

## **Plants and Ecosystems:**

### **Understanding the relative importance of plants within ecosystems South Florida's Ecosystems**

South Florida has a number of unusual ecosystems, some of which are only found here and nowhere else. These ecosystems create a mosaic of plant and animal communities, resulting in a diverse patchwork landscape that is unlike any other in the world. The following seven ecosystems are what make up South Florida's unique tapestry of life.

#### **Answer the following questions about these ecosystems:**

- What are the most dominant plant species or plant types in this ecosystem?
- What are some of the most important animal species or animal types? How are these animals dependent on the plants?
- Why are the plants crucial in this ecosystem (why the ecosystem could not function without the plants)?
- What are the biggest threats to this ecosystem? List the major threats and discuss them. Come up with one or two possible solutions to the problem.
- What are some other interesting facts that you did not know about this ecosystem?

## Mangroves

- **General Description:** Most plants cannot grow in salt water, but Mangrove trees are well adapted to salt. In other words they are salt tolerant. Mangroves are found along tropical and subtropical coasts in flooded saltwater areas. Mangroves provide the shoreline with protection from wind, waves and floods.
- **Plants:** Three species of mangroves are found in Florida; the red, black and white mangroves. Usually, red mangroves grow along the water's edge, black mangroves grow slightly farther from the water's edge than the red mangrove and white mangroves grow inland from the red and black. Buttonwood, which is also salt tolerant, is usually found growing with the white mangrove.
- **Animals:** Mangroves provide protection, and therefore are good breeding grounds and nursery areas for many terrestrial and marine animals including juvenile fish, invertebrates, amphibians, reptiles, birds and mammals. There are two main reasons that these animals like to use mangroves. First, Mangrove leaves, trunks and branches fall into the water and are transformed into detritus. Mangrove detritus is an important food source. Second, the root systems, fallen branches and shading provided by overhead foliage reduce the risk of predation on young animals. Without mangroves, many fish and other animals would not survive to adulthood.
- **Major Threats:** The most pressing threat to mangrove habitats is coastal development. Coastal areas are prime real estate, and many developers in the past have destroyed large tracts of mangroves to build condos or houses. Early settlers found mangrove habitats to be unpleasant, mosquito infested and even smelly (the rotting detritus can produce a distinctive sulfur odor), however we now know that mangroves perform very important ecosystem functions as nurseries for young fish and shoreline protection. Mangrove ecosystems are protected from cutting or trimming.



## Marshes (Sawgrass Marsh or Sawgrass Prairie)

- **General Description:** Marsh is a general term to describe freshwater wetlands with few or no trees but with open expanses of grass-like herbs – especially sedges and rushes. In South Florida, we are particularly known for our sawgrass marshes, often called sawgrass prairies. These herbaceous marsh communities are what people generally are referring to when they talk about the “Everglades.” You may have heard the term “river of grass” to describe the everglades. The water passing through them is headed for its final destination in the gulf. Water flows though the everglades like a river, although it appears still. The grasses of the marsh act as natural filters. As water passes through the grasses in the marsh, water flow is reduced and suspended particles in the water settle out, forming soils that can support the vast array of life that exists here.
- **Plants:** The sawgrass marshes are dominated by, as you would suspect, sawgrass. However, cattails and numerous grasses, sedges and rushes are common. Periphyton, which is composed primarily of blue green algae, is often found floating on the surface of the water when the water level is high and on the soil when water level is low.
- **Animals:** Periphyton is the base of the food web in the sawgrass marsh. The larvae of many invertebrates, frogs and salamanders depend on the periphyton, and these critters are in turn eaten by the larger fish, birds, frogs, snakes, mammals and small reptiles, which are then often eaten by the top predator in the everglades – the Florida gator. Mammals found in the marsh include white-tailed deer, the highly endangered Florida panther and others. Many water birds and wading birds nest and forage in marshes as well, like herons, egrets, anhingas, spoonbills and ibis.
- **Major Threats:** Everglades marshes are threatened by numerous factors. The water from the Everglades has been drained from its original state in order to expand development. Many places that we live in now here in Miami Dade County used to be marsh. Nutrients from agricultural runoff has increased phosphorus levels in the water and caused cattails to become increasingly dominant (cattails like phosphorous), taking over areas that used to be dominated by sawgrass.

