

The problem in lakes

Unlike what happens with running waters, the harmful consequences of eutrophication are most relevant in environments where vertical mixing is limited, as in the case of lakes. In such environments the production of littoral macrophytes can assume invasive aspects and planktonic algae can develop, and form dense biomasses that, in extreme cases, cover the water surface completely like a blanket. Such a blanket can reduce transparency to few decimetres, thus preventing the penetration of sunlight and photosynthetic production of oxygen. The logical consequence of such processes is the establishment of an anaerobic condition.

Stratification and vertical remixing of waters favour the re-oxygenation of deep strata and the renewal of water.

Stratification isn't a stable condition over time; it depends on thermal variations and other characteristics of local climate, such as the régime of winds. In warm periods, waters get warm and the environment forms a stratum of superficial lamina, called epilimnion, which lies over the mass of cold water below – hypolimnion. An intermediate area called metalimnion, characterised by a sudden change in temperature - or thermocline - gets between the two. In winter and autumn, waters can mix and therefore the exchange of gases with the atmosphere is at its peak, while in summer stratification blocks oxygenation in the deepest waters.

A body of water with a considerable volume of water, such as big lakes, will react better to the supply of nutritive salts than one with a limited volume, because of its higher diluting capacity and higher oxygen reserve. A shallow lake can be considered frailer than a deep one since in the former, recycling processes of nutritional substances are facilitated and the oxygen reserve is smaller.