

# **Aquatic microbial groups**

- Generally, the concentration of bacteria in water is proportional to the amount of organic material in the water.

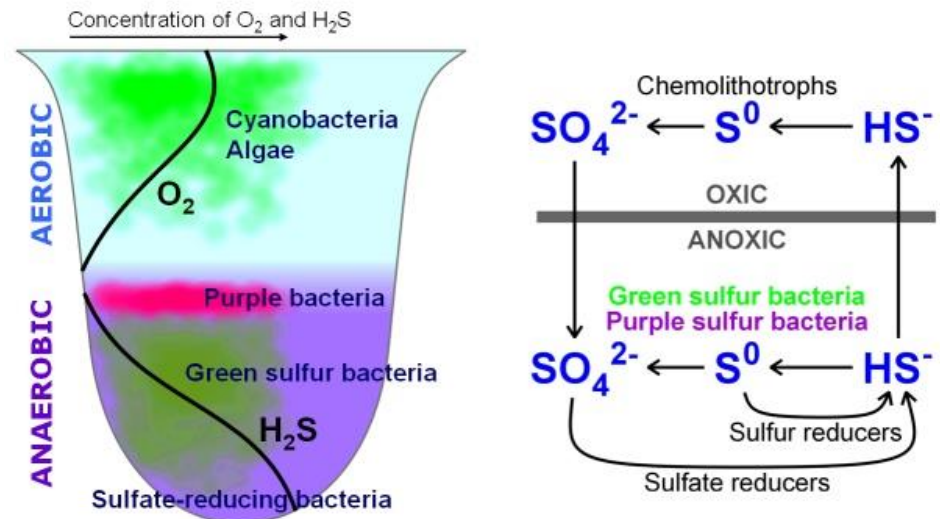
# Freshwater Microbiota

- Number and location of freshwater microbiota depend on the availability of oxygen and light.

Littoral zone:

- Limnetic zone is the open surface water area away from the shore. The profundal zone is the deeper water below the limnetic zone. The benthic zone is the deepest zone with sediment at the bottom.
- Photosynthetic algae are the primary producers of a lake. They are found in limnetic zone.

- Microbial growth in stagnant water uses available oxygen and cause eutrophication.
- Purple and green sulfur bacteria : in the profundal zone
- There are light and  $H_2S$  but no oxygen.
- Benthic zone *Desulfovibrio* reduces  $SO_4$  to  $H_2S$  in benthic mud.
- Methane producing bacteria are also found in this zone.



- In small water bodies: Phosphates cause algal blooms, lead to eutrophication.
- Eutrophication is the result of addition of pollutants or natural nutrients.
- Use of microorganisms to remove pollutants is called *bioremediation*.

# Estuarine microbiota

- An estuary is an interface between fresh and marine habitats. This results in a body of water that is brackish in nature.
- Most organisms in estuaries are from either fresh or salt water origins. The rapid variations in physical and chemical properties in estuaries lead to the establishment of unique microbial communities.
- The biomass in estuaries is high due to high nutrient levels. The sediment conditions fluctuate less than the water

# Marine microbiota

- The marine environment is by far the largest part of the biosphere
- About 75% of the ocean is below 1000 M depth and is constantly cold
- Pressure differences lead to different microorganisms at different depths
- Barophiles, moderate (growing best at 400 atm but able to grow at 1 atm) or extreme (grow only at higher pressures).
- Barotolerant - growing best at lower pressures, but tolerate up to 400 atmospheres

- Many marine bacteria have an absolute requirement for sodium, potassium and magnesium ions. Some also require chloride ions and ferric iron
- Heterotrophic bacteria in the pelagic and deep ocean are often oligotrophic
- Psychrotrophic or psychrophilic
- Microbial luminescence is seen in deep-sea life