

**Poultney Mettowee Watershed Partnership
2011 Water Quality Monitoring Report
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October 21, 2011**

Introduction

The Poultney Mettowee Watershed Partnership (PMWP) in conjunction with the Poultney Mettowee Natural Resources Conservation District (PMNRCD) collected water quality samples at 11 sites between June and August, 2011. The samples were collected by Chuck Domenie, Marli Rupe, and myself. The samples, once collected, were analyzed by the Vermont Department of Environmental Conservation's LaRosa Environmental Lab in Waterbury, VT. Sample tests were done through the Volunteer Water Quality Monitoring Laboratory Services Partnership grant program.

Funding for this year's water quality monitoring program was provided through the Lake Champlain Basin Program Organization Support Grant and a Vermont DEC Watershed Grant. Funding was essential to the success of the program.

This summer the Poultney Mettowee Watershed Partnership Monitored six streams in the watershed. We sampled the Poultney River for the ninth year in a row, the Mettowee River for the fourth year, Flower Brook for the fourth year, Beaver Brook for the fourth year, Wells Brook for the second year, and the Castleton River for the sixth year. One new addition to the sample locations added this year was Lake 01, which is located just south of Lake Saint Catherine on Forest House Lane. This site consists of a small stream to the right side of the road. This stream however was often dried up so few samples were recorded at this site.

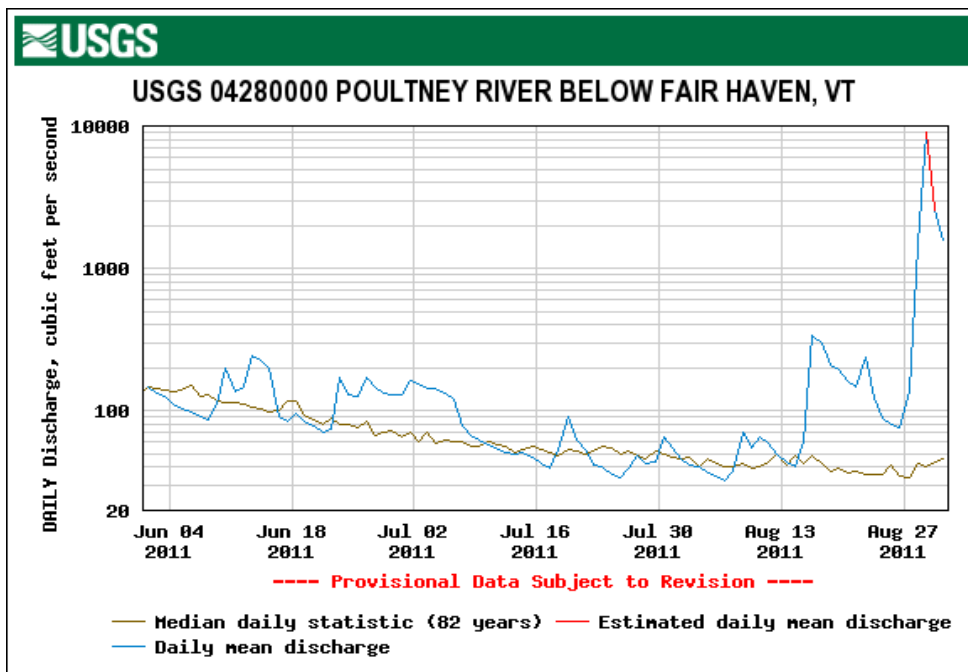
Scientists at the LaRosa Lab analyzed the water samples for *E. coli*, turbidity, total phosphorus, and nitrogen. *E. coli* tests measure the number of bacterial colonies in the water sample. Turbidity is a measure of the water clarity (or conversely sediment levels of samples). Total phosphorus and nitrogen indicates the nutrient levels in the water.

The samples were collected every other Wednesday during the summer beginning June 1st and ending August 24th. In previous years samples were collected every Wednesday during the winter/spring months however cuts in funding have made such sampling not possible. The samples were collected on scheduled days, based on the lab availability, and as a result the samples were not always collected at times that provided the most information.

Due to the destruction of hurricane Irene the final sampling date of August 24, 2011 is not present in this report. The LaRosa Lab's system was knocked out by the storm and as a result the aforementioned sampling date will not be accounted for. Data from this sample date however will be available in the future on the LaRosa Lab Water Quality Division online database.

Flow Data

The following chart contains US Geological Survey (USGS) flow data from a gauge station in our watershed. The gauge is for the Poultney River, below Fair Haven. A gauge for the Mettowee River existed in Pawlet, VT however it has subsequently been removed. Thus flow data for the Mettowee River is non-existent in this report.



E. Coli Data

The following table and graphs consist of compiled *E. coli* data for the 2011 sampling season. The measurement used to detect levels of *E. coli* present in water is MPN/100ml. This measurement stands for most probable number (MPN) of coli form per 100 milliliters of water. The guidelines and standards for *E. coli* levels in streams fall under jurisdiction of the State and Federal regulations. Vermont's water quality standard for single samples collected from the rivers and streams is 77 colonies of *E. coli* per 100 ml of water. This number is one of the most cautious and protective standards assessed for human health in the country. More information about the Vermont state standard can be found on our website (www.poultneymettowee.org) or on the Vermont DEC website (http://www.anr.state.vt.us/dec/waterq/htm/wq_monitoring.htm). The US EPA standard for *E. coli* levels is set at 235 *E. coli* colonies per 100 ml of water. Vermont is governed by more stringent standards; however the US EPA standard can be used as a secondary benchmark against which to compare our results.

