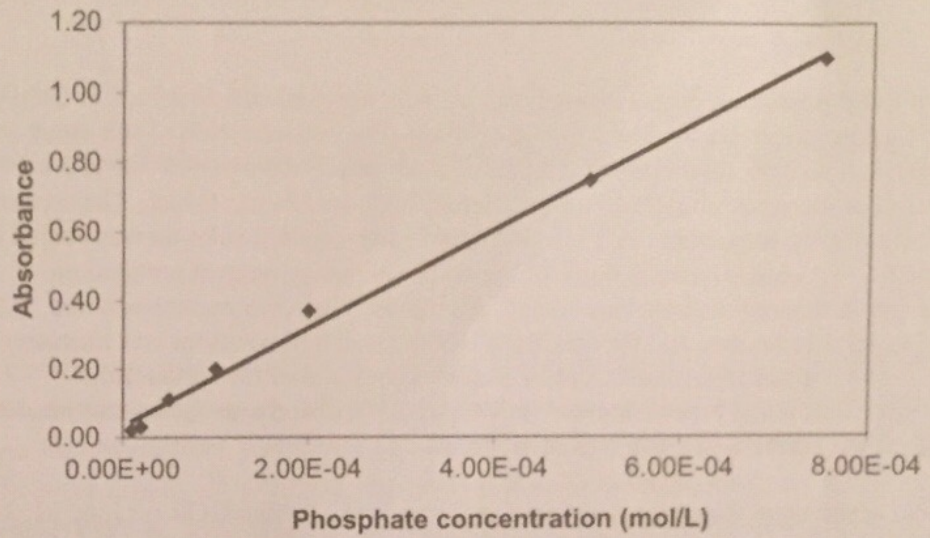

Figure 1. Beer's law plot for phosphate standard solutions. Data were measured at 880 nm versus a blank of aqueous ammonium molybdate/potassium antimonyl tartrate. The line, which is the line of best fit, is y = 1439.5x +0.0334, where y is absorbance and x is phosphate concentration in mol L^{-1}.

From the measured absorbance of the water sample (0.041 at 880 nm) and the equation of the best-fit line in Figure 1, the phosphate concentration of the water sample was calculated to be 6.0 x 10^{-6} mol/L or 0.57 parts per million (ppm).

Discussion

The concentration of phosphate in the water sample (0.57 ppm) as calculated from the line of best fit on Figure 1 and the absorbance data from the unknown sample exceeds the United States Public Health Service standard of 0.3 mg phosphate/L as the maximum allowable amount for drinking water.[3] This result is indicative of significant animal impact from the ducks that frequent the pond.

The quality of the reported phosphate concentration is dependent upon the quality of the absorbance measurements and concentrations of the standard solutions used to construct the calibration curve in Figure 1. Some scatter among the data is noted in Figure 1, and although the scatter about the best-fit line appears to be random in nature, it is noted that the intercept on Figure 1 (0.0314) differs significantly from the intercept of zero as predicted by eq 1. It is noted that the spectrophotometer exhibited significant drift during the absorbance measurements, and the calibration plot seems to exhibit a slight curve toward the x-axis. This downward curvature in the calibration curve would account for the positive y-intercept and the scatter of the data about the best-fit line in Figure 1.

References

1. Brown, T. L.; LeMay, H. E., Jr.; Bursten, B. E.; Murphy, C. J. *Chemistry: The Central Science*, 11th ed.; Pearson; Upper Saddle River, NJ, 2009; p 754.