14530

Central Florida Pine Flatwoods

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Mixed Upland and Wetland

Map Zones

55, 56

Geographic Range

Often considered the matrix vegetation of peninsular Florida. Occurs on the Atlantic and Gulf Coasts separated by a complex of central ridges. On the Atlantic Coast, grades to the north into Atlantic Coastal Plain Wet Pine Savannas and Flatwoods (203.536). On the Gulf Coast, grades toward the west into East Gulf Coastal Plain Near-coast Pine Flatwoods (203.375) and Treeless Savannas and Wet Prairies (203.192). To the south, grades into South Florida Pine Flatwoods (411.381).

Endemic to FL, ranging in the north from approximately Levy and St. Johns counties (ca. 30 degrees N latitude) southward to approximately Hillsborough, Osceola and Polk counties (NatureServe 2006)

Biophysical Site Description

This BpS occurs in seasonally wet to flooded woodlands on nearly level, somewhat poorly to poorly drained sandy soils with dark sandy layers (mostly spodosols) and generally low pH (3-5). It also experiences seasonal droughts during dry periods.

Vegetation Description

Central Florida Pine Flatwoods are characterized by an open, savanna-like to nearly closed canopy of longleaf pine *(Pinus palustris*), with a component of slash pine (*Pinus elliottii* var. *elliottii* in the north and var. *densa* in the south) which can be dominant in wetter areas. Pond pine *(Pinus serotina*) may be present to dominant on the wettest sites, known locally as wet flatwoods.

Drier sites are considered “scrubby flatwoods”, and may be characterized by fewer pines and additional midstory shrubs in a better developed layer. The understory consists of xeromorphic adapted species such as such as *Quercus geminata*, *Lyonia fruticosa*, *Lyonia ferruginea*, *Sideroxylon tenax* (=*Bumelia tenax*) and *Persea humilis*; *Quercus inopina* is especially diagnostic (Abrahamson et al. 1984). *Lyonia lucida*, *L. ligustrina*, blueberries (*Vaccinium corymbosum*, *V. darrowii*, *V. myrsinites*, *V. stamenium*), titi (*Cliftonia monophylla*), oaks (*Quercus* spp.), wax myrtle (*Myrica cerifera*), hollies (*Ilex* spp.) and gallberry (*Ilex glabra*) can also be found. These species are typically of low stature under natural fire regimes. Ground cover species include wiregrasses (*Aristida* spp.), toothache grass (*Ctenium aromaticum*), dropseeds (*Sporobolus* spp.), panic grasses (*Panicum* spp.) and various perennial herbs.

Saw palmetto (*Serenoa repens*) tends to be found on more poorly drained soils (NatureServe 2006).

Canopy trees are patchy in distribution, with regeneration in canopy gaps of 1/2 acre or less in size. Mid-successional clumps occur in similar sized patches as regeneration. The oldest trees occur as isolated individuals or as patches, some of which were acres in size. The reference condition classes are aggregates of numerous patches well dispersed over the landscape. These patches consisted of mostly of older trees. Canopy gaps are created by fire mortality, lightning and wind-throw at the scale of individual to several trees.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PIPA2 | *Pinus palustris* | Longleaf pine |
| PIEL | *Pinus elliottii* | Slash pine |
| SERE2 | *Serenoa repens* | Saw palmetto |
| ARBE7 | *Aristida beyrichiana* | Beyrich threeawn |
| ILGL | *Ilex glabra* | Inkberry |

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

Disturbance Description

Frequent surface fires, often occurring every 1-4yrs but ranging up to seven year intervals or as much as 10yrs in scrubby flatwoods, generally burn most of the ground layer and midstory vegetation. The mean fire return interval is skewed towards the more frequent end of this range. Fires are usually low intensity to moderate in intensity overall, generally resulting in topkill of the lower and middle layers, but periodically will kill young regeneration patches and occasionally individual older trees. Although fire can occur in any season, in pre-European settlement times many lightning fires probably occurred during the dry early spring and summer season, although Native Americans were common in these areas and represented a significant ignition source. In this landscape, frequency is more important than seasonality, as long as the season of burn is varied periodically. This community is subjected to hurricanes which may cause thinning of stands, localized blowdown or uprooting of stands, or perhaps rarely blowdowns of larger areas. Two wind types were used in the model; one stand replacing, one not. Flooding may cause vegetation changes at ecotones with wetland types.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 84 | 3 | 50 | 150 |
| Moderate (Mixed) | 8803 |  |  |  |
| Low (Surface) | 2 | 97 | 1 | 7 |
| 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

Low intensity fires may have ranged in size from very small to thousands of acres pre-fragmentation. Replacement fires may have been localized to less than an acre, or as large as hundreds of acres. Hurricane and wind damage may have ranged from single trees, to a few tens of acres scattered in the landscape. Flooding disturbance probably was limited to a few acres. Patch size of this type may range from 10ac to thousands of acres, forming the matrix within which other types are imbedded, especially in FL.

