

Is the Bronx River Watershed healthy?

A watershed is a geographic area in which water flows through before draining into a larger body of water such as an ocean or river. They are very important, as they allow for the draining of rainwater into common bodies of water. Without them, water would just be running down the streets before reaching rivers or the ocean. The Bronx River is a watershed that empties into the East River. The Bronxville science department has spent a significant amount of time studying the river for indicators showing whether or not it is healthy. Through thorough examination of microorganisms present, pH levels, and conductivity, it can be determined that the Bronx River Watershed is not healthy.

The microorganisms and lack thereof seen in the Bronx River and its biodiversity count indicate that it is an unhealthy watershed. Near Scout's Field, leaf packs were examined to see which macroinvertebrates are most commonly present in this river. On the fifth of October this year, the data collected showed that there were about 44 scuds found, 1 midge, 1 water beetle larvae, 11 caddisflies, 3 stoneflies, 2 flatworms, 1 crayfish, 1 alderfly, 1 mayfly, and 10 finger clams. Using the formula: $\frac{\text{the number of species in the area (numerator)}}{\text{the total number of individuals in the area (denominator)}} = \text{biodiversity index}$, we can determine that the biodiversity index for this area is $\frac{10}{75}$ or 0.13. This is a very low number, which indicates that the population of the river is not diverse, and thus is less likely to adapt to environmental changes. This lack of macroinvertebrates indicates that the Bronx River is a very unhealthy watershed.

After analyzing pH levels in three different sites along the Bronx River, even more evidence is provided supporting the claim that this watershed is unhealthy. pH is a measure of how acidic or basic water is. The scale ranges from 0 to 14, with 7 being neutral. Everything below 7 is acidic, and everything above 7 is basic. Along with determining how soluble chemicals are in the water, the pH scale can show whether or not the water is suitable for supporting aquatic life. As seen in the studies of the Bronx River from August to July of this year, the pH levels are acidic, as they are below the 7. The most recent test had startling results, with site C having a pH level of about 4.8. Once a pH level gets below 5, it begins affecting the ability of fish to reproduce. This decrease in pH indicates a significant amount of pollution that is present within the river water. These acidic pH levels indicate that the river has been polluted and is not be able to support as much life, furthermore proving that the Bronx River is unhealthy.

The exceptionally high levels of conductivity seen within the Bronx River also show that it is an unhealthy watershed. Conductivity measures how capable water is of passing electrical flow, and is related to the number of ions found in the water. Ideally, freshwater rivers should have a conductivity from 150 to 500 $\mu\text{S}/\text{cm}$ in order to support diverse life. If the conductivity is outside of this range, the water is not suitable to maintain a good amount of aquatic life, including macroinvertebrates and fish. Conductivity levels analyzed at three different locations along the Bronx River in July and August had results very far out of this range. There were only three instances out of twelve in which the conductivity was below 500 $\mu\text{S}/\text{cm}$, with levels reaching as high as about 1350 $\mu\text{S}/\text{cm}$. These results show an astonishing level of conductivity, and definitely prove that the Bronx River watershed does not have the water quality needed to

support a sufficient amount of life. Thus, this data further proves that the Bronx River is a very unhealthy watershed.

Based on detailed data taken regarding the biodiversity, pH, and conductivity levels in multiple locations along the Bronx River over the course of the past few months , it can be determined that the Bronx River is an unhealthy watershed. The biodiversity index shows that there is very little diversity in aquatic life, the pH levels prove that the water in this river is very acidic, and the conductivity levels indicate that the Bronx River water is not able to sustain a reasonable amount of fish or macroinvertebrate. This river is astonishingly unhealthy, and actions need to be taken to ensure that this problem is fixed. Hopefully, as this research continues, the source of this watershed's pollution will be identified, and its health will be improved.

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