13710

West Gulf Coastal Plain Pine-Hardwood Forest

BpS Model/Description Version: Aug. 2020

Update: 4/19/2018

|  |  |  |  |
| --- | --- | --- | --- |
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Vegetation Type

Forest and Woodland

Map Zones

44

Model Splits or Lumps

This BpS is lumped with 1405

Geographic Range

This Biophysical Setting (BpS) lies in Arkansas, Louisiana, Texas, and southeast 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. Ecological Classification CES203.378. Includes ECOMAP section 231E and subsections 231Eo, 231Eb, 231Ec, 231Ee and 231Ek.

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 low ridgetops and adjacent side slopes, with moderate-to-high fertility and moisture retention. (Ecological Classification CES203.378).

Vegetation Description

This BpS consists of forests and woodlands dominated by shortleaf pine (*P. 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.). This system has undergone major transformations since European settlement of the region.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PITA | *Pinus taeda* | Loblolly pine |
| PIEC2 | *Pinus echinata* | Shortleaf pine |
| QUERC | *Quercus* | Oak |
| ANDRO2 | *Andropogon* | Bluestem |

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

Disturbance Description

This BpS is fire regime group 1. 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 moisture cycles play a strong role interacting with both fire frequency and intensity. Other disturbance factors that played a role included ice storms, wind events, and insect infestations.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 120 | 4 |  |  |
| Moderate (Mixed) | 52 | 9 |  |  |
| Low (Surface) | 5 | 87 |  |  |
| 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, Little River, Ouachita River and Saline River floodplain).

Adjacency or Identification Concerns

The BpS meets the pine and oak-hickory types along the southwestern edge of the Interior Highlands ecoregion, 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 Mississippi River Alluvial Plain ecoregion, map zone (MZ)45.

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 for improved pastures, and/or to make room for homes, development, etc.

Comments

For MZ44 BpS 1405--West Gulf Coastal Plain Nepheline Syenite Glade is lumped with BpS 1371 because 1405 is too fine for mapping and its disturbance regime is dependent on the surrounding pine-hardwood forest.

This model was developed for MZ44 using the MZ37 model for the same BpS as a starting point. Significant changes to the MZ37 model resulted in the change in modelership.

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 9 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIEC2 | Pinus echinata | Shortleaf pine | Upper |
| PITA | Pinus taeda | Loblolly pine | Upper |
| QUERC | Quercus | Oak | Middle |
| ANDRO2 | Andropogon | Bluestem | Lower |

Description

Pine/oak regeneration with grass/forb regrowth. *P. taeda, P. echinata, Quercus* spp., mixed hardwood shrubs, blackberry (*Rubus* spp.), various bluestems (*Andropogon* spp.), sedges (*Carex* spp.) and forbs with weedy (i.e. early successional annual) component. Frequent surface fires, mixed fire and occasional replacement fires are the disturbance factors that maintain this class.

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

Class B 10 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIEC2 | Pinus echinata | Shortleaf pine | Upper |
| PITA | Pinus taeda | Loblolly pine | Upper |
| QUERC | Quercus | Oak | Middle |

Description

Mid-development class dominated by pines and mixed hardwood trees and shrubs. Dense overstory and midstory. Sparse understory with little to no herbaceous component. Frequent surface fires maintain the class.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class C 23 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIEC2 | Pinus echinata | Shortleaf pine | Upper |
| PITA | Pinus taeda | Loblolly pine | Upper |
| QUERC | Quercus | Oak | Mid-Upper |
| ANDRO2 | Andropogon | Bluestem | Lower |

Description

Open mid-development class. Open canopy dominated by pines and fire-tolerant oak species. Open overstory and limited midstory. Continuous herbaceous component.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class D 54 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIEC2 | Pinus echinata | 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 governed by percent canopy closure. Made up of diverse grass and forb species.

*Maximum Tree Size Class*  
Medium 9-21"DBH

Class E 4 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PITA | Pinus taeda | Loblolly pine | Upper |
| PIEC2 | Pinus echinata | Shortleaf pine | Upper |
| QUAL | Quercus alba | White oak | Middle |
| CORNU | Cornus | Dogwood | Lower |

Description

Mature closed canopy pine/mixed hardwood forest. Dense midstory (mixed hardwoods). Sparse shade-tolerant herbaceous understory.

*Maximum Tree Size Class*  
Medium 9-21"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 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.04 | 25 | 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 | 0.01 | 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 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.007 | 143 | 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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