
Mangroves

MANGROVES

What is a mangrove?

Mangrove plants include trees, shrubs, ferns and palms. These plants are found in the tropics and sub- tropics on river banks and along coastlines, being unusually adapted to anaerobic conditions of both salt and fresh water environments. These plants have adapted to muddy, shifting, saline conditions. They produce stilt roots which project above the mud and water in order to absorb oxygen. Mangrove plants form communities which help to stabilise banks and coastlines and become home to many types of animals.
Mangrove distribution is taken from a variety of sources used in preparation of the World Mangrove Atlas, which was compiled by the World Conservation Monitoring Centre as a joint project with the International Society for Mangrove Ecosystems and the International Tropical Timber Organization.

Tropical ecosystems

Mangroves are marine tidal forests and cover about 180,000 sq km. They are most luxuriant around the mouths of large rivers and in sheltered bays and are found mainly in tropical countries where annual rainfall is fairly high.

Characteristics

Mangroves are the characteristic littoral plant formations of sheltered tropical and subtropical coastlines. Where conditions are suitable, they form extensive and productive forests. The existence of extensive mangrove communities depends on a number of basic requirements.
The characteristics are:

1. Climate (in tropical zone average temperature and approximately. 1,500-3,000 mm of rain fall);
2. Light (long day, high intensity of full sun light)
3. Coastal physiography (shallow shores mudflats and tidal estuarine deltas)
4. Soil (Unripened soil, Ripening soil, Organic soil)
5. Wind and storm (as agents of pollination and seed dissemination)
6. Nutrients (Organic nutrients and Inorganic nutrients)

7. Mud substrate
8. Protection of shelter
9. Salt water, High tidal range, Ocean current

Mangroves occur in 112 countries around the world. The modern distribution pattern of mangroves is the result of a wide range of historical and contemporary factors. The total area of mangroves in the world is approximately 181,399 sq.km (Spalding 1997). 79 mangrove species are found in the world. (Aksornkoae S.1995). Saenger et.al. (1983) has divided the mangroves into two broad groups (1) exclusive species (only found in mangrove)(2) non-exclusive species (commonly associated with mangrove) Most of the dominant and important species are in the family *Rhizophoraceae.* The distribution of mangroves are broadly divided into two main zone

- an Easternzone comprising of East Africa, South Asia and the Pacific including the islands down to Australia
- a Western zone including West Africa, the coast of America and the Caribbean (FAO, 1952).

Apart from the true mangroves species, a number of characteristics species of other plants occur in the mangrove communities, such as bacteria, algae, lichens, mangrove epiphytes, mistletoes, salt marshes.

Like the flora, the fauna of mangroves is composed of a characteristics assemblage of species (both vertebrates and invertebrates) derived from those in terrestrial marine and fresh water environment such as mammals, birds, reptiles and amphibians, wild animals, avifauna, aquatic resources (fish, shrimp, crab, shellfish, benthos), insects and spider. Mangroves are intimately associated on the land-ward side, and with mud flats, eelgrass beds or other marine or estuarine communities on the seaward side.

Ecological Importance

Mangrove trees are an indigenous species to Florida and a major contributor to the state's marine environment. The mangrove tree is a halophyte, a plant that thrives in salty conditions. It has the ability to grow where no other tree can, thereby making significant contributions that benefit the environment. Their coverage of coastal shorelines and wetlands provides many diverse species of birds, mammals, crustacea, and fish a unique, irreplaceable habitat. Mangroves preserve water quality and reduce pollution by filtering suspended material and assimilating dissolved nutrients.

