MANGROVE MYTHOLOGY

by Jane Snedaker

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Test your knowledge about mangroves.
True or False:
1. Mangroves require salt water to develop and grow.
2. Mangroves extend shorelines.
3. Mangroves build up land.
4. The red mangrove is the most valuable species.
5. Some mangrove forest types are more important than others.

No one will argue that Florida's popularity stems from its geographical location in the warm subtropics. This fortunate gift of geography makes Florida unique, as it is the only state in the Union that harbors an extensive area of coastal mangrove forests.

To most people, these forests of the sea are forbidding, mosquito-breeding, smelly wastelands that only block a good view of the water.

Most coastal residents, conservationists, and most of all, the old Florida fishermen, however, value the mangroves primarily as habitat, breeding and nursery grounds, and food sources for a large number of estuarine fish and shellfish and associated forms of wildlife. These enlightened few also recognize that mangroves provide — free — other natural services such as protecting property against storm surges, providing green buffer zones in heavily developed coastal areas, and maintaining a good water quality by filtering out pollutants such as fertilizer runoff. Though mangroves may be perceived in many different ways by different groups of people, public wisdom is speckled with myths about these unusual trees. Let's explore the basis for some of these myths.

MYTH: ***Mangroves require salt water to develop and grow.***

Everyone knows that mangroves grow in salt water along quiet coastal shorelines throughout the tropics, and this logically leads to the presumption that mangroves *require* salt water for their survival and growth.

This is not true. In fact, mangroves require fresh water and are capable of growing in the complete absence of sea salt and tidal flooding. As a result, and to the astonishment of many people who believe the myth, mangroves make nice ornamental house plants needing only sunlight and normal horticultural care. Although mangroves do not require salt, they are unique in that they have special adaptations that allow them to successfully tolerate, grow, and thrive in the salt water environment where there is no competition from other plants which cannot tolerate salt.

One of the adaptations is a specialized root system that allows certain species of mangrove trees to extract the fresh water from seawater, a feat that terrestrial trees cannot perform.

Other mangrove species have special salt-collecting glands that enable the tree to discharge any accumulated salt through its leaves. Tasting the underside of a black mangrove leaf will reveal that this mangrove actually "sweats" salt.

MYTH: ***Mangroves extend shorelines.***

Much of the early scientific literature reported that mangoves extended shorelines by trapping sediments and debris among the red mangrove prop roots at the edge of the shore. As these new sediments accumulated, they would be colonized by further growth of the red mangroves whose prop roots would continue to trap new sediment and debris at the water's edge.

If this concept were true, mangroves should by now occupy all of the

shallow water habitat surrounding our coastline. Also, the problem of coastal erosion could be solved simply by planting mangroves to prevent it. Unfortunately, the early studies and observations focused on mangroves that were growing in areas of natural sediment accretion; shoreline shoals would have formed in these areas whether or not mangroves were present. In contrast, if the same research and observations had been conducted in areas of coastal erosion along mangrove shorelines, the equally erroneous conclusion might have been that mangroves caused the loss of shorelines.

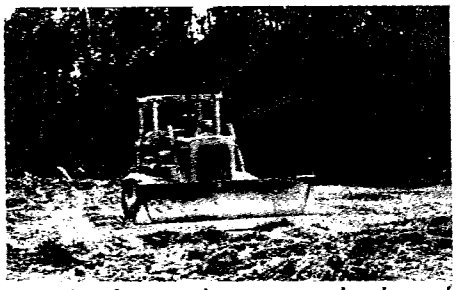
The simple clarification of this myth is — first the sediments, then the mangroves. It is well established that sediment accretion and erosion are naturally occurring and ongoing processes in most coastal areas. In areas of accretion where new shoals and shorelines are forming, mangroves can quickly colonize sheltered areas that are free of heavy wave action. Once the mangroves are established they can stablize the sediment effectively against moderate erosion.

