

Estuaries



Why protect them?

- ▶ Transitional zones that encompass a wide variety of environments.
- ▶ Ecologically
 - ▶ Are among the most productive natural environments in the world.
 - ▶ Sustain organisms in many of their life stages, serve as migration routes, and are havens for threatened and endangered species.
 - ▶ Associated wetlands filter pollutants, dissipate floodwaters, and prevent land erosion.
- ▶ Economically
 - ▶ Support major fisheries, shipping, and tourism.



<http://smallmillerphoto.com/images/Dep-50.jpg>

Ohrel, R. L., & Register Kathleen M. (2006).

This is the area where rivers empty into the ocean. These are important areas, rich in nutrients which aid in allowing great numbers of primary producers to survive. Many organisms use estuaries as nurseries since food is so plentiful.

They are critical in that they contain a great deal of sediment that washes down the river that filters the water running into the oceans, purifying it and keeping the ocean from being “swamped” with pollutants. MOST POLLUTION COMES FROM RUN OFF FROM THE LAND. Usually it washes down with rain into streams and into rivers and finally into the ocean. Before it enters the ocean however, it drains through the sediment which has built up from being washed down the rivers and is “cleaned”.

Estuaries form a transition zone between river environments and maritime environments. They are subject both to marine influences—such as tides, waves, and the influx of saline water— and to riverine influences—such as flows of fresh water and sediment. The mixing of sea water and fresh water provide high levels of nutrients both in the water column and in sediment, making estuaries among the most productive natural habitats in the world.

Estuaries are popularly known by many names including lagoons, sloughs, bays and rivers. Many formed as a result of rising sea levels at the end of the last glaciation.

Jamaica Bay is a saline EUTROPHIC (lots of nutrients because of sewerage) RICH estuary

Another estuary is Long Island Sound which is a tidal estuary as is the East River (which is not a river)

The greatest threat to them is development of cities along the ocean. New York, London, Tokyo are just a few of the cities located on estuaries. The cities tend to develop along them because they are often associated with good harbors. As a result, estuaries have been dredged, filled, had marinas built on them along with seaport, garbage dumps and industrial parks. Many have been destroyed and other are endangered.

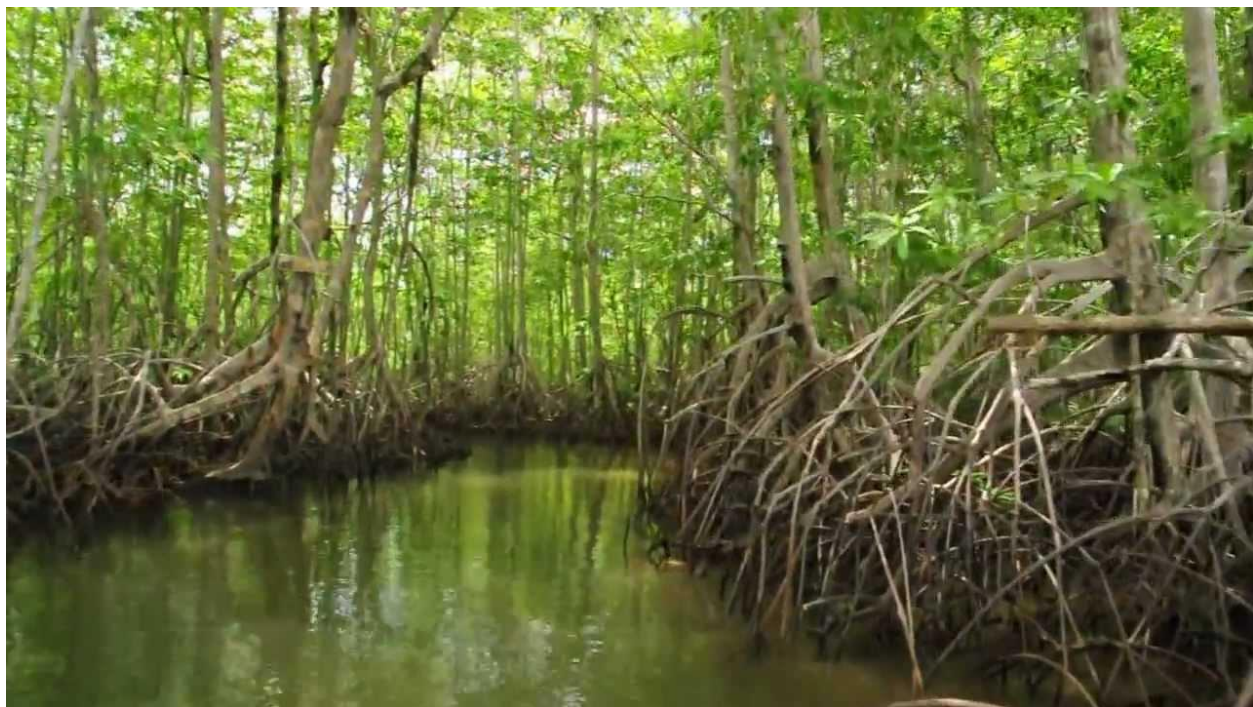
Dredging increases exposure to wave action (the deeper the further in the wave can travel).

