Chemical and Microbiological Studies of the Effectiveness of Bioaugmentation to Prevent Algal Growth in Two Shaker Heights Lakes in the Doan Brook Watershed

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The Doan Brook Watershed is located in the City of Cleveland and surrounding suburbs, ultimately emptying into Lake Erie. Several lakes are located in its headwaters and have experienced excessive algal growth during the past few summers, reducing habitat and aesthetic quality. To curb the algal growth, the City of Shaker Heights, OH decided to use bioaugmentation; a private firm was hired to spray the lakes with a proprietary mixture of three bacteria that would remove ammonia from the system preventing algal growth, and also oxidize organic material in the lake sediments, effectively dredging the lake bottom. A bi-weekly treatment routine was enacted between June and October, 2004, with extensive chemical and biological monitoring of the two treated lakes and a third untreated "control" lake to determine the treatment's efficacy. The results of these studies will be presented. It was found that the lake sediments only contained 10-15% volatile (mostly organic) solids and therefore, the treatments would not increase the depth of the lake significantly. Microbiological studies indicated that one of the treated lakes had very high E. coli concentrations, most likely from urban or sewer run-off infiltration. Algal growth was limited in both treated and untreated lakes, however, the chemical studies, particularly analysis of ammonia and phosphorous, were inconclusive as to whether the bioaugmentation treatments were successful. Future chemical studies are planned for this coming summer to further investigate the water quality in these lakes and gain more information on to the cause and potential prevention of algal growth.