



# The Understory

Where it's at for wildlife in longleaf pine communities

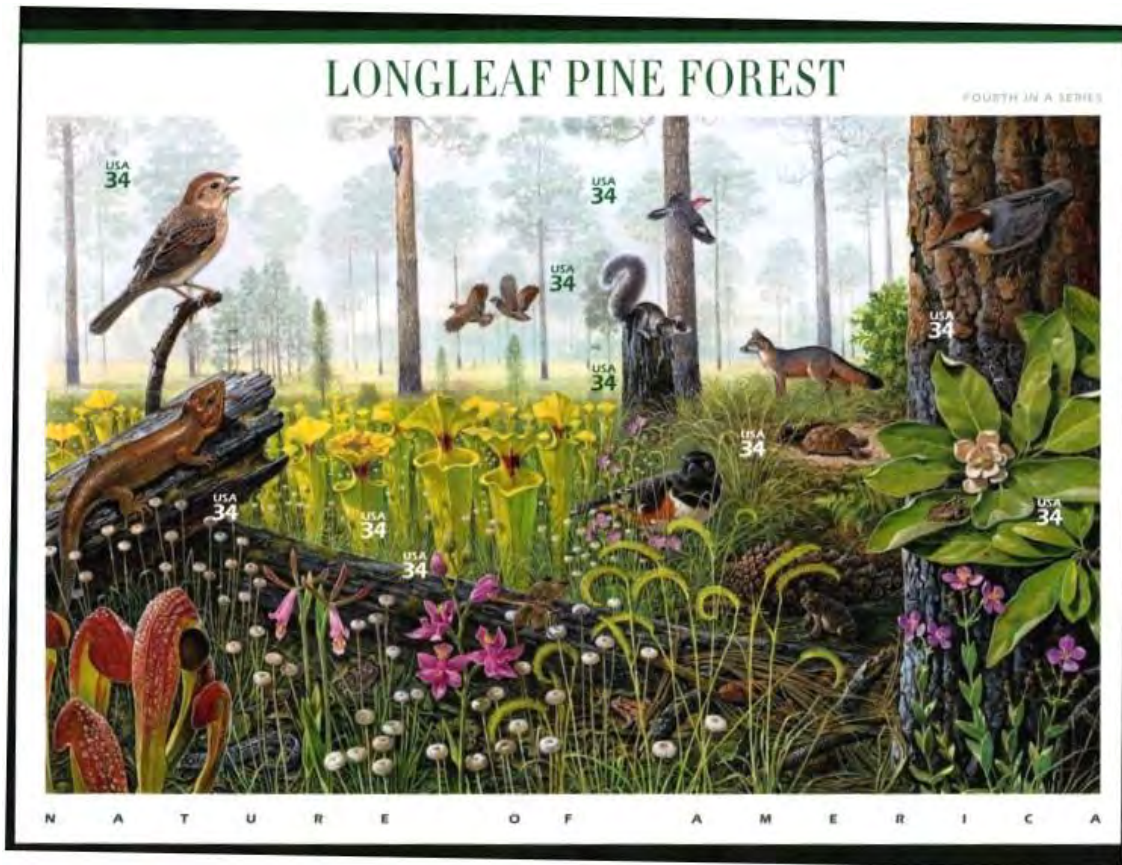


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**Georgia Department of Natural Resources**

# Longleaf pine communities: diversity in the understory

Comparable to tropical forests in species richness!

(at 100 square meter scale) – Reed Noss, *Forgotten Grasslands of the South*



~5,000 species of arthropods (insects & spiders) found in dry longleaf pine forests alone



Michaux's milkweed and a visiting bee fly species

# Longleaf pine communities: diversity in the understory

High levels of endemism in flora and fauna

*(endemic: native and not found elsewhere)*

Fire-adapted plants & animals  
(even in wetlands!)

Herbaceous structure historically maintained by fire, hurricanes, and grazing



Pitcher plants and *Exyra* moths: The pitcher plant mining moth lives inside of the pitcher and feeds on its walls as a caterpillar.



# Habitat

- “Habitat” represents the physical and biological resources (food, cover, water, space, and arrangement) required by wildlife for survival and reproduction.
- Habitat needs may vary by season
- Habitat requirements are species-specific.
- Not all species require the same resources in the same amount.



