13470

Atlantic Coastal Plain Upland Longleaf Pine Woodland

BpS Model/Description Version: Aug. 2020

Vegetation Type

Forest and Woodland

Map Zones

55,58,60

Geographic Range

The ecological system that corresponds to this BpS is noted by NatureServe (2006) to be found in the Atlantic Coastal Plain (exclusive of the Fall-line Sandhills) from southern VA to northeastern FL (see CES203.281).

Biophysical Site Description

Once perhaps the most extensive system in the Outer Coastal Plain within its range. Examples and associations share the common feature of upland (non-wetland) moisture regimes and natural exposure to frequent fire (NatureServe 2006).

Occurs on upland sites of the Middle to Outer Atlantic Coastal Plain, on landforms that include loamy to sandy flats, relict beach system deposits, eolian sand deposits, Carolina bay rims and occasional low rolling hills. Soils range from mesic to xeric and from sandy to loamy or occasionally clayey. Most natural remnants are on coarse sands, but most examples probably once occurred on loamy soils. Soils are largely acidic and infertile, and the coarsest sands are excessively drained and sterile.

The unifying feature of this system is non-wetland sites that naturally supported frequent fire. As such, it once covered much of the landscape of the Coastal Plain. Variations in soil texture and drainage appear to be a primary driver of differences between associations within the system, with biogeography also important (NatureServe 2006).

Vegetation Description

Vegetation is a set of associations that are most naturally woodlands or savannas dominated by Pinus palustris and having a well-developed grassy herb layer. A few associations have sparse herb layers due to excessively drained soils, and a few are dominated by scrub oaks. Other pine species may sometimes be present. Scrub oaks (Quercus laevis, Quercus incana, Quercus margarettiae, Quercus hemisphaerica and others) form an understory in most associations, all but the mesic ones. Low shrubs, most ericaceous, are often an important component. In most of the range, Aristida stricta is the dominant herb. In the southern and northern parts of the range, it is absent, and various other grass species dominate. Forbs, especially composites, are usually also an important herb component, and lichens are abundant in some associations. Many associations have moderate species richness, with most of the species in the herb layer. Some mesic associations have very high species richness, among the highest values ever measured at the 1/10-hectare scale. Associations on deep, coarse sands may have low species richness but have a distinct set of xerophytic herbs and dwarf-shrubs.

BpS Dominant and Indicator Species

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

Disturbance Description

Frequent, low-intensity fire is the predominant natural force in this system. Component communities naturally burned every few years, many averaging as often as every three years. Fires are naturally low to moderate in intensity. 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, less fire-tolerant species increase and others invade the system. The scrub oaks and shrubs, kept to low density and mostly reduced to shrub size by fire, become tall and dense and can suppress tree regeneration. Herb layer density and diversity decline. Only on the most excessively drained coarse sands does the vegetation not undergo substantial structural alteration and reduction in species richness after just a few years without burning (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. Most plants in these systems appear to be conservative, living a long time and only rarely sexually reproducing or colonizing new sites (NatureServe 2006).

Fire Frequency

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 is naturally a matrix system, probably once the most extensive system in its range. Most occurrences now are artificially bounded remnants or naturally small islands. Occurrences often form mosaics with Atlantic Coastal Plain Northern Wet Longleaf Pine Savanna and Flatwoods (CES203.265 or BpS 1449) or Atlantic Coastal Plain Peatland Pocosin (CES203.267 or BpS 1452) and may have small-patch systems embedded in them. A few landscape matrix areas of several thousand acres remain (NatureServe 2006).

Adjacency or Identification Concerns

This system is distinguished from Atlantic Coastal Plain Northern Wet Longleaf Pine Savanna and Flatwoods (CES203.265 or BpS 1449) because of the ecological role of saturated wetland conditions in the latter. The two systems have much in common, including frequent fire and the same primary dominant tree and herb species. They often occur in the same landscapes. However, floristic differences are well marked, and no associations are shared. This system is distinguished from the Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland (CES203.254 or BpS 1346) based on the differences in landscape patterns and prevailing associations in the two regions. Dissected topography with much higher relief, predominance of interbedded sands and clays, and interspersion with seepage wetlands all characterize the Fall-line Sandhills. This is in contrast to the low relief, pure sands or loams, and mosaics containing other wetland types in the rest of the Coastal Plain. Some matrix associations in the Fall-line Sandhills, such as Pinus palustris/Quercus marilandica/Gaylussacia dumosa/Aristida stricta Woodland (CEGL003595) are nearly absent in the rest of the Coastal Plain, and there are systematic floristic differences. If this were to be split into a northern and southern component, the distinction would be justified based on differences in climate, flora, and some differences in ecological dynamics. Gopher tortoises (Gopherus polyphemus) are an important keystone species in the southern portion of the range. The dominant grass also changes at this approximate point, with Aristida beyrichiana dominating herb layers to the south (NatureServe 2006).

