13560

Florida Longleaf Pine Sandhill

BpS Model/Description Version: Aug. 2020

Update: 4/25/2018

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

Forest and Woodland

Map Zones

55, 56, 99

Geographic Range

This type occurs from northeastern Florida at the St. Mary's River to central Florida to a line between about Sarasota County and Indian River County, and westward into the panhandle along a band between the inner and outer coastal plain.

NatureServe 2006 lists the range as found in the Outer Coastal Plain and adjacent Inner Coastal Plain of Florida, including the central Florida Peninsula (Ocala National Forest, Brooksville Ridge, southern end of the Lake Wales Ridge) (Abrahamson et al. 1984) and the panhandle, e.g., Eglin Air Force Base.

Biophysical Site Description

Longleaf pine sandhills occur as dry woodlands/savannas on excessively drained or other xeric soils. Soils are deep coarse sands. It occurs on upland, gently rolling, broad ridge tops.

Soils are typically Entisols (*Psamments*), with very limited profile development. Some soil series associated with this system include the Astatula series (Kalisz 1982), as well as the Lake, Tavares. and Orsino series (Abrahamson et al. 1984). In some cases the soils may be unusually dark in color at the surface, which has been attributed, in part, to the presence of charcoal. Soils are strongly acidic (pH 4.7-5.0). At least some of these sites have silt or clay in the subsoil contributing to significantly higher extractable bases at the surface when compared to nearby scrub sites (Kalisz 1982). Excluded are areas with a "shallow sand cap" (K. Outcault personal communication). On Eglin Air Force Base, habitat for this system includes areas covered by the Citronelle Formation. Psamments are the dominant soil suborder in the areas of Florida where this system is found (NRCS n.d.) (NatureServe 2006).

Vegetation Description

The canopy is strongly dominated by longleaf pine (*Pinus palustris*). Xerophytic scrub oaks, predominately turkey oak (*Quercus laevis*), bluejack oak (*Quercus incana*), sand live oak (*Quercus geminata*), or sand post oak (*Quercus margaretta*), are present as sparsely scattered midstory individuals or clumps and shrub-size fire-sprouts under the reference condition. The oaks become denser with fire exclusion. Other less xerophytic oaks are absent or extremely rare.

A rich herbaceous layer is present. Characteristic species in this stratum are *Aristida beyrichiana* over most of the range, and *Licania michauxii* (NatureServe 2006). Also bluestems (*Schizachyrium* spp or *Andropogon* spp), and dropseed (*Sporobolus* spp.) in places. The herb layer is moderately dense, with a variety of other xerophytic herbs present. In addition, a number of species found primarily in central Florida may also be present, among the most frequent of which is *Chapmannia floridana*. Other geographically limited species may include *Sabal etonia*, *Polygonella ciliate*, and *Arnoglossum floridanum* (NatureServe 2006).

Low shrubs are sparse in the reference condition, but can become dense with fire exclusion.

Canopy trees are patchy to dense in distribution, with regeneration in canopy gaps of one-quarter to a few acres in size, occasional mid-successional clumps in similar sized patches, with the oldest trees occurring as isolated individuals or as large patches. Canopy gaps are created by fire mortality, lightning, and wind throw at the scale of individual trees or several trees. Because of the irregular seed production of longleaf pine, canopy gaps may lack regeneration for several years.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PIPA2 | *Pinus palustris* | Longleaf pine |
| QULA2 | *Quercus laevis* | Turkey oak |
| QUIN | *Quercus incana* | Bluejack oak |
| ARBE7 | *Aristida beyrichiana* | Beyrich threeawn |

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

Disturbance Description

Frequent surface fires, every 1-4yrs generally burn across large expanses. Fires are usually low in intensity overall, but will occasionally kill young regeneration patches and rarely kill individual older trees. Hurricanes and accompanying tornadic winds may result in blowdowns that occur as thinnings, patches, or, rarely, large patches.

Fire is essential to maintain this system, without which it may be almost completely replaced by scrub vegetation (in the Florida Peninsula) (NatureServe 2006).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 187 | 1 | 150 | 250 |
| Moderate (Mixed) | 14045 |  |  |  |
| Low (Surface) | 3 | 99 | 1 | 10 |
| All Fires | 2 | 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

The landscape is adequate in size to contain the natural variation in vegetation and disturbance regimes. Topographically, areas could be very large and extend continuously over a large expanse of the landscape, or they could occur as small patches.

This system represents larger patches of *Pinus palustris* Sandhills (in Florida), ranging from 60-4000ha in size (NatureServe 2006).

Adjacency or Identification Concerns

This type is distinguished from other longleaf pine-dominated groups by the presence of xerophytic oaks and the absence of other oaks, and by the absence of mesophytic or wetland herbs.