*Diana McGrath*



# Habitat loss

## Habitat loss: greatest threat to wildlife populations

Land use change: conversion from rural uses to residential, development, etc., but also conversion to agriculture and production forestry – many common practices (in ag and forestry) are tough on biodiversity

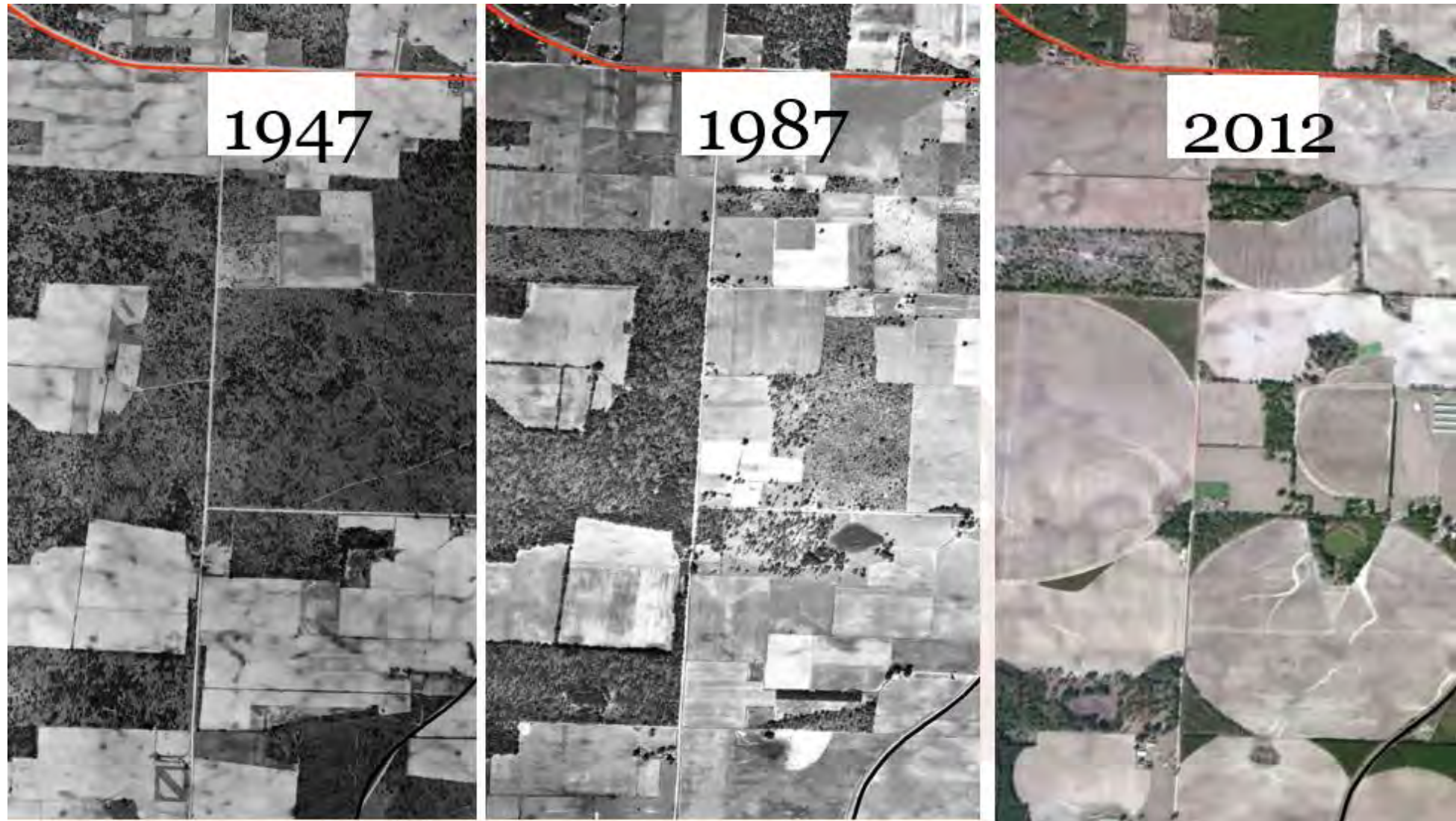
habitat **fragmentation** and degradation in remaining landscape

- roads
- lack of fire or lack of growing season fire
- intensive soil disturbance in uplands, wetlands, ecotones
- invasive species (plants and animals)
- \*aggressive chemical site prep and roadside management



Utility right of ways and roadsides are often refuges for longleaf understory plants and animals.

# Land Use Change: Decatur County, Georgia



# Pines aplenty!



**food? shelter? water?**

# Home Range

**home range:** that area traversed by the individual in its normal activities of food gathering, mating and caring for young...

