USGS
science for a changing world

Ecosystems of South Florida

http://sofia.usgs.gov/virtual_tour/ecosystems/index.html

South Florida is home to a variety of ecosystems. Small variations in elevation (in some cases, only inches), water salinity (a measure of salt content), soil type, and fire frequency dictate which landscape community will prevail. Below are descriptions and photographs of some of South Florida's unique ecosystems.

Coral Reefs

Star and staghorn coral found in the Florida Keys. Photo courtesy of Eugene Shinn.

Over 30 different kinds of corals are found in Florida waters. Individual corals are interconnected colonies of soft, fleshy polyps that secrete complex shells made of calcium carbonate. These colonies can form branching corals or massive head corals depending on species. As the colonies compete for space, and as dead colonies are replaced, they grow on top of each other and build what we call a coral reef. Coral reefs provide habitat for thousands of species of plants and animals.

Corals that grow in sunlit areas depend on tiny algae called zooxanthellae that live in their soft tissue. The zooxanthellae help provide oxygen and food for the polyps. Corals that live in deep water, where there is no sunlight, do not have zooxanthellae.

Freshwater Marsh

Freshwater marshes are generally wetlands with an open expanse of grasses, sedges, rushes, and other herbaceous plants. Freshwater marshes generally contain few, if any, trees and shrubs. Marshes have standing water for much of the year and act as natural filters. As water passes over the marsh, water flow is reduced, and suspended particles settle out.

Wet prairies, sawgrass marshes, ponds, and aquatic sloughs are freshwater marsh communities common in South Florida. The word "slough" (pronounced "slew") is used to describe Everglades areas where the water is slightly deeper than in the surrounding marshes and where a slow current is present.

Animals found in the freshwater marsh can include fish, invertebrates, frogs, snakes, alligators, white-tailed deer, the Florida panther, and other mammals. Many waterbirds and wading birds nest and forage in marshes as well.

Freshwater marsh in Water Conservation Area 3.

Hardwood Hammock

Hardwood hammock in Fern Forest Park.

Hardwood hammocks are localized, thick stands of hardwood trees that can grow on natural rises of only a few inches of land. Hammocks in the Everglades perpetuate themselves by builiding up thick layers of soil and peat, thus providing high ground for the trees to grow. In south Florida, hammocks occur in marshes, pinelands, and mangrove swamps. Hammocks rarely flood because of their slight elevation. Woodland that is not logged or burned for 20 or more years will develop into a hammock.

Hammocks may contain trees of a temperate or tropical climate origin, such as the sabal palm, live oak, red maple, 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 forest in the United States.

Wildlife in hammocks can include tree snails, raccoons, opossums, birds, snakes, lizards, tree frogs, and large animals such as the Florida panther, bobcat, and deer.

Salt Marsh

Salt marshes exist along the coast, where fresh water and marine water meet. These areas are at least occasionally inundated with salt water and contain non-woody, salt-tolerant plants. Salt marshes generally contain few, if any, trees and shrubs.

Most of the animals in coastal salt marshes can tolerate variable water depth and salinity. Animals that may be found in these areas include small mammals, juvenile and adult fish, shellfish, and birds.

Salt marsh at Everglades National Park.

Scrub

Scrub community at Jonathan Dickinson State Park.

Generally, scrubs are communities dominated by pinewoods with a thick understory of oaks and saw palmetto. Scrubs occupy well-drained, nutrient-poor, sandy soils. Plants that grow here have adapted to dry conditions. Fires play an important role in scrub ecosystems; in the absence of fires, a hardwood forest of oak will develop.

Animals that live in the scrub are adapted to hot, desert-like conditions. Gopher tortoises, scrub jays, lizards, insects, and spiders are commonly found here.

Dunes

Close-up of dunes at Blowing Rocks beach.

A little over 60% of Florida's coastline is sandy. South Florida's beaches are primarily composed of quartz sand along northern and central coasts, and calcium carbonate sand along southernmost coasts .

