

14490

Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Woody Wetland

Map Zones

58, 60

Geographic Range

This system ranges from southern VA to southern SC (NatureServe 2006)

Biophysical Site Description

This BpS occurs in seasonally wet woodlands on nearly level, moderately well to somewhat poorly drained sandy soils of an acid character. Examples of occupied soil series include Foreston, Rains and Altavista. This BpS is typically dissected by wet hardwood or coniferous communities.

NatureServe (2006) note this was once one of the most extensive systems in the coastward part of its range. This system occurs on wet mineral soil sites (see modeler's description above), primarily in the Middle and Outer Coastal Plain but occasionally in the Fall-line Sandhills. Landforms include low areas in relict beach ridge systems and eolian sand deposits, and poorly drained clayey, loamy, or sandy flats. They occasionally occur on river terraces above current flood levels. Soils range from clayey to sandy, with no accumulated organic surface layer. Soils are seasonally saturated, due to high water table or poor soil drainage. The unifying feature of this system is wet mineral soils associated with a high frequency of fire.

Vegetation Description

Northern Wet Longleaf Pine Savanna is characterized by an open, savanna-like to nearly closed canopy of longleaf pine (*Pinus palustris*), with a component of pond pine (*Pinus serotina*) or slash pine (*Pinus elliotii*). Hardwoods are present in any abundance only in examples altered by fire suppression (NatureServe 2006). The understory consists of predominantly wiregrasses (*Aristida* spp.), blueberries (*Vaccinium* spp.) and various perennial herbs. Switchcane (*Arundinaria* spp.) and evergreen shrubs are present on the wettest sites. The ground cover is a dense combination of herbs and low shrubs. A variety of ericaceous shrubs and hollies is common, with density determined by fire history. Grasses naturally dominate the ground cover. *Aristida stricta* often dominates within its range, but *Ctenium aromaticum*, *Sporobolus pinetorum*, *Sporobolus teretifolius*, or other grasses may dominate. A great diversity of other herbs is often present, including composites, sedges, insectivorous plants and variety of showy forbs (NatureServe 2006).

Canopy trees are patchy in distribution, with regeneration in canopy gaps generally less than an acre in size. Mid-successional clumps occur in similar sized patches as regeneration. The oldest trees occur as isolated individuals. The reference classes are aggregates of numerous patches well dispersed over the landscape. Canopy gaps are created by fire mortality, lightning and wind-throw at the scale of individual to several trees.

Communities in this system are often very high in species richness, with some of the highest values measured anywhere at the 1/10-hectare, 1/100-hectare, and 1-square-meter levels. However, some associations are naturally low to moderate in species richness.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIPA2	<i>Pinus palustris</i>	Longleaf pine
PISE	<i>Pinus serotina</i>	Pond pine
ARIST	<i>Aristida</i>	Threeawn
ARUND 2	<i>Arundinaria</i>	Cane
QUERC	<i>Quercus</i>	Oak

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

Disturbance Description

Frequent, low -intensity fires are the dominant natural ecological force, with seasonally wet areas excluded. Fires are usually low 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 lightning fires were most prevalent in the April-May period, 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 on larger areas.

Frequent fire is crucial in determining its structure and even its identity. They burn above-ground parts of herbs and shrubs but have little effect on the fire-tolerant trees. Vegetation recovers very quickly from fire, with live herbaceous biomass often restored in just a few weeks. Many plants have their flowering triggered by burning. In the absence of fire, the shrubs increase and hardwoods may invade the system. Herb layer density and diversity decline after just a couple of years without fire. In time, unburned examples will become nearly indistinguishable from the drier associations of Atlantic Coastal Plain Peatland Pocosin (CES203.267) (NatureServe 2006).

Canopies are believed to naturally be many-aged, consisting of a fine mosaic of small even-aged groves driven by gap-phase regeneration. Longleaf pine is shade-intolerant and slow to reach reproductive age but is very long-lived (NatureServe 2006).

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	90	3	50	200
Moderate (Mixed)	263	1		

Low (Surface)	3	96	3	4
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

This system naturally occurs as large to small patches, sometimes part of extensive matrix mosaics with other systems. It was naturally one of the most abundant systems on the lower terraces of the Outer Coastal Plain. Many remaining examples are naturally bounded islands (NatureServe 2006).

Low intensity fires may have ranged in size from very small to thousands of acres. 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 entire timber stands scattered in the landscape. Flooding disturbance probably was limited to a few acres associated with storm events. Patch size of this type may range from 10ac to thousands of acres, forming the matrix within which other types are imbedded.

Adjacency or Identification Concerns

Northern Wet Longleaf Pine Savanna occurs within the landscape on Carolina Bay rims to large flats adjacent to pocosin types.

This system is distinguished from Atlantic Coastal Plain Southern Wet Pine Savanna and Flatwoods (CES203.536) because of substantial biogeographic differences. The break is placed at the northern range limit of *Aristida beyrichiana*, which is a keystone species in the communities where it occurs. This corresponds roughly with the geographic break in the upland longleaf pine systems (NatureServe 2006).