**Burt W. H. 1943 Territoriality and home range concepts as applied to mammals**

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Gopher frogs



wetland

upland

# Habitat requirements differ

## Generalists

- Broad diet
- Greater dispersal capability
- Can live in a wide variety of habitats
- Less sensitive to fluctuations in resources



## Specialists

- Narrower diets
- Lower dispersal potential
- Smaller, less connected populations
- Highly sensitive to changes in resource availability
- Survival linked to very specific habitat types



# Habitat requirements differ

## Generalists

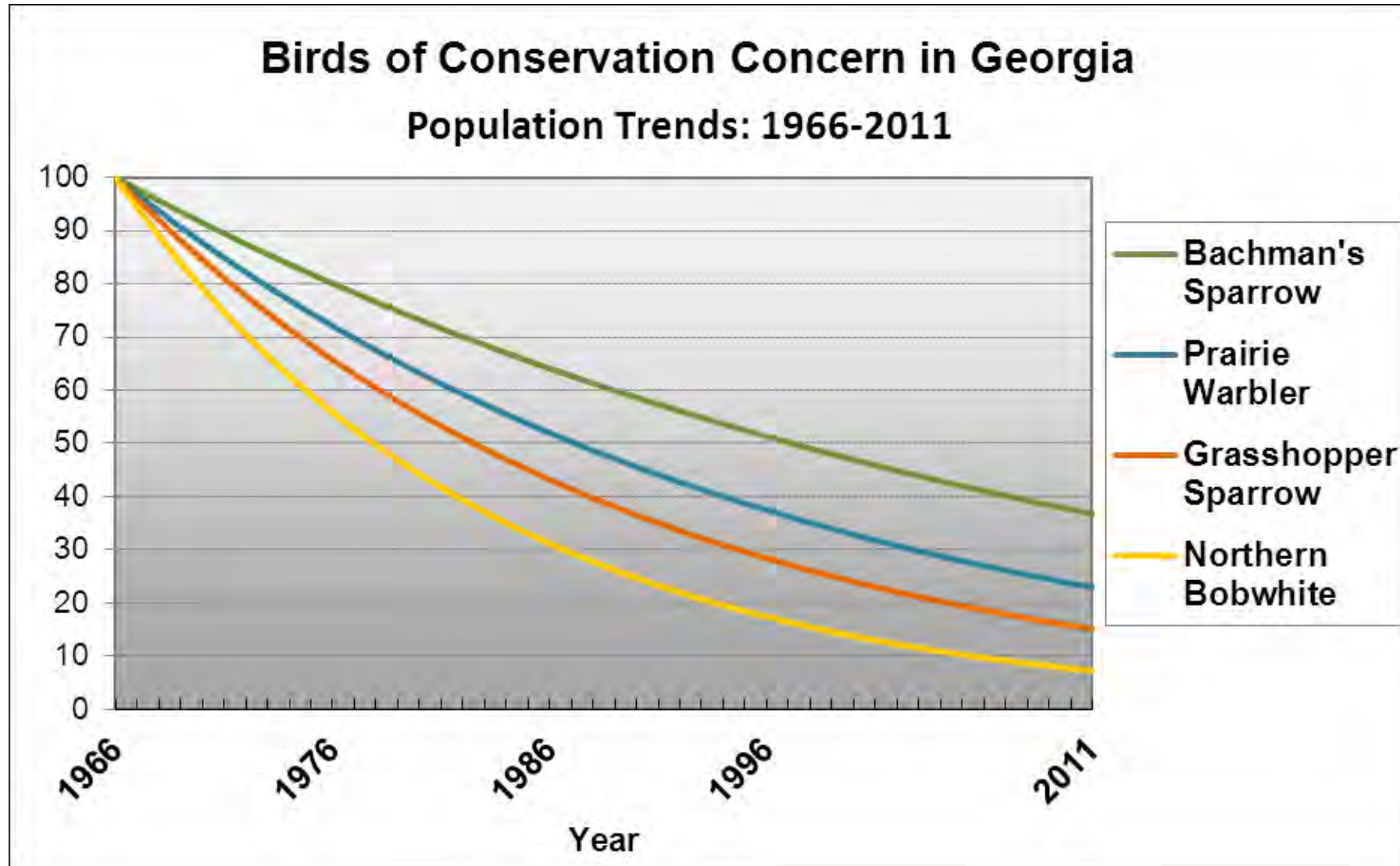
- Broad diet
- Greater dispersal capability
- Can live in a wide variety of habitats
- Less sensitive to fluctuations in resources
- ***Still benefit from longleaf understory***



Example: Longleaf communities with healthy native groundcover support healthy fungal communities.

