Water Quality Lecture

Turbidity: When we measure turbidity, we're measuring how much dirt (pollutant), or suspended material is in the water. Turbidity is measured in units – called Nephelometric Turbidity Units or NTUs. When we're measuring turbidity, we're looking at how much light is scattered by the particles in the water, making it appear cloudy or opaque. Too much turbidity is bad for water quality as these suspended solids prevent sunlight from reaching aquatic plants. In addition, many pollutants "stick" to particles like sediment. Sources of turbidity include sediment from construction sites and streambank erosion. Planting our riverbanks with native vegetation is one activity to help decrease turbidity because it reduces erosion.

Nutrients: Nutrients encourage algae and weed growth in waterways. Too much algae in the water will use up the oxygen, which is bad for aquatic organisms. There are two kinds of nutrients we're concerned with. One is **Phosphates** – a key ingredient in most fertilizers and can also be found in soaps. The other is **Nitrates** – often found in animal waste and fertilizer. We measure nutrients in milligrams per liter or mg/L.

Dissolved Oxygen: When we sample for this, we're measuring how much oxygen is available in the water. It is measured in milligrams per liter. Dissolved Oxygen is what makes aquatic life possible. Aquatic organisms breathe the oxygen in the water. Changes in the concentration of oxygen affects aquatic species, like many macroinvertebrates. If they don't have enough oxygen they can die, and this disrupts the food chain. Many fish have a certain range of dissolved oxygen they need to survive. (Cold water fish: 6.5 mg/L or more)

Temperature: We measure this in degrees Celsius or Fahrenheit and it tells us how cold or warm the water is. Water temperature greatly affects macroinvertebrates, fish, and other aquatic species. Salmon, for example, need cold water. The temperature of the water actually changes their metabolism, speeding it up or slowing it down depending on the surrounding temperature. If the temperature changes too drastically, they won't function well. It will decrease their ability to reproduce and survive. Warm water also cannot hold as much dissolved oxygen as cold water does. What increases stream temperature? Removal of vegetation that provides shade along riverbanks, shallow streams, warm water discharges from industries like power plants to streams.

pH: This measures how acidic or basic the water is. pH is measured on a scale of 0-14. Acidic values (think lemons) are from 0-7, with 0 being the most acidic. Basic (think drain cleaners) are from 7-14. A neutral pH is 7 (think distilled water). A 7 or 8 is optimal for most fish. Water with an extremely high or low pH is deadly to aquatic life. An example of a pollutant that makes pH extremely basic is concrete washout.

Bacteria: We measure bacteria in the number of colonies per unit volume (100 ml). *E. coli* is one type of fecal (poop) Coliform bacteria and is used as an indicator of fecal contamination. In Oregon, the state water quality standard for *E. coli* in recreational waterways is 406 colonies/100 ml to protect human health during water contact. Some common sources of bacteria in streams are pet waste, leaking septic systems, and illegal discharges of human waste. One easy way to prevent bacterial pollution is to always pick up pet waste.

REMEMBER: As rain washes over the cities and neighborhoods, it collects and carries the pollutants listed above into our waterways. Runoff from urban areas is one of the main sources of pollution in our rivers and streams.

BUT: in the summer, it is not raining, and the water in our rivers and streams is clean. Go play in the river!