

Upland Hardwoods

Intermediate contestants should study the following description to prepare for the Ecosystem Quiz station in the annual [Florida 4-H Forest Ecology Contest](#)



Figure 1. Upland hardwoods ecosystem at San Felasco Hammock State Park.
Source: Shirley Denton, Florida Native Plant Society

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General Description

Upland hardwood forests are unique ecosystems found on higher ground, such as slopes and bluffs. These forests feature a closed canopy of shade-loving deciduous trees that lose their leaves in the fall, creating a rich layer of organic material on the forest floor. Pines and evergreen trees are often mixed in, adding variety to the canopy. Beneath the trees, multiple layers of woody shrubs and flowering plants grow in the shade, with beautiful wildflower displays in the spring and summer.

The soils in upland hardwood forests are generally a mixture of sand and clay, with substantial amounts of organic material and limestone near the surface. The upper layers of soil are coarse, while the layers below are finer-textured sand. This coarse upper layer helps trap moisture and nutrients while allowing excess water to drain away. Although these higher elevation forests are usually dry, or xeric, some are found on mid-level slopes and can be moderately wet, or mesic, depending on the slope's steepness and water availability. The dense canopy and layers of midstory vegetation block air and light movement, maintaining a high relative humidity. Upland hardwood forests are often located near flatwoods or sandhill ecosystems and are primarily found in north Florida and along the high ridges of the peninsula. In northern Florida, they gradually blend into the Appalachian Mountains of Georgia and the Carolinas, where soils may contain more clay and loam. Farther south, upland hardwoods mix with tropical hardwood hammocks.

Upland hardwood trees have deep roots to reach water far below the surface. In northern Florida, species like American beech are common but can't survive in the warmer central and southern parts of the state. The canopy is thick, letting very little sunlight reach the ground, resulting in sparse groundcover. In southern forests, the canopy is more open, allowing more light to support a thicker layer of grasses and shrubs.

Environmental Factors

Upland hardwood forests are not dependent on fire. Lightning strikes, which can cause natural fires, are rare in these forests because the thick layers of leaf litter trap moisture and help prevent intense burning. Additionally, the plants in these forests have fewer flammable oils compared to plants in flatwoods, making them less likely to catch fire. However, if a large fire does occur, it can be devastating to the forest because most plants are not adapted to these conditions. Pioneer species, like pines, might move in after an intense fire, replacing the hardwoods and changing the ecosystem's makeup.

High winds are more common in upland forests than fires. These winds break off dead branches from the trees, which can pile up on the ground and create brush piles that often provide refuge and nesting sites for wildlife. If severe windstorms blow through an



Figure 2. Upland hardwoods forest. Source: MSU

area, they may blow over entire trees, creating gaps in the canopy where other species may grow.

Because upland hardwood forests are found near streams and rivers, they play a crucial role in protecting watersheds and controlling erosion. The deep roots of the trees stabilize the soil, preventing excessive runoff of water and nutrients. Many wildlife species, including some that are threatened or endangered, depend on these forests. Additionally, the herbaceous groundcover in upland hardwood forests is sometimes used as high-quality forage for livestock. These forests are also valuable for their durable saw timber.

Flora & Fauna

Plants

Upland hardwood forests are rich in plant life, featuring a variety of trees and shrubs depending on the geography. The overstory is dominated by oaks such as bluff oak, swamp chestnut oak, laurel oak, and live oak. Other canopy trees include pignut hickory, southern magnolia, loblolly pine, and Carolina laurelcherry. The understory layer has numerous species of smaller trees, woody shrubs, and flowering grasses like American hornbeam, sparkleberry, yaupon holly, black cherry, and Virginia creeper. Additionally, over 50 species of rare plants occur in upland hardwood forests, including heartleaf, trout lily, and the endemic Marianna columbine.

Epiphytes are important and abundant in upland hardwood ecosystems. These plants, which live on other plants without harming them, collect all their nutrients and water from the air. Many species of ferns, orchids, and bromeliads are epiphytes found in upland hardwood forests. One of the most recognizable is Spanish moss, which drapes from the branches of large oak trees, giving the forests a unique appearance.