These fungal communities are often utilized by wildlife as a source of important nutrients which plants growing in poor sandy coastal plains soils often lack, especially phosphorous (which is important for deer to grow antlers).

# Declines of grassland birds



Source: Breeding Bird Survey data

# Grassland Birds

- 80+ species of birds (excluding migrants) utilize this community to fulfill essential aspects of their life histories (Engstrom 1993).
- 69% of birds and mammals in longleaf forest forage on or near the ground (Engstrom 1993).



Bobwhite quail nest



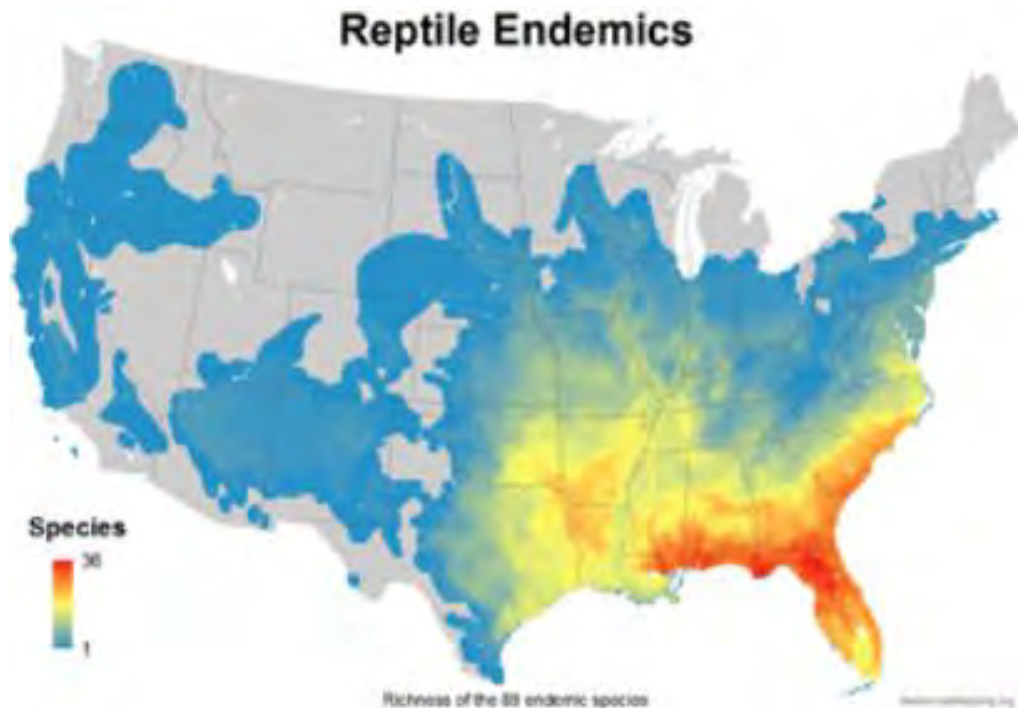
Foraging area for red-cockaded woodpecker



Common nighthawk "nest"

# Reptiles and Amphibians

- Herpetofaunal diversity is high
  - 38 reptile species
  - 34 amphibian species
  - ~1/3 of these are considered longleaf pine specialists



# Reptiles and Amphibians



Gopher tortoise in mammal-expanded burrow

## Gopher tortoise

Varying levels of protection across its range

Keystone species: >350 commensal species

Keystone species: Some individual species essentially hold their ecosystems together, like the **keystone** that prevents an arch from collapsing.



# Reptiles and Amphibians

Andy Day

Eastern indigo snake



Eastern diamondback rattlesnake



Andy Day

Oak toad



Ornate chorus frog



# Flatwoods salamander

Grassy ecotone



Fire promotes/preserves herbaceous groundcover within and between seasonal ponds and maintains pond morphology critical to rare and declining amphibians

Bare mineral soil



Egg deposition sites



Protective cover and camo



# Mammals

## Mammal species characteristic of longleaf pine forests (Engstrom 2011)

Virginia opossum	Evening bat	Wild boar
Southeastern shrew	Nine-banded armadillo	White-tailed deer
Southern short-tailed shrew	Eastern cottontail	Cotton mouse
Least shrew	Gray squirrel	Golden mouse
Eastern mole	Fox squirrel	Northern pygmy mouse
Eastern pipistrelle	Southern flying squirrel	Pine vole
Southeastern myotis	Fulvous harvest mouse	Raccoon
Red bat	Hispid cotton rat	Long-tailed weasel
Seminole bat	Eastern harvest mouse	Striped skunk
Yellow bat	Fulvous harvest mouse	Coyote
Southeastern pocket gopher	Marsh rice rat	Red fox
Hispid cotton rat	Florida mouse	Gray fox
Eastern harvest mouse	Oldfield mouse	



Oldfield mouse burrow and common goat's rue



Fox squirrels: large size = adapted for traveling overland, rather than in the canopy

In one study, ground-dwelling mammals were eliminated from a pine savanna after 15 years without fire.

