WETLANDS, ESTUARIES, MANGROVE SWAMPS & SALT MARSHES

Wetlands

There is no single definition for wetlands that all scientists and government officials agree upon. As the name suggests, wetlands are found where water and land come together. *In general,* **wetlands** *are ecosystems in which the roots of plants are submerged under water at least part of the year.* Marshes, swamps, and bogs are just a few of the many types of wetlands. Wetland soils are soaked with water and contain very little dissolved oxygen. The water in most types of wetlands is standing water that may be fresh or brackish. However, there are also wetlands with flowing water and salt water.

Wetlands are a very important part of the biosphere that have not, until recently, been fully appreciated by most people. Wetlands act as filters, detoxifying chemicals in the water that passes through them. Wetlands are so efficient in this process that they can be used as part of treatment systems for waste water. Wetlands are also important breeding, feeding, and resting grounds for migratory waterfowl, such as ducks and geese, and other animals. Wetlands along the banks of rivers act as flood protection regions. And the water that seeps into the ground under wetlands contributes to the refilling of aquifers.

Wetlands are being destroyed by human activity in the United States and other parts of the world at an alarming rate. There are several reasons for the disappearance of the wetlands. Many people do not find wetlands as attractive as other natural habitats. They are often breeding grounds for mosquitoes. Wetlands may give off an unpleasant odor, due to the methane, or "swamp gas," released by the organisms in the muddy, oxygen-free soil.

Because wetlands are often found in coastal areas, the land they occupy may be very valuable for other uses. People like to own property with a waterfront view. Many wetlands have also been used as landfill sites, helping solve garbage-disposal and land-shortage problems at the same time. Large areas of many coastal cities in the United States have been built on filled wetlands. The Swamp Lands Act passed by Congress in 1849 encouraged the filling and draining of wetlands. More than half the wetlands in the United States have been destroyed. The Clean Water Act has subsequently prohibited the filling of wetlands, but only 8 percent of remaining wetlands in the United States are federally protected.

Wetlands serve many purposes in the environment. They purify water, recharge aquifers, provide a breeding ground for many animals, and protect the surrounding land from floods.

Estuaries

An **estuary** (ES-tyoo-ayr-ee) *is a region where a freshwater source, usually the mouth of a river, meets the salt water of the ocean.* Estuaries are subject to the rise and fall of ocean tides that mix the nutrient-rich waters and sediments. The water in estuaries is usually brackish, but the salinity varies with depth, time of year, flow rate, and tide. Many marine organisms, including commercially important food species, use estuaries as spawning grounds. Humans use estuaries for recreational activities, such as boating, hunting, and fishing. Estuaries function as important buffer zones, filtering sediments and pollutants from the water. They also ease the effects of storms and floods by slowing the flow of water.

Mangrove Swamps

Mangrove swamps are a type of coastal wetland that occurs only in warm climates. Frost kills the plants in a mangrove swamp. Therefore, mangrove swamps can exist only in areas that do not freeze for more than one or two days each year. The dominant plant life in a mangrove swamp is the mangrove, a woody plant that can be either a tree or a shrub. There are about 800 species of mangroves worldwide, of which only 10 live in the United States. The red mangrove is the most common U.S. type.

The water in mangrove swamps typically has very little dissolved oxygen. Mangroves are adapted to the low oxygen by having roots that emerge from the water. Some species have roots that grow up from the bottom of the plant, with tips that stick out above the water. Other species have roots that grow from high up on the tree's trunk. The roots make the plant appear to be up on stilts. These elaborate root structures trap sediments, causing soil to accumulate behind the plants. This soil enables other plants to grow. In some parts of the world, such as Southeast Asia, mangrove swamps can develop into extensive mangrove forests.

Mangrove swamps and forests support complex ecosystems full of organisms with unique adaptations. Like many ecosystems worldwide, some species that live in the mangrove swamps are endangered due to loss of habitat. In the Philippines, for example, the 5000 km^2 of mangrove swamps that existed in the 1920s have been reduced to less than 1400 km^2 today. The swamps are destroyed for many reasons, including the creation of aquaculture ponds used for raising commercial fish and shrimp. Other reasons for mangrove swamp destruction include coastal construction projects and waste dumping.

Salt Marshes

Salt marshes are flat, muddy wetlands that often surround estuaries, bays, and lagoons. Most salt marshes are influenced by tides. The mud flats of tidal salt marshes are exposed during dry periods and low tides, but submerged during wet periods and high tides. Salt marshes are a common form of wetland along the coast of the United States, especially the east coast and the shores of the Gulf of Mexico.

Many of the environmental roles of wetlands described in Chapter 10 also apply to coastal salt marshes. One of the most important functions of salt marshes is their role in supporting migratory bird populations. Migratory birds use salt marshes for feeding and resting during their long journeys. Salt marshes are also essential in supporting the ocean ecosystem. The abundant plant life, especially grasses, of the salt marsh supports a rich community of fish and invertebrates. Many of the commercial fish and shellfish harvested in the United States spend at least part of their life cycles in the salt marsh. The plant material becomes food for the animals that breed, hatch, or grow in the water. Many of these animals then move out to sea or become food for ocean animals.

Salt marshes form when streams flow into the calm waters of an estuary or other shallow, neritic waters. The slowing of the water causes sediments, picked up by the stream, to be deposited at the mouth of the stream. The sediments build up over time, forming a delta. *The weight of the accumulated sediments causes the delta to sink under the water in a process called* **subsidence** (sub-SIDents). To remain stable, there must be a balance between the rate of sediment deposition and the rate of subsidence in a salt marsh. Sometimes, the course of the stream may change as a result of these two factors. The Mississippi River delta undergoes a 5000-year cycle of sediment accumulation, subsidence, and change in the river's course. With every change in the river's course, the Mississippi delta changes shape. The salt marshes of the Mississippi River delta account for 40 percent of the coastal wetlands of the United States.

Draining Salt Marshes

Salt marshes are among the most biologically productive environments on Earth. These marshes make up a complex ecosystem that includes marsh grasses, snails, bacteria, crabs, clams, worms, and birds.

Humans have also been attracted to the salt marshes. In part, this was due to easy access by water transportation and an abundant source of food. In addition, coastal land offers many recreational possibilities. To meet the human demand for more coastal land, salt marshes are often drained for development.

Should *salt marshes be drained for development?*

People Need the Land

Coastal land is desirable property for housing and recreation. People enjoy living and vacationing near the water. The development of marsh land helps the economy by providing employment.

Salt-marsh property is also valuable for industry. The easy access to water makes the shipping of raw materials and finished products possible. Industry helps the local economy by providing jobs and paying taxes to local municipalities.

People Need the Marsh

So much salt marsh has already been developed that it is especially important to save what little remains. Salt-marsh habitats support many different species of organisms, including several endangered birds. The salt marsh is also home to many edible species, such as crab, fish, and oysters. Draining the marsh would remove a source of food and a source of local employment.

Salt marshes are also natural flood-control zones. The marsh holds much of the extra water caused by rains and high tides. If the marsh is filled in and paved over, these developed areas will flood, as the water will have nowhere to go.