

14580

West Gulf Coastal Plain Pine-Hardwood Flatwoods

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Mike Melnechuk	mmelnechuk@tnc.org		
Larry Threet	larry_threet@fws.gov		

Vegetation Type

Mixed Upland and Wetland

Map Zones

37, 44, 45, 98

Model Splits or Lumps

This BpS is lumped with: 1402

Geographic Range

This type lies in parts of AR, LA and TX, especially in ECOMAP subsections 231Ec, 231Ea, 234Ec and small portions of 231Ej (Cleland et al. 2007).

Biophysical Site Description

This BpS is situated on second and third Pleistocene Terraces above larger drainages. 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 26m (87ft) 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 precipitation. Above 26 msl, precipitation is the sole source of wetland hydrology in the pine flatwoods. Guyton soils occur in units of 10-400ha. These soils are level and poorly drained. Guyton silt loam soils have water tables within 30cm 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. Soils may be named or classified differently in LA.

DPFW represent a transition from a pine-dominated terrace type to floodplain bottomland hardwood forest. The lower sublevels (the lowest and part of the next higher) are within the current floodplain of the Ouachita River and are primarily bottomland hardwood forest (BLH), whereas the upper part of the second sublevel and the highest sublevel are outside the current

floodplain and are dominantly pine or pine-hardwood. As a result many species occur on both the DPFW and the floodplain BLH communities. Delta post oak (*Quercus similis*) is much more common on the Deweyville than on the Prairie terrace here, as is dwarf palmetto (*Sabal minor*). The presence of laurel oak (*Q. laurifolia*) in vernal pools on the DPFW also indicates overlap between the DPFW and floodplain BLH. It is not uncommon to see loblolly pine (*Pinus taeda*), baldcypress (*Taxodium distichum*), overcup oak (*Q. lyrata*) and dwarf palmetto growing side by side in DPFW.

Prairie Terrace Pine Flatwoods (PPFW)

PPFW are located on the lowest, youngest, and least dissected of the Prairie Terrace sublevels (which are much older than Deweyville terraces and occupy a higher landscape position). More dissected higher levels are naturally occupied by upland hardwood and pine-hardwood forest and woodland. The soils on the PPFW sites are Amy and Pheba silt loams. Amy map units are 10-400ha in size. Pheba map units occur on slightly higher prairie terrace surfaces, and are only 5-20ha in size and occupy only a small portion of the total landscape.

Areas that are located on Amy silt loam soil are extremely wet, due to a seasonal high water table within 30cm of the surface during the winter and spring. Areas that are located on Pheba silt loam have a seasonal water table that is perched above the fragipan during periods of high rainfall. The fragipan restricts water movement and root penetration and causes a hydroxic alteration, as described before.

Vegetation Description

The typical dominant overstory species is loblolly pine (*Pinus taeda*) with willow oak (*Quercus phellos*) in wetter flats and southern red oak (*Q. falcata*) and post oak (*Q. stellata*) or Delta post oak on well-drained surfaces. Shortleaf pine (*P. echinata*) can occupy some part of the canopy and sub-canopy in the northern part of range, while longleaf pine (*P. 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, LA, these pines along with loblolly 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 (*C. 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.), Male-berry (*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 diversity can be very high. Common herbs and grasses include little bluestem (*Schizachyrium scoparium*), broomsedge (*Andropogon virginicus*), big bluestem (*A. gerardii*), split-beard bluestem (*A. ternarius*), spangle-grasses (*Chasmanthium laxum* and *C. sessiliflorum*), three-awn grasses (*Aristida* spp.), panic grasses (*Dichanthelium 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*). The West Gulf Coastal Plain Saline Glade (BpS 1402) community is embedded within this BpS.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PITA	<i>Pinus taeda</i>	Loblolly pine
QUFA	<i>Quercus falcata</i>	Southern red oak
QUST	<i>Quercus stellata</i>	Post oak
QUNI	<i>Quercus nigra</i>	Water oak
QUPH	<i>Quercus phellos</i>	Willow oak
PIEC2	<i>Pinus echinata</i>	Shortleaf pine
PIPA2	<i>Pinus palustris</i>	Longleaf pine
ANTE2	<i>Andropogon ternarius</i>	Splitbeard bluestem

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

Naturally this system was dominated by frequent low to moderate intensity fire with occasional replacement fires associated with grassy fuels and cycles of moisture and drought. Fires would rarely alter species composition or structure. Insect outbreaks (southern pine beetle), ice storm damage and windthrow are also important disturbance factors. Drought and moist cycles play a strong role interacting with both fire frequency and intensity. Native ungulate grazing may have played a small role in maintaining the system.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	177	3		
Moderate (Mixed)	103	4		
Low (Surface)	5	93		
All Fires	5	100		

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. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Greater than 100,000ac.

Adjacency or Identification Concerns

This system often occurs adjacent to and can be influenced by the West Gulf Coastal Plain Pine-Harwood Forest (BpS 1371) and the Gulf and Atlantic Coastal Plain Floodplain Systems (BpS 1473).

