# Spring 2007 Field Report of Minekill, Schoharie County, N.Y.

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**Abstract:** A survey of Minekill, Schoharie County, N.Y. was conducted in order to determine the water quality, invertebrate quantities, and fish habitat of the stream. Both upstream and downstream tests were conducted. To facilitate this, a YSI water analyzer was used in conjunction with several test kits with the purpose of measuring the water quality. The results showed very poor alkalinity (0.0) and as a consequence a fluctuating pH which is currently 6.85 and 7.95. These are within the optimal ranges (6.5-8.5) but are subject to change due to the alkalinity. Conductivity (50 and 57 mhos) and hardness (51.3 and 34.2 ppm) were also in ranges that were lower than preferable. These findings are important because although the rest of the results of the stream were good, the fish are likely stressed due to the pH and cold temperatures during the winter. The hardness was also limiting for the fish at these ranges. Due to this increase in dissolved ions, the conductivity was also at a less than optimal range.

## Introduction

The survey of Minekill Schoharie County, N.Y. was conducted to determine the water quality and how it affects the fish in it.

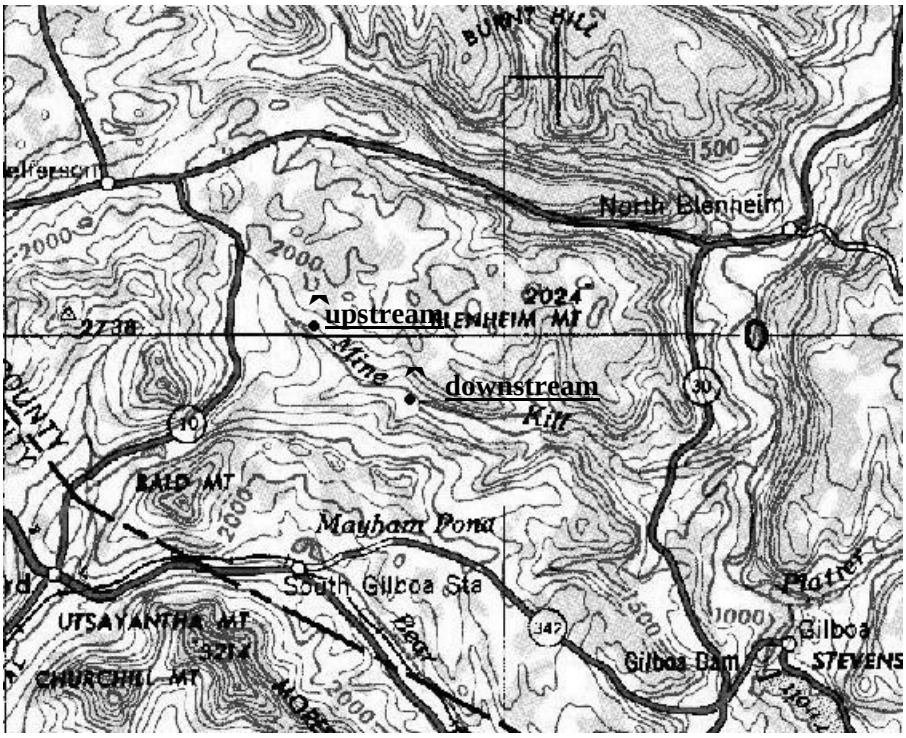
This particular body of water has medium relative importance. It is not used for boating; and unlikely any drinking by nearby landowners. Fishing, however, seems to be the primary use of Wharton Hollow Creek.

The specific goal of this survey was to determine the water quality of Minekill, Schoharie County, N.Y. To meet this goal, various tests were done to sample the water and determine its quality including temperature, pH, dissolved oxygen, conductivity, total dissolved solids, hardness, and alkalinity. Measurements for mean depth, mean velocity, and discharge were also conducted.

## Materials and Methods

Minekill is located along Blenheim Hill Road, Schoharie County, N.Y. It can be reached by, traveling onto Blenheim Hill Road, Cobleskill, N.Y. Once on Blenheim Hill Road the stream is on the right side while traveling southeast (Figure 1). The coordinates for the downstream section surveyed was 42° 26.464'N and 74° 32.110'W. The elevation was at 1,527 ft. Upstream was recorded as being 42° 40.062'N and 74° 22.971'W. .

**Figure 1:** Aerial view of the survey site on Minekill, Schoharie County, N.Y. Spring 2007.




The survey was conducted in the 6 of April 2007. The field work was completed in two hours between the times 9 am and 11 am.

State University of New York at Cobleskill students conducted the survey in one stream broken up into three groups covering two areas. The first group analyzed the benthic invertebrate community. They collected 4 samples at 4 different places 6 inches into the substrate in the riffles, and to do this they picked the invertebrates with pairs of soft forceps in labeling jars. The second group determined the alkalinity, hardness, and turbidity with the use of test kits for each at the upstream and downstream portions of the stream. While on the site, they also determined the dissolved oxygen, pH, conductivity, TDS, and temperature with the YSI. In addition to that they determined other useful data such as volume of flow, width, and depth. The last group's task was to determine the downstream changes in the fish community. To do this they electro fished for 850 seconds and recorded the numbers of each species captured.

## Results and Discussion

The results from team one revealed the EPT Index by percent to be 53.3% upstream and 97.9% downstream for the invertebrates. Considering the optimal levels are anything above 10% this is excellent. The standing crop biomass of the invertebrates was poor for the upstream (0.063 g/ft²) and the downstream section (0.032 g/ft²). Anything from 1-2 grams is average and anything below 1 g/ft² is poor. The biotic water quality index for the upstream portion was poor (21.4) but

excellent for the downstream portion (95.45). Anything above 79 is considered an indicator of excellent water quality but below 40 is considered poor water quality. The number of invertebrates in the upstream portion was poor (26.75/ft.$^2$) and also poor (47.5/ft.$^2$) for the downstream portion. A density of anything from 50-100 inverts/ft.$^2$ is considered average but anything below that is poor.

