

November 3, 2025

Re: Lake water sampling

Dear Professor Maas,

As requested, a chemical analysis was conducted on a lake water sample to evaluate its physical and chemical characteristics and determine the overall health of the lake. This executive summary presents the findings from the lab analyses and explains what they reveal about the lake's health for a general audience. Based on the parameters examined, the water appears to be in good condition with minimal impact from human sources.

The lake water had a pH of 7.5, which shows it is slightly basic and well-buffered. This value is typical for natural lakes that contain carbonate minerals capable of neutralizing acids. A pH within this range supports aquatic life and means the system is unaffected by acid rain or industrial runoff.

The dissolved oxygen (DO) levels were measured at 10 mg/L initially and 6 mg/L during a second reading. Both values are suitable for fish species such as bluegill and largemouth bass, which need at least 5 mg/L. The decrease in DO over time could've been caused by sample aging and warmer water temperatures, since oxygen solubility decreases with increasing temperature. Expired testing reagents may also have caused some error.

The nitrate concentration was 0 ppm, and chloride was 0 mg/L, both of which are very low levels. These results show little to no pollution from fertilizers, sewage, or other human sources. This is consistent with the lake's location in a remote, forested region, where runoff from fertilizer or wastewater is unlikely.

The phosphate concentration was 5 ppm, which is higher than typical background levels for natural lakes. However, this may result from natural organic matter decomposition rather than human sources. Elevated phosphate levels could contribute to algal growth if persistent.

The hardness of the water was measured at 30 mg/L, classifying it as soft. This means the water contains low levels of calcium and magnesium. Soft water can be beneficial for aquatic species but may also be more sensitive to acid inputs over time.

The acidity was 0, and dissolved carbon dioxide was approximately 0.01 mg/L. Both values are very low and show a stable and balanced system with minimal input from decaying organic matter or external pollutants.

Testing for coliform bacteria using mEndo agar LES revealed approximately 48 cfu. The colonies appeared red to reddish pink, which means they were likely atypical coliforms.

Sources of these bacteria include waste from wildlife and sewage from septic systems. Although there are some bacteria present, it does not mean unsafe conditions for aquatic life or recreational activities.

In summary, the lake has high water quality with chemical conditions suitable for a healthy aquatic environment. Human influence appears minimal, nutrient and contaminant levels are low, and the water chemistry is balanced. However, the slightly elevated phosphate concentration and moderate bacterial activity are worth observing in the future.

Please let me know if you have any questions.

In science we trust,
Stephanie Nelson