



Wildlife in the Longleaf Ecosystem

Diversity and Management

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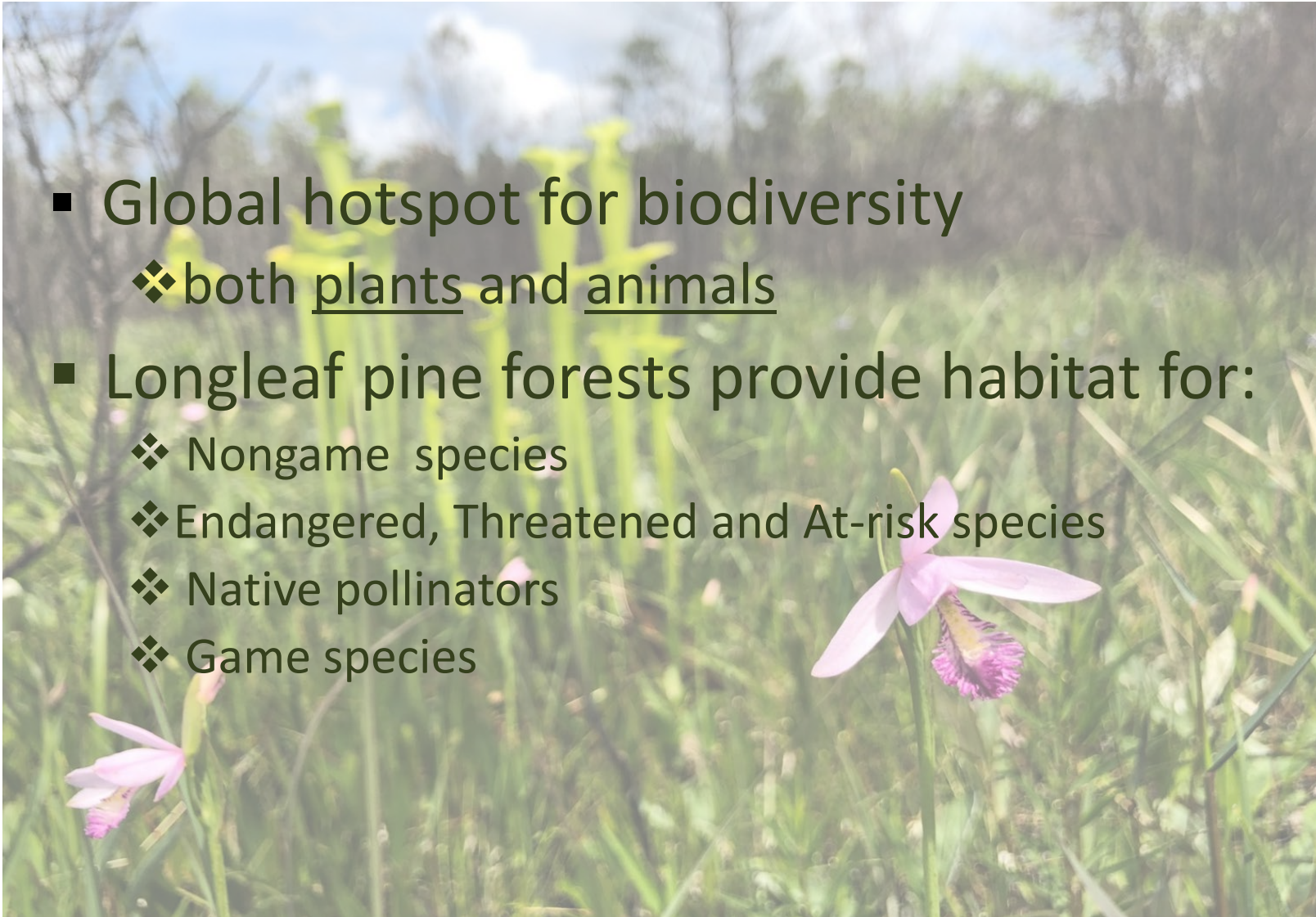