Figure 3. Bluff oak leaves/bark. Source: Niels Proctor, UF



Figure 4. Spanish moss hanging from an oak tree. Source: UF

Animals

These ecosystems support numerous animals by providing year-round food sources and shelter. Pollinators such as bees, butterflies, bats, and hummingbirds are attracted to the many flowering plants and trees, which produce a variety of food choices including black cherries, persimmons, acorns, mistletoe berries, and numerous grains and seeds.

The mix of tall trees and dense underbrush in upland hardwood forests provides homes for

many bird species. Some birds live in the tree tops, while others find shelter in the shrubs and on the ground. Cavity-nesting birds like owls and woodpeckers use the large trees, while ground-nesters live among the underbrush. This allows more animals to benefit from the resources without competing against each other. Common birds in this ecosystem include the barred owl, red-shouldered hawk, ruby-throated hummingbird, red-bellied woodpecker, downy woodpecker, blue jay, tufted titmouse, and Carolina wren. Some are year-round residents, while others use the forests during spring and fall migration. Resident birds include blue jays, bluebirds, mockingbirds, cardinals, wrens, and woodpeckers. Cedar waxwings, great-crested flycatchers, and various warblers may be seen in the forest during spring and fall migration. Ground birds like bob-white quail and wild turkey are also found in these forests.

Reptiles in upland hardwood forests include the green anole, Southeastern five-lined skink, and the Eastern diamondback rattlesnake, which is highly venomous. These forests offer diverse habitats that provide essential resources such as food, water, and cover for these reptiles. Additionally, gopher tortoises, a threatened species, and the federally threatened indigo snake, which often lives in gopher tortoise burrows, are also found in these ecosystems. Amphibians, such as the narrow-mouthed toad, ornate chorus frog, and squirrel treefrog, thrive in the forest's moist conditions.

Gray squirrels, raccoons, black bears, and white-tailed deer are examples of common mammals in upland hardwood ecosystems. The deep leaf litter and rich groundcover provide them with shelter and places to search for food. The variety of plants and trees in the forest helps these animals find what they need and keeps the ecosystem balanced.



Figure 5. Barred owl in a tree.
Source: FL State Parks



Figure 6. Eastern diamond-backed rattlesnake.
Source: Florida Museum

Human Impacts

One way that humans have impacted upland hardwood ecosystems is by cutting down trees to build homes. Since upland forests are found on well-drained land and offer beautiful trees with shade and shelter from winds, these locations are popular residential areas. Upland hardwood forests are often cleared for housing or agricultural purposes. In addition, much of the land has been converted to commercial pine plantations or rangeland for livestock.

Currently, there is a market for lumber from upland hardwood trees such as black cherry, white oak, southern red oak, and walnut. However, since upland hardwoods are usually found in relatively small stands in Florida, the forests are not able to produce large quantities for commercial purposes. The value of these upland forests to wildlife is greater than their value for commercial timber production.

Lastly, invasive species can cause significant damage to the ecosystem. In recent years, invasive plants like coral ardisia, camphor tree, and Japanese climbing fern have threatened to replace native plants in upland hardwood forests. Feral hogs, which are also invasive, cause damage as they dig for roots.

Some of the most beautiful land in Florida is found in upland hardwood forests. The picturesque moss-draped oak trees and gently rolling terrain offer a classic view of the original Florida. Many of the most serene parks and recreation areas in Florida are located in upland hardwood forests, where visitors can enjoy pleasant walks along wooded trails and view the many species of trees, flowering plants, birds, and other wildlife.

Places to see examples of upland hardwoods:

- Florida Caverns State Park
- Mike Roess Goldhead Branch State Park
- San Felasco Hammock Preserve State Park
- Torreya State Park
- Tosohatchee State Reserve
- Wakulla Springs State Park

Links to learn more:

- [Florida Natural Areas Inventory](#)
- [UF/IFAS Extension Florida Land Steward](#)
- [Climate Adaptation Explorer](#)