Adjacency or Identification Concerns

Flatwoods exist as matrix in which many other types occur, often due to slight elevation changes, drainage features, fire shadows or strips parallel to extended elevation gradients between uplands and wetlands. In dry locations, it may be considered “scrubby flatwoods.” The wetter end may grade into wet flatwoods or savannas. Flatwoods may grade into dry or wet prairie as the tree canopy thins.

NatureServe (2006) recognizes East Gulf Coastal Plain Near-Coast Pine Flatwoods (CES203.375) as a closely related system that is found to the north.

Issues or Problems

This community has very few reference examples from which to test the model outputs. The relative patchiness and presence of a high percentage of seral class C, represents a hypothesis for how fire and other disturbances maintained this community. The distribution of seral stages in this model should be managed with wide confidence intervals, recognizing the variation of structure in this community on the model landscape and the few glimpses of it in its pre-Columbian condition.

Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been homogenized by logging or clearing, often coupled with drainage. Examples include where loblolly or additional slash pine have replaced some or all of the longleaf pine. The effects of bedding, even when establishment of planted pine plantation has failed, persist often for many decades. Bedding may not completely drain a site; however, the alteration of micro-topography may affect the spread of fire. Disturbance caused by insects and other pathogens are very rare, except where conversions to dense stands of loblolly have occurred. I really think percents in this and the other longleaf dominated models should look more like the mesic uplands model.

Native Uncharacteristic Conditions

Susceptible to a number of invasive exotics including cogon grass, tallow, climbing fern.

Comments

(R9MEFL) Mesic-Dry Flatwoods by Hardin, K. Hiers and K. Outcalt (with appropriate apologies) was used as the basis for this BpS model description and corresponding VDDT model.

This model was reviewed during a model review workshop held 09/19/2006 in 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 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 | 10-25 | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix | B mix |
| 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 | 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 17 Early Development 1 - All Structures

DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| PIEL | Pinus elliottii | Slash pine | Upper |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |
| ILGL | Ilex glabra | Inkberry | Low-Mid |

Description

Class is a post replacement fire stage with canopy gaps, mostly single tree to quarter acre up to one acre in size, of pine regeneration. The native ground cover is dominated by wiregrass and other grasses, small statured shrubs, and forbs.

*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 |
| PIEL | Pinus elliottii | Slash pine | Upper |
| QUERC | Quercus | Oak | Middle |
| LYONI | Lyonia | Staggerbush | Middle |

Description

Class is characterized as a mid-seral closed stage with patches, mostly quarter acre or less in size, of canopy pines and a substantial component of hardwoods (e.g., oaks, titi and bays) or other pine species encroaching in the absence of fire.

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

Class C 36 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| PIEL | Pinus elliottii | Slash pine | Upper |
| SERE2 | Serenoa repens | Saw palmetto | Low-Mid |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |

Description

Class is characterized by a mid-seral open condition with patches, mostly ¼ acre to a few acres in size, of canopy pines and a minimal hardwood component due to frequent fire. The ground cover is grass-dominated, generally by wiregrass.

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

Class D 45 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |
| PIEL | Pinus elliottii | Slash pine | Upper |
| SERE2 | Serenoa repens | Saw palmetto | Low-Mid |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |

Description

Class is a late-seral open stage with patches, mostly ¼ acre to many acres in size, of canopy pines and a minimal component of hardwoods. The ground cover is grass-dominated, generally by wiregrass with a significant component of saw palmetto (*Serenoa repens*).

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

Class E 1 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUERC | Quercus | Oak | Upper |
| PIPA2 | Pinus palustris | Longleaf pine | Upper |

Description

Class is characterized by a late-seral closed stage with patches of canopy pines and a substantial component of hardwoods or pines other than longleaf in either the overstory or understory. The ground cover is shrubby or sparse. The hardwood and encroaching pine cover is >50%. *Serenoa repens* may dominate the ground to lower midstory layer.

*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 | 75 |
| Mid1:CLS | 15 | 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 | 13 |
| Wind or Weather or Stress | Early1:ALL | Early1:ALL | 0.005 | 200 | No | 0 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.04 | 25 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.4 | 3 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 15 |
| 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 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.01 | 100 | Yes | 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 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.007 | 143 | Yes | 0 |
| Wind or Weather or Stress | Mid1:CLS | Mid1:CLS | 0.01 | 100 | No | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.4 | 3 | No | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 15 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Wind or Weather or Stress | 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 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.007 | 143 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:CLS | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.4 | 3 | No | 0 |

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