*The Longleaf Alliance
Longleaf 101 Academy*

Wildlife in the Longleaf Ecosystem

Longleaf Forests = Diversity

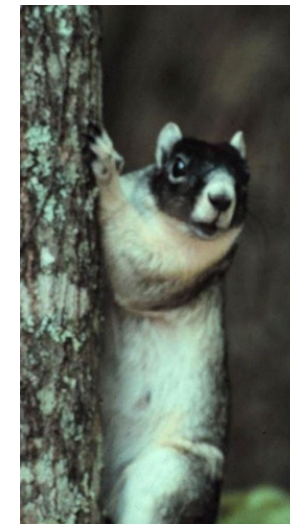
- Global hotspot for biodiversity
 - ❖ both plants and animals
- Longleaf pine forests provide habitat for:
 - ❖ Nongame species
 - ❖ Endangered, Threatened and At-risk species
 - ❖ Native pollinators
 - ❖ Game species



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



Characteristics of Wildlife in Longleaf Forests

- Burrowers
- Browsers
- Grazers
- Insectivores
- Generally small body size
- Forage primarily on or near the ground



FOOD

Forage (strategies can change seasonally)

WATER

Essential for all species, sometimes may come via forage

Basic needs of wildlife

COVER

Shelter from predators and weather, roosting, loafing, nesting sites

SPACE

Must have adequate habitat structure and arrangement to fulfill the other basic needs



Maintaining and managing longleaf cover

- **Silvicultural techniques**
- **Prescribed fire**



1 Week after Burn



6 months post-fire



Fire as a wildlife management tool

+ Fire →



Benefits of Prescribed Burning for Wildlife



- Sets back succession
- Stimulates plant growth which provides food and cover
- Recycles nutrients
- Sets back succession for better cover
- Stimulates germination of seeds in the soil
- Stimulates flowering and seed production of many native species

Fire Influences Habitat

Results are highly dependent on:

- Burn frequency
- Time of year (seasonality)
- Rotation of burns across the landscape
- Scale (acres)
- Intensity



Benefits of Prescribed Burning for Wildlife

- Many shrubs produce more fruit 2 - 5 years after a fire
- Sprouting hardwoods post-fire have more available protein and phosphorus
- Exposes seeds and insects for birds
- Patchiness - cover and abundant insects



Diversity of Wildlife in the Longleaf Ecosystem

Specialists

- Depend on the longleaf ecosystem through all phases of life
- Are not found, or are not viable, in other systems
- Especially vulnerable to habitat loss



Generalists

- Utilize the longleaf ecosystem for all or parts of their life; pass through
- Exist in other habitats; not confined to longleaf
- Species range includes longleaf



Wildlife in the Longleaf Forest

- Reptiles and Amphibians
- Birds
- Mammals
- Pollinators



Reptiles and Amphibians



- About 170 species of reptile and amphibian are found in the range of longleaf pine.
- Many are specialists
- Many are threatened, endangered, or candidates for federal listing



Ecological Roles of Amphibians and Reptiles

- Regulate prey population density (insects, mammals, bird, and other reptiles/amphibians)
- Food sources for predators
- Seed dispersers for some understory plants
- Engineer habitat for other species of wildlife
- Indicator of forest health



Ecology of Amphibians and Reptiles



- Foraging strategies

- Herbivores
- Detritivores
- Filter feeders
- Predators

- Live in a variety of habitats

- Arboreal
- Aquatic
- Fossorial (burrowing)
- Surface dwellers



Gopher Tortoise *Gopherus polyphemus*



- Strict longleaf specialist
- Only tortoise species in Eastern US
- Herbivorous
- Long lived -> up to 60 years old
- Requires open, fire-maintained forests