Fresh water in rivers for example can be dammed or diverted thus removing the fresh water component from the estuary.

Estuaries have been seen as nuisances as a result of their being a breeding ground for insects and have been used for land fill. Of course the insects have a role in the ecosystem as well (pollination and being a food source for frogs, bats etc.). About 1/3 of the estuaries in the US have disappeared. 67% of the ones in California have been lost.

Mangrove Forests/Swamps

Mangroves a groups of trees and shrubs living in the coastal intertidal zone





Mangrove: Loxahatchee, Florida

These occur in areas where there isn't much oxygen in the soil. They are found only in tropical and subtropical areas near the equator since they cannot survive cold weather.

The tangle of roots above the water makes the mangrove easily recognizable. They need to be able to handle the rise and fall of the tide. Water is slowed and filtered by the roots and allows a build-up of a muddy bottom. This cleans the water of sediment.

The mangroves act as a stabilizing force for the coast line from the wear of tides, storm surges, currents and waves. The complicated root system is attractive to fish that need protection while looking for food. Larger

predators have difficulty getting into the small water areas between the roots.

Mangrove swamps, with salt-loving shrubs or trees, are common in tropical climates, such as in southern Florida and Puerto Rico.

Mangroves provide an array of ecosystem services, from coastal protection to fishery support to carbon sequestration, all of which are at risk in the Indo-Pacific region due to sea-level rise (SLR). SLR can lead to inundation of these habitats and shoreline retreat.

The mangroves are often cleared for crops, urban development, roads and garbage dumps.

About 75% of all sheltered tropical coast line were once covered by mangrove forests, but about 1/2 have been destroyed. Southeast Asia has a much higher rate of destruction

One of the places from which the water comes into the rivers is underground water. When rain falls, some falls into the ocean some into the rivers and streams and some is absorbed into the land where it permeates the ground and moves underwater to the same places that the rain falls – rivers, streams and ocean. Water moving through the ground brings with it many of the chemicals and materials. This includes fertilizer. Fertilizer is used to make plants grow and it does the same thing in the water that it does on the land. Fertilizer that enters the ocean causes eutrophication and the algae to grow in large numbers called “alga blooms”. This increase initially causes an increase in the amount of photosynthesis which will produce a good amount of oxygen and uses up carbon dioxide. Since the algae grow in huge numbers, they cover the surface of the water that blocks sunlight from the plants on the bottom of the water. Without sunlight, they have no light to photosynthesize and die off. Heterotrophs in the water have some difficulty since their food supply is now cut off. On top of that, the algae die off and begin to decompose. The process of decomposition uses up the oxygen in the water and so the oxygen that is needed by the organisms, and so they may die off creating a “dead zone” where things can’t live.

