The background features a stylized forest illustration. On the left, a large tree trunk with brown bark and a thin branch extends upwards. In the center, a light-colored tree trunk is visible. On the right, a tree with a thick brown trunk and a dense, rounded canopy of green leaves is shown. The bottom of the image is decorated with a row of green, leafy plants. The overall color palette is soft and natural, with greens and browns on a light cream background.

Upland Hardwoods & Mangrove Forests: An Ecosystem Journey

2025 Florida 4-H Forest Ecology Contest

Table of Contents

01 Introduction: what is an ecosystem?

03 Ecosystem journey: mangrove forests

02 Ecosystem journey: upland hardwoods

04 Mock contest practice questions

01

Introduction

We start our ecosystem journey as Florida hikers with the goal of walking from the highest upland habitats all the way to the lowlands of the coast! But before we hit the trail, there's one big question we need to answer:

What is an ecosystem?

An ecosystem is defined as “a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life.” (National Geographic, 2022)

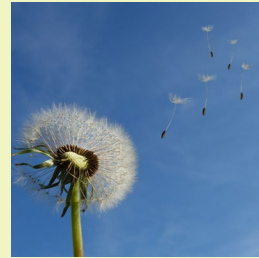
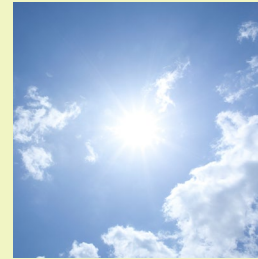


What Makes Up an Ecosystem?

Biotic Factors (living things):



Abiotic Factors (nonliving things):



The background is a stylized illustration of a forest. On the left, a large tree with a thick brown trunk and a full, rounded canopy of green and yellow leaves stands prominently. To its right, another tree trunk is visible. In the foreground, there is a layer of green grass and foliage. On the left side of the foreground, there are several pink mushrooms with white spots. A small blue squirrel is standing on the grass, facing right. The overall color palette is soft and natural, with greens, browns, and yellows.

02

Upland Hardwoods

Our hike begins on higher ground in the upland hardwood forest! These forests are full of tall trees like oaks, hickories, and magnolias, creating lots of shade. The ground is rich and moist, perfect for plants that like cooler, shady spots.

As we walk down the slope, the ground gets wetter, and we see different plants and trees that thrive in the damp conditions.

Upland Hardwood Highlights

- Found on higher ground like hills and slopes, mostly in northern Florida
- Tall, **deciduous** trees like oaks, hickories, and magnolias in the overstory
- **Shade-tolerant** shrubs and flowering plants in the understory
- Soil is a mixture of sand and clay with a large amount of **organic material**
- Vary from relatively dry, or **xeric**, to moderately moist, or **mesic** depending slope steepness and water availability
- Fire is rare due to high humidity and shady conditions, but not impossible
- Play an important role in protecting watersheds and controlling **erosion**



Upland Hardwood Trees

Bluff Oak (*Quercus austrina*)



- Found on bluffs/slopes above rivers or streams
- Pale, yellow-gray bark in strips or plates
- 3-7 rounded, shallow lobes along the leaf margin
- Small acorns, mostly enclosed in the **cupule**
- Uncommon and not widely-known due to limited natural range

Carolina Laurelcherry (*Prunus caroliniana*)



- Member of the *Prunus* genus (includes wild cherries, peaches, almonds, plums)
- Fruit and leaves are important food sources for wildlife
- Provides nesting habitat and cover for birds
- Widely planted as an ornamental

Upland Hardwood Trees

Sparkleberry (*Vaccinium arboreum*)



- Grows in sand dunes, hammocks, hillsides, meadows, and a variety of moist sites
- Spreading branches and small, white flowers
- Berries eaten by black bears, deer, and chipmunks
- Wood is used to make tool handles and crafts; bark is used for tanning leather

Yaupon Holly (*Ilex vomitoria*)



- Often dispersed by birds that eat the fruit
- Important wildlife food source, especially in winter
- Used by Indigenous groups for medicinal and ceremonial practices
- Popular Christmas decoration due to **evergreen foliage** and bright red berries

Other Upland Hardwood Plants

Spanish Moss



Laurel Oak



Trout Lily



Upland Hardwood Animals

Invertebrates

- Butterflies/Moths
- Bees
- Spiders
- Beetles
- Ants

Fish

- Golden topminnow
- Mosquitofish

Amphibians

- Squirrel treefrog
- Narrow-mouthed toad
- Ornate chorus frog

Birds

- Barred owl
- Cedar waxwing
- Tufted titmouse
- Carolina wren
- Bob-white quail
- Wild turkey

Reptiles

- Eastern diamondback rattlesnake
- Gopher tortoise
- Southeastern five-lined skink

Mammals

- Raccoon
- Gray squirrel
- Black bear
- White-tailed deer
- Eastern cottontail rabbit

Threats to Upland Hardwoods

Habitat Loss & Overharvesting

- Trees are cut down to build homes
- Upland hardwood forests are cleared for commercial pine stands, rangeland, and agriculture
- Large market for lumber from upland hardwood trees

Invasive Species

- Invasive plants like coral ardisia, camphor tree, and Japanese climbing fern threaten to replace native plants
- Invasive feral hogs can cause damage as they dig for roots

The background features a stylized illustration of a mangrove forest. On the left and right sides, there are large mangrove trees with thick, brown trunks and dense, dark green foliage. Their roots are prominent, extending down into a blue body of water. In the center, a bright yellow sun is partially obscured by the horizon, with its reflection visible in the water. The sky is a light blue color.