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## Swamps (Cypress Swamp)

- **General Description:** Swamp is a general term used to describe freshwater wetlands that are dominated by trees rather than grassy herbs. In South Florida we have some impressive swamps, which are dominated by cypress trees (*Taxodium distichum* and *T. ascendens*). Marshes in South Florida may include small patches of cypress swamp called cypress domes or cypress ponds. In other places like the Fakahatchee Strand or Big Cypress there are large, continuous areas of cypress swamp. You may also see “dwarf cypress” swamps in areas that are nutrient poor – here the cypress trees will be stunted and small.
- **Plants:** Cypress trees are the dominant plant, but numerous epiphytes grow on cypress, including bromeliads, orchids and ferns. The cypress, also called bald cypress, is a **deciduous conifer**, closely related to the redwood trees of California. Cypress trees have elaborate root systems that include “knees,” which stick out above the water. These root systems may function to increase oxygen levels in the roots and/or to slow down water currents and thus allow sediment to settle and build up. As water flow is reduced, sediment in the water settles, forming rich soils high in nutrients. The health of cypress swamps is dependent on regular water level fluctuations, since seedlings can only germinate during the season when soils are not flooded.
- **Animals:** The fauna of cypress swamps can include mammals like white-tailed deer, Florida black bears (a highly endangered species), raccoons and otters. Just as in sawgrass marsh you will find water birds like herons, egrets and anhingas. You will also find other birds like barred owls, woodpeckers, warblers, wood storks and even bald eagles. Cypress trees provide excellent nesting habitat for these birds. Reptiles and amphibians found in cypress swamps include salamanders, frogs, snakes, turtles and alligators.
- **Major Threats:** Just like the sawgrass marshes, water has been drained from swamps to support development. Humans have altered the natural water flow and flood patterns in many areas, which affect cypress trees that are dependent on regular, seasonal flood patterns.



## Pine Rocklands

- **General Description:** Pine rocklands are found on limestone bedrock on the Miami Rock Ridge and in the Florida Keys. The pine rockland ecosystem once covered 382,000 acres on the southern tip of the Florida peninsula and the lower Keys, but has now been reduced to only 2% of its original extent. The pine rocklands are fire dependent, which means that periodic fires are required in order to eliminate invading hardwoods and assist in nutrient cycling. Fire helps the pine rocklands by aiding seed germination and reducing the number of exotic plant species. Ashes from the fires recycle back into the earth and provide nutrients for the plants. Therefore many plants in the pine rocklands are fire tolerant and will recover quickly from burning.
- **Plants:** Pine rocklands are dominated by one species of pine tree, the South Florida slash pine, also called Dade County pine (*Pinus elliottii* var. *densa*). The forest floor has various shrubs, herbs and palms, as well as young hardwoods. Saw palmetto and coontie are common understory plants in the pine rocklands. Many **endemic** plants such as the crenulate leadplant, deltoid spurge and Small's milkwort are found here.
- **Animals:** Pine rockland plants provide critical foraging and nesting habitat for a diverse array of wildlife including the endangered Key deer and Lower Keys marsh rabbit; birds such as the white crowned pigeon and the scrub jay, as well as various threatened species of snakes, tortoises, lizards, and insects.
- **Major Threats:** Pine rocklands have been heavily impacted by development and fire suppression. Before scientists fully understood the role of fire in pine rocklands, fires were routinely suppressed to prevent their spread to inhabited areas. Now scientists and park managers employ prescribed burns, which are controlled and localized so that the pines get the fire they depend on and there is low risk of the fire escaping and accidentally destroying homes. When fire is suppressed, it becomes easier for **exotic species** to take over. Exotic plants, such as Brazilian pepper, tend to push out native species.



## Hardwood Hammocks

- **General Description:** Hardwood hammocks are localized, thick stands of hardwood trees that can grow on natural rises of only a few inches in elevation. In South Florida, hammocks occur within marshes, pinelands and mangrove swamps. Hammocks rarely flood because of their slight elevation. Woodland or pine rockland that is not logged or burned for more than 20 years will develop into a hammock. Close to 80% of the hardwood hammock habitat has been destroyed in South Florida.
- **Plants:** Hammocks may contain trees of temperate climate origin like red maple and live oak, and of tropical climate origin such as the sabal palm, cabbage palm, mahogany, gumbo limbo and cocoplum. The diverse flora found in hammocks also includes many additional tree species, **epiphytes** (air plants), and ferns. More epiphytes are found in South Florida hammocks than in any other type of forest in the United States.
- **Animals:** The plants of the hardwood hammocks provide critical foraging and nesting habitat for some highly endangered animal species including the Florida tree snail and the Schaus swallowtail butterfly. Both of these are found only in hardwood hammocks of South Florida. Other wildlife found in hammocks include raccoons, opossums, birds, snakes, lizards, tree frogs, and large endangered animals such as the Florida panther, bobcats and Key deer.
- **Major Threats:** Hammocks that grow on high ground have long been considered ideal home sites because they are well drained, shaded, and beautiful. Consequently, most of Florida's upland hammocks have been destroyed by development. Those that remain occur in a few state and national parks.



