13230

West Gulf Coastal Plain Mesic Hardwood Forest

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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| None | None | None | None |
| None | None | None | None |

Vegetation Type

Forest and Woodland

Map Zones

32, 36, 37, 44, 45, 98

Geographic Range

This ecological system is found in limited upland areas (especially side slopes and narrow ridgetops) of the Gulf Coastal Plain west of the Mississippi River. These areas were topographically isolated from historically fire-prone, pine-dominated uplands in eastern Texas, western Louisiana and southern Arkansas.

In LANDFIRE map zone (MZ)37 in ECOMAP section 231.

Biophysical Site Description

Soils can be quite variable ranging from coarse to loamy in surface texture. Most are acidic in surface reactions and less commonly circumneutral. These sites have moderate to high fertility and moisture retention. Sites are often found along slopes above perennial streams in the region.

Vegetation Description

Vegetation indicators are mesic hardwoods such as American beech (*Fagus grandifolia*), white oak (*Quercus alba*) and American holly (*Ilex opaca*), although scattered, large-diameter pines, most often loblolly (*Pinus taeda*), are also often present. Spring-blooming herbaceous species are typical in the understory of most examples. This system is not known to support localized endemic or globally rare plant species.

At Nacatoch Ravines Natural Area in Arkansas, the mesic slope and ravine forests are very diverse with large trees and a well-formed subcanopy and herbaceous layer. The canopy is a mix of more mesic trees including northern red oak (*Q. rubra*), Shumard oak (*Q. shumardii*), chinkapin oak (*Q. muehlenbergii*), white oak (*Q. Americana*), sweetgum (*Liquidambar styraciflua*), white ash (*Fraxinus americana*), sycamore (*Platanus occidentalis*), basswood (*Tilia americana*), mockernut hickory (*Carya tomentosa*), blackgum (*Nyssa sylvatica*), and maple (*Acer* spp.). There are multiple shrub layers with redbud (*Cercis canadensis*), buckeye (*Aesculus pavia*), hophornbeam (*Ostrya virginiana*), deciduous holly (*I. decidua*), witch hazel (*Hamamelis virginiana*), Hercules club (*Aralia spinosa*), American hornbeam (*Carpinus caroliniana*), paw paw (*Asimina triloba*), and cane (*Arundinaria gigantea*). The herbaceous layer is rich in recently burned areas (sparse in unburned) including the uncommon eared goldenrod (*Solidago* *auriculata*) and puccoon (*Lithospermum caroliniense*). Seeps are dense with ferns, vines and forbs. Many of the Arkansas plant species of concern occur in the mesic ravines.

Thin-barked trees like American beech are more fire sensitive so are limited to areas subject to low-intensity fire.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUAL | *Quercus alba* | White oak |
| QURU | *Quercus rubra* | Northern red oak |
| FAGR | *Fagus grandifolia* | American beech |
| QUPA5 | *Quercus pagoda* | Cherrybark oak |

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

Disturbance Description

Growing season (April-September) and pre/post drought year burns may have a greater effect on maintaining an open understory than other burns. An examination of Arkansas Forestry Commission records indicate a prevalence of lightning ignited fires occurring from mid-July through October (Foti and Glenn 1990). Anthropogenic fires could have occurred in any season but early records of aboriginal burning reference September through December (Young and Hoffman 1995, Lottinville 1980).

Normally, fire would enter this system from up slope pine-oak systems. Severity/intensity is typically lower than in the drier up-slope pine-oak systems.

Other disturbance include tree fall resulting in small gaps.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 268 | 6 |  |  |
| Moderate (Mixed) | 89 | 19 |  |  |
| Low (Surface) | 23 | 75 |  |  |
| All Fires | 17 | 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

This system occurs at Large Patch scale (100-1000ac).

Adjacency or Identification Concerns

This system is always up slope from West Gulf Coastal Plain Large River Floodplain Forests and/or Small Stream Riparian Forest. It is down slope from West Gulf Coastal Plain Pine-Hardwood Forest.