Table 1: *E. Coli* data for the 2011 sampling season

Site	6/1/2011	6/15/2011	6/29/2011	7/13/2011	7/28/2011	8/10/2011	8/24/2011
Lake 02	x	x	649	x	x	x	x
WELLS02	99	153	2420	93	55	365	186
WELLS01	23	23	124	61	35	96	127
BEAVER02	25	68	1414	179	201	120	160
BEAVER01	> 2419.6	649	> 2419.6	144	129	113	62
FL01	649	179	> 2419.6	308	866	866	187
METT3	308	155	> 2419.6	249	517	461	179
METT2.5	461	210	> 2419.6	387	548	411	147
CA05	127	179	236	727	816	> 2419.6	x

CA01	127	345	387	260	461	1414	205
PR07	105	x	x	345	x	345	75
PR03	248	166	1733	131	201	219	101

	= Above Vermont and EPA Standards <i>E. Coli</i> Standards
	= Above Vermont <i>E. Coli</i> Standards

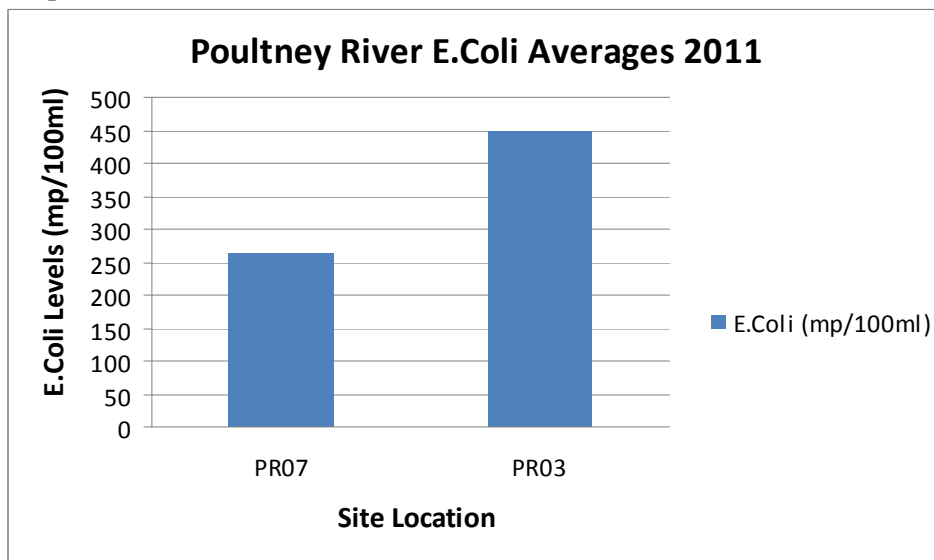
This year the majority of the samples were above both the Vermont and US EPA Water Quality Standard for coli form concentrations. Of the 64 samples collected this season, only 7 samples (10.1%) were below Vermont's *E. coli* Water Quality Standard. 22 of the samples (34%) were above the Vermont Standards but below the EPA standards. 35 of the samples (54%) were above the EPA and Vermont Water Quality Standards.

All of the sites monitored, regularly exceeded both the Vermont and the US EPA Water Quality Standards for *E. Coli* concentration.

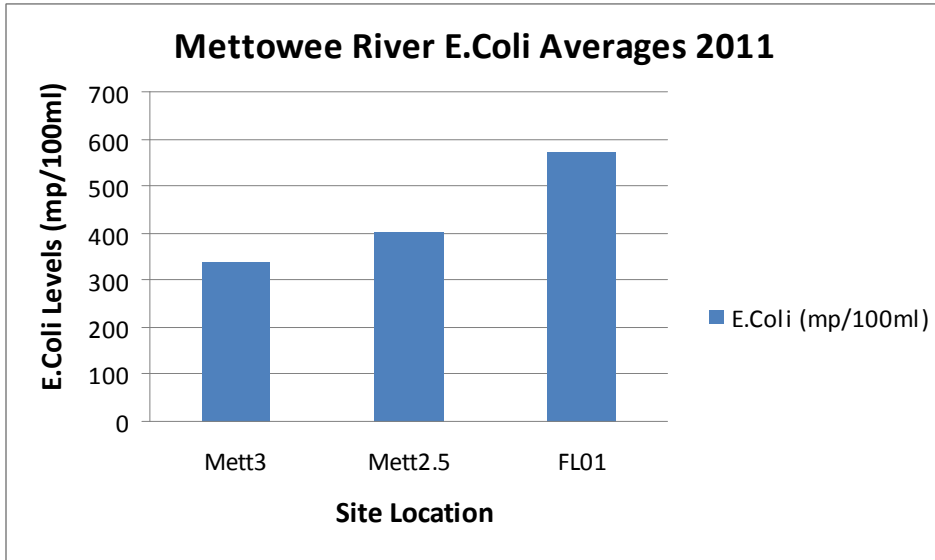
The following graphs show the average levels of *E. Coli* colony concentrations at all sites monitored during the 2011 sampling season. The sample sites are broken down into the respective rivers and streams that the samples were taken from.

