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MIAMI

A Comparison of Mangrove Communities: Florida and Ghana

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Problem Statement: How do the mangrove communities of South Florida compare to those found in Ghana?

Background

Mangrove forests are unique groups of tropical trees and shrubs, which are typically found in what is referred to as an intertidal zone. In this zone, many more traditional plants could not survive for many reasons. The habitat of the mangrove is characterized by a few key traits, including the lack of understory species of plants. Many other plants cannot grow in the understory of the mangrove forests because the water is far too saline for them to thrive. There is also the issue of poor lighting conditions, and the constant stress of flooding that is associated with these intertidal zones. De-

pending on the amount of light that is able to permeate the canopy, the height of the mangroves may vary. Many regions that foster mangroves are also subject to severe weather patterns such as hurricanes.

A mangrove forest can be found on almost all coastlines, in this case Florida has an abundance of mangroves, however in Ghana their species has depleted over the years. Florida mangroves are found primarily in brackish water, in areas where they are protected from strong waves. They grow along the Florida Keys, and small barrier islands. In Ghana, the mangroves grow in lagoons and along parts of the Volta River.

Mangrove trees are a very important part of estuary ecosystems. The water is filtered in a



Ghana Mangroves Two families Four species	Florida Mangroves Three families Four species
Rhizophoraceae family <i>Rhizophora harrisoni</i> <i>R. Mangle</i> <i>R. racemosa</i>	Rhizophoraceae family <i>Rhizophora Mangle</i> Avicenniaceae family <i>Avicennia germinans</i> Cambretaceae family <i>Conmocarpus erecta</i> <i>Laguncularia racemosa</i>
Avicenniaceae family <i>Avicennia germinans</i>	

form of the removal of toxins and stabilizing the silt that enters the estuaries from coastal runoffs or rivers. Mangrove trees are both tropical and subtropical. Their leaves serve as food/nutrients for the ecosystem living within its roots.

The most popular type of mangrove is the “red mangrove”. This is a noticeable plant because of all the roots under the surface of the water, which provides a habitat for small fish and help the tree be propped out of the salt water to exclude the salinity of the water.

The Red Mangrove (*Rhizophora Mangle*) has an extensive range, and is found in the estuaries and lagoons along the west coast of Africa, on the other side of the Atlantic from northern Brazil through Central America to the southern coasts of Florida, and on the Pacific coast from Ecuador to Baja California. It thrives in a habitat where few trees can even survive, and is often found growing in pure stands with little or no vegetative competition. In contrast to most trees, the Red Mangrove grows in sea or brackish water. It does not need land, instead it roots into the soft muck in shallow water.

The black mangrove, (*Avicennia germinans*) usually occupies slightly higher elevations upland from the red mangrove. The black mangrove can

be identified by numerous finger-like projections, called pneumatophores, which protrude from the soil around the tree’s trunk.

The white mangrove (*Laguncularia racemosa*) usually occupies the highest elevations farther upland than either the red or black mangroves. However, it’s red or black features, the white mangrove has no visible above view root systems. The easiest way to identify the white mangrove is by the leaves. They are elliptical, light yellow green and have two distinguishing glands at the base of the leaf blade where the stem starts.

The loss of Mangroves in Florida

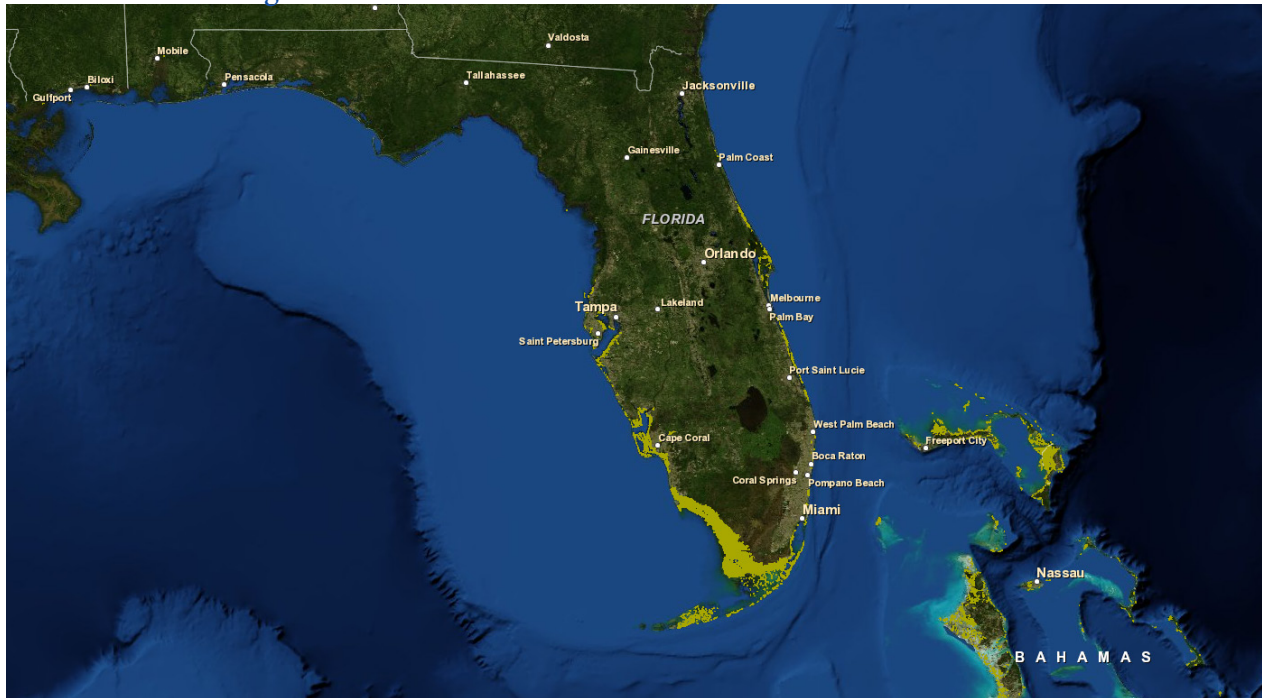
It is true that mangroves can be naturally damaged and destroyed, but there is no doubt that human impact has been most severe. Florida Marine Research Institute scientists are studying changes in Florida’s coastal habitats. The scientists are able to evaluate habitat changes by analyzing aerial photographs from the 1940’s and 1950’s and satellite imagery and aerial photography from the 1980’s. Frequently the changes illustrate loss of mangrove acreage. Through researching the history of study sites, these losses are often attributed to human activities.