Similar Ecological Systems: Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland (CES203.254 or BpS 1346); Atlantic Coastal Plain Northern Wet Longleaf Pine Savanna and Flatwoods (CES203.265 or BpS 1449).

Adjacent Ecological Systems: Atlantic Coastal Plain Northern Wet Longleaf Pine Savanna and Flatwoods (CES203.265 or BpS 1449) or Atlantic Coastal Plain Peatland Pocosin and Canebrake (CES203.267 or BpS 1452) are the most commonly associated systems, often forming mosaics. Atlantic Coastal Plain Southern Depression Pondshore (CES203.262) and small floodplain systems may be embedded in matrices of this system. Other adjacent systems include the Atlantic Coastal Plain Clay-Based Carolina Bay Wetland (CES203.245 or BpS 1459).

Issues or Problems

Native Uncharacteristic Conditions

Most natural remnants are on coarse sands, but most examples probably once occurred on loamy soils (NatureServe 2006).

Comments

This model description was created using the corresponding NatureServe (2006) ecological description for CES203.281. The VDDT model was based on the Rapid Assessment model (R9LLSH -- Longleaf Sandhills) as were the class percentages given below.

Succession Classes

**Mapping Rules**

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

Description

Canopy gaps, most single tree to a quarter acre size characterize class A. Pine regeneration grows here, or site lacks pine regeneration because no mast year has occurred since the gap opened. The native grassy ground cover is dominated by various grasses, with A. stricta the dominant herb.

*Maximum Tree Size Class*  
None

Class B 5 Mid Development 1 - Closed

Indicator Species

Description

Class B is characterized by patches, most ¼ acre or less of canopy pines, and a substantial component of hardwoods or other pine species encroaching in the absence of fire. Hardwood and encroaching pine cover is greater than 50%.

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

Class C 40 Mid Development 1 - Open

Indicator Species

Description

Class C includes patches, most ¼ acre or less with canopy pines, and a minimal hardwood component due to frequent fire. The ground cover is dominated by grasses.

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

Class D 40 Late Development 1 - Open

Indicator Species

Description

Class D includes patches, most ¼ acre or less, with older canopy pines, and a minimal component of hardwoods. The ground cover is dominated by grasses.

*Maximum Tree Size Class*  
Very Large >33"DBH

Class E 2 Late Development 1 - Closed

Indicator Species

Description

Class E is characterized by patches with older 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. Hardwood and encroaching pine cover is increasing.

*Maximum Tree Size Class*  
Very Large >33"DBH

Model Parameters

Deterministic Transitions

Probabilistic Transitions

References

Brown, J.K. and J. Kapler-Smith, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42. vol 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

Christensen, N.L. 1981. Fire regimes in southeastern ecosystems. Pages 112-136 in: H.A. Mooney, T.M. Bonnickson, N.L. Christensen, J.E. Lotan and W.A. Reiners, eds. Fire regimes and ecosystem properties. USDA Forest Service General Technical Report WO-26.

Frost, C.C. 1993. Four centuries of changing landscape patterns in the longleaf pine ecosystem. Pages 17-43 in: S.M. Hermann, ed. The longleaf pine ecosystem: ecology, restoration and management. Proceedings of the Tall Timbers Fire Ecology Conference, No. 18. Tallahassee, FL: Tall Timbers Research Station.

Gan, J. 2004. Risk and damage of southern pine beetle outbreaks under global climate change. Forest Ecology and Management. pp. 61-71.

Landers, J.L. 1991. Disturbance influences on pine traits in the southeastern United States. Pages 61-98 in: High intensity fire in wildlands: management challenges and options. Proceedings, 17th Tall Timbers fire ecology conference, 1989 May 18-21, Tallahassee, FL. Tallahassee, FL: Tall Timbers Research Station.

NatureServe. 2006. International Ecological Classification Standard: Terrestrial Ecological

Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of

18 July 2006.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Palick, B.J. and N. Pederson. 1996. Overstory mortality and canopy disturbances in longleaf pine ecosystems. Can. J. For. Res. 26: 2035-2047.

Price, T., Doggett, C., Pye, J. and Smith, B. 1998. A History of Southern Pine Beetle Outbreaks in the Southeastern United States. Atlanta, GA: Georgia Forestry Commission.

Schmidt, K.M., J.P. Menakis, C.C. Hardy, W.J. Hann and D.L. Bunnell. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 41 pp. + CD.

Wade, D.D., B.L. Brock, P.H. Brose, J.B. Grace, G.A. Hoch and W.A. Patterson. III, 2000. Fire in eastern ecosystems. Pages 53-96 in: J.K. Brown and J. Kapler-Smith, eds. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/.