

Average Water Quality and Level Data

	Weekly Precip. (cm)	Air Temp. (°C)	Water Temp. (°C)	Water Level (cm)	Water Speed (cm/s)	Dis. Oxygen (ppm)	Nitrate/Nitrite (ppm)	pH	Alkalinity (ppm)	Conductivity (µS)	Color (PCU)
1 (Before Rapids)	2.61	12.33	14.5	39.5	1.33	5.66	0.07/0	6.43	28.86	128.57	34.29
2 (During Rapids)	2.61	13.17	13.42	66.72	19.03	7.33	0/0	6.33	29.17	140	42.5
3 (After Rapids)	2.61	12.75	12.75	18.55	14.26	8.13	0/0	6.63	33.75	142.5	21.25

Cathance River Water Level and Quality Monitoring

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PURPOSE

To gather data on the Cathance River's water quality and how abiotic factors (weekly precipitation) change the water quality and levels (DO, Conductivity, Turbidity, pH, Nitrogen, alkalinity, color, water temperature, water speed, and water depth) in three places on the river (calm water before rapids, during the rapids, and after rapids).

HYPOTHESIS

The water quality will change depending on precipitation and water temperature, and the section of the river. After the rapids, the water quality, especially the oxygen level, will be higher than upriver in the calm area. Precipitation will increase the water level, speed, turbidity, perhaps the nitrate content, and will impact the water temperature in some way perhaps in part due to runoff from the cow farm upstream.

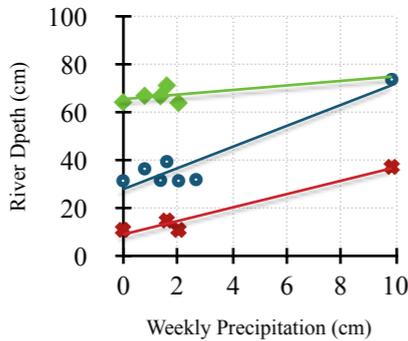
TESTS

- Weekly Precipitation** - amount of rainfall received in the area during the past 7 days
- Water Temperature** - amount of heat the water has
- Water Level** - the depth of the water
- Water Speed** - the distance a float travels in a certain amount of time (distance ÷ time)
- Dissolved Oxygen** - amount of oxygen in water
- Nitrate/Nitrite Concentration** -
- pH** - measure of acidity of the water
- Alkalinity** - tests the buffering ability of the river
- Conductivity** - how well electric current travels through water
- Color** - the color or tint of the water
- Turbidity** - quantity of dissolved solids are in the water

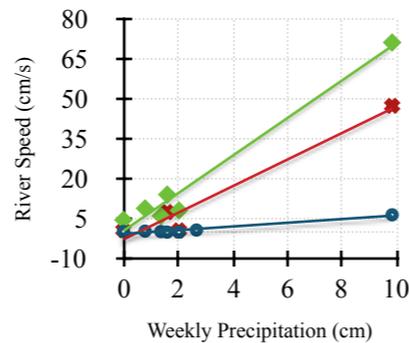
PROCEDURE

- Travel to test site 1 (before rapids)
- Find Water Temperature
- Measure Water Level
- Test Dissolved Oxygen using LaMotte Dissolved oxygen kit
- Calculate Water Speed using distance over time
- Perform Nitrate/Nitrite Concentration Test using WaterWorks test strips
- Perform Conductivity using ECTestr probe
- Perform color Test using Hach Color Tester
- Perform pH test
- Perform Alkalinity Test using LaMotte Alkalinity Test
- Perform Turbidity test
- Record all data
- Clean up all equipment
- Travel to test site 2 (during rapids) and repeat steps 2 through 13
- Travel to test site 3 (after rapids) and repeat steps 2 through 13
- Find the precipitation data from Brunswick Police Department's weather station (<http://www.wunderground.com>)

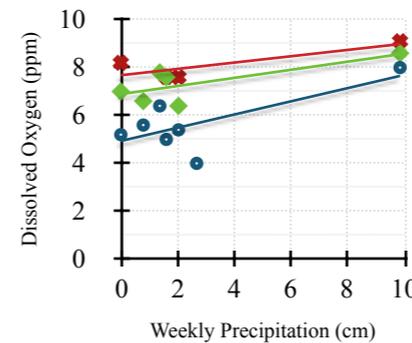
Weekly Precipitation Impact on Water Level



