

Lake Ecology Terminology

from CRC's 2014 Adopt-A-Lake Report

anoxic – no or very low amounts of dissolved oxygen in the water. Because oxygen is necessary for much of life, anoxic waters are sometimes called “dead zones”.

areal hypolimnetic oxygen depletion (AHOD) rate – the rate of decline of oxygen in the hypolimnion of a lake during the summer. It is calculated by estimating the total mass of oxygen in the deep, cold waters of the lake multiple times during the summer to see how fast it is consumed. Oxygen is consumed primarily by respiration bacteria and decomposition of organic matter in the lake sediments. The AHOD is measured in the summer when the lake is stratified (warm on top, cold on the bottom) keeping oxygen from mixing into the deep water.

dissolved oxygen – oxygen is normally found as a gas, but is readily dissolved in water. Concentrations are generally measured in milligrams of oxygen per liter of water (equivalent to parts per million). Dissolved oxygen is produced by photosynthesis of plants and diffusion from air to water.

epilimnion – the upper levels of a lake where, in summer, the water is warmer and light is more available for photosynthesis by shoreline plants and algae.

eutrophic – the scientific term (high food) for the condition in lakes and streams associated with high levels of algae and plant growth, high nutrient concentrations, and, commonly, low levels of dissolved oxygen. Eutrophication or the increase in plant growth over time may result in noticeably poorer water quality and aesthetic conditions. Cultural-eutrophication is the result of changes in lakes, streams and their watersheds caused by humans.

hypolimnion – the deeper colder waters of a lake that are isolated from the surface by temperature stratification or layering of the lake in the summer. **mesotrophic** – the scientific term (mid food) for moderate levels of algae and plant growth and nutrient concentrations. See eutrophic and oligotrophic.

nutrients – chemical elements and compounds that are critical to plant growth. Nitrogen and phosphorous are often in short supply in lakes and streams and thus act like fertilizers influencing trophic conditions. Increasing nutrient supplies are associated with cultural-eutrophication.

nutrient sink – the retention of nutrients in a lake. Much of the nutrient supply coming into a lake from streams, the atmosphere and groundwater can be consumed by plants or adsorbed by suspended sediments and ultimately deposited in lake bottom sediments. In this case the lake traps or stores nutrients and the amount leaving the lake will be less than the amount coming in. Under some conditions, associated with low oxygen near the lake bottom (see AHOD), those stored nutrients can be released making the lake a source of nutrients for itself or other lakes downstream. This change in conditions has been called a

“tipping point” and is associated with eutrophication. Experience in other lakes has shown that it can be extremely difficult to reverse those conditions once they occur.

oligotrophic – the scientific term (low food) for low levels of algae, plant growth and nutrient concentrations. Oligotrophic lakes tend to have high water transparency or clarity and high aesthetic values. Secchi disk – a white and black metal disk approximately 7” in diameter that is lowered into the lake to measure the transparency or clarity of the water. The Secchi depth is the depth at which the disk just disappears.

thermocline – the layer of water in a lake where temperature drops very sharply between the epilimnion and hypolimnion. Because of the change in density of water with temperature, the thermocline can keep the lake from mixing between the near surface, warm epilimnion and the deep cold hypolimnion. transparency – a measure of water clarity in lakes made by lowering a Secchi disk into the lake and recording the depth where it just disappears.

Trophic Status Index – a standardized numerical index of lake trophic condition that can be calculated from different measures such as Secchi transparency, nutrient concentration, AHOD, and measures of plant growth. TSI allows a simple comparison of all the different measurements with a single index.