

Water Quality Index

As the name suggested Water Quality Index is a mean to measure if a river or a lake is healthy, created by the National Sanitation Foundation. The index ranges from 0-100, 0 being very bad and 100 being excellent. There're nine indicators to determine the water quality. The nine indicators are dissolved oxygen (DO), Fecal Coliform, pH, Biochemical Oxygen Demand (BOD), temperature, total phosphate, nitrates, turbidity and total solids.

Dissolved oxygen is how much oxygen is mixed with in the water. It is a necessity for healthy water and aquatic life. Oxygen gets in the water by photosynthesis of aquatic plants and rapid movement of the water flow. 5mg/l is the lowest DO level should be for healthy water and no more than 110%. If less than 5mg/l DO in water all aquatic life is under stressed and if more than 110% fishes could get the gas bubble disease where bubbles block the blood vessel causing a halt in blood circulation leading to death.

Fecal Coli is an aqueous bacteria. The common form is Escherichia coli (E. coli). Its presence in water means that the water has been contaminated by man and animal's fecal. Due to its aerobic decomposition, its mass presence in the water could reduce the DO level.

pH is the measure of acidic and basic level in the water. Its scale is from 0-14, 0 being very acidic and 14 is very basic, 7 is neutral. The scale of 6-9 is ideal for pH level in freshwater to support life.

Biochemical Oxygen Demand (BOD) is a chemical procedure to measure the quantity of oxygen used by microorganisms (aerobic bacteria) in the water.

Temperature is an indicator for good water quality depending on the season. Temperature of water should not be affected by human beyond its natural seasonal routine. Temperature allows different types of aquatic life in different temperatures. It controls the maximum DO concentration in the water and influence the rate of chemical and biological reactions.

Total Phosphate is a measure in quantity of Phosphorous in a body of water. Phosphorous is a fundamental nutrient for plants and animals for metabolic reaction. Sources of phosphorus in the water are from human and animal wastes, industrial waste, soil erosion and fertilizers. Phosphorous is needed for good water quality to support planktons and aquatic plants however, if too much of phosphate, will cause blooms or vast algae growth causing DO to decrease.

Nitrogen is a major component in protein. It exists in natural water as nitrate (NO_3), nitrite (NO_2) and ammonia (NH_3). It is needed as nutrients in streams and rivers. Too much nitrates will stimulate growth of algae and plants which will later decompose increasing BOD. Sewage is the main source of nitrates in water from human.

Turbidity is the cloudiness of the water caused by tiny individual particles that are invisible to the naked eyes. The more turbid is a body of water the murkier it is. Turbidity could cause by soil erosion, urban runoff, bottom feeders disturbing the soil and algae growth. Turbid water tends to be warmer because more particles absorb sunlight. With less sunlight to perform photosynthesis there's decrease in DO level.

Total solid is a measurement of all solids suspended in the water. Total solid is related to turbidity.

References

<http://www.water-research.net/watrqualindex/index.htm>

http://en.wikipedia.org/wiki/Water_quality#Chemical_Assessment

Questions

1. What's the use of water quality index?
2. State the nine things that determine water quality index
3. What's the ideal pH for "healthy" water?