Graphs 1-5: *E. Coli* results for 2011

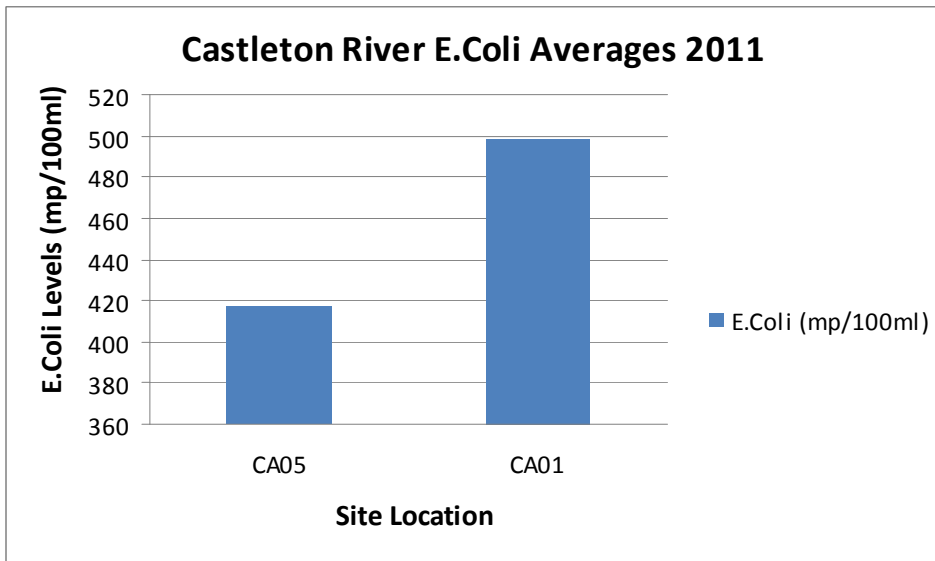
Graph 1:



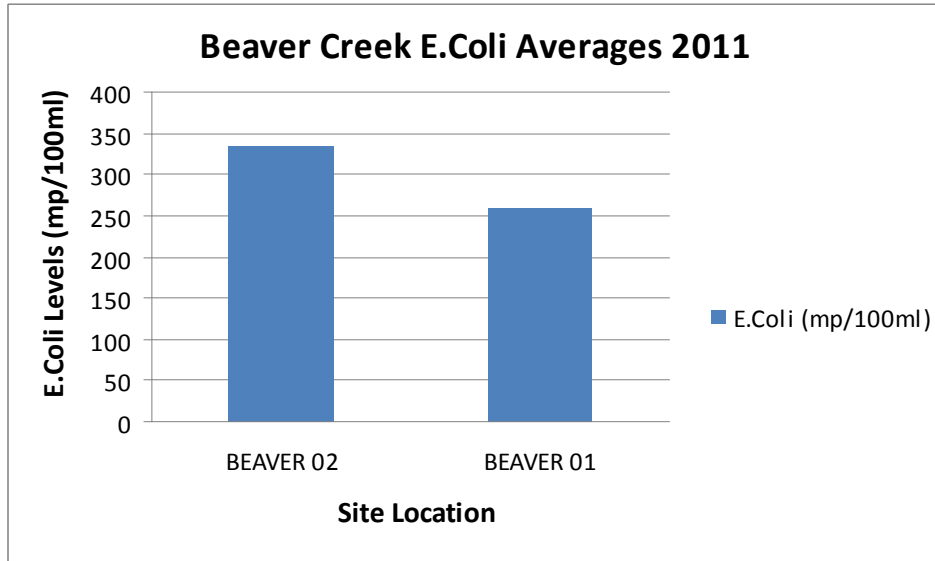
Graph 2:



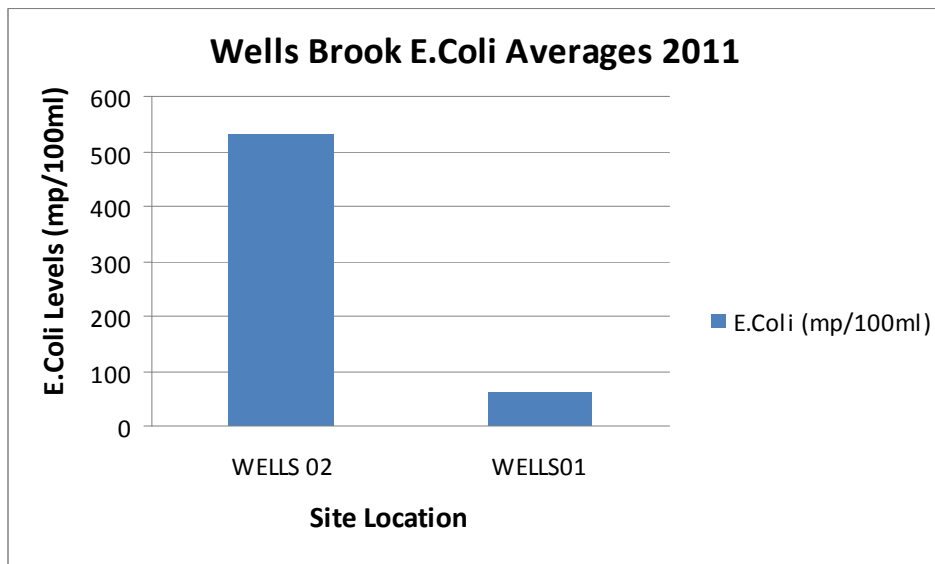
Graph 3:



Graph 4:



Graph 5:



Total Phosphorus Data

Table 2: Total Phosphorus results for 2011 sampling season

Site	6/1/2011	6/15/2011	6/29/2011	7/13/2011	7/28/2011	8/10/2011	8/24/2011
Lake 02	x	x	38.1	x	x	x	x
WELLS02	11.6	15	63.1	17.5	16.5	22.8	24.7
WELLS01	9.12	< 5.0	9.52	< 5	6.81	5.27	9.47
BEAVER02	19.4	16.3	47.1	17.9	16.5	18.1	22
BEAVER01	25.7	23.6	44.2	24.4	21	23.1	21.8
FL01	12.7	x	48	15	8.96	10.1	19.4

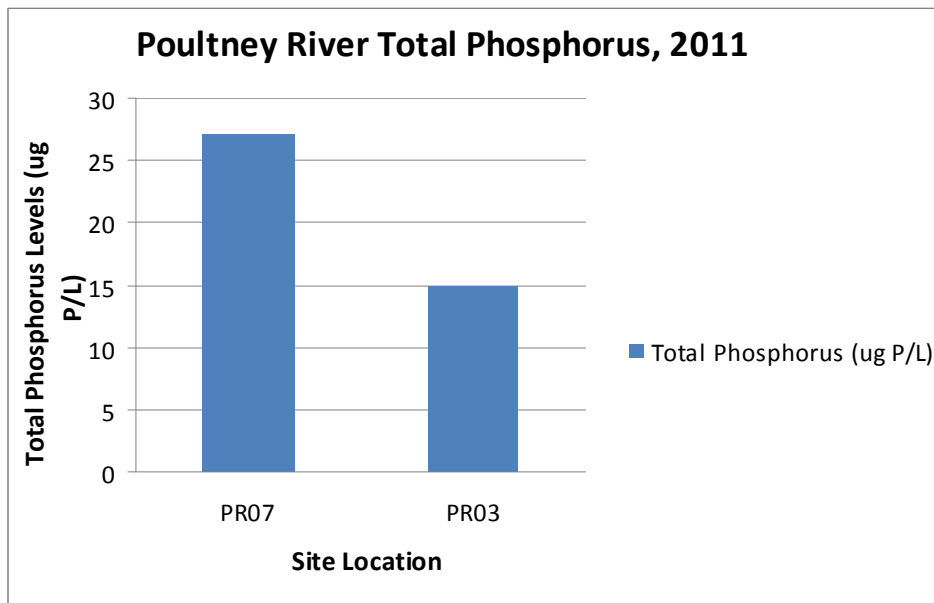
METT3	11.5	8.52	58.2	13.7	7.7	11.4	19.8
METT2.5	14.1	9.63	45.9	12.5	10.5	13.4	20
CA05	23.6	16.6	36.8	31.2	17	28.5	x
CA01	25.8	29.4	31.8	14.9	27.5	33.1	28.7
PR07	12.8	x	x	14.4	x	17.5	9.68
PR03	33.7	11.1	28.1	11.1	8.78	8.18	14.4

According to Vermont DEC's Neil Kamman, "There is no specific criterion for TP in streams, except for streams $\times 2,500\text{ ft}$ (nominally Class A {1}), where the criterion is 10 ppb at low monthly median flow. Otherwise, the standard is that: "loadings shall be limited so that they will not contribute to the acceleration of eutrophication or stimulation of the growth of aquatic biota in a manner that prevents the full support of uses." (Personal communication, December 2006; Vermont WQS, <http://www.nrb.state.vt.us/wrp/publications/wqs.pdf>)

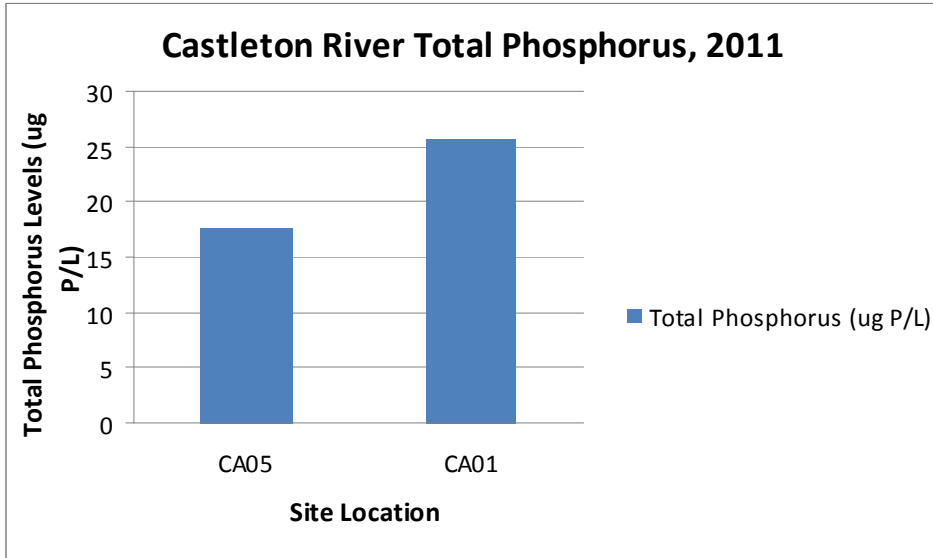
The Vermont Water Quality Standards set 54 ppb as the goal for the South Lake B section of Lake Champlain (LCBP, http://www.lcbp.org/atlas/html/is_pintro.htm). The PMWP has in the past used both 25 ppb and 10 ppb as goals for rivers within its watershed. For the Poultney River and the Mettowee River which have cobble and gravel as bottom substrates, we generally see Total Phosphorus measurements near the 10 ppb goal. For the Castleton and Hubbardton Rivers, which have clay and silt as bottom substrates (phosphorus bonds with clay and sediment), we expect higher Total Phosphorus levels.