03

Mangrove Forests

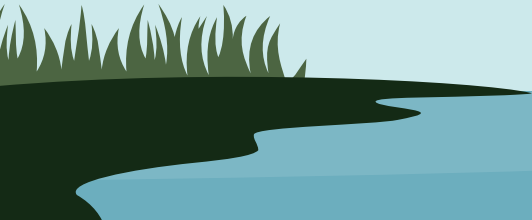
As we continue our hike through Florida's ecosystems, the dense canopy begins to open up, and a winding river appears beside us.

The air smells saltier, and clusters of weird-looking trees on stilts come into view.

We've arrived at the edge of the land—welcome to the mangrove forest!

Mangrove Forest Highlights

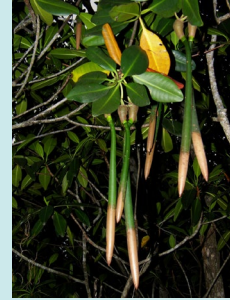
- Found in flat coastal and **estuarine** areas where freshwater rivers meet saltwater
- Home to red, black, and white mangroves as well as buttonwood trees, all **adapted** to survive in salty conditions
- Flooded at high tide and grow in wet, **oxygen-poor** soils like sand, mud, or limestone rock
- Provide shelter, food, and nursery habitat for young fish, shrimp, and other marine animals
- Stabilize the soil and protect shorelines from **erosion** and **storm surges**
- Sensitive to freezing temperatures, mainly grow in southern Florida
- Called “**land builders**” because mangrove roots trap sediment and can create new land over time!



Mangrove Forest Trees

- Grow closest to the shore due to high salt and flood tolerance
- Tall, arching **prop roots** help anchor the tree
- Roots have **lenticels** (pores) that bring oxygen to the plant
- Trap mud and silt, building soil around the roots over time

Red mangrove (*Rhizophora mangle*)



- Grow further inland from red mangroves, where high tides can still reach them
- Pencil-like **pneumatophores** help supply oxygen to roots like snorkels
- Excretes salt through leaves, often covered in salt crystals
- Blooms white flowers in summer, producing high-quality "mangrove honey"

Black mangrove (*Avicennia germinans*)



Mangrove Forest Trees

White mangrove (*Laguncularia racemosa*)

- Grow furthest inland, and are the least tolerant of flooding out of the mangroves
- Rounded leaves have glands called **nectarines** at the base that excrete sugar
- Typically lack pneumatophores or prop roots, but may have them depending on habitat conditions



Buttonwood (*Conocarpus erectus*)

- Found at the edge of mangroves and coastal habitats
- Not a true mangrove, but has salt-excreting glands on its leaves
- Recognized by its cone-like fruit and dense, rounded flower heads
- Used for landscaping and valued for its strong wood



Mangrove Forest Animals

Invertebrates

- Crabs
- Clams
- Shrimp
- Oysters
- Lobster
- Snails

Fish

- Mangrove snapper
- Crevalle jack
- Sheepshead
- Red drum
- Snook

Amphibians

- Squirrel treefrog
- Giant toad
- Cuban treefrog

Birds

- Roseate spoonbill
- Great blue heron
- Brown pelican
- Tri-colored heron
- White ibis
- Great egret

Reptiles

- American crocodile
- American alligator
- Mangrove water snake
- Green sea turtle
- Green/brown anole

Mammals

- Key deer
- Florida panther
- Marsh rabbit
- Opossum
- Manatee
- Bottlenose dolphin

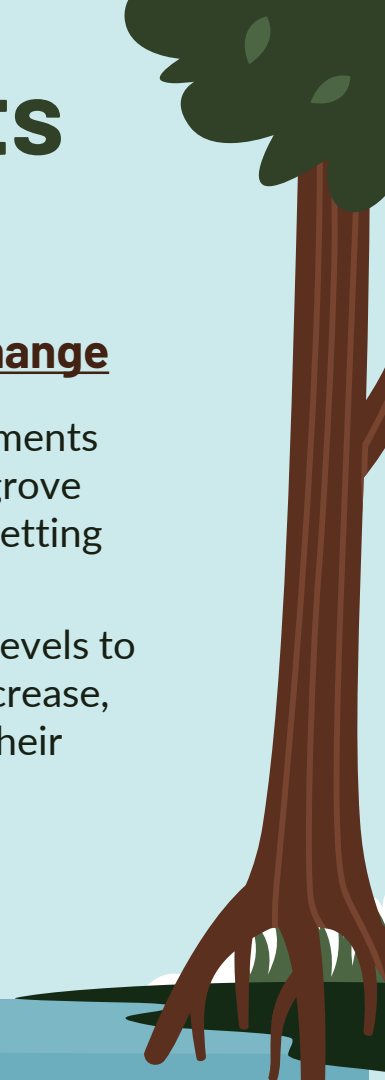
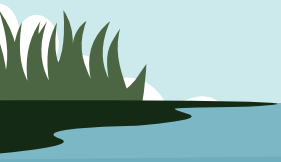
Threats to Mangrove Forests

Drainage & Development

- Building along the coast and altering water flow can destroy mangrove forests
- Dikes and drainage systems can flood or dry out mangroves, making it hard for them to survive

Pollution & Climate Change

- Pollution from oils and sediments can block the roots of mangrove trees, stopping them from getting the oxygen they need
- Climate change causes sea levels to rise and temperatures to increase, pushing mangroves out of their current habitats



Questions?

For study materials and more information about the contest visit the Florida 4-H Forest Ecology website:

