Natural Communities of the Longleaf Ecosystem

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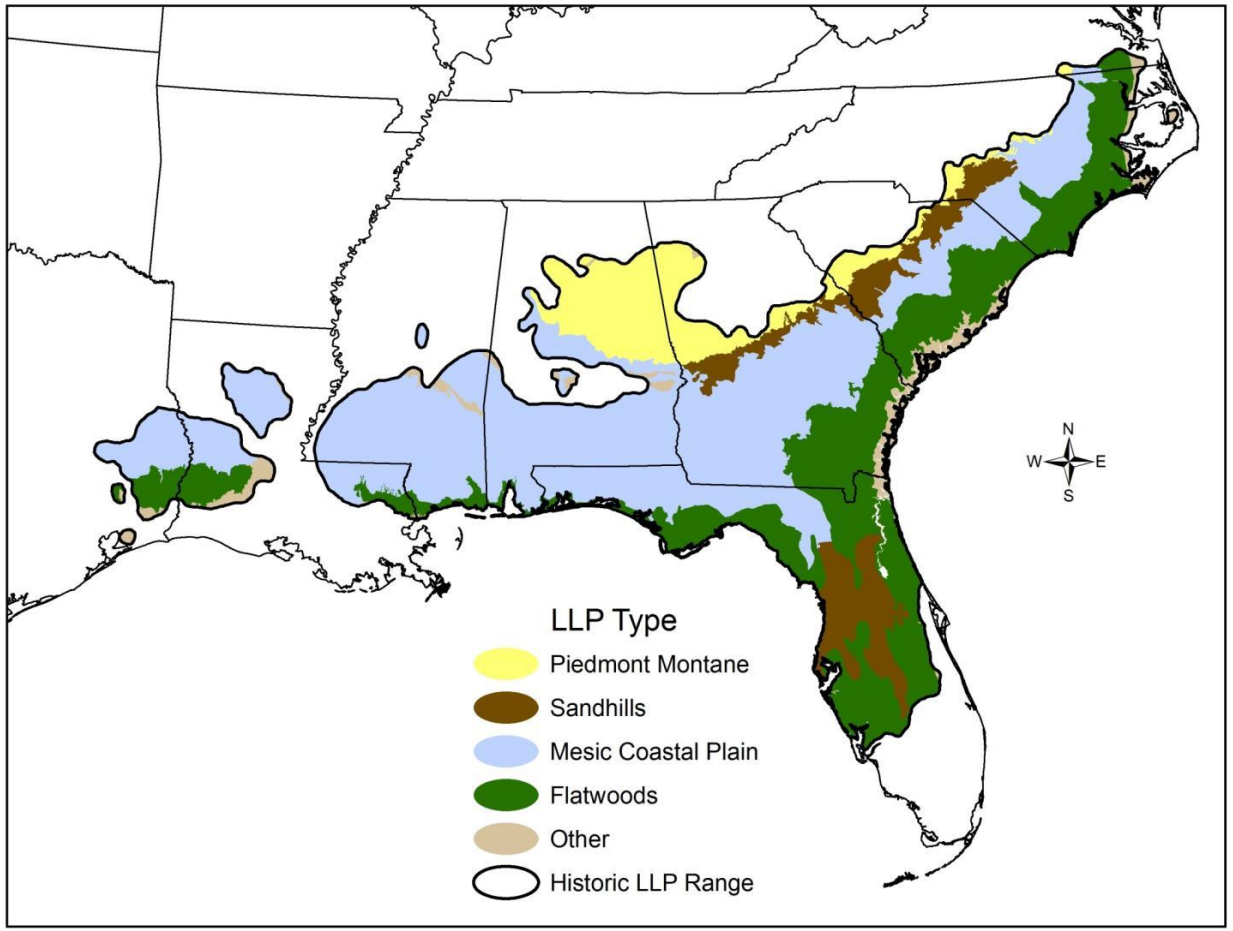
The Longleaf Pine Ecosystem

Mature, well-managed longleaf stands share several characteristics:

- Dominated by a single species of tree - the longleaf pine
- Little to no midstory trees and shrubs
- Numerous wildlife species
- Diverse ground layer, dominated by bunchgrasses and other flowering plants
- Frequent fire

Natural Communities of Longleaf



- Broad range of soil conditions
- Hydrologic gradient
- Site-specific land use history
- Fire history

Longleaf Pine Habitats and Communities

A **habitat** is a place - the abiotic and biotic setting that currently or periodically contains the resources and conditions necessary to support one or more life processes of a species.

