

Water Quality Study of the Upper Hudson River and Sacandaga River

2006

Hadley-Luzerne River Watch
Students

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Abstract/ Summary:

The Hadley-Luzerne River Watch team monitors the water quality of these two very vital rivers which impact the economy, beauty and recreation of the towns of Lake Luzerne and Hadley. This is the eleventh consecutive year of collecting and testing water samples on the Upper Hudson and Sacandaga Rivers.

Actually in eleven years the water quality has not deteriorated to any significant extent. In the spring of 2006 the E. Coli count was very high at a private residence where we sample. We brought this to the attention of the town supervisors and they responded positively.

Since the beginning of our study many of the camps along the river have been converted to year-round homes and the population of our community has grown. There is much activity on and around the water. Recent “rodeo holes” for the white water rafting have been dug on the lower Sacandaga where it meets the Hudson, near the newly restored Bow Bridge. This may bring in world class competition for kayaking and white water canoeing and rafting.

Our team conducts water quality test on the tier 3 level. They include nitrates, phosphates, alkalinity, dissolved oxygen, chlorides, and pH. It should be noted that we have moved “site 4” down stream approximately 300 yards to 14 Service Drive in Hadley. It is still below the golf course.

Background:

The Hudson River, which is a class A-S stream, flows between and through the towns of Hadley and Lake Luzerne. It serves as the natural border between Warren and Saratoga counties. Along the Hudson's banks are found limestone deposits which make it capable of buffering the water, keeping the pH neutral. Additionally, other impacts on the water quality of the Hudson River come from upstream at Rockwell Falls and the Bend of the River golf course.

The second river of our study is the Sacandaga, a class A-S stream too. The Sacandaga flows out of the Sacandaga Lake, and is controlled by the DEC at Stewart Bridge Dam, located approximately 3 miles upstream, and the Conklingville Dam which is further upstream. The regulated flow helps to control the salt wedges on the lower Hudson River. In times of drought the released water from the Sacandaga will push the encroaching salt wedge back down stream; this is important due to the fact that cities as far south as Poughkeepsie rely on the Hudson River as a main source of drinking water.

Furthermore, both rivers run parallel with roadways, and in certain sections of the Hudson and Sacandaga Rivers, roads actually surround the rivers on both sides. They require maintenance work in the winter months due to ice and snow removal.

Results:

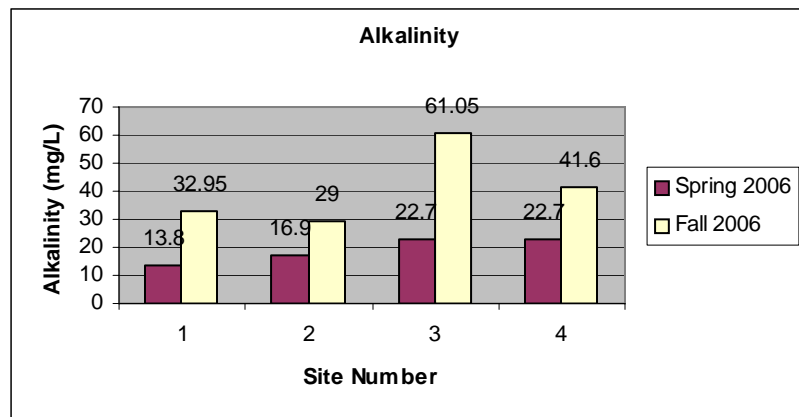
We collected data on these dates:

May 22 and May 24, 2006: Lab analysis was done the day after sampling.

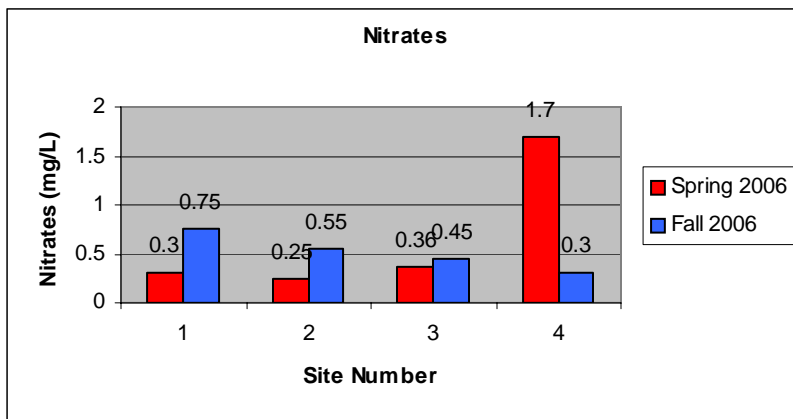
Oct. 4 and Oct. 11, 2006: Lab analysis was done the next day.

