

Thermal Stratification

Summer thermal stratification occurs when the sun warms the lake's surface and the warmer surface water becomes less dense than the colder, deeper water. These density differences cause three thermally distinct layers to form in the lake. The uppermost or surface water layer is uniformly warm; the mid-depth layer or thermocline is a zone of rapid transition where the temperature decreases rapidly as water depth increases; the deepest or bottom water layer is uniformly cold.

The density differences that cause the thermal stratification also inhibit mixing of the layers. The surface water layer, which is well mixed by the wind, is oxygen-rich. The dissolved oxygen concentration in the thermocline and bottom water layers reflects a balance between the oxygen demand by decaying algae and the dissolved-oxygen-bearing capacity of the water, which varies inversely with temperature. Thus, if the oxygen demand is high during summer thermal stratification, the dissolved oxygen concentration in the thermocline and bottom waters may become too low to support fish and invertebrate organisms, including *Hexagenia* nymphs.