Graphs 6-10: Total Phosphorus data for Poultney, Mettowee, and Castleton Rivers. As well as data for Wells Brook and Beaver Creak (averaged for all dates collected this year).

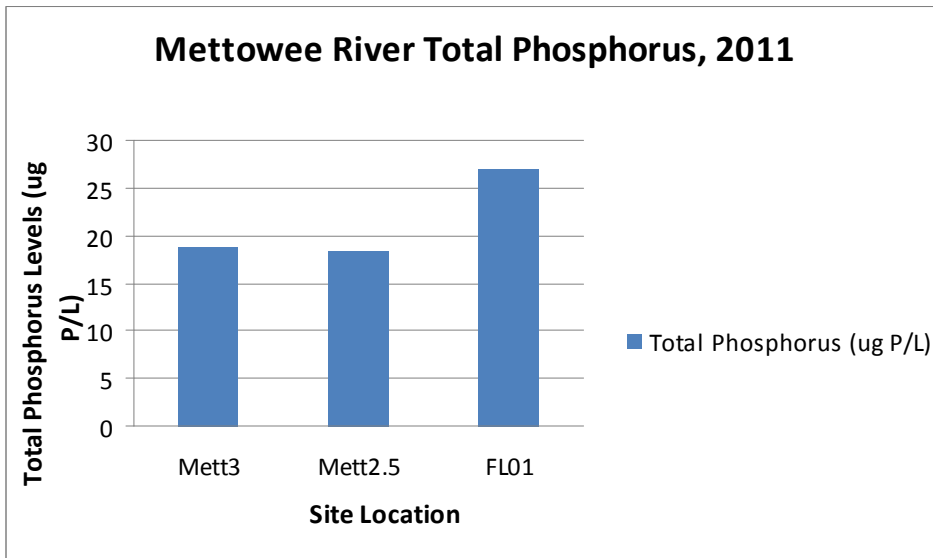
Graph 6:



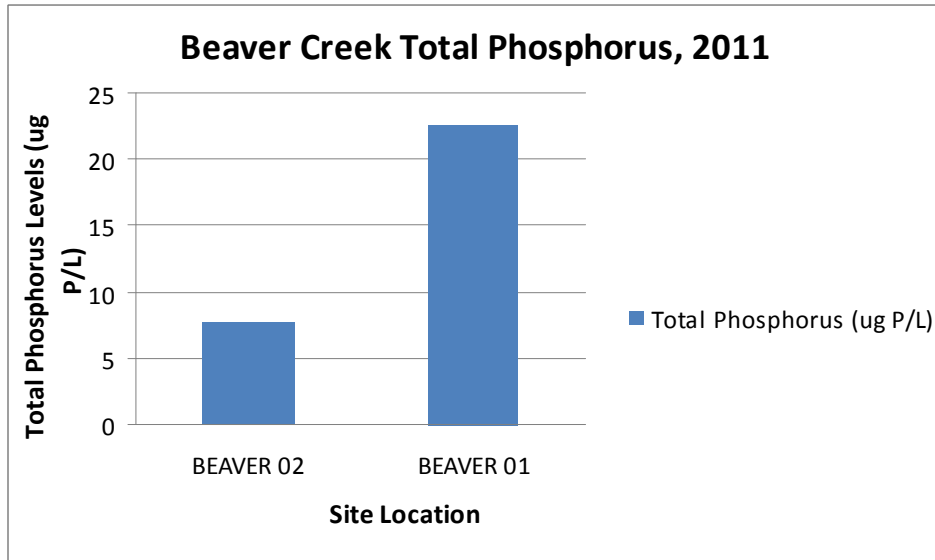
Graph 7:



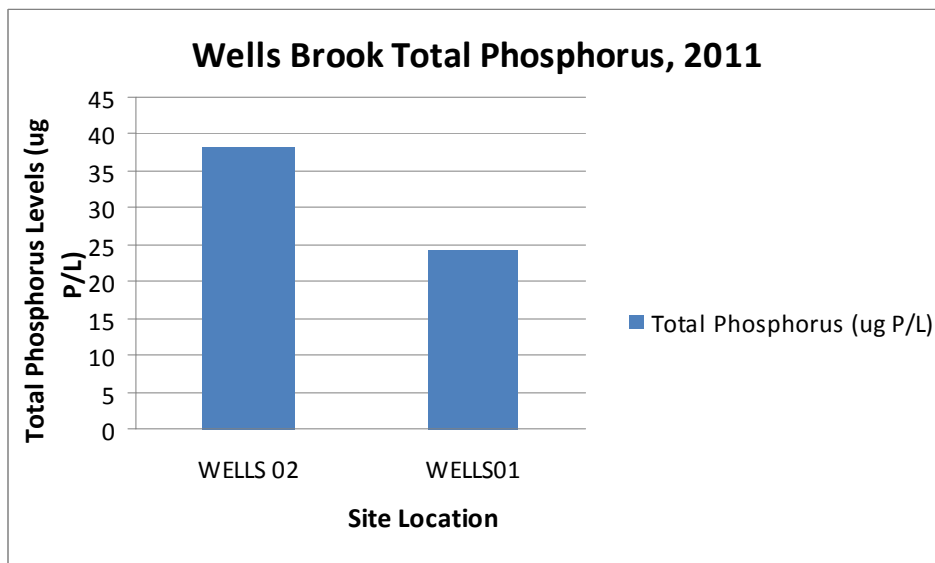
Graph 8:



Graph 9:



Graph 10:



Turbidity Data

Table 3: Turbidity results for the 2011 sampling season.