Site 1: This site has been changed to the canoe take-out just about Rockwell Falls in the town of Hadley, NY. There is no visible drainage into the river at this site and the water runs consistently fast due to the falls downstream. The weather for the month of May was rainy and cold and these factors could have had an effect on our water quality.

Spring readings for nitrates were 0.30 mg/L, but rose considerably to 0.75 mg/L in the fall sampling. Alkalinity was low at 13.8 mg/L and nearly double in the fall. DO was



very good at over 9.00 mg/L. Phosphates showed lower readings as expected in the spring at 0.385 mg/L and nearly double that in the fall. What really took us by surprise was the E. Coli. It was too numerous to count. We thought that maybe we did something wrong in inoculating our sample, so we sent another sample to the Queensbury Water Department and Lake Luzerne and Hadley because the samples were near public and private swimming areas. When we performed the coliform cultures in the fall, they verified our results. We immediately called the supervisors of the towns of readings were back under 200 counts /1 mL of water, which is in the safe and acceptable zone.



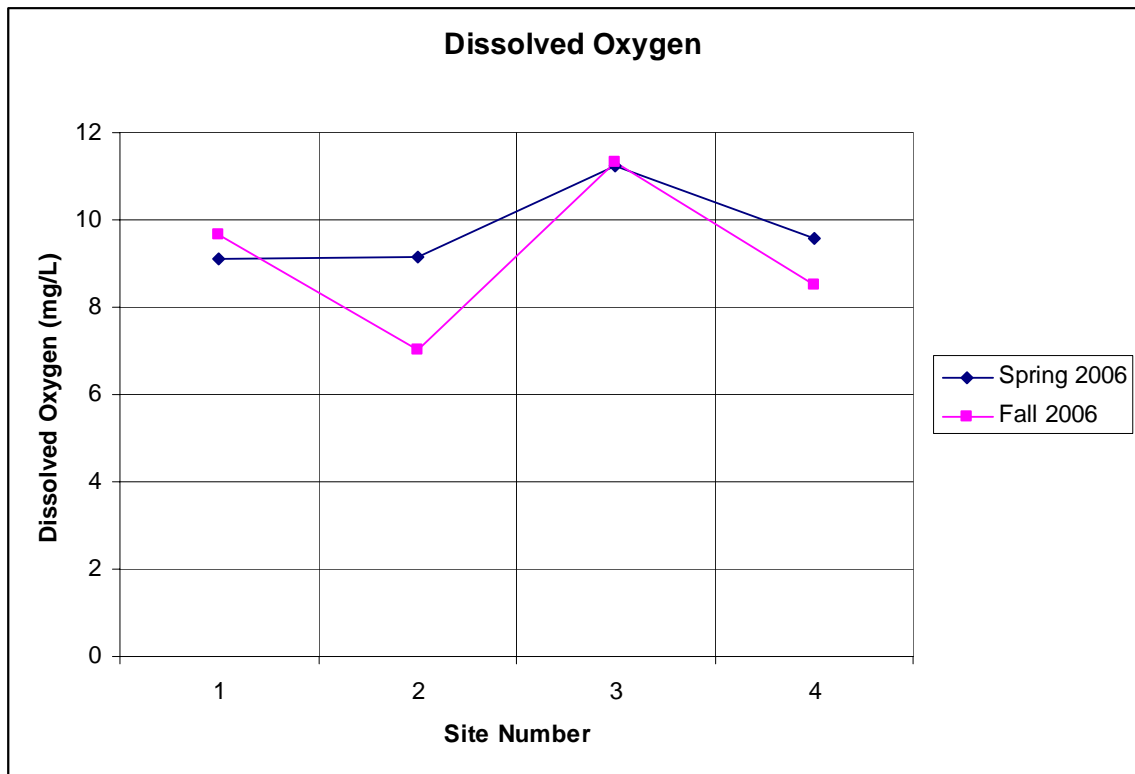
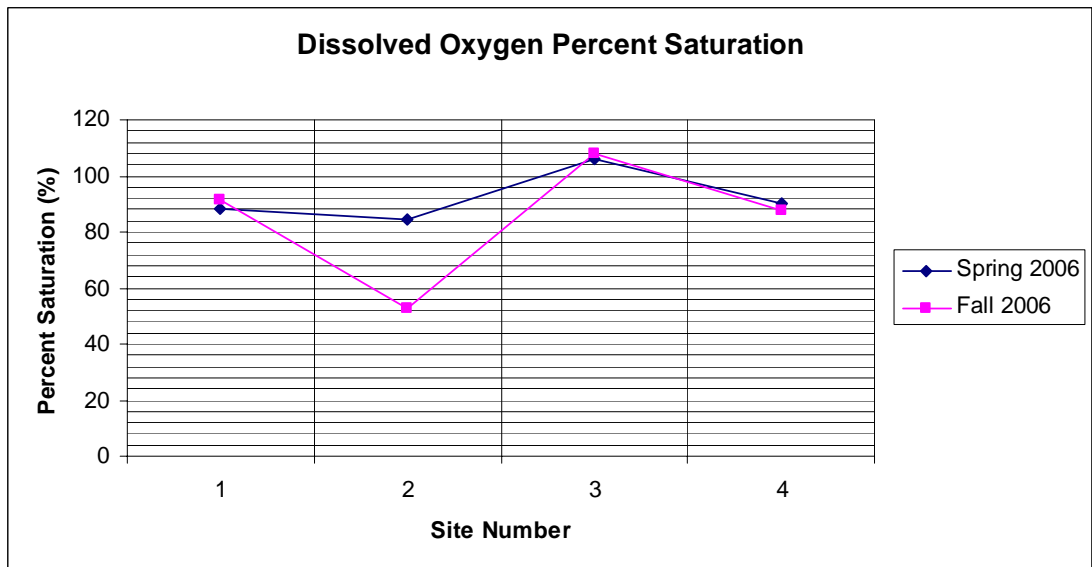
For eleven years the pH has not fluctuated much from the average readings which