A **Community** is an assemblage of the plants and animals that are regularly found together in a **habitat**.

Why are Longleaf Pine Communities Special?

Habitat Diversity

Plant Diversity

Wildlife Diversity

Fire Ecology

Habitat Diversity

Longleaf Flatwoods and Savannas

- Longleaf pine dominate
- Often interspersed with isolated wetlands or wet prairies.
- Productivity is high and longleaf pines can reach heights in excess of 120 feet.
- Highest diversity of ground layer herbs and shrubs.
- Grasses, legumes, orchids and carnivorous plants are common in the ground layer
- **Frequent fire (2-3 year intervals)**

Flatwoods

- Essentially flat or rolling terrain
- Canopy of pines and may have subcanopy of sub-shrub species
- Soil is generally sandy, moderately poor drainage, low organic matter

Savannas

- Flat areas with thin canopy of pines (low basal area)
- Rich herbaceous flora
- Ground is saturated for at least part of the year -- fire is still very frequent
- Pond pine found in wetter areas

Mesic/Rolling Hills

- Richer soils, e.g loamy clay
- Greater diversity of hardwood potential
- Higher productivity
- Greater competition
- Wiregrass, bluestem, legumes
- Diverse
- Good drainage due to rolling topography

Sandhills

- Sandy, well drained soils
- Rolling topography
- Low productivity, sparse groundcover
- Low competition for restoration
- Wiregrass
- Fire (1-10+ years depending on groundcover and needlecast)

Montane/Piedmont

- Rocky soils, stone outcrops
- Topographical relief
- Broomsedges, bluestems dominant
- Fire (2-3 year intervals)

Plant Diversity

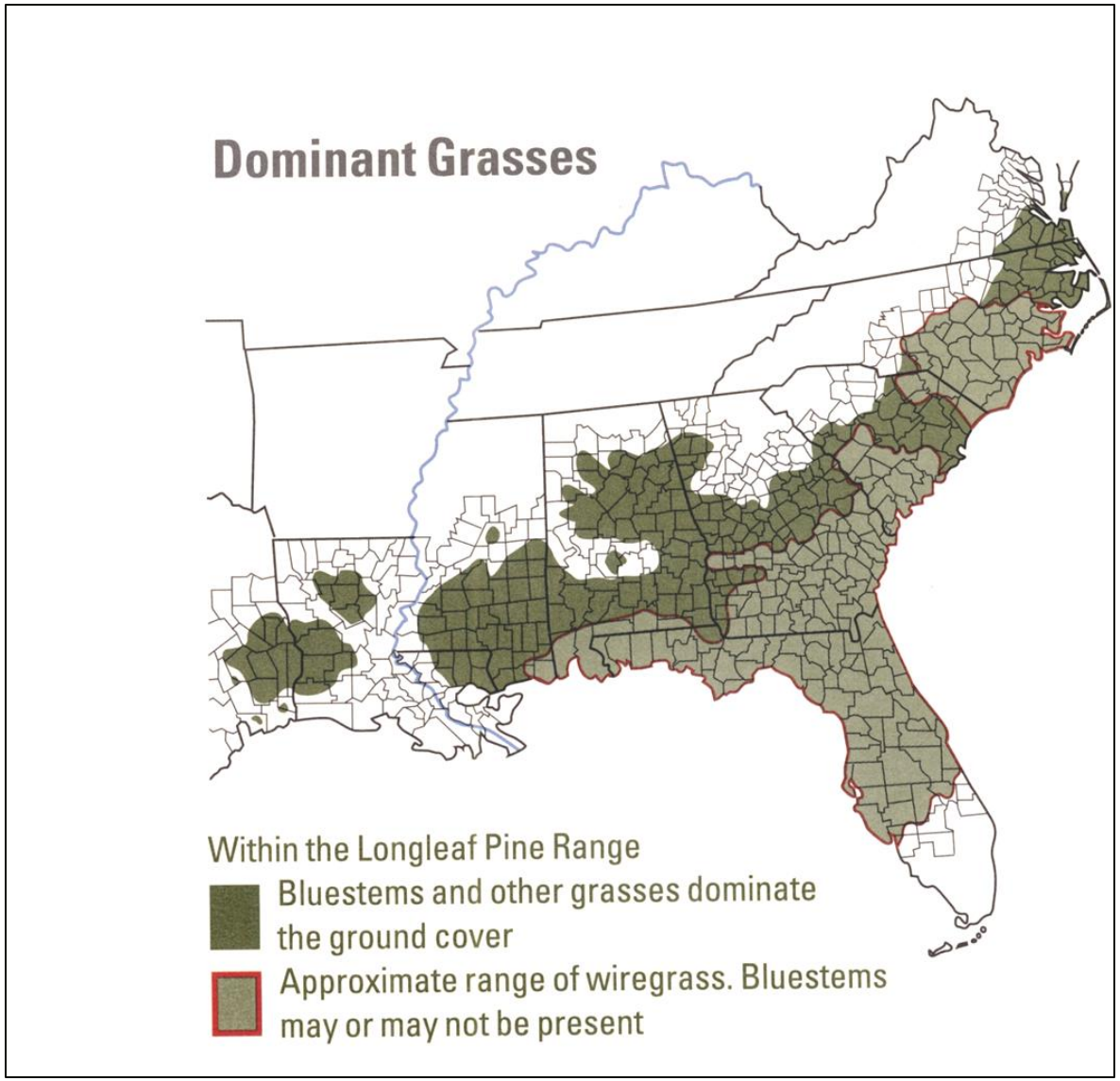
One of the most diverse ecosystems in North America