Site	6/1/2011	6/15/2011	6/29/2011	7/13/2011	7/28/2011	8/10/2011	8/24/2011
Lake 02	x	x	8.14	x	x	x	
WELLS02	0.91	2.69	10.7	0.92	0.27	0.61	1.83
WELLS01	0.44	0.32	1.46	< 0.2	0.2	0.81	0.79
BEAVER02	1.99	2.17	12.2	1.52	1.6	1.68	1.78
BEAVER01	1.83	3.64	10.8	1.78	1.99	1.99	1.94

FL01	1.04	1.24	10.6	1.41	1.02	1.31	9.58
METT3	2.14	1.71	16.5	1.03	1.03	1.87	5.3
METT2.5	1.24	1.05	11.2	0.81	0.62	1.06	5.91
CA05	2.77	1.51	5.06	2.75	1.57	4.81	
CA01	1.72	2.87	2.54	1.29	2.54	2.41	1.61
PR07	0.48	x	x	1.65	x	2.53	0.58
PR03	1.31	0.92	7.85	0.74	0.55	0.47	0.67

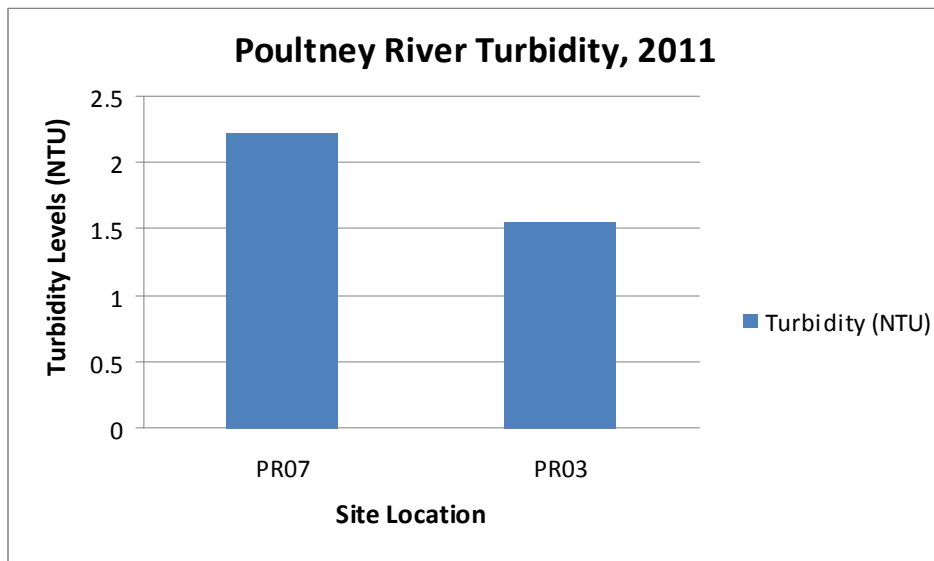
Again, according to Vermont DEC's Water Quality Standards, turbidity results for class A (1) and A (2) waters, are not to exceed 10 NTU. For Class B waters designated warm water reaches, they are not to exceed 25 NTU. (Kamman, personal communication, December 2006; Vermont WQS, <http://www.nrb.state.vt.us/wrp/publications/wqs.pdf>)

Based on warm water/cold water fish habitat designations found in the Vermont Water Quality Standards (WQS), the only warm water segments in the Poultney Mettewee watershed include the Poultney River below Carver Falls and all waters west of 22A. The Castleton crosses 22A in Fair Haven, but no samples were collected in the section designated warm water.

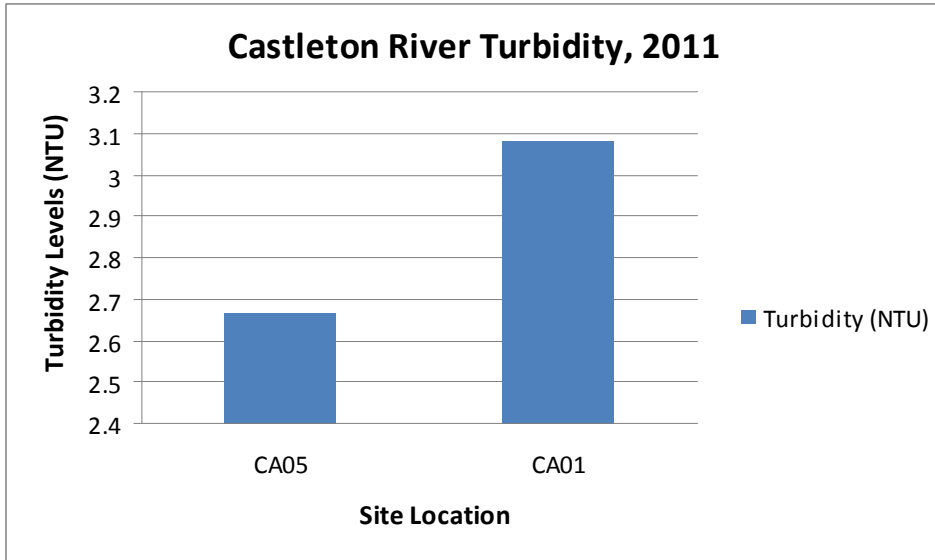
Similar to phosphorus results, the Poultney and Mettewee Rivers for the most part had extremely low turbidity levels. Any spikes in turbidity can be chalked up to the presence of increased sedimentation caused by recent storm activity.