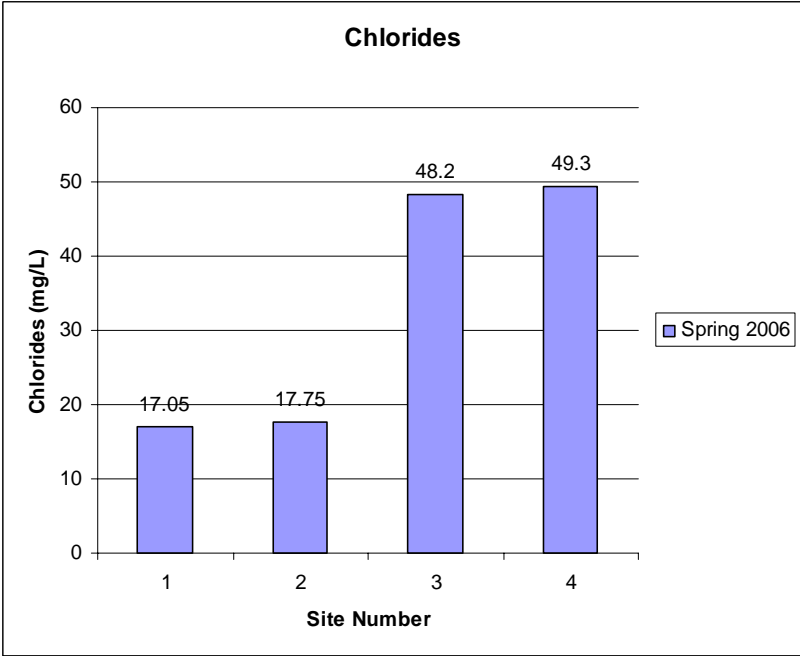
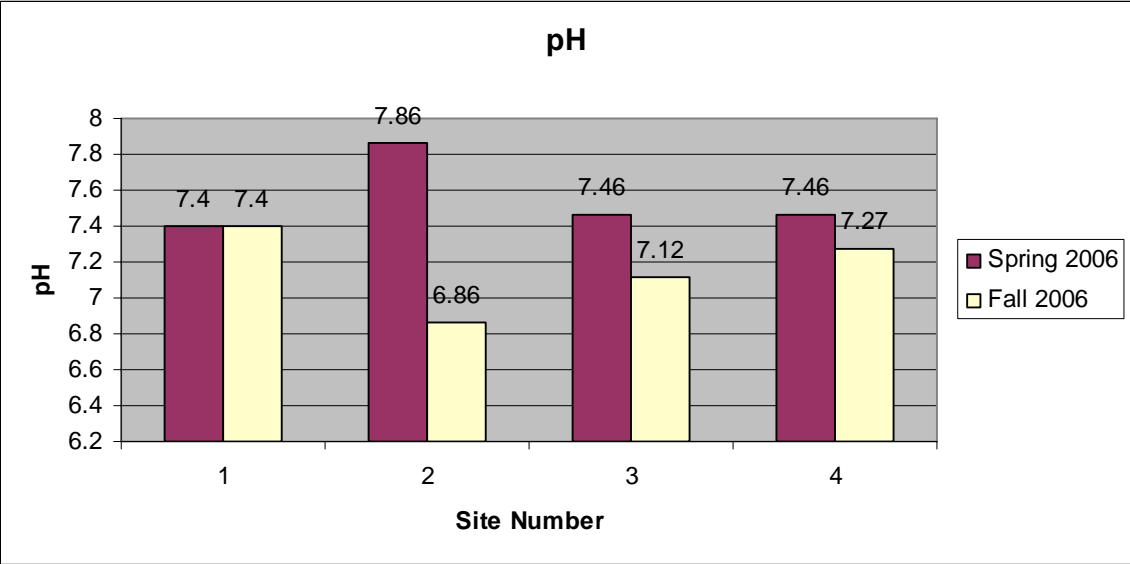
are around 7.5 – making the water slightly basic. The impact of limestone on the river has remained steady. One added observation is the chloride reading is always higher in the spring than in the fall. This is due to the runoff from the salt on East River Drive. We have included a photo this year showing the proximity of the road to the river.

