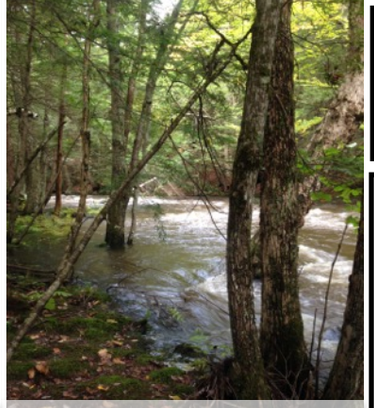
Cathance River Water Quality

by Shannon Harty and Junie Nelson

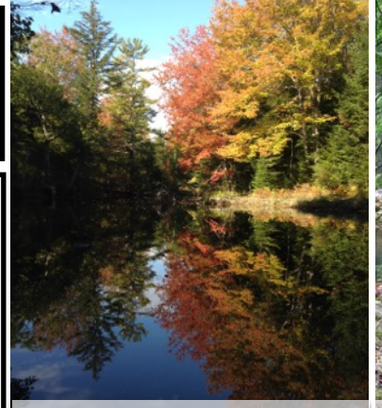
Running alkalinity and dissolved oxygen tests by the slow moving site



Fast moving water site after heavy rains

Problem & Hypothesis

- To determine how abiotic factors such as precipitation levels and temperatures affect the water quality of the Cathance River based on water level, nitrite, nitrate, turbidity, color, water speed, conductivity, pH, alkalinity, and dissolved oxygen tests.
- Fluctuations in water quality will be influenced by the abiotic factors. More rainfall, will bring higher water level and faster moving water, and influence the color of the water. In addition, since warmer water holds less dissolved oxygen than colder water, the level of dissolved oxygen will vary as the colder seasons near.



Leaves changing at the slow moving site

Collecting water samples for tests at the slow moving site

Procedure

Test sites will be before and during the rapids

1. From the ecology center, walk down Barnes Leap trial and then take a left. Walk down the Cathance River Trail until one finds a metal pole in the water at N 43°57'30.0 W069°57'09.5 (see map for location)
2. Use a meter stick to measure the water level at the metal pole in centimeters
3. Use the Hach Aquachek kit to test for nitrate/nitrate
4. Measure turbidity with the LaMotte Turbidity kit
5. Run color test with the Hach Color test kit
6. Measure water speed with a stick 3-4 inches long and a timer
7. Measure conductivity with the ECTestr
8. Use the LaMotte Colorimetric Octet kit to take pH measurements
9. Run LaMotte alkalinity test
10. Run LaMotte dissolved oxygen test
11. Repeat steps 2-10 downstream at the rapids section of the river at N43°57'32.0 W069°57'05.6 also on the Cathance River Trail (see map below for locations).

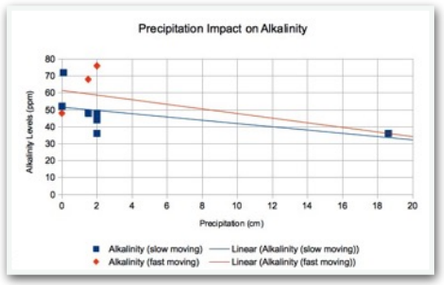
Map of Trail & Testing Sites

Acknowledgements

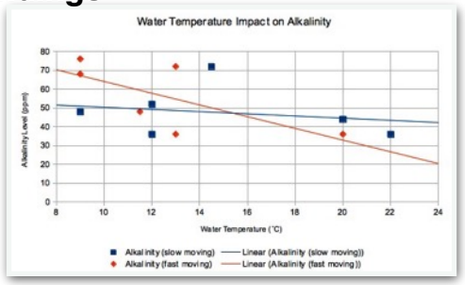
We would like to thank Mr. G. Evans, mentor and teacher, as well as Matt Dubel and Cathance River Education Alliance for making this project possible.

