14850

East Gulf Coastal Plain Savanna and Wet Prairie

BpS Model/Description Version: Aug. 2020

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|  |  |  |  |

Vegetation Type

Herbaceous Wetland

Map Zones

55, 99

Geographic Range

Gulf coast wet pine savannah occurs along the lower Gulf coastal plain from north central Florida to eastern Louisiana.

Western Florida and adjacent Alabama and Mississippi (NatureServe 2006).

Biophysical Site Description

This biophysical setting (BpS) occurs as wet woodlands or savannas growing on wet mineral soils, that are seasonally flooded (late winter to early spring) at least 2-3 times per decade.

This system occupies low, flat plains on poorly drained Ultisols. Sites are saturated for 50-100 days per year (FNAI 1990). Other soil orders may include Ultisols, Spodosols, Inceptisols and Entisols (Collins et al. 2001); some of these soils have an argillic horizon which impedes drainage and contributes to high water tables. On Eglin Air Force Base, this system is found on the Rutledge series (Kindell et al. 1997) (NatureServe 2006).

Vegetation Description

Gulf coast savannahs are characterized by a very sparse canopy dominated by longleaf pine (*Pinus palustris*), sometimes mixed with sparsely scattered cypress (*Taxodium* spp.) and/or slash pine (*Pinus elliottii*). In Mississipppi in the mid-1800’s, Hilgard described this BpS as having scattered stunted longleaf (25ft tall and generally <4in DBH) with spacing of 50ft between trees. There is generally little shrubby understory on reference condition sites, but a variety of hardwoods begin to encroach with infrequent and/or dormant season fire.

Collins et al. (2001) documented <10 trees per acre (*Pinus elliottii* and *Pinus palustris*) in examples of this system on the Apalachicola National Forest. *Magnolia virginiana*, *Acer rubrum*, and *Morella cerifera* are often present in sometimes locally dense patches, especially when managed with infrequent fires (FNAI 1990, Collins et al. 2001).

The ground cover is dense and generally diverse. Grasses such as wiregrass (*Aristida beyrichiana*) (in the eastern part of the range), toothache grass (*Ctenium aromaticum*) and dropseeds (*Sporobolus* spp.), and grass-like species (such as *Cyperus* spp., *Juncus* spp., *Fimbristylis* spp., and *Dichromena* spp) are dominate. Forbs, including many species of carnivorous plants, orchids and composites are common and highly diverse, however, legumes are rarely present. Other typical species include, *Rhexia alifanus*, *Rhynchospora* spp. and *Eriocaulon* spp. (NatureServe 2006). The ground cover exhibits one of the highest small-scale (m2) species richness levels recorded for any habitat-type, world-wide. Unlike many other types of longleaf pine communities, the distribution of trees in usually not strongly patchy. Instead, most trees are isolated, even as young individuals.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ARBE7 | *Aristida beyrichiana* | Beyrich threeawn |
| PIPA2 | *Pinus palustris* | Longleaf pine |
| ILCO | *Ilex coriacea* | Large gallberry |
| SCHIZ4 | *Schizachyrium* | Little bluestem |

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

Disturbance Description

Gulf coast wet pine savannas experience frequent growing season surface fires, every 2-5yrs, that generally burn across large expanses. The fires are usually low intensity overall, but will occasionally kill young individuals, and rarely kill older trees. Because this BpS was originally very open, with only sparse trees, lightning and wind may have been major sources of tree mortality. A major effect of burning is to minimize the coverage of hardwood species (especially species such as black titi [*Cliftonia monophylla*]) that encroach from wetter adjoining areas. Periods of inundation may have been the dominant factor in keeping hardwoods in drier areas from encroaching. The primary disturbance dynamic is the gap phase regeneration of longleaf pine. The model classes are small patches widely dispersed on the landscape. A secondary dynamic (closed vs. open path) is the invasion of shrubs and hardwood trees in patches that escape fire. Once shrubs are established, they slightly decrease the probability of fire, but increase the probability that fires will kill the canopy pines. Once established, shrubs are not easily eliminated by single fires, but may sometimes be eliminated by multiple fires. We have simulated this by using mosaic fire to represent the last of a series of surface fires that eliminates invading hardwoods without killing canopy pines.

