13510

Southeastern Interior Longleaf Pine Woodland

BpS Model/Description Version: Aug. 2020

Updated: 4/25/2018

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| **Modelers** |  | **Reviewers** |  |
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Vegetation Type

Forest and Woodland

Map Zones

48, 54, 59

Geographic Range

This system once ranged along ridge areas on the eastern portion of this map zone (MZ). This longleaf pine-dominated system occupied mountainous, dissected, mostly mesic uplands in northeast Alabama and northwest Georgia, and the Lookout Mountain areas of Tennessee.

It has been greatly reduced in its extent by fire suppression, resulting in oak encroachment.

Biophysical Site Description

This forest type occurs in upland settings, which in this zone is mostly rugged and mountainous. Geologic substrates are dominated by gravely soils in this biophysical area. Primary influence on this site is fire. Remnants are now largely limited, clustered in eastern Alabama, western Georgia, and southeastern Tennessee.

Vegetation Description

These forest areas were dominated by open canopied stands of longleaf pine (*Pinus palustris*), sometimes with a minority component of shortleaf (*Pinus echinata*) and scattered oaks, including *Quercus prinus, Q. falcata, Q. marilandica, Q. laevis*, and *Q. stellata* (Peet 2006).

Shrub, grass, and hardwood cover was kept in check by frequent fire, although hardwoods were more prevalent on the more productive sites.

Alteration of fire regimes and universal logging have made the natural condition of the vegetation somewhat uncertain (NatureServe 2007).

Almost certainly *Pinus palustris* was more abundant than it usually is at present, but very likely some component of other pines and of oaks was present. Under conditions of frequent fire, understories and shrub layers were sparse and the grassy herb layer dense. In remnant examples where fire suppression has affected vegetation structure, the ground cover is often shrubby, with dense ericaceous shrubs leaving little space for herbs. Examples that have been burned recently often have ground cover dominated by shrubs and hardwood sprouts, with somewhat increased herb cover (NatureServe 2007).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PIPA2 | *Pinus palustris* | Longleaf pine |
| QUST | *Quercus stellata* | Post oak |
| QUMA3 | *Quercus marilandica* | Blackjack oak |
| QUPR2 | *Quercus prinus* | Chestnut oak |
| QULA2 | *Quercus laevis* | Turkey oak |
| PIVI2 | *Pinus virginiana* | Virginia pine |
| PIEC2 | *Pinus echinata* | Shortleaf pine |
| CADE12 | *Castanea dentata* | American chestnut |

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

Disturbance Description

The dynamics of this system are strongly dominated by fire. Fires probably once occurred at frequencies somewhat lower than in the Coastal Plain or Piedmont (NatureServe 2007). In longleaf pine mesic uplands, canopy gaps are created by fire mortality, lightning, and wind throw at the scale of individual trees or several trees. Frequent surface fires, every 1-5yrs, on average every 3yrs (Klaus 2005), generally burn the understory vegetation in patches; fires have little effect on fire-tolerant trees. Most fires are lightning caused, with little Native American influence. Fires are usually low in intensity overall but may occasionally kill young regeneration. Fires rarely kill individual older trees. Individual fires cover extensive areas.

Replacement events are generally caused by wind or ice creating local patches of mortality. Canopies are believed to be many-aged, consisting of a fine mosaic of small, even-aged groves driven by gap-phase regeneration.

Modern fire suppression has allowed other pines and oaks to increase in density, along with shrubs, and has resulted in the loss of the herb layer. Reproduction of *Pinus palustris* has been largely eliminated by the lack of fire. Where the canopy was also logged, *Pinus palustris* has often been eliminated, leaving the system indistinguishable from logged Central -South Appalachian Montane Oak Forest (biophysical setting [BpS] 1320) (NatureServe 2007).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 548 | 1 | 500 | 1000 |
| Moderate (Mixed) | 297 | 1 |  |  |
| Low (Surface) | 3 | 98 | 1 | 5 |
| All Fires | 3 | 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

Patch size and the scale of disturbance for this system can range from single trees to 100ac. As noted, mortality from ice, fire, and wind was patchy. Occurrences often form mosaics with the Central South Appalachian Montane Oak Forest Type (BpS 1320). On north facing areas this forest type blends down into the South Central Interior Mesophytic Forest (BpS 1321).

