

Types of Lakes : Some important types of lakes are:

- (a) **Oligotrophic lakes** which have low nutrient concentrations.
- (b) **Eutrophic lakes** which are overnourished by nutrients like nitrogen and phosphorus, usually as a result of agricultural run-off or municipal sewage discharge. They are covered with "algal blooms" e.g. Dal Lake.
- (c) **Dystrophic lakes** that have low pH, high humic acid content and brown waters e.g. bog lakes.
- (d) **Endemic lakes** that are very ancient, deep and have endemic fauna which are restricted only to that lake e.g. the Lake Baikal in Russia; the deepest lake, which is now suffering a threat due to industrial pollution.
- (e) **Desert salt lakes** that occur in arid regions and have developed high salt concentrations as a result of high evaporation. e.g. great salt lake, Utah; Sambhar lake in Rajasthan.
- (f) **Volcanic lakes** that receive water from magma after volcanic eruptions e.g. many lakes in Japan. They have highly restricted biota.
- (g) **Meromictic lakes** that are rich in salts and are permanently stratified e.g. lake Nevada.
- (h) **Artificial lakes or impoundments** that are created due to construction of dams e.g. Govindsagar lake at Bhakra-Nangal.

Streams

These are freshwater aquatic ecosystems where water current is a major controlling factor, oxygen and nutrient in the water is more uniform and land-water exchange is more extensive. Although stream organisms have to face more extremes of temperature and action of currents as compared to pond or lake organisms, but they do not have to face oxygen deficiency under natural conditions. This is because the streams are shallow, have a large surface exposed to air and constant motion which churns the water and provides abundant oxygen. Their dissolved oxygen level is higher than that of ponds even though the green plants

☆ **River Ecosystem:** Rivers are large streams that flow downward from mountain highlands and flowing through the plains fall into the sea. So the river ecosystems show a series of different conditions.

→ **The mountain highland** part has cold, clear waters rushing down as water falls with large amounts of dissolved oxygen. The plants are attached to rocks (periphytons) and fishes are cold-water, high oxygen requiring fish like trouts.

→ **In the second phase** on the gentle slopes, the waters are warmer and support a luxuriant growth of plants and less oxygen requiring fishes.

→ **In the third phase**, the river waters are very rich in biotic diversity. Moving down the hills, rivers shape the land. They bring with them lots of silt rich in nutrients which is deposited in the plains and in the delta before reaching the ocean.



Oceans

These are gigantic reservoirs of water covering more than 70% of our earth's surface and play a key role in the survival of about 2,50,000 marine species, serving as food for humans and other organisms, give a huge variety of sea-products and drugs. Oceans provide us iron, phosphorus, magnesium, oil, natural gas, sand and gravel.

Oceans are the major sinks of carbon dioxide and play an important role in regulating many biogeochemical cycles and hydrological cycle, thereby regulating the earth's climate.

The oceans have two major life zones: (Fig. 3.17)

Coastal zone with relatively warm, nutrient rich shallow water. Due to high nutrients and ample sunlight this is the zone of high primary productivity.

Open sea: It is the deeper part of the ocean, away from the continental shelf (The submerged part of the continent). It is vertically divided into three regions:

→ (i) **Euphotic zone** which receives abundant light and shows high photosynthetic activity.

➤ (ii) Bathyal zone receives dim light and is usually geologically active.

➤ (iii) Abyssal zone is the dark zone, 2000 to 5000 metres deep. The abyssal zone has no primary source of energy i.e. solar energy. It is the world's largest ecological unit but it is an incomplete ecosystem.

Estuary

An estuary is a partially enclosed coastal area at the mouth of a river where fresh water and salty seawater meet. These are the transition zones which are strongly affected by tidal action. Constant mixing of water stirs up the silt which makes the nutrients available for the primary producers. There are wide variations in the stream flow and tidal currents at any given location diurnally, monthly and seasonally. Therefore, the organisms present in estuaries show a wide range of tolerance to temperature and salinity. Such organisms are known as **eurythermal** and **euryhaline**. Coastal bays, and tidal marshes are examples of estuaries.