The tree is the foundation in a complex marine food chain and the detrital food cycle. The detrital food cycle was discovered by two biologists from the University of Miami, Eric Heald & William Odum, in 1969. As mangrove leaves drop into tidal waters they are colonized within a few hours by marine fungi and bacteria that convert difficult to digest carbon compounds into nitrogen rich detritus material. The resulting pieces covered with microorganisms become food for the smallest animals such as worms, snails, shrimp, mollusks, mussels, barnacles, clams, oysters, and the larger commercially important striped mullet. These detritus eaters are food for carnivores including crabs and fish,

subsequently birds and game fish follow the food chain, culminating with man. Many of these species, whose continued existence depends on thriving mangroves, are endangered or threatened. It has been estimated that 75% of the game fish and 90% of the commercial species in south Florida rely on the mangrove system. The value of red mangrove prop root habitat for a variety of fishes and invertebrates has been quantitatively documented. Data suggest that the prop root environment may be equally or more important to juveniles than are sea grass beds, on a comparable area basis. Discovery of the importance of mangroves in the marine food chain dramatically changed the respective governmental regulation of coastal land use and development.

The beneficial effects mangroves have on the marine ecology are summarized as follows :
Basis of a complex marine food chain.
Creation of breeding habitat.
Establishment of restrictive impounds that offer protection for maturing offspring.
Filtering and assimilating pollutants from upland run-off.
Stabilization of bottom sediments.
Water quality improvements.
Protection of shorelines from erosion.

Since mangroves grow along the coastlines, lagoons, and estuaries of the state, their domain has been significantly reduced by land reclamation and bulkheading of waterfront property for development. In addition, large concentrations of mangroves were isolated from lagoon waters in the 1950's, by the construction of dikes that established impounds for mosquito control. These impounds continue to be used for controlling mosquito populations through the managed flooding of wetlands during the summer months when tidal waters are low and insect reproductive activity is high.
The dikes now prevent the free flow of water and movement of organisms between the mangroves and intracoastal waters, thereby denying the marine ecology the full benefits of mangrove wetlands.

Development and population growth will continue to have a negative impact on mangrove habitat necessary to maintain commercial and recreational fisheries. Based on analysis of aerial photos from the 1940's to the 1980's, one study of the Indian River from Sebastian Inlet south to Vero Beach, Florida, documented an 86 percent decline in the availability of mangrove habitat to fisheries over the forty year period.

Escalating pressure on mangrove populations and increasing quantities of pollutants reaching coastal and intracoastal waters has brought new interest in the importance of mangroves to a healthy marine ecology. As natural members of the estuary system, mangroves help mitigate the environmentally adverse effects of development and pollution.

Mangrove Destruction

Despite increasing awareness of their value and importance, the destruction of mangrove swamps continues to take place in many parts of the world for a variety of economic and political reasons. In some areas, mangroves are protected by law but a lack of enforcement, coupled with the economic incentive to reclaim land, results in deliberate destruction.
The two adjacent photos show a red mangrove (Rhizophora mangle) swamp that was poisoned by an "accidental" fuel spill.
Since the ecosystem is no longer functional, the property owner is now able to reclaim the land in the absence of governmental jurisdiction. Photos were taken during a site visit by Bob Riley in 1999, while working on restoration projects in the caribbean.

As shown in the photo below, development can encroach on natural areas leading to their degradation and ultimate destruction. Although unanticipated, a loss of habitat can result from a variety of anthropogenic influences that modify the surrounding infrastructure, introduce pollutants, change hydrology and increase direct human interaction.

This mangrove forest has been under pressure from development for more than a decade; photo was taken in March 2001.

How we can help

- Reduce or stop dumping toxic waste into the Mangroves.
- When you can't avoid using hazardous materials, make sure you dispose of them properly.
- If you use septic tanks do not encourage to connect it with the Mangroves.
- Do not dispose of or recycle unwanted monofilament fishing line in
- Make others aware of the importance of Mangroves.
- Push the government to make a law on protecting Mangrove habitats.

Photographs of a mangrove in Seenu Hithaadhoo

Source:

- Mohamed Zahir (Ecocare)
- Robert W. Riley (Mangroove.org- Copyright)
- Ali Lishan
- William Horst (Reefs.org)
- WCMC (www.wcmc.org)

Design and layout:

- Ali Lishan