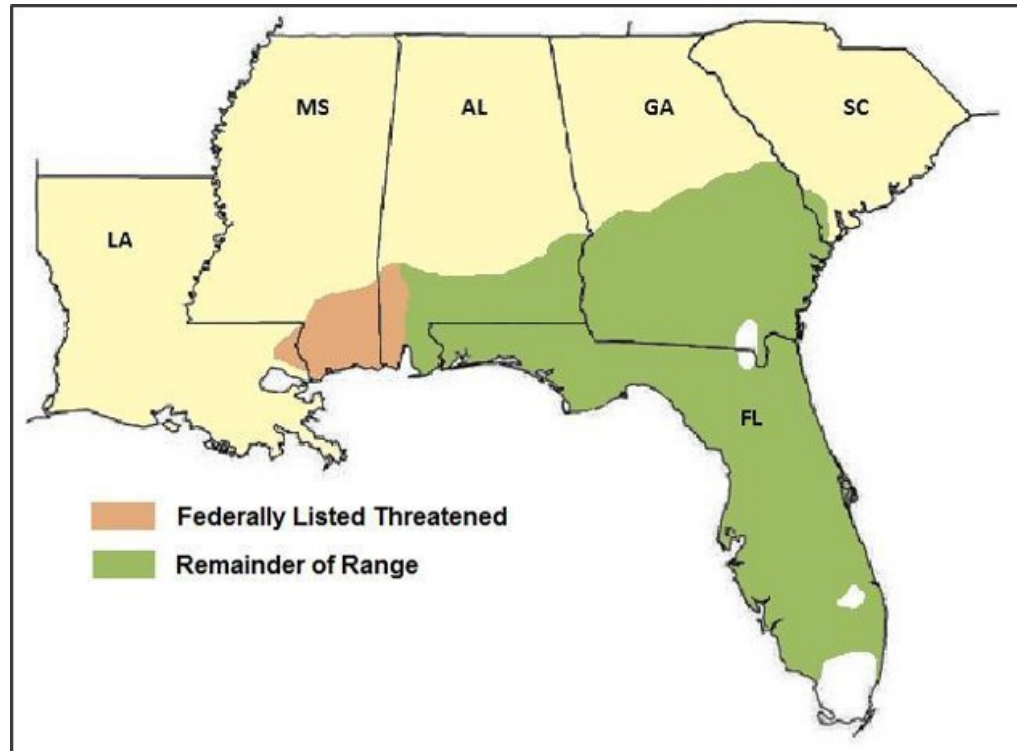
Gopher Tortoise: Longleaf Ecosystem Engineers



- Burrow – 20+ feet in length in sandy xeric sites
- Use one burrow in winter, but may use multiple burrows in warmer months
- Burrows used by 350+ other species
- Lay eggs at the mouth (apron) of the burrow



- **Threatened or Endangered** in all states in range and federally protected west of Mobile River
- SC State Listed as endangered in SC



<https://gophertortoisecouncil.org/gopher-tortoise>



Threats

- **Habitat loss** - development and/or conversion
- **Habitat fragmentation** - roads, parcelization, etc.
- **Habitat degradation** (fire suppression/exclusion, lack of proper management)

Other secondary threats

- Insufficient size of some remnant populations for genetic viability over time
- Disease such as upper respiratory tract disease (URTD)
- Human harassment, consumption, or collection
- Other incompatible human activities and recreation





Amphibians

Amphibians need both upland and wetland habitat.

Ephemeral wetlands, small ponds, and Carolina bays are all important breeding habitat



Tiger salamander





Many types of wetlands in longleaf:

- Bogs
- Ephemeral pond/wetland
- Carolina bays
- Clay-based depressions
- Lime sinks





Wetlands can become fire suppressed

- Thick, dense midstory
- Little herbaceous groundcover
- Overabundance of shrubby plant species resulting in:
 - shorter hydroperiods
 - Changes in water chemistry/temperature
 - Hinders amphibian movement from upland to breeding pond or vice versa



Opening up the canopy

- Growing season burning (or when wetland is dry) to reduce/eliminate the midstory and promote the groundcover
- May need to utilize chemical or mechanical methods to remove large brush and trees.





Gopher Frog (*Lithobates capito*)

- At-risk species -- Endangered at the state level. Considered for listing at the federal level.
- Historically distributed throughout the SE coastal plain but declining from habitat loss (terrestrial uplands and breeding sites).
- Depend on fire-maintained longleaf pine ecosystems
- Breed/develop in open (fish-free) ephemeral wetlands that hold water seasonally.



