

pH, Salinity and Temperature

pH, salinity and temperature are all critical to the survival of most aquatic plants and animals and are therefore an important parameters for water monitoring

pH

pH, which stands for “power of hydrogen”, is a measure of how acidic or alkaline a solution is. pH is measured on a 14 point scale. A pH of 7 (pure water) is neutral; a pH higher than 7 is basic (alkaline); and less than 7 is acidic. pH is measured on a logarithmic scale. This means that each 1.0 change in pH (positive or negative) is a difference of a factor of 10. Thus a pH of 8.0 is 10 times more basic than 7.0 and 100 times more basic than 6.0.

The average pH for sea water is 8.2 but can range between 7.5 and 8.5 depending on the local conditions. Human activities such as sewage overflows or runoff, can cause significant short-term fluctuations in pH and long-term impacts can be extremely harmful to plants and animals. Extreme changes in pH, can stress local organisms and may ultimately lead many species to leave the area or die.

Salinity

Salinity is simply the measure of dissolved salts in water. Salinity is usually expressed in parts per thousand (ppt) or ‰. Fresh water has a salinity of 0.5 ppt or less. Estuaries can have varying salinity levels throughout their length and can range from 0.5-30 ppt depending on their proximity to river inflows or the ocean. The average salinity of ocean water is 35 ppt.

Plants and animals are often sensitive to changes in salinity and salinity levels control local species composition. Changes in salinity can occur as a result of weather patterns, such as droughts or storms, or they can alert us to events such as increased urban runoff and sewer discharge. These events can change the condition of the water as the concentration of dissolved mineral salts typically increases with these types of events (which tend to decrease general water quality).

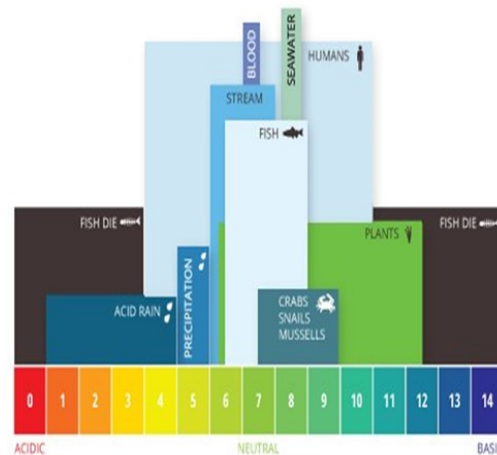
Temperature

Water temperature plays a substantial role in the aquatic system and can determine where aquatic life is found and the quality of the habitat. For example, water temperature can influence the metabolic rates of fish and the rate of photosynthesis of aquatic plants (and algae!). Water temperature also plays a significant role in ocean circulation patterns and influences the distribution and mixing of nutrients.

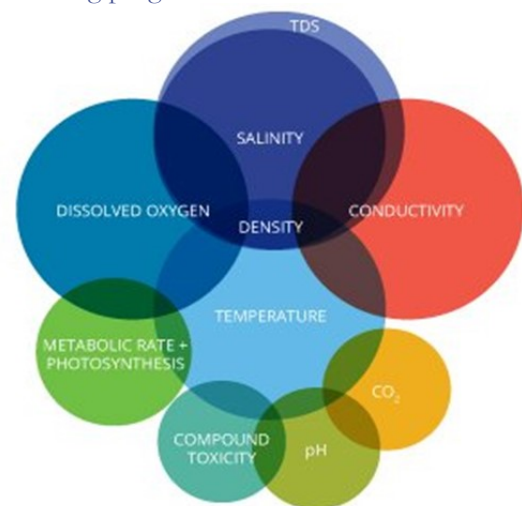
Water temperature is affected by:

- Sunlight (solar radiation)
- Atmospheric heat transfer
- Turbidity (water cloudiness)
- Confluence of water bodies (rivers, streams, storm drains, etc.)
- Depth
- Anthropogenic (human-induced) factors

As you may have noticed by now, the water quality indicators we are attempting to collect data on are all linked in one way or another. Water temperature, however, has a major effect on nearly every other water quality parameter we are attempting to observe and measure and is critical to any water monitoring program.



Optimum aquatic pH levels. Outside of optimum ranges, organisms can become stressed or die.
Image Credit: Fondriest



Water temperature affects nearly every other water quality parameter.
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