

CHAPTER 09

Adaptations in Different Ecosystem

Water salinity and Fish adaptations:

Different fish species have very different tolerances for water salinity.

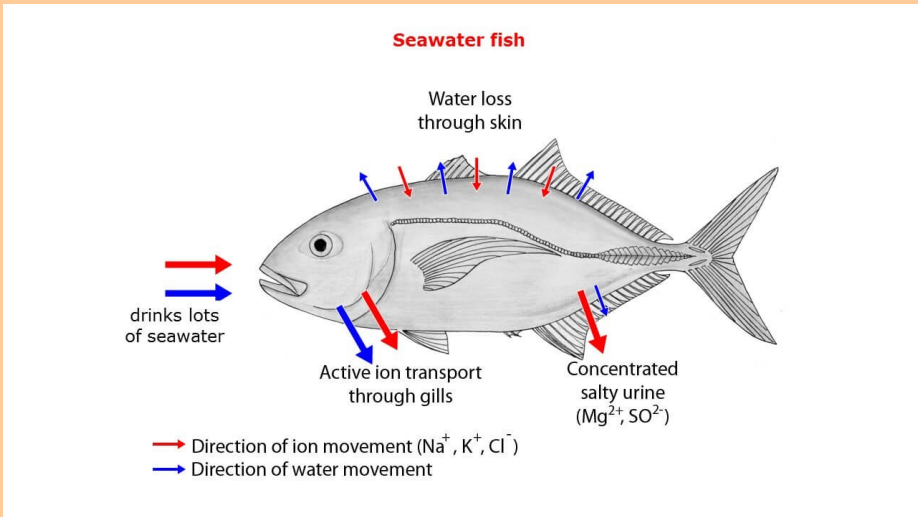
All marine and freshwater fish maintain a constant internal salt concentration, which is midway between that of fresh water and seawater.

Marine fishes have lower internal salt concentration than that of the seawater, which has around 3.5% salinity.

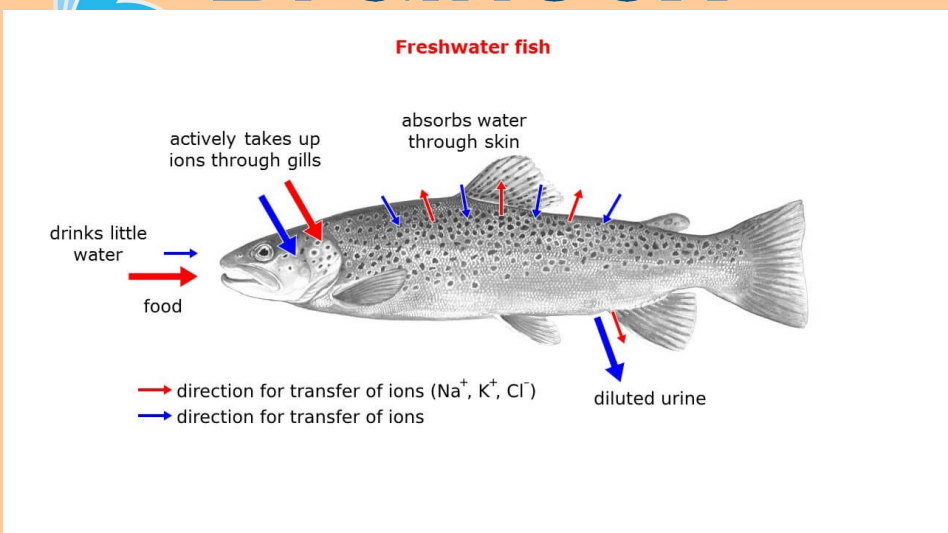
Due to this, they tend to dehydrate as water is lost by osmosis.

The fluid could drain out of the body of the organism into the sea. This could be dangerous and fatal to the organism

To compensate this, they drink large amounts of water, and excrete the salts both through their kidneys and through highly specialized cells in the gills.