The chemical parameters for dissolved oxygen and turbidity were good for both up and downstream considering the optimal levels for each are anything greater than 5 ppm and 0-10 NTU respectively. The pH was also good but should not drop below 6.5 for it to be in the healthy range for all fish (Table 1). It is highly likely it will fluctuate due to the nonexistent levels of alkalinity. The alkalinity measures the ability of the pond to buffer acids.

Generally speaking, most cold water fish stop feeding at 2.5°C, and the optimal range is between 15-20°C. Given these facts, the fish in this body of water are clearly stressed. The temperature ranged from 0.62°C to 0.21°C from upstream to downstream (Table 1). The conductivity and hardness were also low. Conductivity is a measure of how well electricity is conducted through water, which is dependent upon the level of dissolved ions in the water. Therefore, conductivity is a rough measure of dissolved solids. The amount of dissolved oxygen was, once again, on the optimal ranges (Table 1).

**Table 1:** Chemical parameters measured by group two on Minekill, Schoharie County, N.Y. Spring 2007.

| | *Upstream* | *Downstream* | *Optimal Levels* |
|---|---|---|---|
| Temperature (°C) | 0.62 | 0.21 | 15-20 |
| pH | 7.95 | 6.85 | 6.5-8.55 |
| Conductivity (mho) | 57 | 50 | 100-300 |
| D.O. (ppm) | 9.41 | 9.66 | >5 |
| Alkalinity (ppm) (low range) | 0 | 0 | 100-400 |
| Hardness (ppm) | 34.2 | 51.3 | 100-400 |
| Turbidity (NTU) | 4.5 | 6 | 0-10 |
| TDS (g/L) | 0.069 | 0.062 | |

The physical parameters measured by group two are shown in Table 2. Based on the width of the stream, mean depth, and mean velocity the discharge was 416.30ft.$^3$/sec.

**Table 2:** Physical Parameters measured by group two on Minekill, Schoharie County, N.Y. Spring 2007.

| | *Upstream* | *Downstream* |
|---|---|---|
| Width | 17.25 ft. | 18.40 ft. |
| Mean Depth | 0.55 ft. | 0.85 ft. |
| Mean Velocity | 3.78 ft./sec. | 9.00 ft./sec. |
| Discharge | 36.12 ft.$^3$/sec. | 171.36 ft.$^3$/sec. |

Group three determined the downstream changes in the fish community. They electro fished for 850 seconds for each section and recorded the numbers of each species captured. Once this was accomplished the relative abundance and catch per unit effort (CPUE) was calculated. In order to calculate the catch per unit effort one must divide 100% drop in CPUE by the percent drop in CPUE and then make this equal to population size divided by the quantity of fish captured. The upstream portion appeared to be dominated by mostly Black Nose Dace (Rhinichthys atratulus) and not much of Creek Chub (Semotilus atromaculatus) or Cutlips Minnow (Exoglossum maxillingua) (Table 3).

**Table 3:** Upstream fish community Minekill, Schoharie County, N.Y. Spring 2007.

| Species | # captured | UPSTREAM Relative Abundance | CPUE (fish/hr.) |
|---|---|---|---|
| Cutlips Minnow | 1 | 5.20% | 4 |
| Creek Chub | 5 | 26.30% | 20 |
| Black Nose Dace | 13 | 68.40% | 52 |
| Total | 19 | 99.90% | 76 |

The Downstream had similar diversity. The dominant species was clearly Black Nose and Long Nose Dace (Rhinichthys cataractae) with a relative abundance of 37% and 40.7% respectively. They had a CPUE of 58.8 fish/hr and 64.7 fish/hr. (Table 4). Due to the high elevation (>1,200ft.) one would expect trout in a cold water stream such as this. This may also indicate that the water quality is poor.

The cause of this could possibly be the cows in the nearby farms being allowed to drink directly from the stream. This caused a lot of erosion and runoff into the stream as well as contamination. In addition to this, the local farmers also mow their grass all the way up to the stream.

**Table 4:** Downstream fish community Minekill, Schoharie County, N.Y. Spring 2007.

| Species | DOWNSTREAM # captured | CPUE (fish/hr.) | Relative Abundance |
|---|---|---|---|
| Creek Chub | 6 | 35.29 | 22.20% |
| Black Nose Dace | 10 | 58.8 | 37% |
| Long Nose Dace | 11 | 64.7 | 40.70% |
| Total | 27 | 158.8 | 99.90% |

## Conclusions

The findings from this survey show the water chemistry of Minekill to have poor alkalinity and therefore wide fluctuations in pH. The

results also indicate that the temperature is poor as well. Although these low temperatures are to be expected in the colder months, lime should still be added to the stream in order to buffer the pH and prevent any die-off. The conductivity and hardness also needs to be adjusted for the optimum sustainable yield to be obtained. The benthic invertebrate community indicated a low frequency of species diversity and therefore an indication of poor water quality. Even more revealing are the results of the fish community and direct observations of the local landowners' treatment of the stream. These results leads me to believe that this stream is in serious trouble and is in need of immediate repair. To fix this, planting of trees such as Willows should be done all along the stream. Not allowing the cows to come down to the stream would also greatly improve the stream quality.

## Acknowledgements

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