Photo: Brady Beck



Avian Diversity



Photo: Brady Beck

- Longleaf forests provide habitat for resident and migratory birds
- Many are non-specialist species that overlap the longleaf range
- 6 bird species have a close association with longleaf pine or open pine ecosystems

- **American Kestrel**
- **Henslow's sparrow**
- **Bachman's sparrow**
- **Red-cockaded woodpecker**
- **Brown-headed nuthatch**
- **Bobwhite quail**



Birds in the longleaf forest

- Increase biodiversity
- Disperse seeds
- Predators or prey
- Presence or absence can be an indicator of habitat condition



Forest Openings

- Benefit birds preferring open canopies
- Early successional habitat
- 2 to 4 year burn rotation
 - Eastern bluebird
 - American goldfinch
 - blue-winged warbler
 - prairie warbler
 - ground dove
 - blue grosbeak
 - indigo bunting



Legumes, an important food source

https://www.nclongleaf.org/pdfs/FieldGuideLegumes_JonesCenter.pdf

- Found in xeric to wet sites
- Foliage eaten by white-tailed deer, gopher tortoises, rabbits, and more
- Seeds: bobwhite quail, wild turkey, small mammals, and songbirds

Examples:

beggarweeds (*Desmodium* spp.)

lespedezas (*Lespedeza* spp.)

goat's rue (*Tephrosia virginiana*)

sensitive briar (*Schrankia microphylla*)

butterfly pea (*Clitoria mariana*)



FIELD GUIDE TO COMMON LEGUME SPECIES OF THE LONGLEAF PINE ECOSYSTEM



H. NORDEN & K. KIRKMAN
JOSEPH W. JONES ECOLOGICAL RESEARCH CENTER
I CHAUWAY

IN PARTNERSHIP WITH:

Georgia Native Plant Society



The Longleaf Alliance
Longleaf 101 Academy

Wildlife in the Longleaf Ecosystem

Bachman's sparrow (*Aimophila aestivalis*) “Pine Woods Sparrow”

- Open pine forests
- Eat seeds and insects
- Prefers to run rather than fly
- Benefits for frequent fires
 - After four years of no burn, population starts to decline
 - Birds are gone after seven years without burning





Red-cockaded Woodpecker

(*Picoides borealis*)

- Only woodpecker to excavate living trees.
- Prefer longleaf but will nest in other pines.
- Forage on trunks
- Complex social structure
- Cavities used by many other species, increase biodiversity

RCW Tools

- Restoration of longleaf pine habitat
- Prescribed Burning
- Midstory Control in cluster
- Artificial Cavities/Inserts
- Population Monitoring
- Translocation
- Safe Harbor Program





Bobwhite quail The “firebird”

- Bunchgrasses for nesting cover
- Forbs for brood rearing habitat
- Woodies for escape cover
- Bare ground to allow for movement, foraging

Examples of Food Plants

- Beautyberry (*Callicarpa americana*)
- Milk pea (*Galactia* sp.)
- Blueberries and blackberries
- Lespedeza
- Panic grass (*Panicum* sp.)
- Pokeweed (*Phytolacca americana*)
- Witchgrass (*Dicanthelium* sp.)
- Plums (*Prunus* sp.)
- Partridge pea



Practices that benefit quail and other game species

- Forest Stand Improvements and thinning
- Planting buffer strips and field borders
- Early successional habitat
- Prescribed burning (and patch burning where possible)