Graphs 11-15: Turbidity Results for the 2011 sampling season (averaged for all dates collected this year).

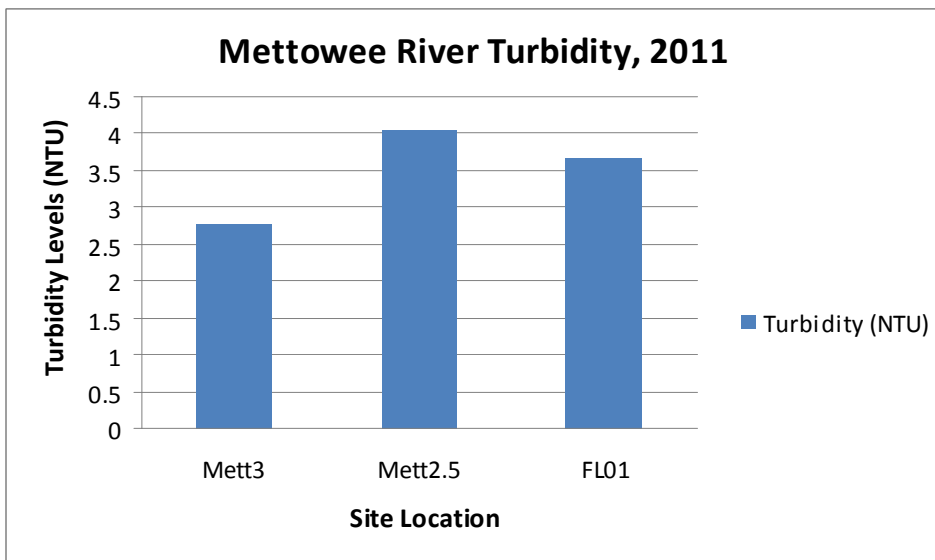
Graph 11:



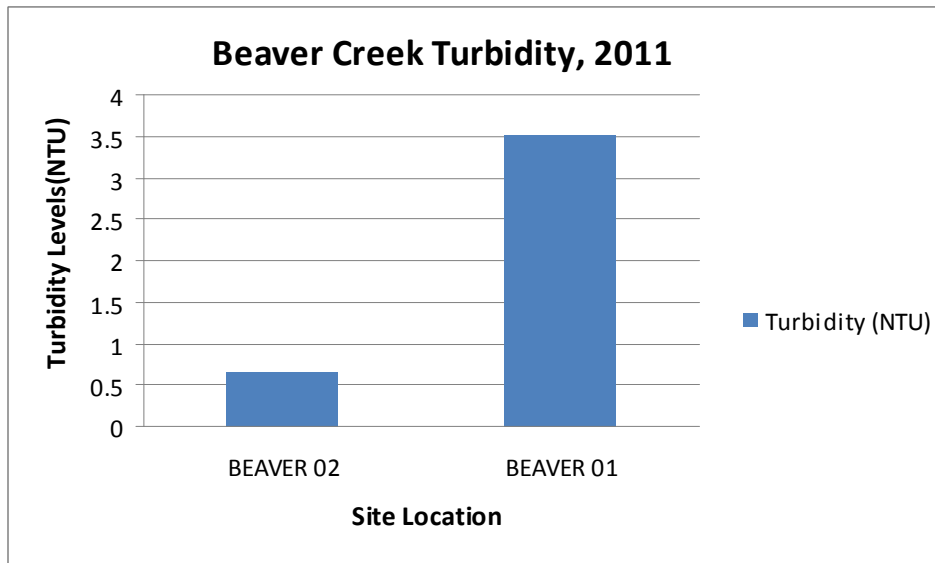
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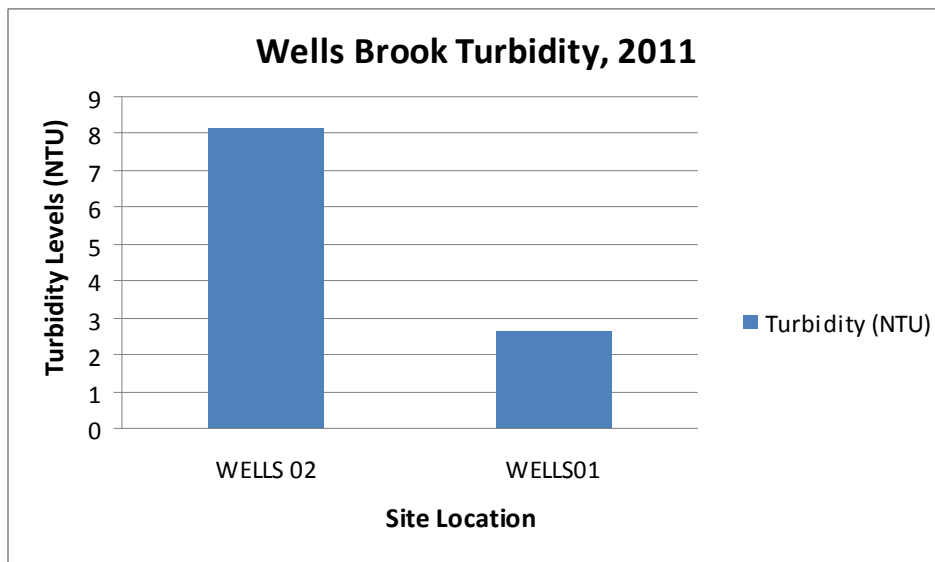
Graph 13:



