

Descriptions of Ecological Systems for Modeling of LANDFIRE Biophysical Settings

Ecological Systems of with a name with words matching the pattern "longleaf pine"; Excluding Aggregates

06 October 2007

Descriptions provided to TNC and LANDFIRE by NatureServe

About this document

This document contains brief definitions of the NatureServe terrestrial ecological systems currently identified as occurring in with a name with words matching the pattern "longleaf pine"; Excluding Aggregates. Terrestrial ecological systems concepts form the basis for three map products from the inter-agency Landfire effort. First, they define the map legend for mapping Existing Vegetation Type (EVT); i.e., the current location of vegetative components of each terrestrial ecological system are mapped in that layer. Second, Environmental Site Potential (ESP) is a spatial model of environments that constrain the possible locations where a given ecological system could occur, without including natural disturbance regime as a factor. Third, Biophysical Settings (BpS) provide another spatial model depicting the probable location of each ecological system type, assuming the inclusion of natural disturbance regimes as a factor.

This ecological systems classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. Most of the following types will be further described, quantitatively modeled, and mapped for LANDFIRE. Comments and suggestions regarding the contents of this subset may be directed to Mary J. Russo, Central Ecology Data Manager, Durham, NC, <mary_russo@natureserve.org>.



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CLASSIFIERS

Conf.: 2 - Moderate

Classification Status: Standard

Primary Division: Gulf and Atlantic Coastal Plain (203)

Land Cover Class: Forest and Woodland

Spatial Scale & Pattern: Matrix

Required Classifiers: Natural/Semi-natural; Vegetated (>10% vasc.); Upland

Diagnostic Classifiers: Forest and Woodland (Treed); Very Short Disturbance Interval; Needle-Leaved Tree

FGDC Crosswalk: Vegetated, Tree-dominated, Open tree canopy, Evergreen open tree canopy

National Mapping Codes: EVT 2347; ESLF 4250; ESP 1347

CONCEPT

Summary: This system of upland *Pinus palustris*-dominated vegetation ranges from southern Virginia (beginning approximately at the James River) to northeastern Florida (excluding longleaf pine of the Fall-Line Sandhills, accommodated by another ecological system), where it was 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. They occur on a variety of well- to excessively drained soils, and on the higher parts of upland-wetland mosaics. The vegetation is naturally dominated by *Pinus palustris*. Most associations have an understory of scrub oaks. The herb layer is generally well-developed and dominated by grasses. *Aristida stricta* primarily dominates in the northern part of its range, and *Aristida beyrichiana* in the southern part. Frequent, low-intensity fire is the dominant natural ecological force.

Classification Comments: This system is distinguished from Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.265) 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) 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 interspersed with seepage wetlands all characterize the Fall-line Sandhills, 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.

Similar Ecological Systems:

- Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland (CES203.254)
- Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.265)

Related Concepts:

- Coastal Fringe Sandhill (Schafale and Weakley 1990) Finer
- Mesic Pine Flatwoods (Schafale and Weakley 1990) Finer
- Pine / Scrub Oak Sandhill (Schafale and Weakley 1990) Finer. in minor part.
- Sandhill (FNAI 1990) Intersecting

DESCRIPTION

Environment: This system 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.

Vegetation: 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 margarettae*, *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.

Dynamics: Frequent fire is the predominant natural force in this system. Component communities naturally burned every few years, many averaging as often as every 3 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.

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. Similar conservatism is shown by some of the vertebrates, such as *Picoides borealis* (red-cockaded woodpecker). Different dynamics occur in insect populations, whose individuals are not resilient to fire. Insect populations must recolonize burned areas from nearby unburned patches.

MEMBERSHIP

Associations:

- *Pinus palustris* - (*Pinus taeda*) / *Schizachyrium scoparium* - *Rhynchosia reniformis* Woodland (CEGL007738, G1)
- *Pinus palustris* - *Pinus* (*echinata*, *taeda*) - *Quercus* (*incana*, *margarettae*, *falcata*, *laevis*) Woodland (CEGL007511, G4)
- *Pinus palustris* - *Pinus taeda* - *Pinus serotina* / *Quercus marilandica* / (*Quercus pumila*) / *Aristida stricta* Woodland (CEGL003664, G1)
- *Pinus palustris* - *Pinus taeda* / *Quercus geminata* - *Quercus hemisphaerica* - *Osmanthus americanus* var. *americanus* / *Aristida stricta* Woodland (CEGL003577, G2)
- *Pinus palustris* / *Amorpha herbacea* var. *herbacea* / *Aristida stricta* - *Sorghastrum nutans* Woodland (CEGL003569, G2G3)
- *Pinus palustris* / *Aristida stricta* - *Sorghastrum nutans* - *Anthaenantia villosa* Woodland (CEGL003570, G2G3)
- *Pinus palustris* / *Quercus incana* - *Quercus marilandica* / *Aristida beyrichiana* - *Nolina georgiana* Woodland (CEGL007842, G2G3)
- *Pinus palustris* / *Quercus incana* - *Quercus stellata* / *Aristida beyrichiana* - *Sporobolus junceus* - *Nolina georgiana* Woodland (CEGL004487, G2G3)
- *Pinus palustris* / *Quercus incana* / *Aristida stricta* - *Sorghastrum nutans* - *Anthaenantia villosa* Woodland (CEGL003578, G2G3)
- *Pinus palustris* / *Quercus laevis* - (*Quercus incana*) / *Vaccinium tenellum* / *Schizachyrium scoparium* - *Eriogonum tomentosum* Woodland (CEGL003593, G2)
- *Pinus palustris* / *Quercus laevis* - *Quercus* (*incana*, *margarettae*) / *Gaylussacia dumosa* / *Aristida stricta* Woodland (CEGL003591, G3?)
- *Pinus palustris* / *Quercus laevis* - *Quercus geminata* / *Vaccinium tenellum* / *Aristida stricta* Woodland (CEGL003589, G2?)
- *Pinus palustris* / *Quercus laevis* - *Quercus incana* - *Quercus margarettae* / *Licania michauxii* / *Aristida beyrichiana* Woodland (CEGL004492, G3)
- *Pinus palustris* / *Quercus laevis* - *Quercus incana* / *Aristida beyrichiana* - *Baptisia perfoliata* Woodland (CEGL007844, G2G3)
- *Pinus palustris* / *Quercus laevis* - *Quercus incana* / *Gaylussacia dumosa* - *Gaylussacia* (*baccata*, *frondosa*) Woodland (CEGL003592, G1)
- *Pinus palustris* / *Quercus laevis* / *Aristida purpurascens* - *Stipulicida setacea* - (*Rhynchospora megalocarpa*, *Selaginella acanthonota*) Woodland (CEGL003590, G2)
- *Pinus palustris* / *Quercus laevis* / *Aristida stricta* / *Cladonia* spp. Woodland (CEGL003584, G2G3)
- *Pinus palustris* / *Quercus laevis* / *Gaylussacia dumosa* / *Aristida beyrichiana* - *Helianthus atrorubens* Woodland (CEGL004488, G2G3)
- *Pinus palustris* / *Quercus laevis* / *Gaylussacia dumosa* / *Aristida stricta* Woodland (CEGL003586, G3?)
- *Pinus palustris* / *Quercus laevis* / *Serenoa repens* - *Vaccinium stamineum* / *Aristida beyrichiana* Woodland (CEGL004490, G2G3)
- *Pinus palustris* / *Quercus marilandica* / *Gaylussacia dumosa* / *Aristida stricta* Woodland (CEGL003595, G2G3)
- *Pinus palustris* Planted Forest (CEGL007176, GNA)
- *Quercus laevis* / (*Andropogon virginicus*, *Aristida* spp., *Schizachyrium scoparium*) Woodland (CEGL004689, GNA)

Alliances:

- *Pinus palustris* - *Pinus* (*elliottii*, *serotina*) Saturated Woodland Alliance (A.578)
- *Pinus palustris* / *Quercus* spp. Woodland Alliance (A.499)
- *Pinus palustris* Planted Forest Alliance (A.96)
- *Pinus palustris* Woodland Alliance (A.520)
- *Quercus laevis* Woodland Alliance (A.617)

SPATIAL CHARACTERISTICS

Spatial Summary: 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 Atlantic Coastal Plain Peatland Pocosin (CES203.267) and may have small-patch systems embedded in them.

Size: Once the most abundant system over large parts of the Coastal Plain, forming the matrix in which most other systems occurred, most occurrences are now naturally small islands or are artificially bounded remnants of small to fairly large size. A few landscape

matrix areas of several thousand acres remain.

Adjacent Ecological Systems:

- Atlantic Coastal Plain Clay-Based Carolina Bay Wetland (CES203.245)
- Atlantic Coastal Plain Peatland Pocosin and Canebrake (CES203.267)
- Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.265)
- Southern Atlantic Coastal Plain Depression Pondshore (CES203.262)

Adjacent Ecological System Comments: Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.265) or Atlantic Coastal Plain Peatland Pocosin and Canebrake (CES203.267) are the most commonly associated systems, often forming mosaics. Southern Atlantic Coastal Plain Depression Pondshore (CES203.262) and small floodplain systems may be embedded in matrices of this system.

DISTRIBUTION

Range: This system is found in the Atlantic Coastal Plain (exclusive of the Fall-line Sandhills) from southern Virginia to northeastern Florida.

Divisions: 203:C

Nations: US

Subnations: FL, GA, NC, SC, VA

Map Zones: 55:C, 58:C, 60:C

TNC Ecoregions: 56:C, 57:C

SOURCES

References: Comer et al. 2003, Schafale pers. comm.

Full References:

See www.natureserve.org/explorer/servlet/NatureServe?searchSystemUid=ELEMENT_GLOBAL.2.723206#references

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Stakeholders: East, Southeast

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