14580

West Gulf Coastal Plain Pine-Hardwood Flatwoods

BpS Model/Description Version: Aug. 2020

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|  |  |  |  |

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 hydroxeric 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 | *Pinus taeda* | Loblolly pine |
| QUFA | *Quercus falcata* | Southern red oak |
| QUST | *Quercus stellata* | Post oak |
| QUNI | *Quercus nigra* | Water oak |
| QUPH | *Quercus phellos* | Willow oak |
| PIEC2 | *Pinus echinata* | Shortleaf pine |
| PIPA2 | *Pinus palustris* | Longleaf pine |
| ANTE2 | *Andropogon ternarius* | 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](mailto: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

DBH

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

All sites, post-fire grass regrowth, grass seedlings, forbs and hardwood sprouting. Little bluestem, panic grasses, composites, oaks, red maple and black gum. Saline barrens, glades, prairies would be included in 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** |
| 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

Dense, thick stands of loblolly pine poles intermixed with oaks and other hardwoods. Fuel loads high, 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*  
Medium 9-21"DBH

Class C 18 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PITA | Pinus taeda | Loblolly pine | Upper |
| QUST | Quercus stellata | Post oak | Lower |
| QUFA | Quercus falcata | Southern red oak | Lower |
| QUNI | Quercus nigra | Water oak | Lower |

Description

A two-layered open woodland (canopy and herbaceous) dominated by loblolly pine, with various hardwoods (oaks, red maple, black gum) present as shrubs or sprouts. Diverse ground layer composed of grasses and forbs. Ground layer becomes more diverse as more sunlight reaches the ground layer.

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

Class D 53 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PITA | Pinus taeda | Loblolly pine | Upper |
| QUST | Quercus stellata | Post oak | Lower |
| QUFA | Quercus falcata | Southern red oak | Lower |
| PIEC2 | Pinus echinata | 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

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PITA | Pinus taeda | Loblolly pine | Upper |
| QUST | Quercus stellata | Post oak | Mid-Upper |
| QUFA | Quercus falcata | Southern red oak | Mid-Upper |
| QUNI | Quercus nigra | 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 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 | 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 |

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