The wetlands are capable of purifying some of the water, but as they are destroyed, more of the nutrients from the run off do not get filtered and the eutrophication cycle begins.

In some cases, large bodies of water have formed as the result of rising sea levels over the last tens of thousands of years.



RED SEA: plate movement. As the plates move apart here, the Indian Ocean moved into the space.

ARABIAN GULF: Rising sea levels flooded into the area.

GHOST SHIPS, MYSTERY SHIPS AND MYTHICAL SEA CREATURES

There are also many stories about ghost ships and mystery ships. Ghost ships are generally supernatural, like the Flying Dutchman which appears and disappears. The story has many forms as expected in folklore, but in general it involves a captain who swears to round a stormy cape if it take all eternity. For a kind of blasphemy he is punished for having to sail forever and it is considered very unlucky to meet the ship. The story has become the subject of an opera by Richard Wagner (Der fliegende Holländer) and of some films like Pandora and the Flying Dutchman. An excerpt from the overture to the opera can be heard on the web site for the course.



In Chile, a ghost ship called the Caleuche.



There are stories that deal with it carrying the people who have died at sea and who now revel in constant parties. The workers are deceased sailors (no rest for the weary). It is one of the most well known legends of the Chilota mythology of southern Chile describes the Caleuche, a ghost ship that appears every night near the island of Chiloe. According to local legend, the ship is a kind of conscious being that sails the waters around the area, carrying with it the spirits of all the people who have drowned at sea. When spotted, the Caleuche is said to be strikingly beautiful and bright, and is always accompanied by the sounds of party music and people laughing. After appearing for a few moments, the ship is then said to disappear or submerge itself under the water. According to Chilota mythology, the spirits of the drowned are summoned to the ship by the Sirena Chilota, the Pincoya, and the Picoy, three Chilota "water spirits" who resemble mermaids. Once aboard the phantom ship, the drowned are said to be able to resume their life as it was before they died. It is unusual in that the ship is thought to be conscious. People are invited on board

A glow on ships can be caused by "St. Elmo's Fire" an atmospheric condition that cause as "glow" on masts and yard arms.



Another famous “phantom ship” is the Mary Celeste which left the East River in NYC bound for Genoa.



A ship, the Dei Gratia, which had also left NY (before the Mary Celeste) found the Mary Celeste sailing with no crew and everything on board as though the crew had suddenly vanished. The captain, his wife and daughter and crew members were never heard of again. The story was made famous by Sir Arthur Conan Doyle J. Habakuk Jephson's Statement, which veered off from the facts and led to much of the confusion about what actually happened. Recently it has been concluded that the ship had only one chronometer (clock) on board – which appears to have been in error. Most ships carried many – up to 20 and more. Why would this have been? What problems would a damaged clock be to the Mary Celeste?

Also involved in folklore are interesting “creatures” like Mermaids, Giant Krakens and Sea serpents. Within different cultures there are many folkloric stories about the ocean and the creatures (real and imaginary) that live in it. The idea that the manatees inspired the concept of the mermaid is not a narrative, so it isn't any of the three. But stories about mermaids catching people and drowning them are. The Japanese have a critter called a Kappa that looks something like a turtle with a dish on its head. There must always be water in the dish or it will die. There are stories about these creatures drowning people.

The indigenous people on the NW Coast have a belief about animals. Each animal is a kind of person – salmon people, otter people who dress in the skins of that animal. Salmon people swim up the rivers from the ocean where they are caught. The fishermen must be careful to return all the

bones of the fish to the river so that they may return to the "salmon home" where they redress as salmon fish and can return up the rivers again. In some stories all the bones are not returned and a person appears in a village, who is missing some body part. The people recognize the person as one of the animal people all of whose bones have not been returned to the water and are now missing the part of the body which lacks the bone. There is often a frantic hunt to locate the bone and return it to the water. Once done the animal-person disappears and can regain their full body.

