Table Definitions:

pH

pH is a measure of how acidic/basic water is. The range goes from 0 to 14, with 7 being neutral. A pH value of less than 7 indicates acidity, whereas a pH of greater than 7 indicates a base. pH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water. Water that has more free hydrogen ions is acidic, whereas water that has more free hydroxyl ions is basic. Since pH can be affected by chemicals in the water, pH is an important indicator of water that is changing chemically. pH is reported in "logarithmic units". Each number represents a 10-fold change in the acidity/basicity of the water. Water with a pH of five is ten times more acidic than water having a pH of six[1].

MAWC uses pH as an indicator parameter to look for changes in water quality over time. Changes in land use or releases from industrial activities can cause the pH to raise or lower depending on the type(s) of released chemicals or dissolved minerals entering the water. For a further discussion on pH see EPA CADDIS Volume 2 webpage[2].

SPC = Specific Conductance

Conductivity is a measure of the ability of water to pass an electrical current. Conductivity in water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge). Organic compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity when in water. Conductivity is also affected by temperature: the warmer the water, the higher the conductivity. For this reason, conductivity is reported as conductivity at 25 degrees Celsius (25 C)[3].

The term “specific conductance” is correctly defined as the electrical conductance of 1 cm^3 of a solution at 25 °C. If the electrical conductance is measured at another temperature, the value is corrected to what it would be at 25 °C and reported as specific conductance at 25 °C. Most modern specific conductance meters are temperature compensated and report the corrected value automatically[4].

MAWC uses specific conductivity as an indicator parameter to look for changes in the basic chemistry of the water. Increases in Conductivity or Specific Conductivity can be attributed to discharges related to oil and gas operations, road salting, earth moving activities that cause dissolution of minerals (mining, or construction), or wastewater discharges from industries and/or municipal sewers.

TDS = Total Dissolved Solids

The dissolved solids concentration in water is the sum of all the substances, organic and inorganic, dissolved in water. This also is referred to as “total dissolved solids”, or TDS. Calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride, nitrate, and silica typically make up most of the dissolved solids in water. Combinations of these ions—sodium and chloride, for example—form salts, and salinity is another term commonly used to describe the dissolved solids content of water[5].

The TDS depicted in the table is a calculated value based on the specific conductance that uses a coefficient assigned by the user of the water quality meter to calculate the TDS value. “The only true method of measuring TDS is to evaporate a water sample and weigh the remains with a precision analytical balance. While this is the most reliable and accurate method, it is also costly. However, over the past few decades, companies have developed less expensive TDS meters”[6].

MAWC uses the calculated Total Dissolved Solids (TDS) value as another means of assessing water quality changes over time at the monitoring sites. The same sources of contamination that can cause Specific Conductance to become elevated will also raise the TDS value.

DO = Dissolved Oxygen

Dissolved oxygen (DO) refers to the concentration of oxygen gas incorporated in water. Oxygen enters water by direct absorption from the atmosphere, which is enhanced by turbulence[7].
MAWC uses Dissolved Oxygen (DO) to assess for pollutants in the water. High levels of nutrients can cause algal blooms that result in low DO levels. DO can also be reduced due to the release of organic chemicals that require oxygen for decomposition. DO levels are related to water temperature; water at colder temperatures can hold higher concentrations of DO than warm water[8].

Sources Cited:

1. **https://www.usgs.gov/special-topics/water-science-school/science/ph-and-water#:~:text=oil%20or%20alcohol.-,pH%20is%20a%20measure%20of%20how%20acidic%2Fbasic%20water%20is,hydroxyl%20ions%20in%20the%20water.**
2. https://www.epa.gov/caddis-vol2/ph#lowchecklist
3. https://archive.epa.gov/water/archive/web/html/vms59.html
4. https://pubs.usgs.gov/tm/09/a6.3/tm9-a6_3.pdf
5. https://www.usgs.gov/mission-areas/water-resources/science/chloride-salinity-and-dissolved-solids#:~:text=The%20dissolved%20solids%20concentration%20in,dissolved%20solids%E2%80%9D%2C%20or%20TDS.
6. https://www.wqpmag.com/water-testing/article/10954713/what-is-total-dissolved-solid-tds-water-testing
7. https://www.epa.gov/caddis-vol2/dissolved-oxygen
8. https://www.usgs.gov/special-topics/water-science-school/science/dissolved-oxygen-and-water#:~:text=Dissolved%20oxygen%2C%20temperature%2C%20and%20aquatic%20life&text=Cold%20water%20can%20hold%20more,oxygen%20concentration%20is%20often%20lower.