- Global hotspot for biodiversity
- Approximately 150 - 300 species of groundcover plants per acre
  - 120+ plants are endangered/threatened
  - Nearly 900 plant species found in the longleaf pine forest and nowhere else

Groundcover

- **Groundcover** - vital part of the longleaf communities
- Grasses provide fine fuel for fire which maintains ecosystem.

Distribution of Dominant Grasses



Groundcover has many roles in a longleaf forest

- Aesthetics
- Wildlife habitat
- Supports pollinator species
- Water regulation and other ecosystems services
- Provides a source of fine fuel for fire

Groundcover Enhances Wildlife Habitat

- High quality groundcover supports a higher diversity of wildlife species

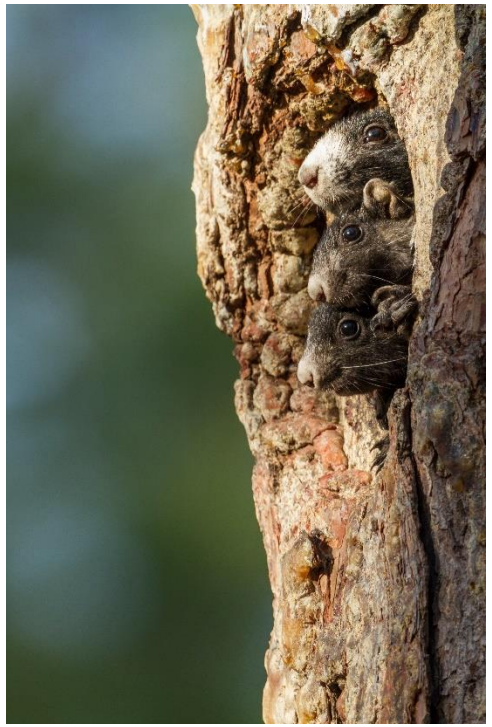
As a rule of thumb, each new plant species provides for 10 new insect species (critical food source!)

- Link between quality, early successional habitat and wild gamebird (quail and turkey) populations

Groundcover Supports Rare Species Habitat

- Many species are found in the longleaf pine system and no where else (gopher tortoise, red cockaded woodpecker, gopher frog, pine snake, etc.)

