The Great Lakes Nonmetal Concentrations: Potential Causes of Harmful Algal Blooms

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Lake Erie has always experienced Harmful Algal Blooms, but the worst recorded was in 2011. The intensity of the HAB reached over 3x that of any other season. Many economic and ecological services were devastated. One predicted cause of this overgrowth is the runoff of nitrate and phosphate-based fertilizers. The purpose of this experiment is to determine the concentrates of specific nonmetals in soil and water samples collected from farmland locations along Lake Erie to see if the levels between corresponding water and soil samples are significant and how they compare to the ppm values in other areas of the lake, not by farmland. Expanding this project beyond local areas will be helpful in determining the relationships between farms and the local waterways. If water and soil samples are collected from locations along Lake Erie and are both tested for their concentrations of phosphate and nitrate, then the water levels will have similar ppm values to the soil samples collected and those ppm levels will be higher than the sample controls. 10 samples of water and soil were gathered along the coast of Lake Erie. A control of non-fertilized soil and water was collected for comparison purposes. The soil samples' concentrations were calculated using Beer's Calibration curve established from standards on a Vernier LabQuest. The water samples were calculated using a NECi color sampler and a Phosphate reader. Each value was far above 0.1 ppm, the amount needed to spark an influential HAB. The hypothesis was supported in that the water levels had similar ppm values to the soil samples collected around the lakes and those ppm levels were higher than the sample controls. These results show the impact that fertilizers can have on the environment, especially marine ecosystems.

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