Weekly Precipitation Impact on River Speed

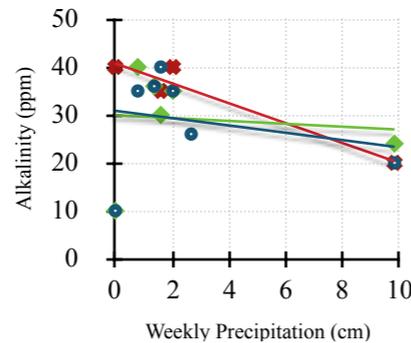


Weekly Precipitation Impact on Dissolved Oxygen

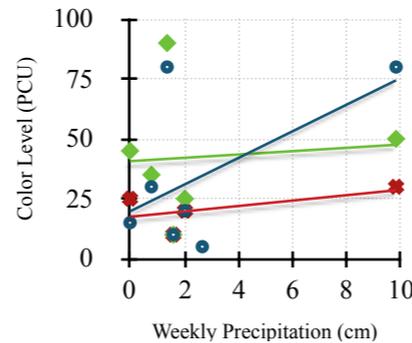


● Before Rapids (N 43° 57.530' W 69° 57.165')
◆ During Rapids (N 43° 57.540' W 69° 57.063')
× After Rapids (N 43° 57.508' W 69° 56.965')

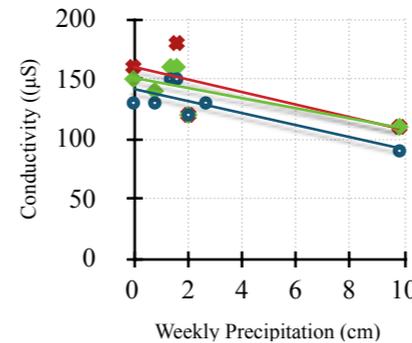
Weekly Precipitation Impact on Alkalinity



Weekly Precipitation Impact on Color



Weekly Precipitation Impact on Conductivity



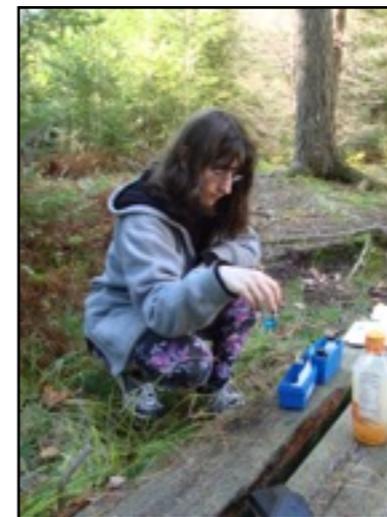
CONCLUSIONS:

The Cathance River is fairly healthy. Some trends appeared: water temperature and precipitation levels had clear effects on other parts of river health. However, it's difficult to make definitive correlations with the limited data.

- Conductivity remained slightly lower than the healthy range of conductivity, but this is because cold water has lower conductivity, and the weather was getting colder and colder. Also, more precipitation seemed to lower conductivity.
- Dissolved oxygen was healthy throughout the study, apparently decreased by higher water temperatures, and increasing as it flowed through the rapids
- Nitrite/Nitrate concentration remained low, as it should.
- pH remained only slightly acidic, which was expected and healthy. Neither precip. nor temperature seemed to change it from 6.5 pH.
- Alkalinity was toward the low end of healthy levels, at one point dropping dangerously low, but recovering by the next week. Rainfall seemed to decrease levels, while higher water temperatures increased it.
- Turbidity stayed low and healthy, only increasing after a large rain storm.
- Color is supposed to be low, but the researchers couldn't find exact healthy levels. It ranged from 5-90 PCU. It was decreased by higher water temperatures, and greatly increased by precipitation.



Map of Test Site Locations.



Patricia performing alkalinity test at Test Site 1 (before rapids).



Katelyn measuring water depth at test site 2 (during rapids).

A special thanks to Mr. G. Evans for guidance and helping complete some tests when one of our researchers was absent. Thank you to CREA for allowing us to gather this data on their reserve.