- Rare species require high quality understory for foraging, nesting, and raising young.



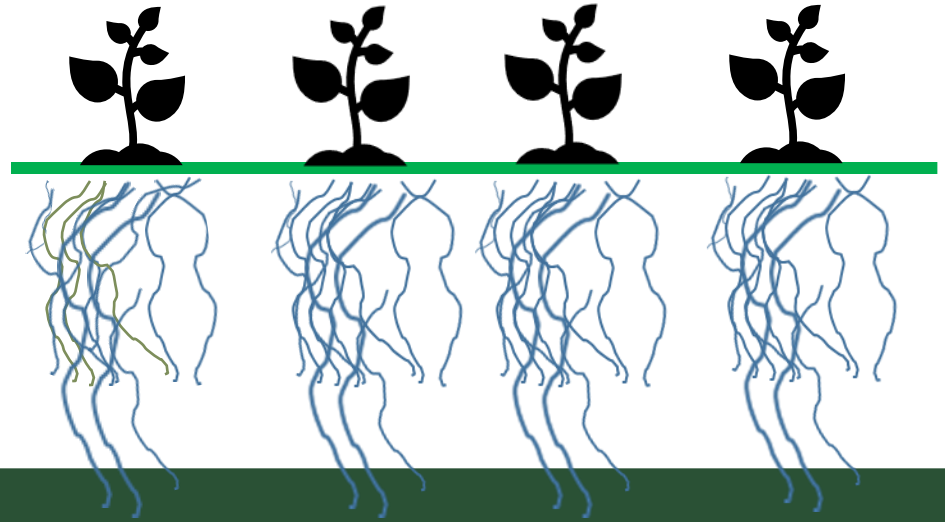
Ecosystem services - water and carbon

Carbon sequestration

- Longleaf pine is long lived
- Groundcover

Water (quality and quantity)

- Low tree density increases yield
- High quality forests = lower drinking water treatment costs



Native groundcover and Prescribed fire

- Groundcover species provide fine fuels to promote and carry fire
- Grasses are especially beneficial)

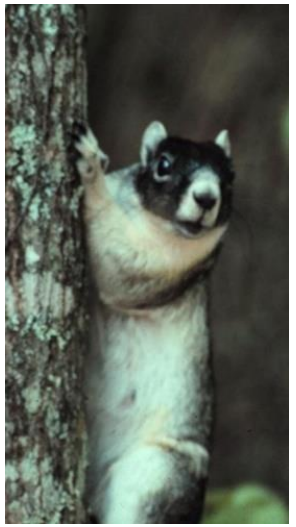
Plant Adaptations to Fire

Wildlife Diversity

Approximately 60% of southeastern amphibian and reptile species found in longleaf forests