Issues or Problems

Conversion to pine plantation and pasture.

Native Uncharacteristic Conditions

Comments

Added QUPA5 (*Quercus pagoda*) to dominant species list 8/22/07 for map zone 36, Ann Wolf Missoula Fire Science Laboratory.

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 4 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUERC | Quercus | Oak | Low-Mid |
| CHSE2 | Chasmanthium sessiliflorum | Longleaf woodoats | Lower |

Description

Oak regeneration with grass/forb regrowth. *Quercus* spp., mixed hardwood shrubs, (*Chasmanthium sessiliflorum)*, sedges (*Carex* spp.), and forbs with weedy component.

*Maximum Tree Size Class*  
Seedling <4.5ft

Class B 23 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUAL | Quercus alba | White oak | Mid-Upper |
| QURU | Quercus rubra | Northern red oak | Mid-Upper |
| CACA18 | Carpinus caroliniana | American hornbeam | Middle |
| ILOP | Ilex opaca | American holly | Middle |

Description

Mid-development class dominated by mixed hardwood trees and shrubs. Dense overstory of *Quercus alba, Q. rubra, Q. sinuata, Q. velutina, Tilia caroliniana, Carya tomentosa, Liquidambar styraciflua, Fraxinus americana,* and *Nyssa sylvatica*. Mid-story species *include Q. alba, Q. rubra, T. caroliniana, C. tomentosa, Cornus florida, Ostrya virginiana, Acer rubrum*, and *Carpinus caroliniana*. Shrubs are sparse*. Callicarpa americana* is a dominant shrub species.

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

Class C 12 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUAL | Quercus alba | White oak | Upper |
| QURU | Quercus rubra | Northern red oak | Upper |
| CAAL27 | Carya alba | Mockernut hickory | Middle |
| CHSE2 | Chasmanthium sessiliflorum | Longleaf woodoats | Lower |

Description

Open mid-development class. Open canopy dominated by fire-tolerant oak species. Open overstory and limited midstory. Discontinuous herbaceous component. Mean fire return interval divided between replacement (rare) and surface fire.

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

Class D 24 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUAL | Quercus alba | White oak | Upper |
| QURU | Quercus rubra | Northern red oak | Upper |
| CAAL27 | Carya alba | Mockernut hickory | Middle |
| CHSE2 | Chasmanthium sessiliflorum | Longleaf woodoats | Lower |

Description

Mature open canopy mixed hardwood woodland to savanna. Very limited midstory. Well- developed herbaceous understory governed by percent canopy closure. Made up of diverse grass and forb species. Ground fires maintaining herbaceous understory and fire intolerant midstory species. Gaps in canopy mainly from windfall. Replacement wind events (tornados) would rarely occur. Most of the fire being surface fire.

*Maximum Tree Size Class*  
Very Large >33"DBH

Class E 37 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUAL | Quercus alba | White oak | Upper |
| QURU | Quercus rubra | Northern red oak | Upper |
| FAGR | Fagus grandifolia | American beech | Upper |

Description

Mature closed canopy mixed hardwood forest. Dense midstory. Sparse shade-tolerant herbaceous understory. Rare replacement events like fire combined with drought and tornados rarely occur. The majority of fire is low intensity. Mixed fire will occasionally open the canopy.

*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 | 9 |
| Mid1:OPN | 10 | Late1:OPN | 54 |
| Mid1:CLS | 10 | Late1:CLS | 54 |
| Late1:OPN | 55 | Late1:OPN | 999 |
| Late1:CLS | 55 | 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 | 8 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.012 | 83 | Yes | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.05 | 20 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 15 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.075 | 13 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.017 | 59 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.03 | 33 | No | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 20 |
| Wind or Weather or Stress | Late1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.075 | 13 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.015 | 67 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.025 | 40 | No | 0 |

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