# Conservation Priorities in Southeast

High priority species/species of concern in Georgia's State Wildlife Action Plan:

**45 species of animals** and **132 species of plants** which rely on early successional habitat



# Native understory components: Legumes

Little leaf sensitive mimosa



Legumes: sprout quickly post-fire; pod forming; source of protein; seed for songbirds, turkey, small mammals; blooming phenology means seed, nectar, or browse (rabbits, tortoise, deer, pocket gopher) available throughout much of the year (but no winter cover).

Roundleaf snoutbean



Common goat's rue



Gopherweed (*B. lanceolata*)



Sundial lupine



White wild indigo



Summer farewell

# Native understory components: Grasses



Splitbeard bluestem



Toothache grass



Wiregrass



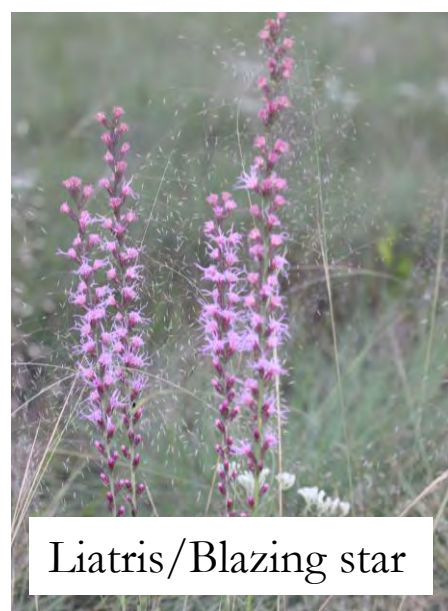
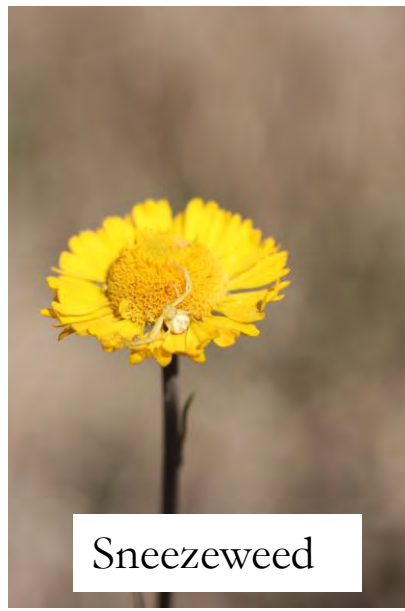
Lopsided indiagrass

Grasses: Cover (predators, thermal – year-round), nest sites (bunch grasses), seed, attracts pollinators and other insects, important bugging areas

# Native understory components: Wildflowers



Wildflowers/forbs: Seed, canopy structure with fewer stems = cover (predators/thermal), important bugging areas – attracts pollinators and other insects (food and nest sites, overwinter in stems)



# Native understory components: Shrubs



American beautyberry



Fetterbush lyonia



Huckleberry species



Slimleaf pawpaw

Shrubs and briars: Cover (predators, thermal), nest sites (shrikes), seed, fruits (vacciniums), attracts pollinators and other insects, important bugging areas

# Understory components valuable to wildlife



Bare soil: ground nesting bees, pollinator insects (minerals), basking sites (thermal), especially important for hatchling birds (bobwhite, turkey, Bachman's sparrow) and gopher tortoise for nest sites and mobility

# Invertebrates and the understory



## Harvester ants

Seed collecting ants that excavate deep into the sand to build their nests (where they also store their seeds).

Recovery of many plant species following drought



Native grasses grow better at the edges of these mounds

# Extra considerations for wildlife

- Hardwood control (but not total elimination of scrub oaks)
- Mosaic of burning and **variability** of fire interval/intensity/season
- Softening the edges
- Smaller burn units and patchy burns
- Insects and vertebrates evolved alongside native vegetation



Preserve native understory plants when possible!



Turkey oak and acorns



# Think twice about your management practices; Where are you now?

- **Winter disking?**
- **Mowing?**
- **Intensive site prep?**
- **Planting annuals?**
- **Winter burning?**

Commonly promoted practices used to create early successional habitat may be inappropriate for your site and restoration goals



# Thank you!



Now only  
**\$25!**



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