44.4C: Estuaries: Where the Ocean Meets Fresh Water

Estuaries, composed of a mix of fresh and salt water and their living communities, are influenced by salinity and the changing tides.

Learning Objectives

- Explain the ecology of estuaries

Key Points

- Estuaries acts as nursery grounds for crustaceans, mollusks, and fish.
- Salinity, regulated by the influx of seawater and outflow of freshwater once or twice each day, is a determining factor in the types of organisms that can live there.
- To deal with the short-term and rapid variation in salinity, estuary species have developed specialized adaptations that enable them to live with the salty conditions; as a result, most plant species found in estuaries are halophytes.

Key Terms

- **brackish**: salty or slightly salty, as a mixture of fresh and sea water, such as that found in estuaries
- **halophyte**: any plant that tolerates an environment having a high salt content
- **estuary**: coastal water body where ocean tides and river water merge
Estuaries: Where the Ocean Meets Fresh Water

Estuaries form a unique marine biome that occurs where a source of fresh water, such as a river, meets the ocean. Therefore, both fresh water and salt water are found in the same vicinity. Mixing results in a diluted (brackish) saltwater. Estuaries form protected areas where many of the young offspring of crustaceans, mollusks, and fish begin their lives. Salinity of estuaries is a very important factor that influences the organisms found there and their adaptations. The salinity, which varies, is based on the rate of flow of its freshwater sources. Once or twice a day, high tides bring salt water into the estuary. Low tides, occurring at the same frequency, reverse the current of salt water.

![Low tide](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3A_General_Biology_(Boundless)/44%3A_E...

The short-term and rapid variation in salinity due to the mixing of fresh water and salt water is a difficult physiological challenge for the plants and animals that inhabit estuaries. Many estuarine plant species are halophytes: plants that can tolerate salty water on their roots or sea spray. In some halophytes, filters in the roots remove the salt from the water that the plant absorbs. Other plants are able to pump oxygen into their roots. Animals, such as mussels and clams, have developed behavioral adaptations that expend a lot of energy to function in this rapidly-changing environment. When these animals are exposed to low salinity, they stop feeding, close their shells, and switch from aerobic respiration (in which they use gills) to anaerobic respiration (a process that does not require oxygen). When high tide returns to the estuary, the salinity and oxygen content of the water increases, causing these animals to open their shells, begin feeding, and to return to aerobic respiration.