This vegetation type occupies much less of its original area and is now considered a habitat type of special concern due to the lack of fire and/or alteration of the hydrology. Many of the larger original areas have been permanently degraded by bedding (in attempts to establish pine plantations), and ditching or tiling to create drier areas for many types of uses including pastures and sod farms. In addition to these threats, damage by feral hogs is a huge problem on Eglin AFB. Hogs root up plants and change hydrology, which in turn changes plant composition, etc. (Engeman et al. 2007). Past establishment of plowed fire lanes may also slowly degrade the habitat by altering hydrology. Lack of fire has degraded much of the remaining areas. Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been increased in density and/or homogenized by logging activities. Scattered longleaf have been replaced with dense stands of loblolly or slash pine. In addition, there are many areas where shrubs have become dense due to inadequate burning, and examples where the grass dominated ground cover has been lost due to soil disturbance or past canopy closure.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 163 | 2 | 10 | 500 |
| Moderate (Mixed) | 510 | 1 |  |  |
| Low (Surface) | 3 | 97 | 1 | 10 |
| 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

Natural lighting initiated fires may have been on the scale of 50-50,000ac, depending on conditions. The larger fires likely burned through savanna, flatwoods, cypress ponds, and may have crossed narrow sloughs if they were dry. The size of savanna patches was probably on the scale of 100-2000ac, but areas could have had more savanna separated by wet sloughs.

Adjacency or Identification Concerns

This BpS is distinguished from other longleaf pine-dominated communities by the presence of wetland herbs and shrubs and seasonally fluctuating hydrology that, in some years, ranges from inundation to excessive drying that may produce cracking in the soil. It does not include the Gulf Coast flatwoods sites with saw palmetto (*Serenoa repens*) as a common species. Slight rises above the elevation of the savanna support mesic flatwoods. Wetter areas are pond cypress (*Taxodium ascendens*) or gum (*Nyssa* spp.) sloughs. Also hypericum (*Hypericum* spp.) ponds are found within this community.

Issues or Problems

Wet Pine Savanna was developed by Sharon Herman in 2004 and reviewed 3/7/2005 by Carl Nordman. The model was modified to reduce the frequency of fire in class E, which resulted in class E being 3% of the landscape rather than <1%. When the model is run without fire nearly all the vegetation comes out as class B and class E. This occurs on much of the current landscape, which is not managed with prescribed fire. Historical fire size (minimum, maximum and average) was based on conjecture by Carl Nordman. Reviewers Grace and Wilder concurred with model descriptions and parameters as given in Rapid Assessment model for map zones 45, 46, 98, and 99. Little bluestem was included as a dominant species and indicator for habitats west of Jackson County where *Arisitda beyrichiana* does not occur. However, A. Stevens suggested that all of the seepage slopes on Eglin are dominated by wiregrass which are in counties west of Jackson County (mainly Walton County and some Okaloosa county). If this classification includes grassy depression wetlands as well (which it sounds like it would) then would include Santa Rosa County in that, too.

Native Uncharacteristic Conditions

Invasive species in this system along the coastal plain include Chinese tallowtree and cogon grass.