Habitat for more breeding birds than any other southeastern forest type

Used by ~ 36 mammal species

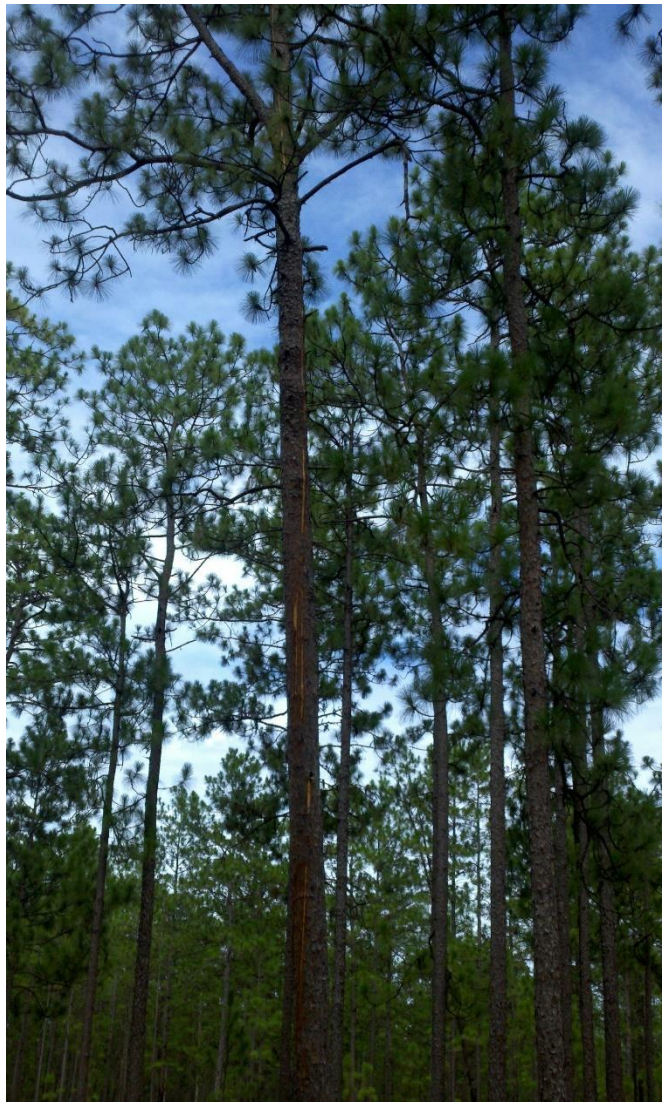


The Longleaf Alliance

Fire Ecology

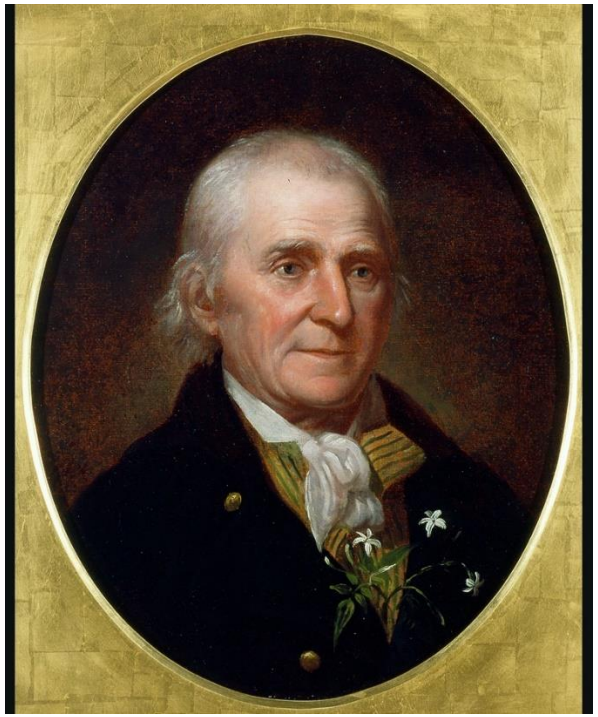
The Forest That Fire Built

Lightning – The Natural Fire Starter



- Shaped the longleaf forest by igniting fires (typically in the “growing season” (April – September with May being the peak)
- Reduced competition from woody species
- Longleaf seeds need bare mineral soil to germinate