MYTH: ***Mangroves build up land.***

Similar to the above is the belief that mangroves can raise the elevation of the land through the buildup of peat and the accumulation of leaf litter and other tidally-delivered debris. Early writers speculated that as the land rose above the high-tide mark, the mangroves would disappear and be succeeded by terrestrial plants.

Only the red mangrove is known to be a prolific peat builder, and the maximum elevation that can be attained by the peat is regulated by the long-term average water level at a given site. Water-saturated peat lacks oxygen, and therefore the peat can persist for long periods of time without decomposing. However, when peat and surface organic matter, such as leaves, are exposed to air (oxygen), they decompose and disappear. Thus, peat cannot rise in elevation unless there is a corresponding permanent rise in the average water level.

For similar reasons, leaf litter debris also cannot accumulate. Fresh mangrove leaf litter either decomposes on the site or is flushed away by tides where it decomposes in the water. Inorganic sediments, such as storm-delivered sand and shell, can accumulate under calm conditions, but this is a somewhat rare event.



Enrique J. Lahmann

Agencies frequently approve developers' requests for total destruction of black and white mangroves.

MYTH: ***The red mangrove is the most valuable species.***

The original research in the early 1970s, by scientists Bill Odum and Eric Heald, established the beneficial role of mangroves to near-shore fisheries. They showed that the leaf litter which decomposed and broke down in brackish water was utilized by a large number of estuarine fish and invertebrates. In essence, decomposing mangrove leaves produce a protein-enriched food for marine life; the varying stages of leaf decomposition are fed upon by different marine organisms in the food web.

In part, based on these classic scientific papers, laws were enacted in Florida to protect mangroves against rampant destruction. Unfortunately, this research was performed only on the red mangroves found along the water's edge. This has led laymen and regulatory agencies in Florida to believe that the black and white mangroves, which tend to grow more inland than the red mangrove, have lesser or no importance in the estuarine food web. As a result, red mangroves receive greater regulatory protection than the other species. It is not uncommon in Florida for developers to be legally permitted to destroy black and white mangrove forests with the provision that they leave the seaward fringe of red mangroves intact.

However, this fails to consider that both black and white mangroves also produce large quantities of leaf litter, roughly comparable to red mangroves. But due to their more inland location, the black and white mangrove litter is partially decomposed *before* it is carried away by the tides. As a result, the material is exported only during infrequent extremely high tides, and its composition is dominated by dissolved organic matter and small particulates.

What is not well understood is precisely how this organic matter soup is ultimately utilized in the near-shore water, and what specific groups of organisms are benefited. Irrespective of the ultimate fate of dissolved organic matter, the absence of a precise knowledge is not a basis for discriminating against the protection of black and white mangrove species.

MYTH: ***Some mangrove forest types are more important than others.***

Different mangrove species are typically found in different location areas, and can be scientifically classified according to composition of species or certain physical characteristics of specific sites. Species types are commonly referred to as the red, black, or white (or mixed species), based on mangrove zones. The forest type categories (fringe, overwash, basin, riverine, dwarf, and hammock) are based predominantly on salinity and tidal flushing characteristics which control transport and distribution of seedlings, patterns of litter decomposition and export, soil salinity balances, input of nutrients, and removal of metabolic waste products. These classification names only categorize mangroves based on measurable characteristics, and do not imply differences in either importance or value. There is no scientific basis for equating differences in mangrove structure and functioning with subjective ideas of importance or value.

Highly-paid mangrove consultants, however, have contrived different descriptive names for the mangroves to be altered or destroyed. Some of the names which have been used in Florida to categorize specific mangrove forests are "inland", "impounded", "freshwater", "stressed", "induced" or "unnatural", "non-tidal", and "dumpsites". Whereas these designations may have some practical basis, they are nevertheless always used as pejoratives to imply a significantly diminished ecological importance or value. Florida regulatory agencies can be fooled by these kinds of spurious arguments in giving government approval for the destruction of our mangrove resources.

Now go back and take the test again.

Answers: *All false.*

Jane Snedaker is a professional editor and writer of books and papers on the tropical coastal zone. She is presently preparing a series of instructional books on coastal ecology for elementary school children.