



Natural Communities of the Longleaf Ecosystem

Lisa Lord
Conservation Programs Director
lisa@longleafalliance.org



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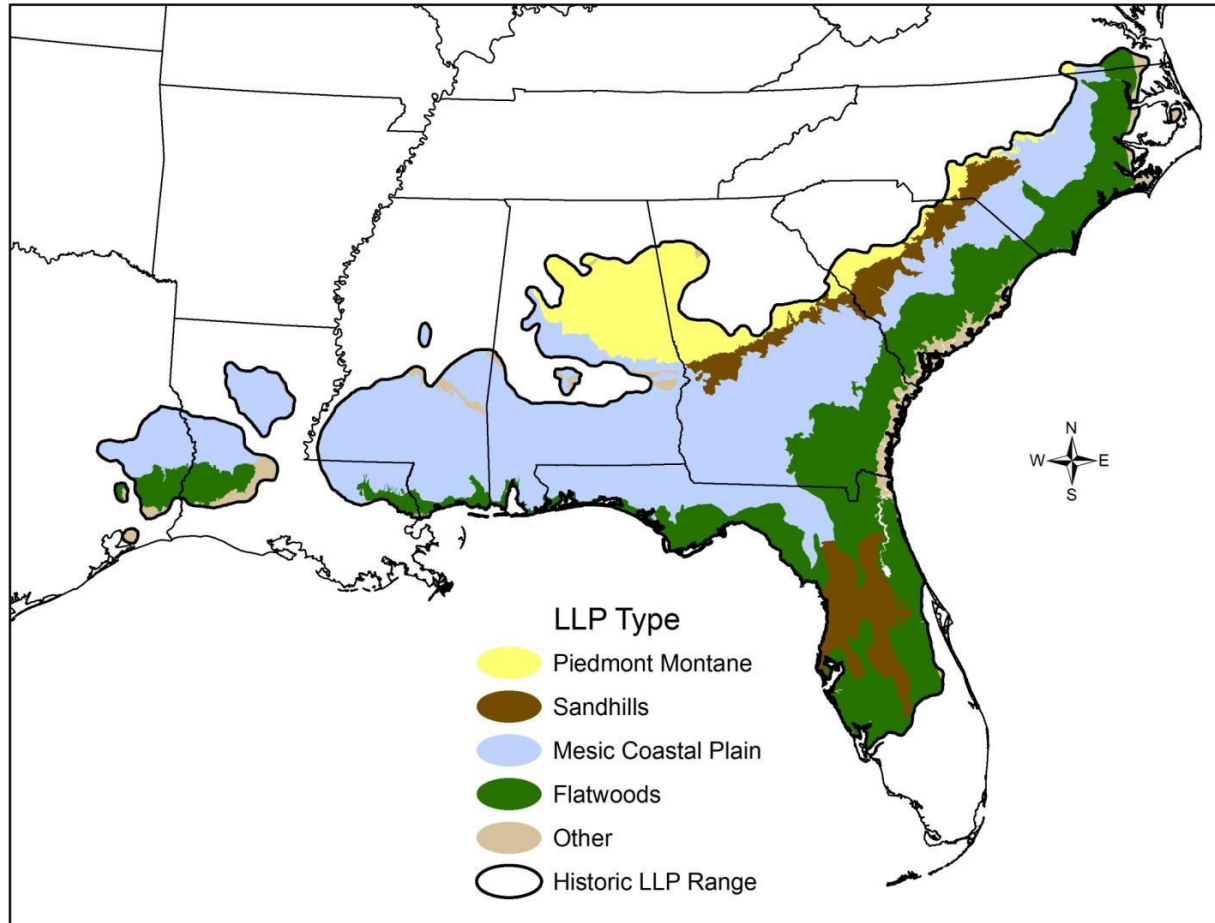
The Longleaf Pine Ecosystem

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



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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

