

# Sandhill Forests

Intermediate and Senior Contestants should study the following description to prepare for the Ecosystem Quiz station in the Florida 4-H Annual Forest Ecology Contest



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## **Overview and History**

Sandhill forests are upland, savanna-like habitats on gently rolling terrain with an open overstory of longleaf pines. While there are many similarities between scrub forests and sandhills (such as dry, sandy soil), sandhills are easily distinguished by the tall, longleaf pines and open, grassy groundcover. Interspersed with the pines are turkey oaks and other hardwood species such as sand post oak, bluejack oak, and persimmon. Sandhills burn more frequently than scrub habitats so there are fewer woody shrubs and thickets of undergrowth in these ecosystems. The widely-spaced trees and soft groundcover makes these open woodlands easily recognizable.

The soil in sandhills is deep, sandy, and well-drained but lacks distinct layers. There may be a variety of textures and types of soil as one travels to different regions within the state. Sandhills in the northern peninsula and Panhandle generally have more coarse soils with some loam and clay mixed in. As you travel south along the ridges of the peninsula, the soil is a finer texture and lacks the clay and loam. Sandhill soils range from yellowish to creamy white and are very permeable. They allow water and nutrients to leach out easily so the soil tends to be fairly infertile. Although sandhill systems have nutrient-poor soils, the open canopy allows plenty of sunlight to reach the forest floor so a large variety of grasses and other herbaceous plants grow well in these habitats.

As early as 20 million years ago, vast expanses of longleaf pines covered the coastal plains from Virginia to Florida and as far west as eastern Texas. At one time there were an estimated 25 million hectares of longleaf forest in the Southeast. While some of this land was low-lying flatwoods, much of it consisted of higher elevation sandhill ecosystems.

Most of the original longleaf forests have been replaced by pine plantations, citrus groves, rangeland, and residential and commercial development. Only a few large tracts of sandhill still exist in Florida today. The largest expanses are located in the Panhandle. Most of the small, isolated areas are scattered throughout the northern peninsula. Only 38% of sandhill habitat in Florida is found on public lands. Most of the remaining land is privately-owned. These beautiful relics of

ancient Florida offer aesthetic, environmental, and economic benefits that cannot be replaced once the last stands are gone.

## Environmental Factors

### *The Role of Fire in Sandhills*

Fire plays a major role in maintaining sandhill ecosystems. These *pyrogenic* (fire-dependent) habitats require frequent, low-intensity fires about every two to five years to minimize competition and stimulate flowering and germination of many sandhill plants. Many plants are adapted to surviving in the fire-dependent habitat. Wiregrass, one of the most common groundcover species in sandhills, needs the heat of a summer fire to bloom and reproduce. Shortly after a spring burn, plants can be seen blossoming across the forest floor.



Figure 1: A young longleaf pine or “furry stick.”

Longleaf pine is a fire-tolerant species. The pines depend on frequent fires to completely remove vegetation and expose bare mineral soil so their seeds can germinate. The tall longleaf pines act as lighting rods and help to ignite the underbrush. Young plants go through a stage when the bud is surrounded and protected by a clump of grass-like leaves. During this grass stage, longleaf pines are able to survive a low-intensity fire. The fire eliminates neighboring vegetation that might compete with the young tree. After a burn, the seedling can access available nutrients and shoot up into a young tree. This second growth stage is called a “furry stick” because the tall, skinny seedlings have long needles that come off of the main stem and give it a fuzzy appearance (Figure 1). Since this stage is susceptible to fire, the seedlings grow very quickly until they are out of the fire zone—about 15 feet in height. As the longleaf pines grow they develop wide plates of bark that are able to disperse the heat of a fire and flake off as they burn. This protects the sensitive inner bark from injury and allows the mature trees to survive fires.

In areas where fire is suppressed, woody shrubs and other hardwood trees, such as laurel oak and sweetgum can become established and alter the composition and structure of the ecosystem. Without fire, sandhill forests will evolve to become upland hardwood stands of oaks and hickories. If the sandhill plant community is to be maintained, hardwood growth must be controlled by regular fire.

### ***Vegetation of Sandhill Communities***

The core species in sandhill ecosystems, longleaf pine, may live from 300 to 500 years. If regular fires occur, these open stands will continue with a groundcover of only herbaceous grasses and ferns for

many years. Wiregrass, lop-sided Indian grass, pineywoods dropseed, and bracken fern are common in regularly burned sandhills. A variety of flowering grasses and plants decorate the open landscape. Among these are blazingstar (Figure 2.1), butterfly-weed, goldenrod common asters, and prickly pear (Figure 2.2).



Figure 2.1: Blazingstar and swallowtail butterfly. Figure 2.2: Prickly pear with fruits.

In systems where fire has been suppressed, turkey oaks and a few other hardwood species can be seen along with woody shrubs and plants such as deerberry, blackberry, and running oak. Saw palmetto is another familiar feature in less-frequently burned sandhills.

As one travels farther south to Central Florida, slash pines often replace longleaf pines as the dominant species in sandhill ecosystems. Most of the other species of hardwoods and plants are similar to those in North Florida sandhills.