Adjacent to Central Florida Wet Prairie and Herbaceous Seep (CES203.491) and Central Florida Pine Flatwoods (CES203.382). It can be surrounded by Florida Peninsula Inland Scrub (CES203.057) (NatureServe 2006).

Longleaf pine sandhills are abundant in the Sandhills Region of North and South Carolina, and scattered on relict beach ridge systems of the outer coastal plain and on sand dune systems associated with rivers. Rare extreme sandhills (sand barrens) are so excessively drained that all strata are low in density, leaving much bare sand even in the absence of fire. Fuels are too discontinuous to support regular fire. This model does not cover these extreme communities.

Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been homogenized by logging or clearing. Examples include where loblolly or slash pine have replaced some or all the longleaf pine, where midstory oaks and/or low shrubs have become dense due to inadequate burning, and where the grass-dominated ground cover has been lost due to soil disturbance or past canopy closure.

Issues or Problems

Longleaf pine-scrub oak sandhills and longleaf pine-turkey oak sandhills can make up this biophysical setting (BpS) within its geographic range. Also, no insect and disease disturbances were noted during the succession pathway of this BpS. It was suggested that some level of disturbance from a bark beetle infestation be added to this pathway. The problem would occur most likely in classes B and D. This addition has not been done.

Native Uncharacteristic Conditions

On Eglin and some surrounding areas, some sandhills have been invaded by the native sandpine from surrounding old planted plantations and natural areas due to fire suppression. This creates a monoculture of sandpine overstory with little to no understory (usually consisting of lichen and bare ground) and little midstory.

Comments

The information from the Rapid Assessment model R9LLSH by C. Bailey and K. Hiers was used as a starting point for this BpS LANDFIRE VDDT model and then adapted by D. Hardin.

This model was reviewed during a model review workshop held 09/19/2006 Tallahassee, FL.

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 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 | 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 | 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 | 10-25 | C con | C con | C con | C con | C con | C con | C con | C con | C con | C 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 | 25-50 | 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 |
| Tree | >50 | D con | D con | D con | D con | D con | D con | D con | D con | D con | D con |

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

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | All |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | All |

Description

Class A is characterized by canopy gaps, perhaps ¼ to 2ac in size, with pine regeneration, or lacking pine regeneration because no mast year has occurred since the gap opened. The native grassy ground cover is dominated by *Aristida stricta*.

*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 | Upper |
| QULA2 | Quercus laevis | Turkey oak | Middle |
| QUGE2 | Quercus geminata | Sand live oak | Middle |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |

Description

Class B includes patches, perhaps ¼ to 2ac in size, with mid-age canopy pines. A substantial component of mid-story hardwoods or shrubs is encroaching in the absence of fire. The hardwood/shrub cover is >50%. Canopy pine cover ranges between 25-75%. This class would also establish in fire shadows created by geologic or hydrologic changes.

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

Class C 38 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| QULA2 | Quercus laevis | Turkey oak | Middle |
| QUGE2 | Quercus geminata | Sand live oak | Middle |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |

Description

Class C includes patches, perhaps ¼-2 ac in size, with mid-age canopy pines. There is a minimal hardwood component and only sparse shrubs due to frequent fire. *Aristida stricta* dominates the ground cover. Canopy pine cover ranges between 25-75%.

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

Class D 46 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| QULA2 | Quercus laevis | Turkey oak | Middle |
| QUGE2 | Quercus geminata | Sand live oak | Middle |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |

Description

Class D is characterized by patches, perhaps ¼ to 2 or more acres in size, with older canopy pines sometimes 100s of years old. There is a minimal hardwood component and only sparse shrubs due to frequent fire. *Aristida stricta* dominates the ground cover. Canopy pine cover ranges between 25-75%.

*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 |
| QUGE2 | Quercus geminata | Sand live oak | Middle |
| QULA2 | Quercus laevis | Turkey oak | Middle |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |

Description

Class E includes patches with a few remnant older canopy pines, with a substantial component of hardwoods and/or shrubs in either the overstory or understory. The ground cover is shrubby or sparse. The hardwood/shrub cover is >50%. This class would also establish in fire shadows created by geologic or hydrologic changes.

*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 | 75 |
| Mid1:CLS | 16 | Late1:CLS | 75 |
| Late1:OPN | 76 | Late1:OPN | 999 |
| Late1:CLS | 76 | 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 | 14 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.4 | 3 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 15 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.4 | 3 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.01 | 100 | Yes | 0 |
| Wind or Weather or Stress | Mid1:CLS | Mid1:CLS | 0.01 | 100 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.4 | 3 | 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 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.4 | 3 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Mid1:CLS | 0.005 | 200 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:CLS | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.04 | 25 | No | 0 |

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