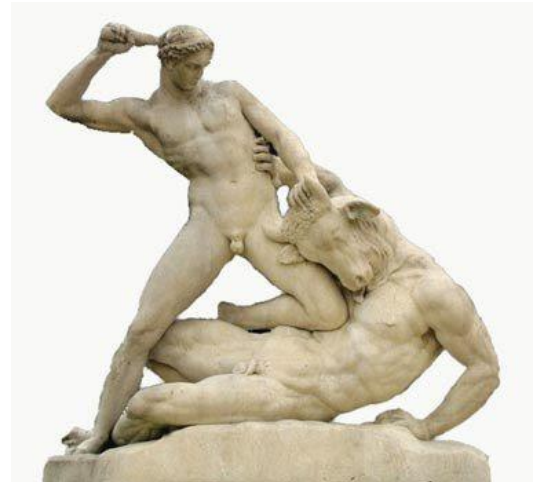
Mermaids are thought to be the result of sailors (being at sea so long) seeing manatees and believing them to be women.



It seems to me you would have to be at sea a pretty long time to mistake these for this:



On a more realistic note, however, the sailors may have seen or heard about manatees from other sailors who sailed along the coast of Africa where they are also found. More significantly though, there are many half animal half human critters in western mythology: Satyrs (1/2 goat 1/2 human), centaurs (1/2 horse 1/2 human), minotaurs (1/2 bull 1/2 human) and so on.

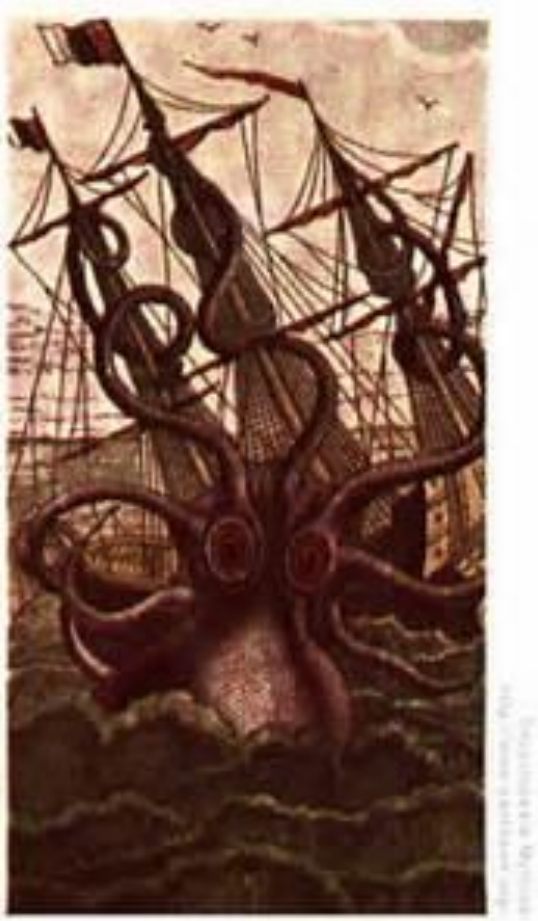


There are many cultures in which there are these mixed human/animal creatures. The Apache have a deer woman who is human (upper) and deer (lower). Mohawk has a kind of mermaid that inhabits the St. Lawrence River. Transformers or shape shifters who can alter their appearance often from human to animal as happens with werewolves, and the occasional vampire who seems able to change into a bat or other animal are also found in many cultures.

Anthropologists Victor Turner points out that some African masks exhibit creature which are half human and half other animal and in some cases half human half plant or thing. He suggests that this is a "questioning" of

boundary categories – in what ways are humans like other animals and in what ways different?

Other mystical sea beasts include the “kraken” an animal believed to have been inspired by the appearance of a giant squid.



The idea that the squid could actually reach up into a ship and pluck sailors off the masts seems far fetched. The squid uses buoyancy from the water for support. Once out of the water the ability to raise its arms up would be very limited.

Sea Serpents



Video

https://www.youtube.com/watch?v=w6oUkMJE_ko

The sea serpent may have the “oarfish” – the largest bony fish – as its inspiration.