

# A First Annual Analysis of the Alplaus Kill

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**Abstract:** This year was the first that the Environmental Studies Team of Niskayuna High School chose to monitor the Alplaus Kill of Alplaus, New York. The Alplaus Kill is located approximately five miles from Niskayuna High School. It is a tributary of the Mohawk River. The site was chosen because it will soon be impacted by the destruction of an upstream dam. The performed physical, chemical and biological tests of this year will be compared to future trials to see whether the dam's destruction has an impact on the Kill.

**Background:** The observed site in the Alplaus Kill was located off Glenridge Road in Glenville, New York. The site was approximately 100 yards away from a major roadway. The Alplaus Kill enters the Mohawk River approximately 1 mile west of Rexford, as measured by the New York State Department of Environmental Conservation. According to the DEC, the Alplaus Kill is of class and standard B. This particular site's proximity to human activity could affect levels of pollution and other contamination.

**RESULTS:** See Figure 1

**Physical parameters:** Though this was the first time in-depth chemical, physical and biological tests were performed, through informal observation it was noted that the Alplaus Kill definitely has adequate water levels year round. Furthermore, it has excellent riffle areas which provide dissolved oxygen to macroinvertebrate species. The stream bottom serves as an ample habitat for macroinvertebrate species. There are nice loose cobbles on the stream bottom which are ideal for many macroinvertebrates that prefer to live on the underside of rocks.

The stream had a width of approximately 40 feet. Its greatest depth was approximately 1.6 feet. It had an average velocity of .41 ft/sec. with an average discharge of approximately 16.5 ft<sup>3</sup>/sec. This discharge was powerful enough to cause the important riffles that provide dissolved oxygen to aquatic organisms.

**Chemical parameters:** See Figure 2

**pH:** The pH test indicates the hydrogen ion concentration of the sample. It measures the acidity of the stream and therefore, if the pH of the stream is unbalanced (too basic or too acidic) the ecosystem subsequently suffers. Our test recorded a pH of 8.0 which slightly acidic, but still within the accepted values for pH.

**Alkalinity:** Alkalinity is a measure of how much acid the water can neutralize; a high alkalinity helps to protect the stream from abrupt ecological changes. The alkalinity of the Alplaus Kill was recorded to be 220 parts per million (ppm) in one test and 160 ppm in the second. Both are within the accepted range of values.

**Phosphates:** Phosphates normally come from phosphate rock. They are a break-up of tetrahedral PO<sub>4</sub>. They can enter streams in the form of fertilizers, detergents, erosion of phosphate rock, and/or human sewage. An excess of

phosphates results in oxygen depletion due to algae blossoms. Our phosphate level was found to be around .5 ppm which is a high value. Ideally, this is a compound that should not be found in the water.

Nitrates: Nitrates are a form of combined nitrogen and oxygen. A measure of nitrates signifies that there are farm wastes and/or fertilizer deposits in the stream. We calculated 1 parts per million of nitrates in the Alplaus Kill which is high, but acceptable. The measurements were taken after a period of above normal rainfall. Runoff from this rainfall could have made the nitrates level slightly higher than normal.

Dissolved Oxygen: Dissolved oxygen is critical to the life of the aquatic organisms. Dissolved oxygen in the range of 8.0 to 12.0 ppm is considered good. Therefore our readings of 7.9 and 8.1 were acceptable.

**Biological Parameters:** See Figure 3

The EPT richness value of 5 suggests that the stream is "slightly impacted." We found a low number of different types of mayfly larva. We believe this was because of the time of year the collection was done. At this time, mayfly larva is usually present however is very small and easy to miss. This made them hard to collect. On the other hand, the taxa richness scores of 11 and 13 were excellent. The stream showed a great diversity of macroinvertebrates. Furthermore, the biotic index values of 3.7 and 3.4 showed the stream was "not impacted." There was a presence of macroinvertebrates like ephemeroptera and plecoptera which are known for their sensitivity to change in environment conditions. Their presence is a good indication that the stream does not experience rapid fluctuations in environment or pollutions levels and that it is an overall healthy place for aquatic organisms.

**Discussion:** Based on the physical, chemical, and biological tests run on the Alplaus Kill, the Environmental Studies Team has concluded that the monitoring site is slightly impacted by human pollutants. Any pollutants found in the stream are due to runoff from roadways and nearby lawns. The high but acceptable levels of phosphate in the water show that this is occurring. Despite the high levels of phosphate, the Alplaus Kill's macroinvertebrate community is thriving with diversity and the habitat is healthy enough to allow even the most sensitive organisms to survive.

