolus teretifolius) dominate, and a large number of other grasses, sedges, and forbs including insectivorous plants are present.

Canopy trees are patchy in distribution, with regeneration in canopy gaps of ¼ acre or less in size, mid-successional clumps in similar size patches, and the oldest trees occurring as isolated individuals. The reference condition classes are aggregates of numerous patches well dispersed over the landscape.

Disturbance Description

Canopy gaps are created by fire mortality, lightning, and wind throw at the scale of individual trees or several trees. Because of the irregular seed production of longleaf pine, canopy gaps may lack regeneration for several years. Full restoration to reference condition may take a number of burns, and may take many years if older trees are not present, but fire produces substantial ecological benefits before full restoration.

Adjacency or Identification Concerns

This PNVG is distinguished from other longleaf pine-dominated types by the presence of wetland herbs and shrubs. It includes the wet pine flatwoods of the Carolinas but not the flatwoods containing saw palmetto

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

(Serenoa repens) of the Gulf Coast region. It is abundant on remaining natural lands in the outer and middle coastal plain, and occurs in small patches in the fall line sandhills region.

Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been homogenized by logging or clearing. Examples include where loblolly pine (Pinus taeda) or slash pine (Pinus elliottii) have replaced some or all of the longleaf pine, where shrubs have become dense due to inadequate burning, and where the grass-dominated ground cover has been lost due to soil disturbance or past canopy closure.

Scale Description

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

Disturbances other than fire typically occur on a small scale and impact patches, most ¼ acre or less in size.

Issues/Problems

Carl Nordman made some modifications to original model developed by Michael Schafale.

Model Evolution and Comments

Suggested reviewers - Cecil Frost, Margit Bucher
Historical fire size figures from Cecil Frost (pers.comm, 2005)

*Succession Classes***

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

Class A 18 %

Early1 All Struct

Description

Class A is characterized by canopy gaps, most a single tree to a quarter acre size, with pine regeneration up to 15 years old, or lacking pine regeneration because no mast production has occurred since the gap opened. The native grassy ground cover is dominated by Aristida stricta. Tree cover ranges between 0 to 50%.

Dominant Species* and Canopy Position

ARST5 Lower

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☑ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Tree Regen <5m	Tree Regen <5m
Tree Size Class	Seedling <4.5ft	

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

The dominant lifeform is the herbaceous component. Canopy closure ranges between 25-100% and is composed of medium height herbs, 0.5-0.9m tall.

Class B 3 %

Mid1 Closed

Description

Class B includes patches, mostly ¼ acre or less in size, with canopy pines 15-75 years old, and a substantial component of mid-story hardwoods or shrubs encroaching in the absence of fire. The hardwood/shrub cover is greater than 50%. Canopy pine cover ranges between 25-75%.

Dominant Species* and Canopy Position

ILGL Low-Mid
PIPA2 Upper

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☑ Tree

Fuel Model 7

Structure Data (for upper layer lifeform)

	Min	Max
Cover	75 %	100 %
Height	Tree Regen <5m	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 Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

Class C 45 %

Mid1 Open

Description

Class C includes patches, most ¼ acre or less in size, with canopy pines 15-75 years old. There are few hardwoods and only sparse shrubs due to frequent fire. The ground cover is dominated by Aristida stricta. Canopy pine cover ranges between 25-75%.

Dominant Species* and Canopy Position

ARST5 Lower
PIPA2 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	75 %
Height	Tree Regen <5m	Tree Medium 10-24m
Tree Size Class	Pole 5-9" DBH	

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

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

The dominant lifeform is the herbaceous component. Canopy closure ranges between 25-100% and is composed of medium height herbs, 0.5-0.9m tall.

Fuel Model 2

Class D 33 %

Late1 Open

Description

Class D is characterized by patches, most ¼ acre or less in size, with canopy pines 75 or more years old. There are few hardwoods and only sparse shrubs due to frequent fire. The ground cover is dominated by Aristida stricta. Canopy pine cover ranges between 25-75%.

Dominant Species* and Canopy Position

ARST5 Lower
PIPA2 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	75 %
Height	Tree Medium 10-24m	Tree Tall 25-49m
Tree Size Class	Medium 9-21"DBH	

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

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

The dominant lifeform is the herbaceous component. Canopy closure ranges between 25-100% and is composed of medium height herbs, 0.5-0.9m tall.

Fuel Model 2

Class E 1 %

Late1 Closed

Description

Class E includes patches with canopy pines 75 or more years old, with a substantial component of hardwoods and/or shrubs in either the overstory or understory. The ground cover is shrubby or sparse. The hardwood/shrub cover is greater than 50%.

Dominant Species* and Canopy Position

ILGL Low-Mid
PIPA2 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	75 %
Height	Tree Medium 10-24m	Tree Tall 25-49m
Tree Size Class	Medium 9-21"DBH	

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

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

Fuel Model 7

Disturbances

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

Disturbances Modeled

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

Historical Fire Size (acres)

Avg: 100000
Min: 50
Max: 1000000

Sources of Fire Regime Data

- [ ] 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 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			0.01	4
Mixed	175			0.00571	2
Surface	4			0.25	94
All Fires	4			0.26571	

References

Boyer, W. D. 1993. Long-term development of regeneration under pine seed tree and shelter wood stands. Southern Journal of Applied Forestry 17: 10-15.

