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Technical Note
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Lower Loup Monitoring Site

PARAMETER DEFINITIONS

The following definitions are an explanation of parameters found at the Lower Loup monitoring site.

Parameter Definitions

Blue-green algae: EXO2(BGAPC_RFU)	Algae that are often associated with problem blooms in lakes. Some produce toxins that are harmful to animals, including humans. They can form a floating scum or be distributed in the water. Nitrogen and phosphorus runoff provide food, and some can fix atmospheric nitrogen (N2) when nitrogen is not available.
Chlorophyll a: EXO2(Fluorecence_pct_FS)	Green pigment present in all plant life as well as most algae, and required for photosynthesis. Used as a surrogate measurement for the amount of algae in the water. The chlorophyll molecule fluoresces when exposed to light of a particular wavelength that is emitted by the sensor. The molecule will get "excited" and then emit a wavelength of light that is higher than the wavelength used to excite it. The sensor detects that wavelength of light coming off of the chlorophyll. These measurements are complemented by lab analyses of extracted chlorophyll.
Conductivity (specific conductance): EXO2(Cond_uS_cm) EXO2(TDS_mg_L) EXO2(spCond_uS_cm)	Measures water's ability to conduct an electric current. Conductivity is reported in micromhos per centimeter (µmhos/cm) and is directly related to the total dissolved inorganic chemicals in the water. Specific conductance is an early indicator of change to a water system. It is also the basis of most total dissolved solids and salinity calculations. Values are commonly two times the water hardness. Conductivity is primarily used to determine the mineralization of water, sometimes referred to as the total dissolved solids (TDS mg/l). TDS can be used to determine changes in water at different times of the year and can also be used to predict certain physiological effects on plants and animals.

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Depth: EXO2(Depth_ft)	Depth is where sensors are located within the water profile and where data is being collected.
Fluorescent Dissolved Organic Matter (fDOM): EXO2(FDOM_RFU)	Dissolved organic matter (DOM) in lakes is colored, typically yellow-brown for lakes or rivers receiving wetland drainage. Some of that DOM fluoresces and is measured by this sensor. The color or taint of the water affects light penetration and thus the depth at which aquatic plants and algae can grow.
Oxygen (O2): EXO2(ODO_pctplus_pct) EXO2(ODO_Concplus_mg_L)	Most aquatic organisms need Oxygen (O2) to survive, and its concentration in the water depends upon temperature. The colder the water, the more gases, including O2 it can hold. Boiling water removes all dissolved gases. **Dissolved Oxygen** (dO2) can be expressed in a percentage or in units such as mg/l. The water quality standard for oxygen in "warm water" lakes and streams is 5 mg/l. This is the minimum amount of O2 needed for fish to survive and grow. The standard for trout waters is 7 mg/l.
pH–acidity: EXO2(pH)	An index of lake water's acid level, pH is an important component of the carbonate system. A pH of 7 is neutral. Water with a pH of 7 has equal amounts of hydrogen ions and hydroxide ions (OH-). Pure, distilled water without any carbon dioxide has a pH value of 7. Lower pH waters (less then 7) are more acidic. Higher pH waters (more than 7) are more basic. pH levels too high or too low can stress or kill aquatic organisms. pH levels of 6.5 to 9 are ideal for most aquatic organisms.
Turbidity: EXO2(Turbidity_NTU)	Turbidity is caused by particles of matter rather than dissolved organic compounds. Suspended particles dissipate light, which affects the depth at which plants can grow. Turbidity affects the aesthetic quality of water. Lakes receiving runoff from silt or clay soils often possess high turbidities. These values vary widely with the nature of the seasonal runoff. Suspended plants and animals also produce turbidity. Suspended sediments, such as particles of clay, soil and silt, frequently enter the water from disturbed sites and affect water quality. Suspended sediments can contain pollutants such as phosphorus, pesticides, or heavy metals. Suspended particles cut down on the depth of light penetration through the water, hence they increase the turbidity – or "murkiness" or "cloudiness" -- of the water. High turbidity affects the type of vegetation that grows in water.

Oxygen Solubility at Different Temperatures

Temperature °F	Oxygen solubility (mg/l)
32	15
41	13
50	11
59	10
68	9
77	8

References: https://www.nps.gov/laro/learn/education/upload/Lesson3-Water-Quality.pdf
https://www.ysi.com/parameters
http://www3.uwsp.edu/cnr-ap/weal/Documents/G3582.pdf

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