**Conclusions:** The data shows that the Alplaus Kill is a moderately healthy stream. We, the Environmental Studies Team at Niskayuna High School are resolved to continue our annual monitoring of the stream in order to detect and investigate any changes or negative impacts on the stream. We hope to continue monitoring the Alplaus Kill to see what affect the destruction of an upstream dam will have on the stream.

Figure  
1

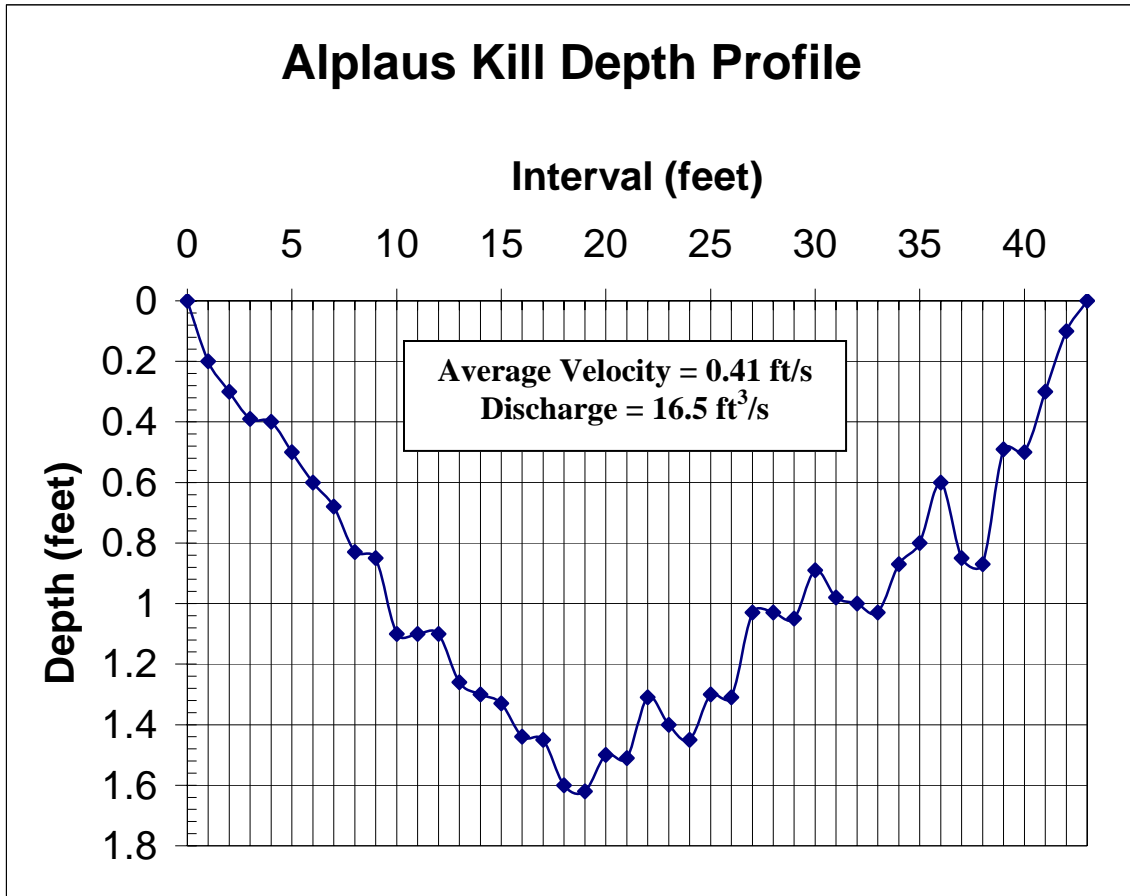


Figure 2

Chemical Parameter	2006	
	Sample 1	Sample 2
Water Temperature (°C)	15.8	15.6
pH	8.0	8.0
Dissolved Oxygen (ppm)	7.9	8.1
Alkalinity (ppm)	220	160
Nitrate/Nitrogen (ppm)	1.0	0.8
Phosphate (ppm)	0.5	0.5

Figure 3

## Benthic Macroinvertebrate Data

	Biotic Index	Taxa Richness	EPT Richness	Percent Model Affinity	Level of Impact
2006 Sample 1	3.7	11	5	48.7%	Slightly Impacted
2006 Sample 2	3.4	13	5	42.8%	Slightly Impacted