Project Development Phase

Delivery of Sprint - 3

Date	12 November 2022
Team ID	PNT2022TMID17403
Project Name	IOT Based Real-Time River Water Quality Monitoring and Control System

The Basic Water Quality Parameters

Temperature:

Temperature is a measure of the average energy (kinetic) of water molecules. It is measured on a linear scale of degrees Celsius or degrees Fahrenheit.

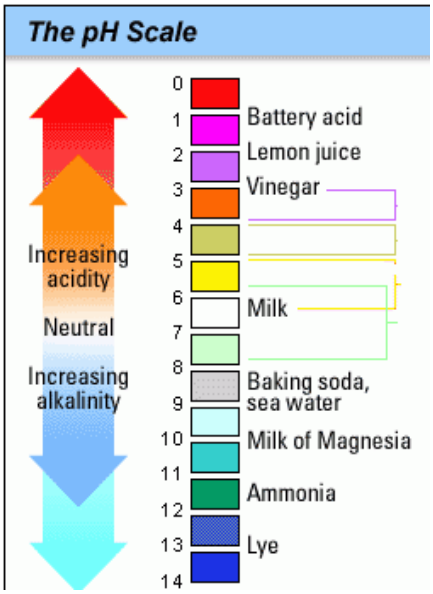
It is one of the most important water quality parameters. Temperature affects water chemistry and the functions of aquatic organisms.

It influences the:

- Amount of oxygen that can be dissolved in water,
- Rate of photosynthesis by algae and other aquatic plants,
- Metabolic rates of organisms, sensitivity of organisms to toxic wastes, parasites and diseases, and timing of reproduction, migration, and aestivation of aquatic organisms

PH:

pH is a measure of how acidic or basic (alkaline) the water is (the term pH comes from the French: "puissance dihydrogen" which means strength of the hydrogen). It is defined as the negative log of the hydrogen ion concentration. The pH scale is logarithmic and goes from 0 to 14. For each whole number increase (i.e. 1 to 2) the hydrogen ion concentration decreases tenfold and the water becomes less acidic.



As the pH decreases, water becomes more acidic. As water becomes more basic, the pH increases

Many chemical reactions inside aquatic organisms (cellular metabolism) that are necessary for survival and growth of organisms require a narrow pH range.
At the extreme ends of the pH scale, (2 or 13) physical damage to gills, exoskeleton, fins, occurs.

Changes in pH may alter the concentrations of other substances in water to a more toxic form. Examples: a decrease in pH (below 6) may increase the amount of mercury soluble in water. An increase in pH (above 8.5) enhances the conversion of nontoxic ammonia (ammonium ion) to a toxic form of ammonia (un-ionized ammonia)

Turbidity:

Turbidity is a measure of the amount of suspended particles in the water. Algae, suspended sediment, and organic matter particles can cloud the water making it more turbid.

Suspended particles diffuse sunlight and absorb heat. This can increase temperature and reduce light available for algal photosynthesis. If the turbidity is caused by suspended sediment, it can be an indicator of erosion, either natural or man-made. Suspended sediments can clog the gills of fish. Once the sediment settles, it can foul gravel beds and smother fish eggs and benthic insects. The sediment can also carry pathogens, pollutants and nutrients.

Dissolved Oxygen:

It is the amount of oxygen dissolved in water. Most aquatic organisms need oxygen to survive and grow.

Some species require high DO such as trout and stoneflies.
Other species, like catfish, worms and dragonflies, do not require high DO.
If there is not enough oxygen in the water, the following may happen:

- Death of adults and juveniles
- Reduction in growth
- Failure of eggs/larvae to survive
- Change of species present in a given waterbody.

Humidity:

Humidity is the amount of water vapour in the air. If there is a lot of water vapour in the air, the humidity will be high. The higher the humidity, the wetter it feels outside. On the weather reports, humidity is usually explained as relative humidity.

Humidity depends on the temperature and pressure of the system of interest. The same amount of water vapour results in higher relative humidity in cool air than warm air.

The amount of water vapour contained within a parcel of air can vary significantly. For example, a parcel of air near saturation may contain 28 g of water per cubic metre of air at 30 °C (86 °F), but only 8 g of water per cubic metre of air at 8 °C (46 °F).