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. elliottii* (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* (chittum-wood), *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), *Anthaenantia* 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. elliottii*, 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 | *Pinus palustris* | Longleaf pine |
| SCSC | *Schizachyrium scoparium* | Little bluestem |
| ANGE | *Andropogon gerardii* | Big bluestem |
| ANTE2 | *Andropogon ternarius* | Splitbeard bluestem |
| ANVI2 | *Andropogon virginicus* | Broomsedge bluestem |
| QUST | *Quercus stellata* | Post oak |
| QUMA | *Quercus macnabiana* | Quercus macnabiana |
| QUIN | *Quercus incana* | 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

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

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

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

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 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

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 | Upper |
| PITA | Pinus taeda | 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 *Iex vomitoria, Calicarpa 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 |

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