In contrast, freshwater fish have a higher internal salt content than that of the water they swim and they tend to float, because osmosis leads to excess water entering the body through the permeable membranes in the mouth and gills.



The water can be excreted in the form of urine, but to maintain a suitable salt balance freshwater fish need to reabsorb salt through the kidneys, and collect additional salts through salt-collecting cells in the gills.

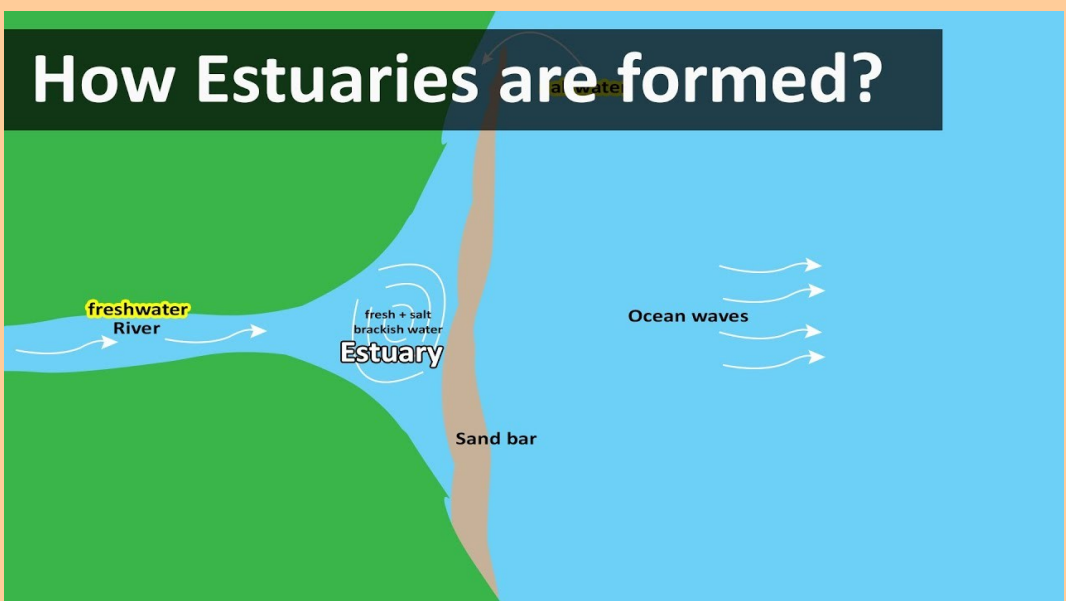
It is the ability to regulate the salt absorption that determines the tolerance of a freshwater fish for saline water. When the water salinity level exceeds the fish's ability to adjust its salt regulation mechanisms, the delicate salt and fluid balance is upset and the fish dies.

During summer, the water in the lakes gets heated up and evaporates. There is a fall in oxygen and nutrients levels as well.

This leads to the death and decomposing of organisms, which makes living conditions unsuitable.

Whereas in cold regions, the water in the lakes and ponds gets frozen, killing all the organisms.

Fishes in estuarine ecosystem can survive in river as well as in sea due to its tolerance to varying salinity.



Adaptations in some aquatic plants:

Partially submerged plants like water hyacinth and water lilies have numerous air spaces inside the stems, leaves, roots that aid in gaseous exchange and buoyancy.

Water Hyacinth (*Eichhornia crassipes*) - The Leaf bases of this plant form air filled structures to keep them afloat.



In water lilies leaves are flat, and have an oily surface with stomata present on the upper surface of the leaf,



Whereas in incompletely submerged plants like Hydrilla, stomata are absent, leaves are thin, stems are highly flexible.



Adaptations of Hydrilla:

The main adaptations that give Hydrilla an advantage over other native plants are:

- It can grow at low light intensities.
- It is better at absorbing carbon dioxide from the water.
- It is able to store nutrients for later use.
- It can tolerate a wide range of water quality conditions like extreme saline conditions and it can

propagate both sexually and asexually.

