

13480

West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zones

37, 45, 98

Model Splits or Lumps

This biophysical setting (BpS) is lumped with 1403 and 1404

Geographic Range

This BpS occurs in the hilly uplands of western and central Louisiana. It also extends into eastern Texas. In map zone 37 this BpS is found in ECOMAP subsections 231Ef, 231Eg, 232Fa, 232Fb, 232Fe and 232Ff (Cleland et al. 2007).

Biophysical Site Description

This BpS occurs on acidic loamy sands to acid clays associated with Pleistocene or Tertiary formations. The community is characteristically dissected by small to large branch or creek bottoms.

Vegetation Description

Pinus palustris (longleaf pine) is the dominant overstory species, and in locations where fire has frequently occurred, it is often the only canopy species. It is reported in the literature that *Q. marilandica* (blackjack oak) and *Q. stellata* (post oak) were common associates of longleaf pine in the northern part of its range. Where fire is less frequent or suppressed, a number of overstory associates may occur, including *Pinus echinata* (shortleaf pine), *P. taeda* (loblolly pine), *Nyssa sylvatica* (black gum), *Liquidambar styraciflua* (sweetgum), *Q. falcata* (southern red oak), *Q. stellata* (Post oak), *Q. marilandica* (blackjack oak), *Q. shumardii* (shumard oak), *Q. alba* (white oak), *Q. nigra* (water oak), *Prunus serotina* (black cherry), *Carya tomentosa* (mockernut hickory), *C. texana* (black hickory, central Louisiana), *Acer rubrum* (red maple), *Diospyros virginiana* (persimmon) and *Sassafras albidum* (sassafras). In sandy soils, *Q. incana* (bluejack oak), and *Q. hemisperica* (upland laurel oak) are frequent associates. Significant shrub species include *Cornus florida* (flowering dogwood), *Vaccinium arboreum* (farkleberry), *V. elliotii* (Elliott's blueberry), *V. stamineum* (deer berry), *V. darrowii* (dwarf blueberry, southeast Louisiana), *Gaylussacia dumosa* (dwarf huckleberry, southeast Louisiana), *Callicarpa americana* (French mulberry), *Myrica cerifera* (wax myrtle), *Bumelia lanuginosa* (chittumwood), *Ilex vomitoria* (yaupon), *I. opaca* (American holly), *Rubus* spp (blackberries), and *Rhus copallina* (winged sumac). Common vines include *Vitis* spp (grapes), *Smilax* spp (greenbriers),

Parthenocissus quinquefolia (Virginia creeper) and *Gelsemium sempervirens* (yellow jessamine). The herbaceous flora may be exceedingly diverse if fire has frequently occurred. Grasses, composites, and legumes are predominant in the ground layer. *Andropogon* spp (broomsedges) and *Schizachyrium* spp (bluestems) are usually the dominant grasses, but several other genera are usually present, including *Aristida* spp (three-awn grasses), *Sporobolus* (dropseeds), *Panicum* spp (panic grasses), *Anthraenantia* spp (silky scales), *Ctenium aromaticum* (toothache grass), *Digitaria* spp (crab grasses), *Eragrostis* spp (love grasses), *Erianthus* spp (plume grasses), *Gymnopogon* spp (skeleton grasses), *Muhlenbergia* spp (muhly grasses), *Paspalum* spp (paspy grasses), and *Setaria* spp (bristle grasses). Composites include *Aster* spp (asters), *Carphephorus odoratissimus* (vanilla plant), *Chrysopsis* spp (golden asters), *Heterotheca* spp (golden asters), *Elaphantopus* spp (elephant-foot), *Eupatorium* spp (thoroughworts), *Euthamia* spp (flat-topped goldenrods), *Gnaphalium* spp (rabbit tobaccos), *Helenium* spp (sneeze-weeds), *Helianthus* spp (sunflowers), *Liatris* spp (blazing-stars), *Rudbeckia* spp (brown-eyed susans), *Solidago* spp (goldenrods), and *Vernonia* spp (ironweeds). Prominent legumes are *Baptisia* spp (indigos), *Cassia* spp (partridge-peas), *Centrosema virginianum* (butterfly pea), *Clitoria mariana* (pigeon wings), *Crotolaria* spp (rattle pods), *Desmodium* spp (beggar's ticks), *Lespedeza* spp (bush clovers), *Stylsanthes biflora* (pencil-flower), *Rhynchosia* spp (snout beans), and *Tephrosia* spp (hoary peas). Additional frequent forbs include *Oenothera* spp (milkworts), *Lobelia* spp (lobelias), *Callirhoe papaver* (poppy-mallow), *Ruellia* spp (wild petunias), *Hypoxis* spp (yellow-eyed grasses), *Asclepias* spp (mildweeds), *Lechea* spp (pinweeds), *Euphorbia* spp (spurges), *Sabatia* spp (rose-gentians), *Agalinis* spp (false foxgloves), and *Rhexia* spp (meadow beauties). The fern *Pteridium aquilinum* (bracken fern) is often conspicuous in large colonies.