Conclusions

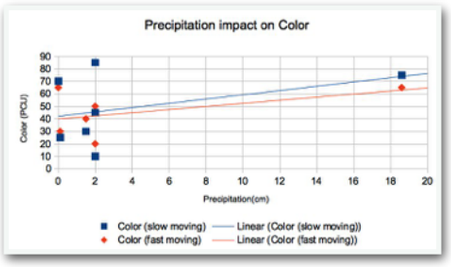
Results and Findings



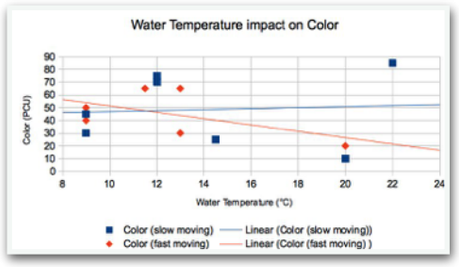
- High precipitation decreased alkalinity levels.
- Ex. In the rapids, the alkalinity was 72 ppm after 0.1 cm of precipitation on September 25, but after receiving 18.6 cm of rain, the levels dropped to 36 ppm.
- See table for comparison of healthy average and recorded average levels.



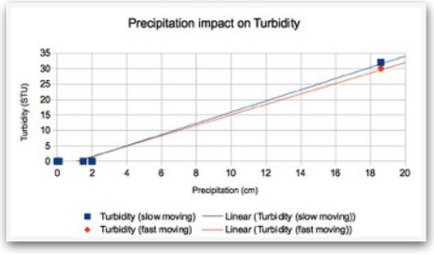
- Higher water temperatures lower alkalinity.
- (Ex. at the slow moving test site, on September 25, there was a water temperature of 13˚C and an alkalinity level of 72 ppm. On October 7 there was a water temperature of 11.5˚C and an alkalinity level of 48 ppm.)
- See table for comparison of healthy average and recorded average levels.



- Color levels increased with precipitation levels.
- Ex. On September 25, after 0.1 cm of precipitation, the color level was 30 PCU. On October 1, after 18.6 cm of rain, the color increased to 65 PCU.
- See table for comparison of healthy average and recorded average levels.



- In the fast moving water, color levels decreased with higher water temperature. In the slow moving water, it gradually increased with warm water.
- Ex. In the rapids, the water temperature was 13˚C on October 1 and the color was 65 PCU. On October 22, the water temperature was 9˚C and the color was 40 PCU.
- See table for comparison of healthy average and recorded average levels.



- Precipitation levels raise turbidity levels
- Ex. Turbidity levels were 0 at both testing sites except for after the storm, when the turbidity level was 30 STU in the rapids and 32 STU before the rapids.
- Higher turbidity can be a result of soil erosion, shown by the large amounts of rainfall which can lead to soil erosion.
- See table for comparison of healthy average and recorded average levels.

Average Results vs. Healthy Results

	Water Temp. (C˚)	Color (PCU)	Conductivity (umhos)	Turbidity (STU)	Dissolved Oxygen (ppm)	pH level	Alkalinity Level (ppm)	Nitrate Level (ppm)	Nitrite Level (ppm)
Slow Moving Water (Average Results)*	14.1	48.6	125.7	4.6	4.8	6.2	48	0	0
Fast Moving Water (Average Results)*	12.5	45	111.6	5	5.7	6.2	56	0	0
Healthy Reading	5-28	0-25	150-500	0-8	5-6	6-7	20+	0-10	0-1

*Results are rounded to the nearest tenth

- The average levels of water temperatures, pH, alkalinity, nitrate and nitrites all fell in the healthy ranges, but average levels of water color did not.
- See table above for comparison of healthy average and recorded average levels.

Sources of Error

- The most accurate place to perform the water speed test would be in the middle of the river where no rocks were present but the researchers were only able to measure off a rock or the bank- the closest they could get to the water.
- The water depth might also be slightly inaccurate, in the slow moving area the meter stick could have slid farther into the mud by the pole, or at the rapids it may have been on a slanted rock underwater.
- The researcher could have made an error in performing a test. Drops of chemicals used in an experiment may have been larger or smaller than the other times the experiment was run.

Improvements & Additions

- More test sites to help expand data points, making results and calculations more accurate
- A smaller mode of transportation for the tests and tools- the large cooler was hard to navigate through the trails and its extra space allowed for the forceful movement and breaking of the instruments and tests.
- More accurate methods of testing- it can be difficult to find exact measurements with provided test kits as many rely on the visual sense