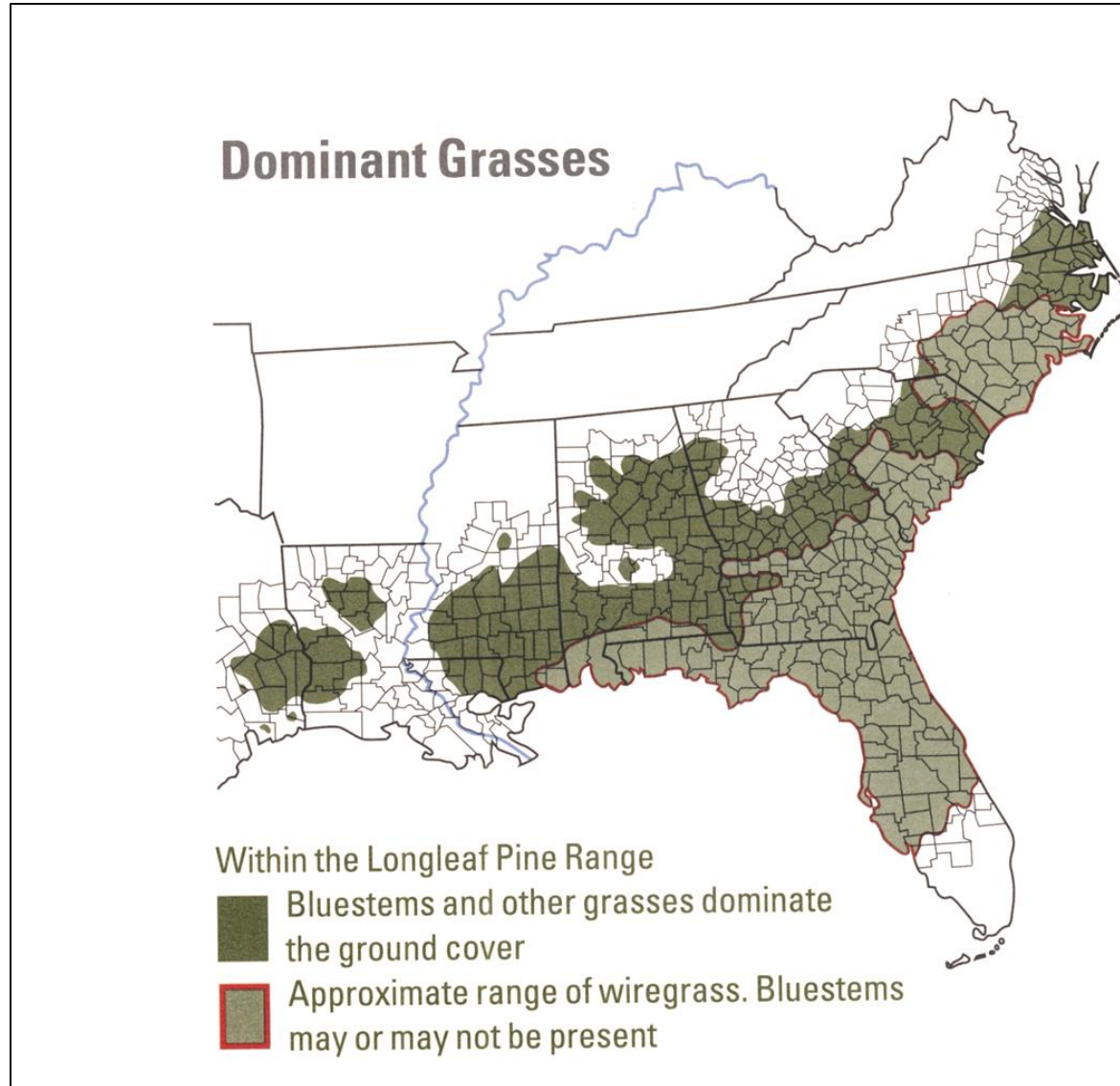


Groundcover

- **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.



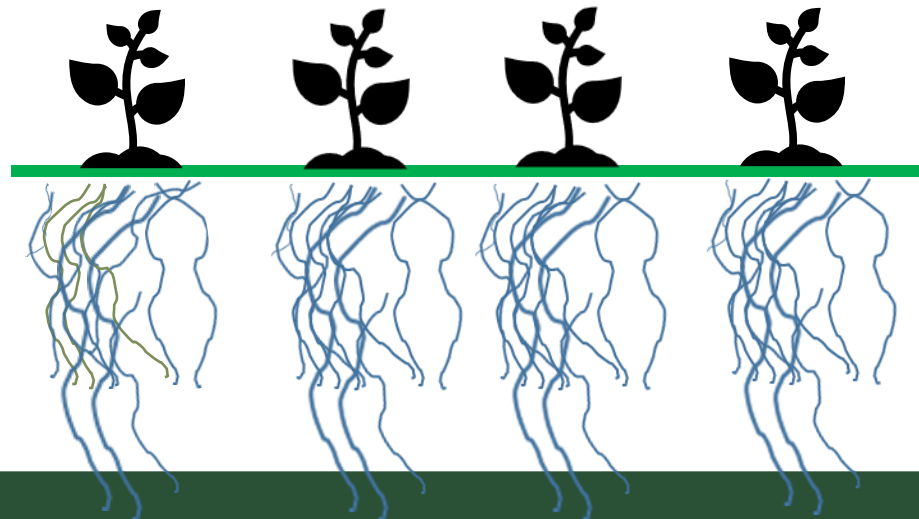
Ecosystem services - water and carbon

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





Fire Ecology



The Forest That Fire Built



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Lightning – The Natural Fire Starter