There are fewer endemic or threatened species in sandhill habitats than are found in the scrublands. However, some plants are listed as endangered. These include clasping warea, a federally endangered species, and bent golden aster and pigeon wing, both listed by the State of Florida as endangered.

## Wildlife of Sandhill Ecosystem

Sandhill ecosystems support a wide variety of wildlife. However, most of these animals also use neighboring habitats and are not found exclusively in sandhills. Many burrowing and digging species live in the deep sandy soils. These animals are known as *fossorial* species because of their digging ability. Many of them have shovel-like feet to help remove the dirt as they dig. Gopher tortoises and skinks, move so well through the soil that they are called *sand swimmers*.

As with the plants in sandhill communities, the wildlife that live in these habitats may vary according to how frequently the area is burned. In areas where regular fires occur, species that prefer an open understory, such as pocket gophers, gopher tortoises (Figure 4), and Sherman's fox squirrel can thrive. Red-cockaded woodpeckers (RCW's), an endangered species, require older pines and an open understory. If fire is suppressed, RCW's cannot move about freely and are forced to relocate to more open forests. Bobwhite quail are another species that depends on the open understory of fire-maintained sandhills. Several songbirds also prefer the open pine forests including pine warblers, Bachman's sparrows, shrikes, and kestrels.



Figure 4: A gopher tortoise.

Without fire, sandhills will have more turkey oaks, woody undergrowth, and other hardwood trees. These habitats support several different wildlife species. Many songbirds use the hardwoods and pines in overgrown sandhill systems. These include ground dove, eastern kingbird, eastern bluebird, white-breasted nuthatch, and red-bellied woodpecker.

A number of threatened or endangered wildlife species can be found in sandhill ecosystems. Already mentioned were the red-cockaded woodpecker and the gopher tortoise, a vulnerable species that shares its burrow with many other animals. As many as 300 species of insects and animals have been known to use tortoise burrows. They are called *commensal* species because they live together in the same location. Several of the co-habitants of these burrows are listed as



threatened or endangered including the indigo snake, gopher frog, and sand skink. Other endangered species that live in sandhills are the Florida mouse and scarab beetle.

The greatest risk to these threatened species is the loss of sandhill habitat through the suppression of fire or suburban development. If regular fires do not occur in these ecosystems many of the wildlife will probably move to better habitats. The few natural systems that still exist must be carefully protected and maintained in order to provide enough good habitat for native wildlife.

### **Human Impacts on Sandhill Ecosystems**

Sandhill ecosystems are generally found on level, well-drained ground which makes the land ideal for home sites and many agricultural uses. Native American Indians who lived in Florida burned pinelands and cultivated maize here. European settlers cleared much of the land to grow tobacco, cotton, and food crops. Thousands of acres of original sandhill habitat have already been cleared and developed. Other areas have been converted to citrus groves, planted as commercial pine plantations, or allowed to change into hardwood hammocks.

Other than development, the most important factor in the decline of sandhill ecosystems is the suppression of fire. Since people are nervous about having fires and smoke close to their homes, they tend to avoid burning the land. Eventually the fire-dependent pines and other plants will be crowded out by woody shrubs and hardwood trees. The plants and animals of the sandhill system are unable to survive in the thick understory and are displaced.



Figure 5: Prescribed fire

Suppression of fire in these habitats also allows the vegetation to build up and increase the risk of high-intensity wildfires. Such wildland fires may burn out of control and threaten homes, farms, and livestock in the vicinity. Managing sandhill habitats with regular, prescribed burns will reduce the risk of destructive fires while preserving the land for native plants and wildlife.

## Summary

Sandhill ecosystems represent one of the oldest types of native habitats in Florida. Easily recognized by tall longleaf pines and an open, park-like understory, these ecosystems support a variety of plants and animals. Many of the species found in sandhills are threatened or endangered. Once covering vast expanses of land in the Southeast, all that remains of these systems now are a few scattered areas, mainly in Northern Florida and along the ridges of the panhandle. Thousands of acre of sandhills have been cleared for agricultural, commercial, and residential use.

In addition to providing valuable wildlife habitat sandhills, are a source of timber. Some landowners are planting longleaf pines to restore this ecosystem and may be able to harvest the trees for their economic value.

Suppression of fire is the main cause of decline in sandhill ecosystems since many of the native species found here are fire-dependent. In the absence of fire, the pines, grasses, and ferns cannot continue to thrive and will be replaced by woody shrubs and hardwood trees. Many species of wildlife in sandhills depend on the open understory. They are unable to thrive if regular burns do not occur to control vegetation and stimulate flowering and seed dispersal of fire-dependent plants. Sandhill ecosystems and the wildlife that use them need to be protected and

managed if they are to continue to provide natural beauty as well environmental and economic benefits.

Some beautiful examples of natural longleaf-turkey oak sandhills (Figure 6) may be seen in the Ocala National Forest, Blackwater River State Forest, Eglin Air Force Base, Wekiwa Springs State Park, Torreya State Park, Gold Head Branch, San Felasco Hammock

Preserve State Park, and the Janet Butterfield Brooks Preserve.



Figure 6: Turkey oak leaves