

# Aquatic Biomes: Freshwater

## Freshwater Lakes

Standing bodies of freshwater.

Temperate lakes have a seasonal thermocline

Tropical lakes have a year-round thermocline.

The chemical environment varies greatly among lakes

Oligotrophic lakes—nutrient poor and generally O<sub>2</sub> rich. There is not much decomposable matter.

Eutrophic lakes—are nutrient rich and O<sub>2</sub> poor. They have a lot of decomposable matter.

Eutrophic lakes have a high photosynthetic rate.

There are a variety of animals that inhabit freshwater lakes: zooplankton, invertebrates, and fish.

Humans impact freshwater mostly due to runoff from fertilizers.

## Wetlands

These are generally shallow water covered tracts of land that support aquatic life. They can be temporal.

There is a lot of decomposition, and the soil has a low O<sub>2</sub> concentration.

They are good filters of nutrients and chemical pollutants.

They form in shallow basins, along the banks of rivers, and along the coast of large lakes and seas.

Wetlands are very productive and contain plants specialized to grow in wet environments.

Many invertebrates live in wetlands and they support many birds.

Draining and filling by humans have destroyed a number of these wetlands.

## Streams and Rivers

Streams are cold, clear, turbulent, and fast moving. They generally have a narrow, rocky bottom. They generally contain a lot of algae and rooted aquatic plants.

Rivers are formed by numerous streams and are generally warmer and move slower. Rivers are generally not as narrow, and have silty bottoms that are rich in organic matter.

As you get to the mouth of the river, the salt and nutrient concentration generally increases.

Rivers have many vertebrates and invertebrates.

Depending on the size of the stream, it may or may not contain a number of vertebrate and invertebrates.

Runoff and pollution by humans often impairs the natural functioning of rivers and streams.

## Estuaries

This is the transition between the river and the sea. Water moves back and forth during high and low tide, and the salty water stays on the bottom.

Estuaries consist of many different flow patterns, islands, channels, etc.

There are various forms of animals such as worms, oysters, crabs, and many fishes. Estuaries are often used as a breeding ground for fishes.

Upstream pollution, filling, and dredging often disrupt estuaries.

# Aquatic Biomes: Marine

## Intertidal Zones

These are periodically submerged and exposed by tides.

O<sub>2</sub> and nutrient levels are generally high.

Generally, intertidal zones are very rocky or sandy.

Many different organisms generally live in these areas, and they often lack plants attached to the bottom due to the waves. Many of the animals have structural adaptations that help them attach to the hard substrate. In sandy intertidal zones, many organisms burry themselves in the mud when the water recedes.

## Ocean Pelagic Zone

These are vast realms of open water always mixed and driven by wind. The water is clearer in the open waters than in the coastal waters.

O<sub>2</sub> levels are generally high and nutrient levels are usually lower than at the coasts.

They are very deep, and average 4000m deep (10000m+ at the deepest)

Many photosynthetic organisms such as phytoplankton and photosynthetic algae thrive.

Animals such as zooplankton are the most abundant, along with protozoans, worms, krill, jellies, and many free swimming animals.

Over-fishing by humans is severely depleting fish stocks.

## Coral Reefs

These are limited to the photic zone of a stable marine environment along with a high water clarity. Most thrive at temperatures between 18°C and 30°C.

Corals reefs exist in areas with a high O<sub>2</sub> concentration, and they require a solid substrate for attachment. They are formed from CaCO<sub>3</sub>.

Many photosynthetic algae live within the tissues of corals and form a mutualistic, symbiotic relationship.

The animal diversity is very high in and around coral reefs rivaling that of tropical rain forests in terms of diversity.

Over-fishing by humans, and over-exploitation by the aquarium trade along with global warming have severely hurt many of the coral reefs world-wide.

## Marine Benthic Zone

This biome exists along the sea floor. Near shore, it receives sunlight and supports many organisms. Most, however, is too deep to receive any sunlight. The deepest portions of the sea are about 3°C.

The environment is usually O<sub>2</sub> rich enough to support a large diversity of animals at reasonable depths.

Most of the benthic zone is covered in sediment. There also are many submarine mountains and volcanoes that exist here.

In the shallow benthic areas, normal marine ecosystems usually exist. Deep beneath the sea surface there are occasional hydrothermal vents of volcanic origin. These are home to many chemoautotrophic prokaryotes and a wide variety of other organisms.

Many animals such as vertebrates and fishes exist in the neritic benthic zone. Deeper benthic zones depend on food that settles from above.

Over-fishing has had a negative impact on the benthic fish populations, and dumping of organic wastes has created an O<sub>2</sub> poor environment in many benthic areas.