## Coral Reefs

- **General Description:** Coral is a collection of small, individual animals called polyps. Many polyps secrete a limestone cup around themselves and as they grow they come into contact with other polyps, forming a living reef. When the polyps die, new polyps will grow on top of the limestone skeletons. Coral reefs require relatively calm, clean saltwater with stable temperatures.
- **Plants:** Zooxanthellae are tiny algae that grow in the tissues of coral polyps. Zooxanthellae have a *symbiotic* relationship with coral, which means the algae and coral are dependent on each other for survival. The algae depend on coral for nutrients and protection and the coral depend on zooxanthellae for oxygen and food. Communities of sea grass (often called seaweed) are often dispersed among the coral. Sea grasses are the only flowering plants that live their entire lives under the sea in saltwater. In South Florida, the most important kinds of sea grass are turtle grass, manatee grass and shoal grass (though there are several other species of sea grass that exist here).
- **Animals:** There are many species of coral found in the reefs of South Florida. Brain coral is the most striking due to its resemblance to a human brain. Sea grasses provide habitat for numerous invertebrates such as sea urchins, sea cucumbers and shrimp, as well as acting as a nursery for young fish. Sea horses are also found in sea grass. As the names indicate, turtles feed on turtle grass; manatees feed on manatee grass and other sea grasses. There are numerous species of fish; some of the more common fish in South Florida's coral reefs include parrot fish (which specialize in eating coral), grunts, sergeant majors and angel fish.
- **Major Threats:** Massive die off of coral has puzzled scientists recently, but many believe it may be due to global warming. Coral are very sensitive to temperature changes, and the slight rise in sea temperatures may be leaving them more vulnerable to diseases. Others have postulated that pollution from leaky septic tanks could be a factor, as scientists have noted increased levels of *E. coli* in the water. In some places in South Florida coral reefs have been buried due to "beach re-nourishment." Since beaches naturally erode, in order to protect beach front property sand is dredged up from deep in the ocean and brought to the beach, but in the process many coral reefs get buried.



## Coastal Dunes

- **General Description:** Coastal dunes play a vital role in protecting coastlines. They act as buffers against severe storms, protecting the lands beyond the dune from salt water intrusion, high wind and storm surges. Dunes also act as sand reservoirs, which are important for replenishing coastlines after tropical storms, hurricanes, intense wave action, or other erosion events. Dune plants stabilize the mounds of sand that protect the coast against winds and pounding tides.
- **Plants:** The vegetation found within Florida's dunes varies and is dependent upon many factors including storm waves, windblown sand, salt spray, substrate (soil) and climate. Dunes are created by specialized grasses, which trap sand grains being moved across the beach by wind. Sea oats, an endangered grass species, is found on dunes along populated beaches in South Florida and can grow to be six feet in height. Other dune grasses include panic grass and beach cordgrass. Other common dune plants include railroad vine (a morning glory with a beautiful purple flower), the edible prickly pear cactus, and sunflower relatives like the sea ox-eye daisy and the beach sunflower. Woody species include mainly sea grape, saw palmetto and the invasive exotic species Brazilian pepper and Australian pine (which, despite its name and appearance, is not actually a true pine).
- **Animals:** Florida beaches are important nesting sites for sea turtles and shore birds. Shore birds that require dune habitats for nesting include the oystercatcher, willet, Wilson's plover, seagulls and terns. Dune rodents include the beach mouse, cotton mouse, cottontail rabbit, and marsh rabbit. Reptiles that depend on this habitat for nesting or food include the endangered sea turtle and various species of snakes, including the Florida rough green snake.
- **Major Threats:** A loss of beach habitat to real estate development has caused a decline in the nesting shore bird and sea turtle populations. Tourism, while good for our economy, has been detrimental to some dune plants, which have been constantly trampled by beach goers. Recently, awareness of these issues has led to areas of dunes on visited beaches, like South Beach (pictured), being fenced off.

