THE EFFECTS OF TROPICAL STORM IRENE ON THE WINOOSKI HEADWATERS:
Physical and Chemical Characteristics and Changes

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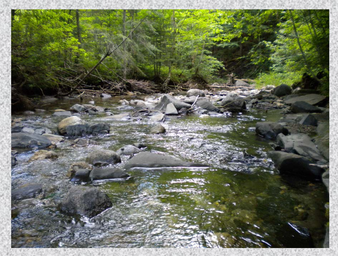
ABSTRACT AND GUIDING QUESTION

Cabot High School chose to study the effects of Tropical Storm Irene on the basic lab data of the two stream sites that were studied; phosphorus, coliform levels and total suspended solids. The guiding question was; how would the rising waters, high winds and destroyed infrastructure affect the streams ecosystems?

JUG BROOK SITE - CHARACTERISTICS AND DESCRIPTION

The Jug Brook site was certainly off the beaten path. In order to get to it, it was necessary to trek through several meters of undergrowth and mud. Once there, it was a lovely area. The stream went through a culvert about 9 meters before the actual site. The culvert guided the stream under a rural dirt road. The actual 6 meter reach of our attention was shallow and filled with rocks, which disrupted the stream flow, creating 'riffles' or ripples in the water; ideal habitat for macroinvertebrates.

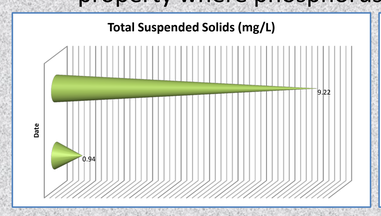


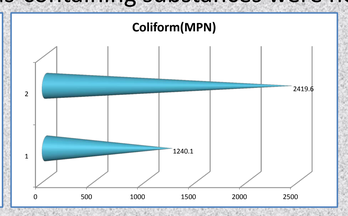
JUG BROOK SITE - POST STORM CHANGES

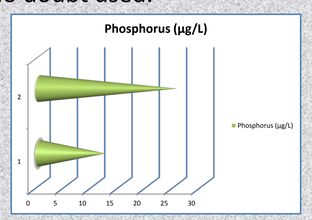
After the storm, it was a completely different 6 meters. The rising water had gone completely over the rural dirt road, 4.5 meters above the natural level. The culvert was on the edge of collapse, and the far bank had been completely eroded. Huge boulders imbedded in the bank had been eroded out and pushed several meters downstream by the force of the volumes of water flowing downstream. The small rocks making the riffles in the water had also been pushed downstream, making the bottom of the river smooth and sandy. The woody debris; also habitat for macroinvertebrates and other water bugs, had been swept away completely.

For the Jug Brook site, coliform levels were at a somewhat reasonable level; around 124MPN. After the storm, the coliform bacteria levels had increased significantly.

The Jug Brook site had virtually no phosphorus whatsoever before the storm, as it was in an extremely rural area running through the woods. After the storm, phosphorus had increased by almost 7mg/L, due to the river running over roads and residential property where phosphorus-containing substances were no doubt used.

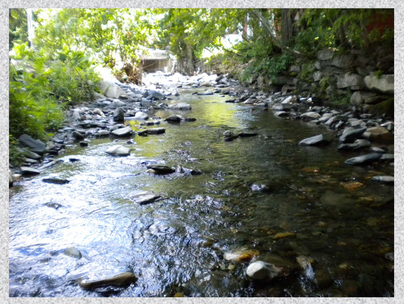


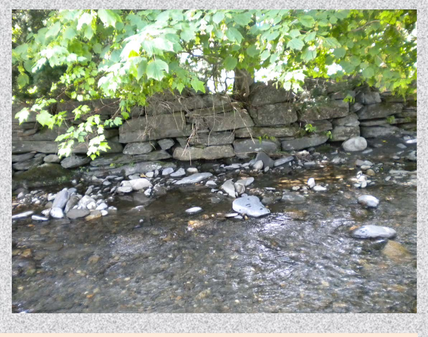




WINOOSKI RIVER SITE - CHARACTERISTICS AND DESCRIPTION

The Winooski River site is immediately adjacent to the Cabot town recreation field, and is a popular swimming and picnicking place. The river is shallow and filled with riffles. The canopy cover is total and the river has been disrupted frequently by young dam-builders keen on cooling off during the summer. Most of the rocks were embedded into the bottom of the stream, which meant that the stream wasn't as healthy as the Jug Brook site; as the macroinvertebrates didn't have a place they could crawl under to hide. We hypothesize that this compaction is due to the impact of many young feet in the stream over the course of the summer.





WINOOSKI RIVER SITE - POST STORM CHANGES

After the storm, the Winooski River site was in far better shape than the Jug Brook site, as the banks of the river had been previously reinforced with stone and formed concrete to protect the residential areas from severe flooding. The walls did not help with flooding, as the water rose far past the stone wall, but did save the banks from being completely eroded away with the increased water velocity. Because most of the stones were embedded in the river, the river bottom was relatively unscathed.

At the Winooski site, coliform bacteria averaged 1240MPN. After the storm this count doubled. This was expected, as the river flowed over several agricultural pastures on its way down into the town center.
Phosphorus levels at the Winooski site were already relatively high, around 12mg/L, attributed to the more populated location. After the storm, phosphorus levels increased by another 12mg/L, after the water had washed over conceivably every yard between the headwaters and the testing site.