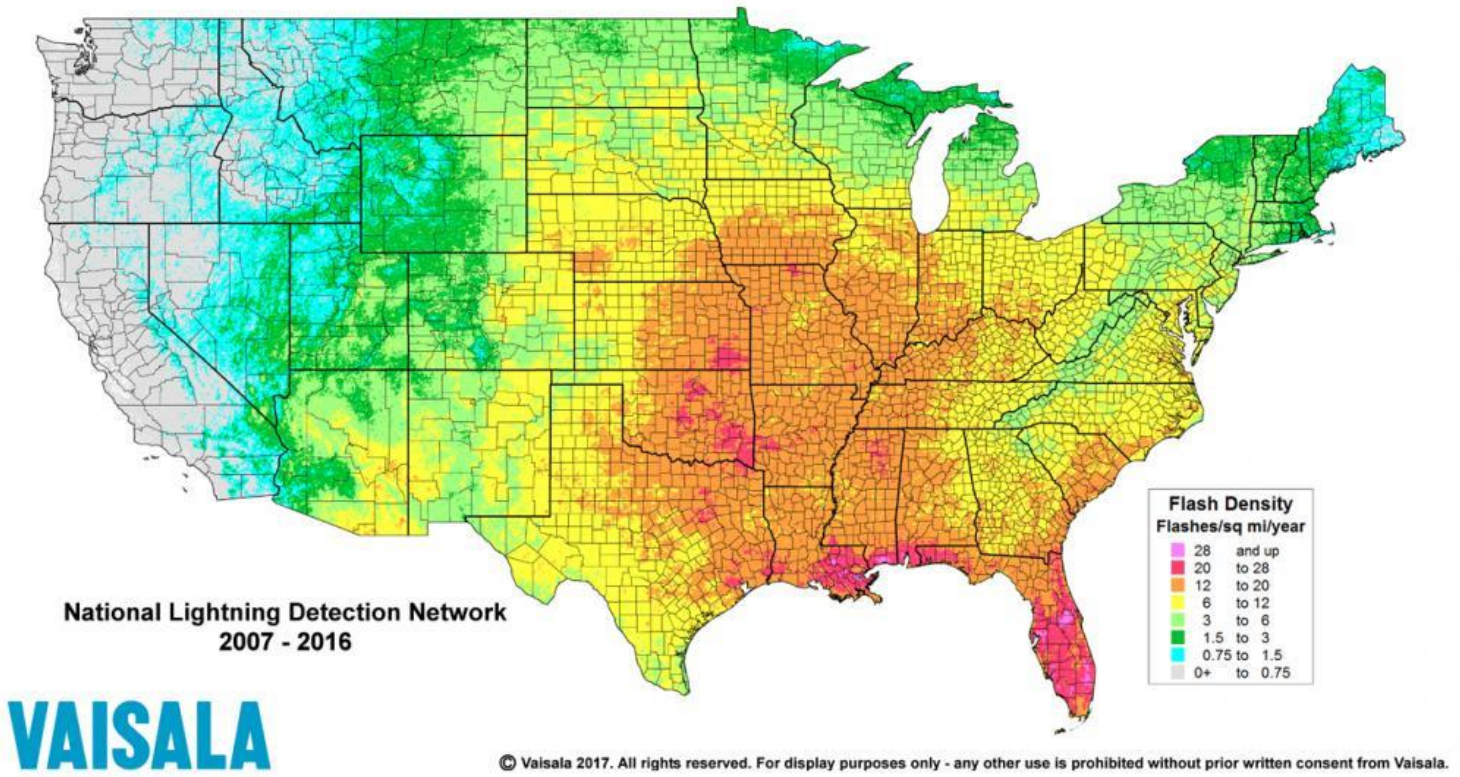
Naturalist William Bartram described the forests influenced by fire during his 1777 exploration of the US:



- "This plain is mostly a forest of the **great long-leaved pine** the earth covered with grass, interspersed with an infinite variety of herbaceous plants, and embellished with **extensive savannas**, always green…"

- "… riding through high open, pine forests, green lawns and flowery savannas in youthful verdure and gaiety, **having been lately burnt, but now overrun with a green enameled carpet** …"

Lightning Occurrence



1 year since last burn

2 years since last burn

Unique Longleaf Communities

Xeric Scrub -Sandhills






- Found on ridges with very deep sand (up to 30ft deep)
- Sparse groundcover – widely spaced with exposed sand
- Scrub oaks dominant

Sandhills Seepage Slopes

- Disjunct plant communities – e.g. Mountain Laurel & Virginia Pine
- “Chalk Cliffs” or – Kaolin deposits underly sandy soils

Depressional wetlands: Carolina Bays

- Precipitation fed-some are very wet and some a relatively dry
- Oval or elliptical shaped (lies northwest to southwest in orientation)
- Shallow or deep

Bogs or Wet Prairies

- Very high diversity of groundcover
- High productivity
- Poorly drained soils
- **Wetter conditions**: toothache grass/pitcher plants
- **Drier conditions:** wiregrass (*Aristida stricta* (northeast) and *A. beyrichiana* (southeast)
- **Burn frequency:** every 2-3 years

Loblolly and mixed pine-hardwood stands and Fire

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