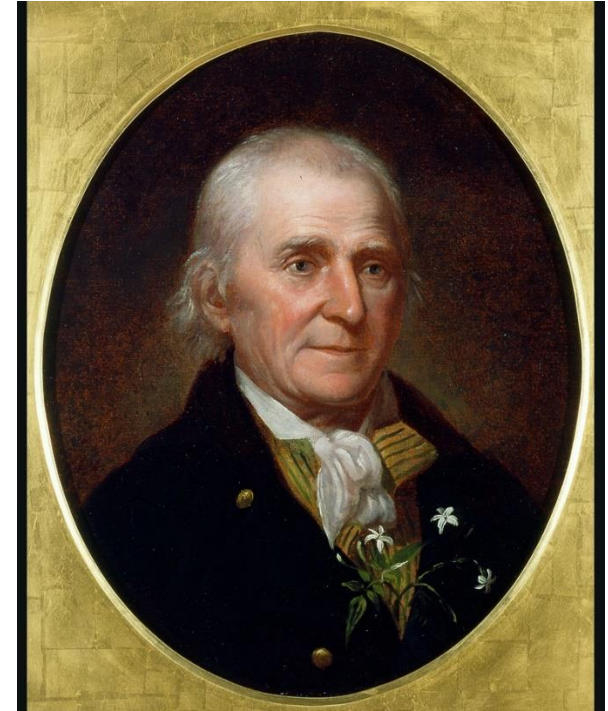


- Shaped the longleaf forest by igniting fires (typically in the “growing season” (April – September with May being the peak))
- Reduced competition from woody species
- Longleaf seeds need bare mineral soil to germinate

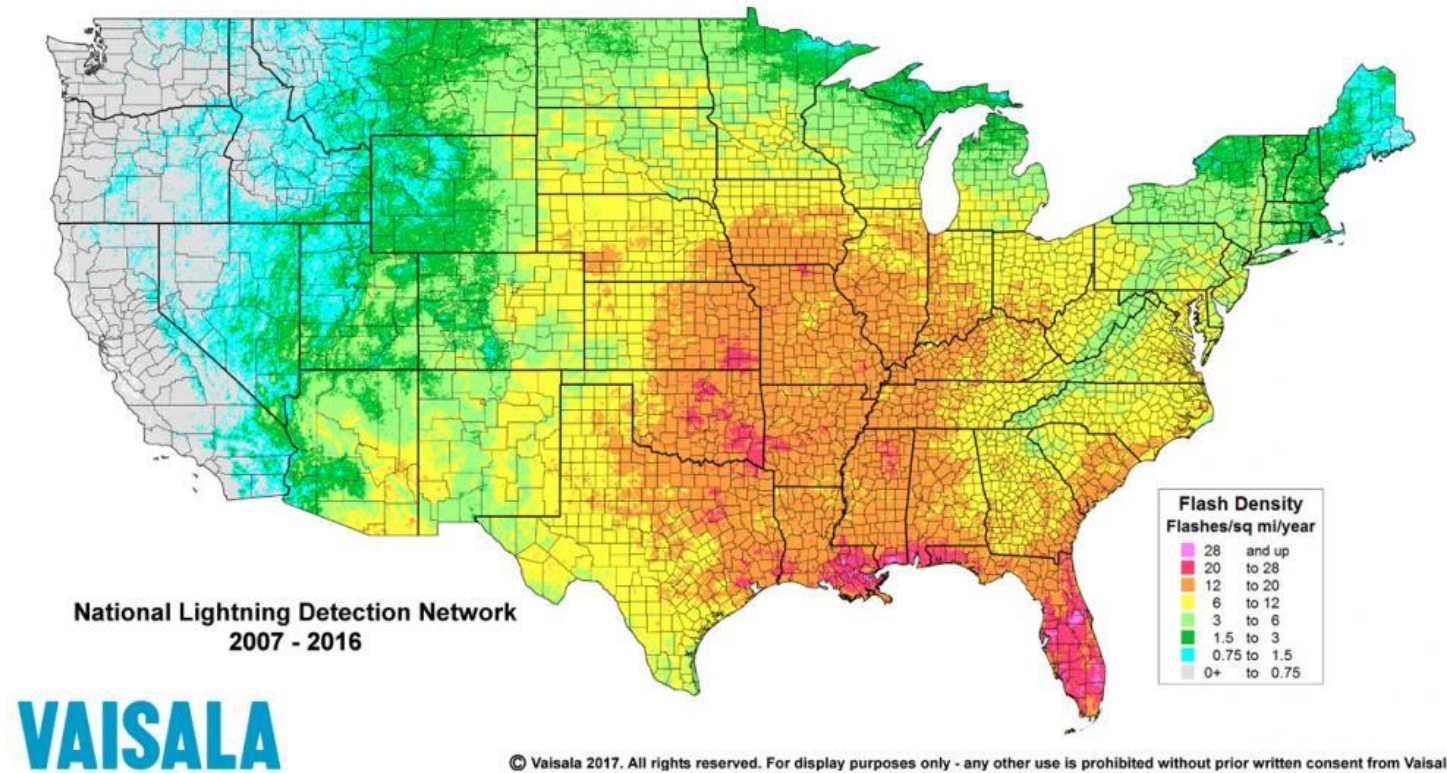


Naturalist William Bartram described the forests influenced by fire during his 1777 exploration of the US:

- "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**



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Unique Longleaf Communities



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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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