Tampa Bay, located on the southwest Florida coast, has experienced considerable change. It is one of the ten largest ports in the nation. Over the past 100 years, Tampa Bay has lost over 44 percent of its coastal wetlands acreage; this includes both mangroves and salt marshes.

The next major bay system south of Tampa Bay is Charlotte Harbor. Unlike Tampa Bay, Charlotte Harbor is one of the least urbanized estuarine areas in Florida. However, there has been some mangrove destruction here also. Punta Gorda waterfront development accounts for 59 percent of the total loss. An increase in mangrove acreage was noted in parts of the Harbor. This is due to changes in the system. As tidal flats were colonized by mangroves, tidal flat acreage decreased and mangrove acreage increased. Spoil islands, created as by-products of dredging, also provide suitable habitat for mangroves.

A changing system was also observed on the Southeast Florida coast in Lake Worth, near West Palm Beach. Lake Worth naturally evolved from a saltwater lagoon to a freshwater lake. Human changes modified the lake back to an estuarine lagoon. Lake Worth has experienced an 87 percent decrease of its mangrove acreage over the past forty years. Mangroves appear to be

Distribution of mangroves in Florida and Ghana



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swissstopo and the GIS User Community

replaced by Australian pines and urbanization. The remaining 276 acres of mangroves occur in very small scattered areas and are now protected by strict regulations.

Another study site included the Indian River from St. Lucie Inlet north to Satellite Beach. Indian River is the longest saltwater lagoon in Florida. There are just less than 8,000 acres of mangroves within the study site, but only 1,900 acres are available as fisheries habitat because of mosquito impoundments. Consequently, 76 percent of the existing mangrove areas are not productive to fisheries. A total of

86 percent of the mangrove areas have been lost to fisheries since the 1940's.

The Central African Mangroves flank the Coastline of western and central Africa, in suitable low energy marine environments. The largest mangrove stand is found in the Niger Delta, which supports the most extensive area of mangrove in Africa. These mangroves are home to some endangered species, such as manatees and pygmy hippopotamuses and soft shell turtles. Additionally, these mangroves serve as resting points for many birds on migratory patterns. Mangroves are important as nursery and feeding



areas for marine fish, and they trap large amounts of sediment.

Unfortunately, several factors have contributed to the decline of the mangrove in the African landscape. Deforestation poses one of the biggest risks to the mangroves, which is usually the result of locals clearing land. Mangroves are also burned for salt panning, due to the fact that the mangrove, when burned, produces little smoke. The wood also has value for construction projects and fuel wood. Land is also cleared for agricultural use, destroying many mangrove habitats. Additionally, oil spills and pollution pose a threat to these delicate ecosystems.

The African Mangrove Current State

Estimates of mangrove area provided by Spalding et al. range between 16,673 and 17,176 kilometers², of which more than two-thirds are found in Nigeria. Delineations on maps of mangrove areas suggest even larger extents, but estimates are problematic because the

mangroves are interspersed with swamp forests.

The most important remaining blocks of habitat are found in the Niger River Delta in Nigeria, to the east of the mouth of the Cross River in Nigeria and Cameroon, around Doula in Cameroon, and the Muni Estuary and Como River in Gabon. Smaller areas of habitat are also found in Ghana, in the Conkouati lagoons of Congo, at the mouth of the Congo River in the Democratic Republic of Congo, and in Angola. The Niger Delta has been growing for millions of years and is still in the process of expanding into the Gulf of Guinea. The delta mangroves mark the transition between swamp forest habitats to pioneer communities on the coastline and can extend up to 40–45 km wide.

Attempts have been made to preserve the mangrove trees in Ghana. Organizations such as the Resource and Environment Development Organization are taking great strides in preservation of the mangroves. One of the first and most important steps in this process is education. The organization often conducts seminars which discuss the importance of mangroves, and how they directly contribute to the safety of the neighboring villages from inclement weather and coastal conditions. Often times, volunteers take villagers out to see the differences in regions where the mangrove forests have been cut down by humans. Community involvement is essential in the preservation of the mangroves, so community leaders are selected and given plots of land with alternate trees for wood fuel. Within these plots of land, individuals are made accountable for specific tasks and duties to

ensure that the community as a whole will actively participate and be deterred from using mangroves as the key source of lumber.

Similar, community based projects could have a deep impact here in Florida as well, where the organization of coastal clean ups contributes greatly to the maintenance of our mangrove population. The most important aspect of any conservation effort is education. The more people who can become aware of the problems facing mangroves, the more people are able to contribute to their maintenance and protection.

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Worldwide distribution of mangroves.