The Catahoula Barrens is an inclusional community that occurs within this BpS. It occurs on sandstone outcrops with shallow acidic soils which are highly erodible. The community is characterized by widely scattered, stunted trees and shrubs, and a sparse ground cover of grasses and forbs with some areas consisting of exposed rock having little or no vegetation. Tree species include *P. palustris*, *P. echinata*, *P. taeda*, *Q. stellata*, *Q. incana*, *Q. marilandica*, and *Liquidamber styraciflua*. Shrubs may include *Ilex vomitoria*, *Vaccinium arboreum*, *V. elliotii*, and *Bumelia lanuginosa*. Common herbaceous species include *Bigelowia virgata* (rayless goldenrod), *Andropogon* spp, *Eragrostis* spp, *Liatris* spp (blazing stars), and *Aster* spp. A rare occurrence in Texas is the *Spiranthes parksii* (Navasota ladies' tresses), a threatened and endangered species.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIPA2	<i>Pinus palustris</i>	Longleaf pine
SCSC	<i>Schizachyrium scoparium</i>	Little bluestem
ANGE	<i>Andropogon gerardii</i>	Big bluestem
ANTE2	<i>Andropogon ternarius</i>	Splitbeard bluestem
ANVI2	<i>Andropogon virginicus</i>	Broomsedge bluestem
QUST	<i>Quercus stellata</i>	Post oak
QUMA	<i>Quercus macnabiana</i>	Quercus macnabiana
QUIN	<i>Quercus incana</i>	Bluejack oak

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

Disturbance Description

This BpS experiences frequent surface fires every 1-5yrs. Fires are usually low in intensity overall, consuming only shrubs and herbs. They will occasionally kill patches of young pine regeneration but rarely kill individual older trees. Individual fires cover extensive areas. Replacement and mixed fires are local patches of mortality within the context of these extensive low-intensity fires. Mosaic fire in the model represents the probability of a series of surface fires sufficient to move closed vegetation to open. Effects of single fires are minimal but cumulative over time.

Open structural stages are characterized by surface fire disturbances of 3yrs while closed structural stages are characterized by mixed fire regimes occurring every 100yrs.

Wind, weather, and stress disturbances include occurrences of hurricanes and tornadoes. While ice storms are also a weather factor, to what degree they are is unknown.

Competition between pine and hardwood trees maintains the mid and late classes.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	631	1		
Moderate (Mixed)	784			
Low (Surface)	4	99	1	5
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

Distribution of the dominant longleaf pine canopy is patchy, as represented by the open structural stages. Canopy gaps are created by fire mortality, lightning, and wind throw at the scale of individual trees or several trees. These "gaps" are represented under structural stage A of the model. Palik and Pederson (1996) report patch disturbances removed 550-1300 square meters (0.14-0.32ac) of exposed crown area to form openings 1,000-2,000 square meters (0.25-0.5ac); but occur only once per 1,000ha in 5yrs.

Adjacency or Identification Concerns

This BpS is the presumed matrix vegetation type of the inner (landward) portions of the West Gulf Coastal Plain in Louisiana and eastern Texas within the range of longleaf pine. The system is bounded on the outer (seaward) side by West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (BpS 1451) and on the inner (landward) side primarily by West Gulf Coastal Plain Pine-Hardwood Forest (BpS 1371). Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been homogenized by logging or clearing. Examples are found where loblolly pine, shortleaf pine, slash pine, or oaks have replaced some or all the longleaf pine, and where the grass-dominated ground cover has been lost due to soil disturbance or past canopy closure. Full restoration to reference condition may take a number of burns over years if older trees are not present, but fire produces substantial ecological benefits before full restoration.

Issues or Problems

Native Uncharacteristic Conditions

Loblolly pine plantation.

In the absence of fire, shrub or mid-story hardwood densities increase.

Comments

For map zone 37, this model was adapted from the Rapid Assessment model R9LLBS (Longleaf Pine/Bluestem).

The Ecological Classification System developed by James Van Kley at Stephen F Austin State University for the National Forests in Texas and the Kisatchie National Forests in Louisiana is a good reference document for describing this BpS (Turner et al. 1999).