Sites 2 and 3: Readings were in the ranges of sites 1 and 4.

Site 4: We decided to report on just two sites to shorten our report for easier reading.

Spring reading for nitrates spiked at 1.7 mg/L. This may seem low to sites being tested downstream from us, however, that is a high reading. We did change the location of our site. Although it is only 300 yards downstream from the former site, the new site is the location of a seasonal camp that is probably over 50 years old. It definitely looks like it could use some upgrading. The former site was a newly renovated year round residence. It is possible that our new site could have septic problems. This could explain the higher than usual phosphates readings on site 4. Also, the water sample contained E. Coli and both spring and fall's count were too numerous. The DO was slightly higher than past years at 8.49 mg/L. Alkalinity was nearly double than the fall before. This could be due to the new site. This site is also located across the river from East River Drive. Drainage pipes are also visible across the road from the site's location.





Discussion:

Alkalinity and pH measurements were in the acceptable ranges, showing that the buffering capacity of the rivers has remained affective. Dissolved oxygen readings remain high and percent saturation coincides with the D.O. The rivers support many species of fish and aquatic life.

Phosphate and nitrate levels continue to remain low. There has not been any visible algae growth or particulate mater floating around the water. It is amazing that in spite of all the rain over the past year, the run off has not negatively impacted the rivers.

Our main cause for concern was the abnormally high coliform/E. Coli counts. We can't control the weather, but we were able to inform the authorities of a potential problem at the public beaches.

The Hudson and Sacandaga Rivers run through the commercial and residential districts of Hadley and Lake Luzerne. Obviously the water quality and ecosystem of the rivers could be adversely impacted. By collecting and analyzing water samples during the spring and fall for the past eleven years, we have been able to determine and provide a window into the health of these rivers.

Lake Luzerne flows into the Hudson just above site 1 via Mill Creek. It should be noted that there are many permanent and seasonal homes around the lake, as well as two public beaches that are heavily used all summer long. The environmental science classes at Hadley-Luzerne High School have been sampling the lake and testing the water quality variables as part of their curriculum for the past four years. They have been using LaMotte kits and have not found any readings to be unacceptable.

Conclusions and Recommendations:

- The water quality of the upper Hudson and Sacandaga Rivers has remained acceptable and continues to support a diverse fish and animal population.
- Bacteria testing done in both spring and fall of 2006 resulted in one of the highest counts of coliform and E. Coli that has been reported since our studies began in 1995.
- In past recommendations, we proposed that further testing on the water quality variables at other times of the year would give us better seasonal measurements and information to draw conclusions. However, we have not been able to work more testing into our students' busy schedules.
- It was also proposed in the past to do our testing at the same times during the day. We haven't strictly adhered to exact times, but our times have been more uniform. We now collect samples during mid-afternoon and do not go out in the mornings. Actually, except for the times the dam has been open on Sacandaga Lake, the difference of a few hours hasn't really made an impact on our results. It is necessary, however, to inoculate our cultures to grow coliform as soon as possible after collecting the water.
- The past few years have seen copious amounts of rainfall in our area. This has had a significant impact on our testing sites. While we have not been able to measure run-off, it is impossible to ignore the impacts it has had on nitrates, phosphates, and especially fecal coliform and E. Coli. We are amazed that there isn't more algae growth which affects the turbidity of the water.

- We were not able to perform the chloride ion test for the fall sampling because the order for the reagents from Hach Company had not come in.

There was a personnel issue in the business office of our school that was not resolved until the testing dates ended. As in previous years, the spring readings for chlorides remain higher than the fall results; this is due to salting East River Drive and other roads that drain into the rivers.

Resources used:

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