

Abstract

Testing Lake Beds Capabilities to Buffer Acid Rain

The purpose of this lab was to test the effect of different types of lake bedding on how well they mitigate acid rain of different pH's. It was hypothesized that limestone bedding would be the most effective at maintaining the pH level of water when acid rain was added. Containers were set up with the different lake beds (sand, gravel, clay, limestone, and a control) and were filled with water. The pH of the lakewater was recorded before, five minutes post, and 48 hours after adding a nitric/sulfuric acid solution to simulate acid rain at pH's of 3, 4, and 5. The results showed that the limestone had a consistently greater impact on mitigating acid rain as compared to the other lakebeds when the acid rain was of a higher pH (pH = 5). After 48 hours (pH= 5), the limestone ($M=7.94\pm0.03$) was proven more effective ($p<0.01$) than the sand ($M=6.33\pm0.02$), gravel ($M=7.67\pm0.07$), and clay ($M=6.80\pm0.03$). When the pH of the acid rain was lower (pH^s = 4 and 3) limestone was generally better at mitigating the acid rain, but not as consistently. After 48 hours, the limestone had the same effects as the sand ($p=0.77$), gravel ($p=0.90$), and control ($p=0.16$). The use of finding the best buffering agent for lakes can help improve bodies of water that have fallen into an inhabitable ecosystem due to the acidity in the water.