

At first glance, the Bronx River is clearly polluted, therefore leading the spectator to assume that it is unhealthy. The color of the water is a faded brown color, very different from the crystal clear water of healthy rivers. Though a river may look healthy, or unhealthy based on its color, to be completely certain of its health, scientists must conduct different tests and experiments to be positive. Based on the experiments conducted by my biology class, I can conclude that the Bronx River is unhealthy.

There are many contributing factors that may cause the pollution. First, the most obvious is pollution and waste from humans and man-made structures. Also because the Bronx River is a watershed, or an area of land that drains rainwater or snow into one location, mud can easily be washed into the water. There are different ways to prove by experimentation that this claim that the Bronx River is unhealthy and one way is to take samples from the river and observe what macroinvertebrates and insects are found. There are other ways to conclude the river is in poor health by seeing if there is enterococcus, or a bacteria found in human feces. Lastly we can test for conductivity and pH to see if the water can conduct electricity and how acidic it is.

For experimental purposes, my biology class went to the Bronx River and took previously placed "leaf packs" out of the river to be examined. The first thing that I noticed about the leaves in the permeable bag was that they were coated in mud. To see more clearly, we rinsed the mud off in a bucket then looked for any insects, macroinvertebrates, or some other form of life. We mainly found scuds which are clear macroinvertebrates that are somewhat tolerant to pollution. Our class did not find other macroinvertebrates though another class did. The other biology class that examined different "leaf packs" found finger clams. Finger clams, like scuds, are somewhat sensitive to pollution. From this information alone, we can assume that the Bronx River is unhealthy, or polluted, but to be confident, we must conduct different tests and collect more data.

Tests on enterococcus in the Bronx River has been recorded since September, 2015. At that time there were extensive amounts of the bacteria found at three different sites. Since then, the count has decreased greatly. This could mean that biologists are working to clean the river and get rid of enterococcus that can easily contaminate it. Although this could aid the Bronx River in gaining its health back, the lack of enterococcus doesn't necessarily mean the river is healthy.

Healthy streams usually should have between 150 to 500  $\mu\text{S}/\text{cm}$  to support diverse aquatic life, also the water should be right around 7 on the pH scale, where pure water lies. After testing for conductivity, we found that the Bronx River has a conductivity far over 500  $\mu\text{S}/\text{cm}$ . The highest amount being over 1200  $\mu\text{S}/\text{cm}$ . When the pH of the water was tested, we found that the pH was below 7, though it was around 6.5, the lowest pH found was only 5.4 which is more on the acidic side. These conditions are unsuitable for most aquatic life, therefore providing a reason as to why we didn't find small aquatic animals.

Biodiversity index can also help scientists understand the relative number of species in the area. The formula is:

The number of species in the area

----- = biodiversity index  
The total number of individuals in the area

From the data found, the formula should look like this:

$$\frac{5}{70} = 0.0714$$

This reflects how many species were in the data set and allowing us to compare to the biodiversity index of other areas.

In conclusion, I know that the Bronx River is unhealthy and clearly polluted. You can see just by looking at it, it seems unclean. The macroinvertebrates found in the leaf packs were somewhat tolerant to pollution, there were some traces of enterococcus, the pH level was lower than what is expected, and the river had too much conductivity. The Bronx River and the surrounding wildlife is undoubtedly in need of help and it is up to the surrounding town and biologists to try to help it.

#### Citations

*Bronx River Research*. N.p., n.d. Web. 30 Oct. 2016.

<https://sites.google.com/bronxvilleschool.org/bronxrivercorebio16/home>