This system is distinguished from Atlantic Coastal Plain Upland Longleaf Pine Woodland (CES203.281) because of its more upland character. However, the two systems have much in common, including frequent fire and the same primary dominant tree and many herbaceous species. They can also occur in the same landscapes. However, floristic differences are well marked, and no associations are shared. This system occurs primarily in the Outer Coastal Plain, but small patches may occur in atypical landforms in the Fall-line Sandhills. Sandhills examples are not treated as a separate system, as the upland longleaf pine systems are, because they are confined to sites that more resemble the Outer Coastal Plain. They are distinguished in the Sandhills from Atlantic Coastal Plain Sandhill Seep (CES203.253) by landform and apparent hydrology that is driven by seasonal high water table rather than seepage. Similar Ecological Systems also include Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland (CES203.254) (NatureServe 2006).

Adjacent Ecological Systems noted by NatureServe (2006) include: Atlantic Coastal Plain Upland Longleaf Pine Woodland (CES203.281) and Atlantic Coastal Plain Peatland Pocosin (CES203.267) are the most frequently associated systems. Atlantic Coastal Plain Southern Depression Pondshore (CES203.262) patches may be embedded, and Atlantic Coastal Plain Small Blackwater River Floodplain Forest (CES203.249), Atlantic Coastal Plain Small Brownwater River Floodplain Forest (CES203.250), and Atlantic Coastal Plain Mesic Hardwood

and Mixed Forest (CES203.242) may adjoin. Atlantic Coastal Plain Clay-Based Carolina Bay Wetland (CES203.245) is also an adjacent system.

Issues or Problems

Uncharacteristic vegetation types include even-aged canopy stands in which age structure has been influenced by plantation establishment and mechanical treatments. Site conversion to other species, primarily loblolly pine has reduced acreage in longleaf communities. Suitability for development for agriculture, commercial and residential development has eliminated forest land acreage. Site preparation methods have altered microsite hydrology and impacted movement in the landscape. Fire suppression activities have negatively impacted natural regeneration of longleaf pine.

Native Uncharacteristic Conditions

Comments

Model results for MZ58 and MZ60 were slightly different, but the differences appeared to be due to rounding as the model parameters looked identical. The descriptions for MZ58 and MZ60 were very similar, with additional information in MZ60 description that we intended to delete in the BpS duplicate review process. The description from MZ58 was used for both map zones.

Some information excerpted from Rapid Assessment for Longleaf Pine Mesic Uplands.

After reviewing the model developed by Wilson/Mangus, Szell noted that the correction of several violations of the usage of alternate succession changed model outputs. Therefore, the fire frequency values reflect the output from K. Outcalt model BpS 1450 which Szell adapted for BpS 1449.

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	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Herb	0.5-1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Herb	>1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	0-0.5	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	0.5-1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	1.0-3.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	>3.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	0-5	A	A	A	A	A	UN	UN	UN	UN	UN
Tree	5-10	A	A	A	A	A	UN	UN	UN	UN	UN
Tree	10-25	C	C	C	C	C	B	B	B	UN	UN
Tree	25-50	D	D	D	D	D	D	UN	UN	UN	UN
Tree	>50	D	D	D	D	D	D	UN	UN	UN	UN

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	19	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPA2	<i>Pinus palustris</i>	Longleaf pine	Upper
PISE	<i>Pinus serotina</i>	Pond pine	Upper
ARIST	<i>Aristida</i>	Threeawn	Lower
ARUND2	<i>Arundinaria</i>	Cane	Lower

Description

Post replacement stage with canopy gaps, mostly single tree to quarter acre in size, of pine regeneration. The native ground cover is dominated by wiregrass and other grasses, small statured shrubs, and forbs. Subject to ice damage in the northern part of model zone.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Class B	5	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPA2	<i>Pinus palustris</i>	Longleaf pine	Upper
PISE	<i>Pinus serotina</i>	Pond pine	Upper
QUERC	<i>Quercus</i>	Oak	Mid-Upper
ARUND2	<i>Arundinaria</i>	Cane	Lower

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. Older age classes potentially impacted by hurricanes.

Maximum Tree Size Class

Medium 9-21"DBH

Class C	46	Mid Development 1 - Open
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Indicator Species

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	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	10
Replacement Fire	Early1:ALL	Early1:ALL	0.02	50	Yes	0
Surface Fire	Early1:ALL	Early1:ALL	0.3	3	No	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	11
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	0.33	3	No	0
Wind or Weather or Stress	Mid1:CLS	Mid1:CLS	0.005	200	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.02	50	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.05	20	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.31	3	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	11
Insects or Disease	Late1:OPN	Early1:ALL	0.002	500	Yes	0
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
Surface Fire	Late1:OPN	Late1:OPN	0.3	3	No	0
Wind or Weather or Stress	Late1:CLS	Mid1:CLS	0.0083	120	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.02	50	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.05	20	Yes	0

Surface Fire	Late1:CLS	Late1:CLS	0.31	3	No	0
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References

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