Dunes are created by wind, but are held in place by grasses that trap sand grains as they are being moved across the beach. Dunes stabilized by grasses protect the coast against winds and pounding waves. 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 .

Florida beaches are important nesting sites for sea turtles and shorebirds. A loss of beach habitat to real estate development, erosion, and rising sea level has caused a decline in the nesting shorebird and sea turtle populations.

Freshwater Swamp

Freshwater swamps are generally wet, wooded areas where standing water occurs for at least part of the year. During the dry season, their mucky soils may dry out.

Although the freshwater swamp seen in this picture is dominated by cypress trees, other freshwater swamps found in Florida can be dominated by bay trees (i.e. sweetbay, sweet gum) or hardwoods (i.e., oak, elm, red maple). Other plants found in swamps include epiphytes ("air plants") growing on trees, vines, and ferns. Influences on the characteristics of a swamp include temperature, fire frequency, the length of time soils are covered with water, and the amount of accumulated organic matter.

Many animals spend part of their lives in the swamp, moving as water levels rise and fall. Wood storks, herons, many other birds, otters, black bear, and the Florida panther are only a few of the animals that find food, homes, and nesting sites in Florida's swamps.

Freshwater swamp in Loxahatchee National Wildlife Refuge.

Pinelands

Pinelands in Everglades National Park grow on porous limestone or limestone with a thin soil cover.

Pinelands, or pine flatwoods, are the most common plant communities in Florida. Pinelands occur on nearly level land composed of coarse, poorly drained soil, or on porous limestone. Longleaf pine and slash pines are the dominant trees in pinelands. Understory plants commonly include saw palmettos, wildflowers, and ferns.

Plants that grow in the pinelands must be resistant to fire because pinelands are maintained by fire. Fires are beneficial to the pines because young pine seedlings require lots of sunlight to survive, and the fires destroy hardwood competitors. When fires occur, hardwood seedlings and other understory plants are affected, but the thick bark of the pine resists fire damage. Without fires, hardwoods would eventually overshadow the pines, and a hardwood hammock would emerge.

Wildlife commonly found in pinelands includes deer, squirrels, bobcats, skunks, opossums, raccoons, birds, snakes, and tortoises.

Mangroves

Three species of mangroves are found in Florida: the red mangrove, black mangrove, and white mangrove. Typically, red mangroves grow along the water's edge, black mangroves grow on slightly higher elevations than the red mangrove, and white mangroves grow upland from the red and black. The buttonwood is often associated with the mangrove community. It is usually found growing with the white mangrove, upland of the red and black mangroves. Mangroves grow in saltwater and in areas frequently flooded by saltwater.

Early settlers to South Florida regarded mangrove forests as being useless, mosquito-infested, uninhabitable lands. Today, ecologists realize their important role in coastal ecosystems. Mangrove leaves, trunks, and branches fall into the water and are transformed into detritus and peat, which is the basis of an elaborate food chain. Mangroves provide protected habitat, breeding grounds, and nursery areas to many terrestrial and marine animals. Mangroves also provide shoreline protection from wind, waves, and erosion.

Many terrestrial and marine animals including invertebrates, fish, amphibians, reptiles, birds, mammals, and mosquitoes find food and shelter within Florida's mangrove forests.

Red mangrove in West Lake Park.

We would like to thank Eugene Shinn, Brian Bossak, Barbara Lidz, and Heather Henkel for their assistance in reviewing this report.

Open File Report 2005-1021
T.J. Enright and K.M.H. Pegram

Information for this report was taken from the South Florida Virtual Tour website. To take a virtual trip of South Florida or to learn more, visit the South Florida Virtual Tour website at http://sofia.usgs.gov/virtual_tour

SOFIA
South Florida Information Access

For more information about the science being conducted in South Florida, visit the USGS South Florida Information Access (SOFIA) website at http://sofia.usgs.gov