Issues or Problems

Native Uncharacteristic Conditions

Most of this system has been converted to pure loblolly pine plantations less than twenty five years of age.

Comments

This model was adopted for MZ44 without changes from MZ37 because the main distribution of this system is not in MZ44. No changes were made to the description, the model or modelership.

For MZ37, this model was adapted from a Rapid assessment model (R5GCPF) by David Moore and Tom Foti (davemoore@fs.fed.us, tom@arkansasheritage.org).

Succession Classes

Mapping Rules

Upper Layer Lifeform	Height (m)	Canopy Cover (%)									
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Herb	0-0.5	A	A	A	A	A	A	A	A	A	A
Herb	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Herb	>1.0	A	A	A	A	A	A	A	A	A	A
Shrub	0-0.5	A	A	A	A	A	A	A	A	A	A
Shrub	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Shrub	1.0-3.0	A	A	A	A	A	A	A	A	A	A
Shrub	>3.0	A	A	A	A	A	A	A	A	A	A
Tree	0-5	A	A	A	A	A	A	A	A	A	A
Tree	5-10	C	C	C	C	C	C	C	C	B	B
Tree	10-25	C	C	C	C	C	C	C	C	B	B
Tree	25-50	D	D	D	D	D	D	D	D	E	E
Tree	>50	D	D	D	D	D	D	D	D	E	E

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A	13	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PITA	Pinus taeda	Loblolly pine	Upper
QUPH	Quercus phellos	Willow oak	Mid-Upper
QUFA	Quercus falcata	Southern red oak	Mid-Upper
QUNI	Quercus nigra	Water oak	Mid-Upper

Description

Maximum Tree Size Class
Sapling >4.5ft; <5" DBH

Class D	53	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PITA	<i>Pinus taeda</i>	Loblolly pine	Upper
QUST	<i>Quercus stellata</i>	Post oak	Lower
QUFA	<i>Quercus falcata</i>	Southern red oak	Lower
PIEC2	<i>Pinus echinata</i>	Shortleaf pine	Mid-Upper

Description

Two-layered open woodland (canopy and herbaceous) dominated by loblolly pine, with various hardwoods (oaks, red maple, black gum) present as shrubs or sprouts. Very diverse ground layer composed of many species of grasses and forbs. Shortleaf pine becomes more abundant than loblolly pine with age of stand due to longer life span and greater fire tolerance.

Maximum Tree Size Class

Very Large >33" DBH

Class E	6	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PITA	<i>Pinus taeda</i>	Loblolly pine	Upper
QUST	<i>Quercus stellata</i>	Post oak	Mid-Upper
QUFA	<i>Quercus falcata</i>	Southern red oak	Mid-Upper
QUNI	<i>Quercus nigra</i>	Water oak	Mid-Upper

Description

Dense, thick stands of mature loblolly pine intermixed with oaks and other hardwoods. Vines (especially *Vitis rotundifolia* and *Gelsemium sempervirens*) prominent. Mid canopy and shrub layer prominent. With prominent ladder fuels and deep layers of needles on forest floor. Little herbaceous vegetation due to intense shading and thick layers of needles on forest floor.

Maximum Tree Size Class

Very Large >33" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	14
Mid1:OPN	15	Late1:OPN	40
Mid1:CLS	15	Late1:CLS	40
Late1:OPN	41	Late1:OPN	999
Late1:CLS	41	Late1:CLS	999

Probabilistic Transitions

Disturbance	Disturbance	Moves	Disturbance	Return	Reset Age to New	Years Since
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Type	occurs In	vegetation to	Probability	Interval (yrs)	Class Start Age After Disturbance?	Last Disturbance
Alternative Succession	Early1:ALL	Mid1:CLS	1	1	Yes	13
Replacement Fire	Early1:ALL	Early1:ALL	0.007	143	Yes	0
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Early1:ALL	Early1:ALL	0.05	20	No	0
Surface Fire	Early1:ALL	Early1:ALL	0.2	5	No	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	10
Replacement Fire	Mid1:OPN	Early1:ALL	0.007	143	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.2	5	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Insects or Disease	Mid1:CLS	Early1:ALL	0.007	143	Yes	0
Wind or Weather or Stress	Mid1:CLS	Mid1:OPN	0.01	100	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.02	50	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.2	5	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	25
Insects or Disease	Late1:OPN	Late1:OPN	0.003	333	No	0
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.2	5	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.01	100	Yes	0
Insects or Disease	Late1:CLS	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.02	50	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.2	5	No	0

References

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored

Foti, T.L. 1974. Natural Divisions of Arkansas. Pages 11-34 in: Arkansas Natural Area Plan. Arkansas Department of Planning, Little Rock, AR.

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

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

NatureServe. 2006. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 18 July 2006.

Reynolds, E.T., Allen, E.T., May, T.L., and Weems, T.A. 1985. Soil Survey of Morehouse Parish, Louisiana. USDA, Soil Conservation Service. Pages 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 pp.

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 pp. plus maps.

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

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