Adjacency or Identification Concerns

NatureServe (2007) notes this system is closely related to the upland longleaf pine systems of the Piedmont, with which it shares the ecological importance of fire, much of its flora and presumably fauna, and probably canopy dynamics. It is distinguished by the distinctive Talladega upland landscape with its greater topographic relief. This system is distinguished from all other interior systems in having *Pinus palustris*, an indicator of frequent fire, as a dominant species.

Issues or Problems

The unifying factors are the occurrence of longleaf pine and fire dependent hardwoods. American Chestnut was historically a component of this forest type.

Universal logging and fire suppression have blurred its distinction, although this system should be recognized where there remains evidence of its past occurrence in the form of remnant flora (NatureServe 2007).

Native Uncharacteristic Conditions

Much of this forest type has been fire suppressed and converted upland pine oak or mountain dry oak. Some of this forest type have been subject to conversion to development, mostly single residences on lookout sites on the ridgetops, especially on the Lookout Mountain area of Tennessee and northeast Alabama.

Comments

Models for MZs48, 54, and 59 were identified as identical in the BpS review process. The descriptions for MZs 54 and 59 were identical except for editorial comments. The description from MZ48 appeared to be more complete, so it was used to represent this BpS in MZs 48, 54, and 59.

Suggested Reviewers include: Bill Pickens (bill.picken@ncmail.net) - NCDFR Pine Specialist; Johnny Stowe - SCDNR; John McGuire - Longleaf Alliance; Nathan Klaus - Georgia DNR

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 con | C con | C con | C con | C con | C con | C con | C con | C con | C con |
| 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 | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix |
| 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 | 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 | 25-50 | 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 brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf |
| 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 8 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Lower |
| QUERC | Quercus | Oak | Lower |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

Class A is a post-replacement condition, with canopy gaps, ranging from a single tree up to 100ac size after large-scale wind or ice events. The understory is dominated by native grasses with numerous forbs. Tree cover ranges from 0-30%.

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

Class B 1 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Middle |
| QUERC | Quercus | Oak | Middle |
| KALA | Kalmia latifolia | Mountain laurel | Lower |

Description

Class B is characterized as a mid-seral closed condition with patches, mostly one-quarter acres or less in size, of middle aged canopy pines. There is a substantial component of hardwoods or other pine species encroaching in the absence of fire. The hardwood/encroaching pine cover is >50%. The canopy pine cover ranges from 15-75%.

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

Class C 26 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Middle |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

Class C is characterized as mid-seral open middle-aged canopy pines old within patches, mostly one-quarter acre or less in size, or in larger groves from weather origins. There is a minimal hardwood component, <5%, due to frequent fire. The ground cover is dominated by grass. The canopy pine cover ranges from 31-75%.

Overstory characteristics cannot be used to identify this class. The difference between this and class B is the amount of hardwood midstory being <10% here and 10% or greater in class B.

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

Class D 63 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

Class D is a late seral open condition with patches, mostly one-quarter acre or less in size, of older canopy pines. There is a minimal component of hardwoods. The ground cover is dominated by grass.

*Maximum Tree Size Class*  
Large 21-33"DBH

Class E 2 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| QUERC | Quercus | Oak | All |
| KALA | Kalmia latifolia | Mountain laurel | Lower |

Description

Class E is characterized as a late seral closed condition with patches of canopy pines more than 50yrs old. There is a substantial component of hardwoods, i.e. >40%, and often pines other than longleaf in either the overstory or midstory. The ground cover is shrubby or sparse. The encroaching hardwood/pine cover is >50%.

Differentiation from class D is based on hardwood component >40% in the overstory.

*Maximum Tree Size Class*  
Large 21-33"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 15 |
| Mid1:OPN | 16 | Late1:OPN | 50 |
| Mid1:CLS | 16 | Late1:CLS | 50 |
| Late1:OPN | 51 | Late1:OPN | 999 |
| Late1:CLS | 51 | 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 | 12 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.33 | 3 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 20 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.33 | 3 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Wind or Weather or Stress | Mid1:CLS | Mid1:OPN | 0.02 | 50 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.1 | 10 | No | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 20 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Mixed Fire | Late1:OPN | Mid1:OPN | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.33 | 3 | No | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.007 | 143 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.1 | 10 | No | 0 |

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