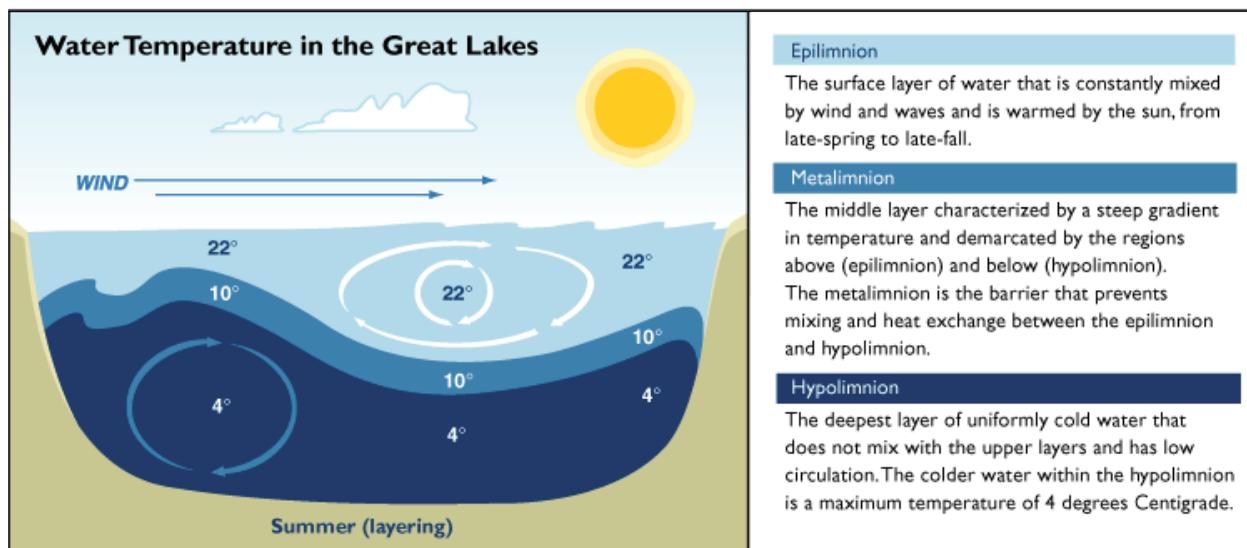


Temperature

What is it?

Temperature can be measured either as degrees Celsius (°C) or Fahrenheit (°F). Temperature can vary depending on the time of year and the size and depth of a body of water.

A unique phenomenon for lakes is the stratification of the water into layers due to changes in temperature at different depths. These layers occur because as water temperature changes so does its density. The stratification of a lake typically includes three general layers: the upper, warmer epilimnion, the middle metalimnion (which includes the thermocline), and the lower, colder hypolimnion. In regions that have fluctuating water temperatures (i.e., change of seasons), the layers of water will turn over (known as mixing) due to the change in temperature, and thus density.



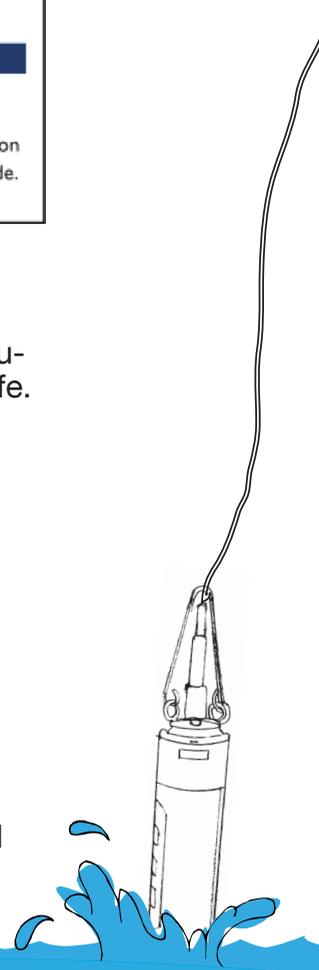
Source: Michigan Sea Grant

Why do we measure it?

The temperature of water has a large impact on overall water quality as it directly influences many of the other parameters. Temperature also is very important to aquatic life.

Temperature influences the amount of dissolved oxygen water can hold (e.g., colder water holds more). Conductivity also increases as the temperature rises. In addition, warmer water makes some substances more toxic for aquatic animals because the speed of chemical reactions usually increases at higher temperatures. Temperature directly influences aquatic life by impacting the rate of metabolism, photosynthesis, growth, decay, etc. Every aquatic animal has an optimum temperature range that is best for its health.

It is also important to be aware of the negative impact climate change could have on water quality. For example, a potential increase in severe rain events could lead to elevated concentrations of pollutants and nutrients entering a waterway from runoff. The increase of nutrients, such as nitrogen and phosphorus, could lead to more algal blooms, which in turn could result in a decrease of dissolved oxygen.



What affects it?

Temperature naturally varies at different depths and by season. Also, riparian vegetation produces shade, which can cool water. Conversely, when the vegetation is removed, more sunlight can penetrate and warm up the water. In addition, erosion can raise water temperature by increasing suspended particles, which absorb the sun’s heat.

Water temperature can be impacted directly by humans, by means of thermal pollution and urban runoff. It is common to find thermal pollution near power plants, which use water to cool machinery and then discharge the warmed water back into the waterway. Urban runoff can also increase the temperature of streams, rivers, and lakes when rain water is heated up on pavement and sidewalks and then runs into the water body.

Fish Species Activity Temperature Range

Species	Lower Limits	Most Active	Upper Limits
Carp	74°F (24°C)	84°F (29°C)	88°F (31°C)
Largemouth Bass	50°F (10°C)	70°F (21°C)	84°F (29°C)
Bluegill	58°F (14°C)	69°F (20°C)	75°F (24°C)
Walleye	50°F (10°C)	67°F (19°C)	76°F (24°C)
Smallmouth Bass	60°F (16°C)	67°F (19°C)	73°F (23°C)
Northern Pike	56°F (13°C)	63°F (17°C)	74°F (23°C)
Coho Salmon	44°F (7°C)	54°F (12°C)	60°F (15°C)
Lake Trout	42°F (4°C)	54°F (12°C)	62°F (17°C)

This table shows fish species and their preferred temperature range in which they are most active.

Source: Outdoor Life