Other cavity nesters: Eastern bluebird

- Nest boxes add habitat when snags are not available or adequate



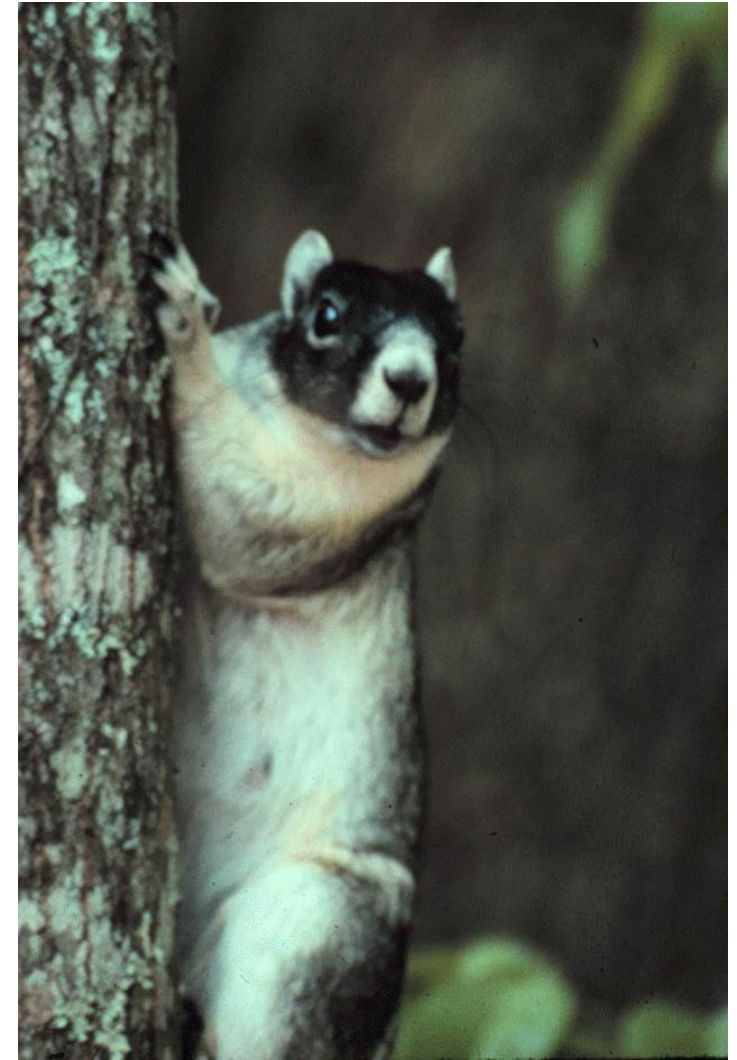
Mammals in the Longleaf Ecosystem

- Most are generalists in longleaf and common to many habitats
- ~70% forage on or near the ground
- Seed dispersers, including longleaf pine seeds



Fox Squirrel *Sciurus sp.*

- Several subspecies of fox squirrel (*Sciurus niger*, *Sciurus niger shermani*, *Sciurus niger niger*, etc.)
- Seed dispersers, seed eaters, or prey for other species
- Diet includes acorns, longleaf pine seeds, fruits, insects and fungi





- Prefer open, mature longleaf (sandhills and flatwoods)
- Spend most of their time on the ground (more than any other NA squirrel)
- Increased tree cover = competition with gray squirrels



Pollinators and Fire

- $\frac{3}{4}$ of plant species endemic to longleaf depend on insect pollination (mostly bees)
- Abundance and diversity of bees increases in areas that are frequently burned
 - Provide foods for adults and larvae
 - Nesting areas



Snags



- Snags are important to a suite of cavity-dependent species associated with longleaf.
- Woodpeckers, kestrels nuthatches, chickadees, titmice, flycatchers, Bluebirds, and martins all benefit from snags.
- Removal of snags limits nesting opportunities and increases competition for the remaining resources.



Woody debris and stumps

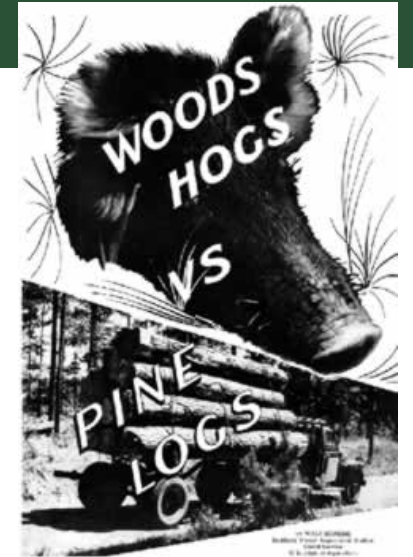


- Creates physical diversity and for many groundwelling species including snakes, turtles, and lizards
- Key cover for amphibians moving from wetlands breeding sites to terrestrial uplands
- Can be a barrier to movement and accessing food if too heavy



Invasive Species

- Armadillo
- Coyote
- Feral hog
- Fire ants





- ❑ The longleaf ecosystem is rich in plant and animal diversity.
- ❑ Fire is critical for maintaining the stability, abundance, and complexity of the ecosystem



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