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	B mix	B mix	B mix	B mix	B mix	B mix	B mix	B mix	B mix	B mix
Tree	5-10	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf
Tree	5-10	C con	C con	C con	C con	C con	C con	C con	C con	C con	C con
Tree	10-25	C con	C con	C con	C con	C con	C con	C con	C con	C con	C con
Tree	10-25	B mix	B mix	B mix	B mix	B mix	B mix	B mix	B mix	B mix	B mix
Tree	10-25	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf	B brdlf
Tree	25-50	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf
Tree	25-50	D con	D con	D con	D con	D con	D con	D con	D con	D con	D con
Tree	25-50	E mix	E mix	E mix	E mix	E mix	E mix	E mix	E mix	E mix	E mix
Tree	>50	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf	E brdlf
Tree	>50	D con	D con	D con	D con	D con	D con	D con	D con	D con	D con
Tree	>50	E mix	E mix	E mix	E mix	E mix	E mix	E mix	E mix	E mix	E mix

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	6	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ANTE2	Andropogon ternarius	Splitbeard bluestem	Upper
ANVI2	Andropogon virginicus	Broomsedge bluestem	Lower
SCSCS3	Schizachyrium scoparium var. stoloniferum	Creeping bluestem	Lower

Description

Class A includes canopy gaps, mostly from a single tree to a one-quarter acre in size, with pine regeneration. The ground cover is predominantly native grasses.

Maximum Tree Size Class

Sapling >4.5ft; <5"DBH

Class B	4	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPA2	Pinus palustris	Longleaf pine	Upper
QUST	Quercus stellata	Post oak	Mid-Upper
LIQUI	Liquidambar	Sweetgum	Low-Mid
ILVO	Ilex vomitoria	Yaupon	Low-Mid

Description

Class B is characterized by patches, mostly one-quarter acre or less of canopy pines, and a substantial component of hardwoods or other pine species encroaching in the absence of fire. Hardwood and encroaching pine cover is >50%.

Maximum Tree Size Class

Medium 9-21"DBH

Class C	16	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPA2	Pinus palustris	Longleaf pine	Upper
ANVI2	Andropogon virginicus	Broomsedge bluestem	Lower
SCSCS3	Schizachyrium scoparium var. stoloniferum	Creeping bluestem	Lower

Description

Class C includes patches, mostly one-quarter acre or less in size, with canopy pines and a minimal hardwood component due to frequent fire. The ground cover is dominated by grasses. The pine canopy cover ranges from 25-75%.

Maximum Tree Size Class

Medium 9-21"DBH

Class D	68	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPA2	<i>Pinus palustris</i>	Longleaf pine	Upper
ANVI2	<i>Andropogon virginicus</i>	Broomsedge bluestem	Lower
SCSCS3	<i>Schizachyrium scoparium</i> var. <i>stoloniferum</i>	Creeping bluestem	Lower

Description

Class D includes patches, mostly one-quarter acre or less in size, with older canopy pines and a minimal component of hardwoods. The ground cover is dominated by grasses. Pine canopy cover ranges from 25-75%. Canopy closure will take considerable time. Mid-story closure will take place over time in many areas.

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
PIPA2	<i>Pinus palustris</i>	Longleaf pine	Upper
QUST	<i>Quercus stellata</i>	Post oak	Mid-Upper
LIQUI	<i>Liquidambar</i>	Sweetgum	Upper
PITA	<i>Pinus taeda</i>	Loblolly pine	Upper

Description

Class E is characterized by patches with older canopy pines, and a substantial component of hardwoods or pines other than longleaf in either the overstory or understory. The ground cover is shrubby or sparse. Hardwood and encroaching pine cover is >50%. A very dense tall shrub component of species such as *Ilex vomitoria*, *Callicarpa Americana*, and *Myrica cerifera* typically develops. Height ranges from 85-100ft.

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	49
Mid1:CLS	15	Late1:CLS	49
Late1:OPN	50	Late1:OPN	999
Late1:CLS	50	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	0.01	100	Yes	0
Surface Fire	Early1:ALL	Early1:ALL	0.3	3	No	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	15
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.005	200	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.3	3	No	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Competition or Maintenance	Mid1:CLS	Mid1:CLS	0.01	100	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.02	50	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.0667	15	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	15
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Competition or Maintenance	Late1:OPN	Late1:OPN	0.01	100	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.3	3	No	0
Wind or Weather or Stress	Late1:CLS	Mid1:CLS	0.01	100	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.01	100	Yes	0
Competition or Maintenance	Late1:CLS	Late1:CLS	0.01	100	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.01	100	Yes	0

References

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