Comments

Suggested reviewers - William Platt (LSU), Guy Anglin (USFS - Florida NFs Supervisors Office), Jean Huffman (FL DEP), Ann Johnson (FNAI)

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 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 | 5-10 | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf | B brdlf |
| Tree | 10-25 | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf | E brdlf |
| Tree | 10-25 | E mix | E mix | E mix | E mix | E mix | E mix | E mix | E mix | E mix | E mix |
| Tree | 10-25 | D con | D con | D con | D con | D con | D con | D con | D con | D con | D con |
| 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 12 Early Development 1 - All Structures

DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |
| CTAR | Ctenium aromaticum | Toothache grass | Lower |
| SCHIZ4 | Schizachyrium | Little bluestem | None |

Description

The dominant lifeform is the herbaceous component. This class includes scattered pine regeneration or no pine regeneration because no mast year has occurred since the gap opened. The native grassy ground cover is dominated by grass or grass-like species. Replacement means death of the longleaf pines as single trees or small clumps. Most replacement fires occur in the earliest stage. Older trees are very resilient to fire.

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

Class B 2 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ILGL | Ilex glabra | Inkberry | Middle |
| ILCO | Ilex coriacea | Large gallberry | Middle |
| CLMO2 | Cliftonia monophylla | Buckwheat tree | Middle |
| MAVI2 | Magnolia virginiana | Sweetbay | None |

Description

The dominant lifeform are shrubs. This class is characterized by scattered pines with a substantial component of mid-story hardwoods or shrubs encroaching in the absence of fire. Grasses and forbs are declining in cover and vigor. A secondary dynamic (closed versus open path) is the invasion of shrubs and hardwood trees in patches that escape fire. Once shrubs are established, they slightly decrease the probability of fire, but increase the probability that fires will kill the canopy pines. Once established, shrubs are not easily eliminated by single fires, but may sometimes be eliminated by multiple fires. We have simulated this by using mosaic fire to represent the last of a series of surface fires that eliminates invading hardwoods without killing canopy pines.

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

Class C 30 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |
| CTAR | Ctenium aromaticum | Toothache grass | Lower |
| SCHIZ4 | Schizachyrium | Little bluestem | None |

Description

The dominant lifeform is the herbaceous component. This class includes scattered pines. There are few hardwoods and only sparse shrubs due to frequent fire. The ground cover is dominated by grass and grass-like species.

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

Class D 50 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ARBE7 | Aristida beyrichiana | Beyrich threeawn | Lower |
| CTAR | Ctenium aromaticum | Toothache grass | Lower |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

The dominant lifeform is the herbaceous component. This class includes scattered canopy pines, with few hardwoods and only sparse shrubs due to frequent fire. Grass and grass-like species dominate the ground cover.

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

Class E 6 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CLMO2 | Cliftonia monophylla | Buckwheat tree | Mid-Upper |
| ILGL | Ilex glabra | Inkberry | Middle |
| ILVO | Ilex vomitoria | Yaupon | Middle |
| NYSY | Nyssa sylvatica | Blackgum | Mid-Upper |

Description

Pines are in canopy, but shrubs and small trees dominate the mid-story. This class is characterized by older canopy pines, with a substantial component of hardwoods and/or shrubs in either the overstory or understory. Forbs and grasses are sparse. A secondary dynamic is the invasion of shrubs and hardwood trees in patches that escape fire. Once shrubs are established, they slightly decrease the probability of fire, but increase the probability that fires will kill the canopy pines. Once established, shrubs are not easily eliminated by single fires, but may sometimes be eliminated by multiple fires. We have simulated this by using mosaic fire to represent the last of a series of surface fires that eliminates invading hardwoods without killing canopy pines.

*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 | 74 |
| Mid1:CLS | 15 | Late1:CLS | 74 |
| Late1:OPN | 75 | Late1:OPN | 999 |
| Late1:CLS | 75 | 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 | 0.005 | 200 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.4 | 3 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 10 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.005 | 200 | Yes | 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 |
| Competition or Maintenance | Mid1:CLS | Mid1:CLS | 0.01 | 100 | No | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.03 | 33 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.05 | 20 | No | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 10 |
| Wind or Weather or Stress | Late1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Competition or Maintenance | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.35 | 3 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Mid1:CLS | 0.01 | 100 | Yes | 0 |
| Competition or Maintenance | Late1:CLS | Late1:CLS | 0.01 | 100 | No | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.02 | 50 | Yes | 0 |

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