

Water Quality Survey Overview of Tests Included in Lab Report

Water quality monitoring is an important ongoing project of the LMWCC. Regular monitoring helps us to determine the overall health of the Little Manistee River. Trained volunteers collect the samples and transport them to the Great Lakes Water Quality Laboratory at Lake Ann, MI. A brief explanation of the tests performed and what they mean is outlined below.

E. coli, is a fecal coliform, and a biological contaminant that can be found in streams and lakes. It is a bacteria that colonizes the intestines of warm-blooded animals and humans. **High counts over 300 colonies per 100 ml of water** is of concern to people who spend time recreating in lakes or rivers as possible disease-causing organisms that exist in conjunction with E. coli, and some strains of E. coli can cause illness with full-body immersion in, and possible ingestion of, contaminated water. Slightly higher counts are acceptable in partial-immersion areas such as where people just wade or have body exposure for very brief periods. High E. coli counts can also adversely affect dissolved oxygen levels, see BOD below.

The following chemicals/compounds, in excess, contribute to eutrophication, which is the excessive richness of nutrients in a lake or other body of water, frequently due to runoff from the land, and can cause a dense growth of plant life and threatens animal life due to lack of oxygen. High quantities of nutrients (sources such as agricultural run-off, raw sewage, products high in phosphates, i.e. fertilizers and cleaning products) create explosive growth in aquatic plants, exceeding the **BOD or Biological Oxygen Demand**. That is the amount of oxygen required to decompose organic material. A BOD that exceeds the available oxygen produces dangerous levels of carbon dioxide, toxic to many forms of animal life.

Ammonia - A source of nitrogen that is quickly assimilated in moving water, but can act as a fertilizer. **Amounts greater than 0.05 mg/L indicate the presence of ammonia. Higher amounts may indicate a pollution source.**

Nitrate/Nitrites - Like ammonia, most forms of aquatic nitrogen break down in moving water and nitrogen is released into the atmosphere but can also act as a fertilizer. **Nitrates above 1.00 mg/L or Nitrites above 0.05 mg/L may indicate a pollution source.**

Phosphates - Indispensable for plant growth - insufficiencies limit biological productivity. In high concentrations can lead to the rupture of blood vessels in aquatic organisms as well as oxygen depletion in the water chemistry - see BOD above. **Less than 1.0 mg/L is considered acceptable for treated waters flowing into bodies of water from water treatment facilities.**

pH - Water with a pH value of 7.0 is considered neutral. Any pH value under 7.0 is acidic while any pH value over 7.0 is considered alkaline/basic. **Slightly alkaline waters of around 7.5, support trout reproduction, survival, and growth the best.** Values between 6.5 and 8.0 supports life in most aquatic organisms.

Chloride - In less populated areas, chloride in streams and lakes may become elevated due to run-off from roads and ditches along roadsides where salt is used as a de-icer in the winter. Agricultural run-off may also contribute to chloride elevation due to salt and salt compounds used for farming practices. In urban areas, water softeners and waste water discharge affect the amount of chloride detected. **Levels above 10 mg/L are reason to suspect contamination.** Salt is damaging to the environment of fresh water plants and animals and contributes to the effects of pollution and degradation of fresh water systems.

Dissolved Oxygen - The table below breaks down the solubility of oxygen at sea-level with air-pressure of 29.92 in (or 760mm.), and is equivalent to 29.38 in. at 500' above sea-level, the average elevation of the Little Manistee River.

Air Temperature - ° F	Oxygen in PPM
32°	14.6
41°	12.8
50°	11.3
59°	10.2
68°	9.2
77°	8.4
83°	7.6

A minimum of 4 ppm of dissolved oxygen is necessary for a viable aquatic ecosystem. **Fish thrive best in well oxygenated water at 7.0 - 9.0 ppm.** An adult brown trout thrives in water carrying levels of 9 - 12 ppm DO.