Brewer, J. S., and Platt, W. J. 1994a. Effects of fire season and herbivory on reproductive success in a clonal forb, Pityopsis graminifolia. Journal of Ecology 82: 665-675.

Brewer, J. S., and Platt, W. J. 1994b. Effects of fire season and soil fertility on clonal growth in the pyrophilic forb, Pityopsis graminifolia (Asteraceae). American Journal of Botany 81: 805-814.

Brown, James K. and Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

Christensen, N. L. 1981. Fire regimes in southeastern ecosystems. In Mooney, H.A., Bonnickson, T.M., Christensen, N.L., Lotan, J.E. and Reiners, W.A., eds. Fire regimes and ecosystem properties. USDA Forest Service General Technical Report WO-26. Pages 112-136.

Croker, T.C. and Boyer, W.D. 1984. Regenerating longleaf pine naturally. USDA Forest Service Research Paper SE-105.

Glitzenstein, J.S., Harcombe, P.A. and Streng, D. R. 1986. Disturbance, succession, and maintenance of species diversity in an east Texas forest. Ecological Monographs 56: 243-258.

Hainds, M.J., Mitchell, R.J., Palik, B.J. and Boring, L.R. 1999. Abundance and distribution of native legumes (Leguminosae) in frequently burned longleaf pine (Pinaceae)—wiregrass (Poaceae) ecosystems. American Journal of Botany 86:1606-1614.

Hermann, S.M., Van Hook, T., Flowers, R.W., Brennan, L.A., Glizenstein, J.S., Streng, D.R., Walker, J.L. and Myers, R.L. 1998. Fire and biodiversity: studies of vegetation and arthropods. North American Wildland and Natural Resource Conference 63:384-401.

Hiers, J.K., Wyatt, R., Mitchell, R.J. 2000. The effects of fire regime on legume reproduction in longleaf pine savannas: is a season selective? Oecologia 125:521-530.

Jacqmain, E.I., Jones R.H. and Mitchell, R.M. 1999. Influences of frequent cool-season burning across a soil moisture gradient on oak community structure in longleaf pine ecosystems. American Midland Naturalist 141: 85-100.

Kirkman, L.K., Drew, M.B. and Edwards, D. 1998. Effects of experimental fire regimes on the population dynamics of Schwalbea americana L. Plant Ecology 137:115-137.

Palik, B.J. and Pederson, N. 1996. Natural disturbance and overstory mortality in longleaf pine ecosystems. Canadian Journal of Forest Research 26: 2035-2047.

Palik, B.J., Mitchell, R.J., Houseal, G. and Pederson, N. 1997. Effects of canopy structure on resource availability and seedling responses in a longleaf pine ecosystem. Canadian Journal of Forest Research 27: 1458-1464.

Palik, B.J. and Engstrom, R. T. 1999. Species composition. In Hunter, M.L. Jr., ed. Maintaining biodiversity in forest ecosystems. Cambridge University Press. Pages 65-94.

Peet, R.K. and Allard, D.J. 1993. Longleaf pine vegetation of the Southern Atlantic and Eastern Gulf Coast regions: a preliminary classification. In Proceedings of the 18th Tall Timbers Fire Ecology Conference. Tallahassee, Florida, USA.

Platt, W.J. and Rathbun, S.L. 1993. Populations dynamics of an old-growth population of longleaf pine (Pinus palustris). In Proceedings of the 18th Tall Timbers Fire Ecology Conference. Tallahassee, Florida, USA.

Platt, W.J., Evans, G.W. and Rathbun, S.L. 1988. The population dynamics of a long-lived conifer (Pinus palustris). American Naturalist 131: 491-525.

Platt, W.J., Evans, G.W. and Davis, M.M. 1988. Effects of fire season on flowering of forbs and shrubs in longleaf pine forests. Oecologia 76: 353-363.

Robbins, L.E. and Myers, R.L. 1992. Seasonal effects of prescribed burning in Florida. Miscellaneous Publications of the Tall Timbers Research Station 8: 1-97.

Schmidt, Kirsten M., Menakis, James P., Hardy, Colin C., Hann, Wendel J. and Bunnell, David L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p. + CD.

Streng, D.R., Glitzenstein, J.S. and Platt, W.J. 1993. Evaluating effects of season of burn in longleaf pine forests: A critical literature review and some results from an ongoing long-term study. Proceedings of the Tall Timbers Fire Ecology Conference 18:227-259.

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/.

Walker, J. and Peet, R.K. 1983. Composition and species diversity of pine-wiregrass savannas of the Green Swamp, North Carolina. Vegetation 55: 163-179.

Walters, J.R. 1991. Application of ecological principals to the management of endangered species: the case of the red-cockaded woodpecker. Annual Review of Ecology and Systematics 22: 505-523.

Ware, S., Frost, C., and Doerr, P.D. 1993. Southern mixed hardwood forest: The former longleaf pine forest. In Martin, W.H., Boyce, S.G. and Echternacht, A.C., eds. Biodiversity of the southeastern United States. New York, NY: John Wiley and Sons, Inc. Pages 447-493.

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