

13710

West Gulf Coastal Plain Pine-Hardwood Forest

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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Vegetation Type

Forest and Woodland

Map Zones

32, 36, 37, 45, 98

Geographic Range

This Biophysical Setting (BpS) lies in Arkansas, Louisiana, Texas, and southeastern 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 predominant vegetation system over most of the Upper West Gulf Coastal Plain ecoregion with smaller incursions into the southern Interior Highlands (NatureServe 2006). Includes ECOMAP section 231E and subsections 231Ea, 231Eg, 231Ef, 231Ek, 231Eb, and 234Ec.

Biophysical Site Description

This BpS 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 (NatureServe 2006).

Vegetation Description

This BpS consists of forests and woodlands dominated by shortleaf pine (*Pinus echinata*) and/or loblolly pine (*P. taeda*) in combination with a host of dry to dry-mesic site hardwood species at lesser prevalence (e.g., oak [*Quercus* spp.], sweetgum [*Liquidambar styraciflua*], hickory [*Carya* spp.]). The ground layer was dominated by grasses and forbs. Herbaceous cover was dense under open canopy conditions. The midstory had scattered ericaceous shrubs and regeneration in open conditions. In closed canopy conditions, there would be an abundance of woody vines. This system has undergone major transformations since European settlement of the region (e.g., conversion of BpS to pine plantations) (NatureServe 2006).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIEC2	<i>Pinus echinata</i>	Shortleaf pine
PITA	<i>Pinus taeda</i>	Loblolly pine
QUERC	<i>Quercus</i>	Oak

ANDRO 2	<i>Andropogon</i>	Bluestem
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Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

This BpS is Fire Regime Group I. 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 played 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.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	121	4		
Moderate (Mixed)	64	7		
Low (Surface)	5	89		
All Fires	4	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

Historically, this BpS 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, Ouachita River, and Saline River floodplain).

Adjacency or Identification Concerns

The BpS meets the oak-hickory-pine type BpS along the southwestern edge of the Interior Highlands ecoregion (map zone [MZ] 44), and there may be some integration of this type into the lower areas of the Ouachita Mountains. Along the eastern border, the BpS also integrates with the bottomland hardwood systems of the MSRAP ecoregion (MZ45). Southern areas of the BpS have been reclassified as a separate BpS dominated by longleaf pine (*P. palustris*). The West Gulf Coastal Plain Nepheline Syenite Glade system (BpS 1405) is included within this BpS and is limited to Pulaski and Saline counties in Arkansas.

Issues or Problems

Native Uncharacteristic Conditions

Large areas of this type have been converted to pure loblolly pine plantations and/or have been harvested or eliminated to make room for homes, development, etc.

Comments

Models for MZ32, MZ36, MZ37, and MZ45 were identified as duplicates during the BpS review process. The model for MZ98 was slightly different due to an error in one S-class definition, so it is effectively a duplicate as well and will therefore also be considered a duplicate (the model has not been changed as of 7/30/2015). Also, note the comment just below about lumping in MZ37. The descriptions were only slightly different, so the description from MZ32 was used for this BpS in all 5 MZs noted.

For MZ32, this model was imported without changes from BpS 1371 in MZ37. In MZ37, this BpS was lumped with BpS 1405 (West Gulf Coastal Plain Nepheline Syenite Glade). This lump was removed in MZ32 because BpS 1405 does not occur there.

Tom Foti, Doug Zollner, Roger Fryar, and Ron Masters, East Texas. This model was developed in Shreveport, LA, at the MZ37 workshop and was based on the Rapid Assessment model R5GCPU developed by Mike Melnechuk. This same model will be used for MZ45.

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	B	B	B
Tree	10-25	C	C	C	C	C	C	C	B	B	B
Tree	25-50	D	D	D	D	D	D	D	E	E	E
Tree	>50	D	D	D	D	D	D	D	E	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 10 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	<i>Pinus echinata</i>	Shortleaf pine	All
PITA	<i>Pinus taeda</i>	Loblolly pine	All
QUERC	<i>Quercus</i>	Oak	Middle
ANDRO2	<i>Andropogon</i>	Bluestem	Lower

Description

Pine/oak regeneration with grass/forb regrowth. *P. taeda*, *P. echinata*, *Quercus* spp., mixed hardwood shrubs, blackberry (*Rubus* spp.), various *Andropogon* spp., *Carex* spp., and forbs with

weedy component. Frequent surface fires and occasional replacement fires are the disturbance factors in this class.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Class B	10	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	<i>Pinus echinata</i>	Shortleaf pine	All
PITA	<i>Pinus taeda</i>	Loblolly pine	All
QUERC	<i>Quercus</i>	Oak	Middle

Description

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. There are abundant woody vines. Surface fires are frequent, and there are occasional mixed fires, insect outbreaks, and rare wind events in this class.

Maximum Tree Size Class

Medium 9-21" DBH

Class C	22	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	<i>Pinus echinate</i>	Shortleaf pine	Upper
PITA	<i>Pinus taeda</i>	Loblolly pine	Upper
QUERC	<i>Quercus</i>	Oak	Mid-Upper
ANDRO2	<i>Andropogon</i>	Bluestem	Lower

Description

Open mid-development class. Open canopy dominated by *Pinus* spp. and fire-tolerant oak species. Open overstory and limited midstory. There is a continuous herbaceous component. Surface fires are frequent, but replacement fires are rare.

Maximum Tree Size Class

Medium 9-21" DBH

Class D	54	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	<i>Pinus echinata</i>	Shortleaf pine	Upper

PITA	Pinus taeda	Loblolly pine	Upper
QUERC	Quercus	Oak	Upper
ANDRO2	Andropogon	Bluestem	Lower

Description

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 regeneration). Well-developed herbaceous understory is governed by percent canopy closure and is made up of diverse grass and forb species. Surface fires are frequent, and there are occasional mixed fires. Replacement fire is rare, as are insect outbreaks, which generally take out the older trees.

Maximum Tree Size Class

Very Large >33" DBH

Class E 4 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PITA	Pinus taeda	Loblolly pine	Upper
QUAL	Quercus alba	White oak	Upper
CORNU	Cornus	Dogwood	Middle
CAREX	Carex	Sedge	Lower

Description

Mature closed canopy loblolly pine/mixed hardwood forest with a dense midstory (mixed hardwoods, with some pine regeneration). The understory is composed of sparse shade-tolerant herbaceous species. Mesic, seepage, and swale areas. Surface fires are frequent, and there are occasional mixed fires and minor insect outbreaks. Replacement fire and major insect outbreaks are rare.

Maximum Tree Size Class

Large 21-33" 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 Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Alternative Succession	Early1:ALL	Mid1:CLS	1	1	Yes	10
Replacement Fire	Early1:ALL	Early1:ALL	0.02	50	Yes	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	0.01	100	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.2	5	No	0
Wind or Weather or Stress	Mid1:CLS	Mid1:OPN	0.004	250	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Insects or Disease	Mid1:CLS	Mid1:OPN	0.02	50	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.04	25	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.2	5	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	20
Insects or Disease	Late1:OPN	Mid1:OPN	0.005	200	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.02	50	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.2	5	No	0
Insects or Disease	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.01	100	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.015	67	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.02	50	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.2	5	No	0

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