Graph 14:



Graph 15:



Nitrogen Data

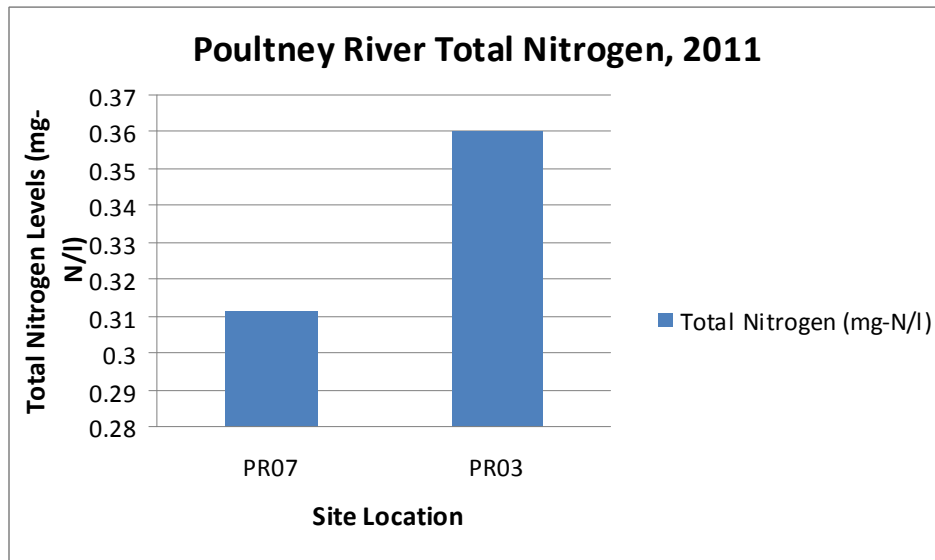
Table 4: Nitrogen results for 2011 sampling season.

Site	6/1/2011	6/15/2011	6/29/2011	7/13/2011	7/28/2011	8/10/2011	8/24/2011
Lake 02	x	x	0.55	x	x	x	x
WELLS02	0.39	0.34	0.39	0.35	0.32	0.39	0.36
WELLS01	0.45	0.46	0.41	0.47	0.47	0.5	0.37
BEAVER02	1.36	1.26	1.26	1.4	1.28	1.36	1.31
BEAVER01	1.42	1.44	1.83	1.7	1.25	1.25	1.19

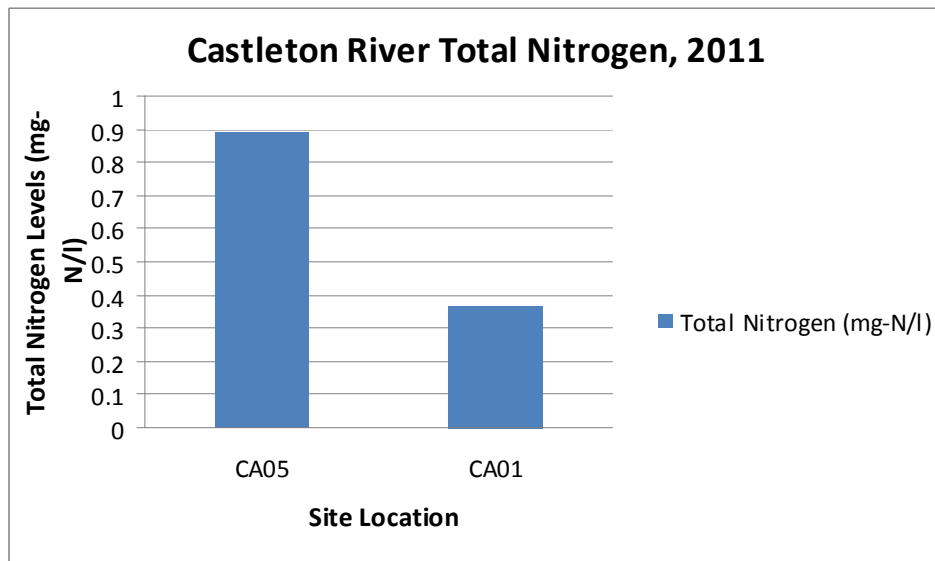
FL01	0.88	0.59	0.68	0.69	0.68	1	0.57
METT3	0.66	0.59	0.72	0.7	0.65	0.81	0.59
METT2.5	0.66	0.78	0.92	1.03	0.96	1	0.57
CA05	0.42	0.37	0.31	0.28	0.38	0.43	x
CA01	0.34	0.29	0.24	0.38	0.27	0.35	0.23
PR07	x	x	x	0.39	x	0.33	0.3
PR03	0.34	0.27	0.41	0.38	0.32	0.35	0.37

Graphs 16-20: Nitrogen results for 2011 sampling season (averaged for all dates collected this year).

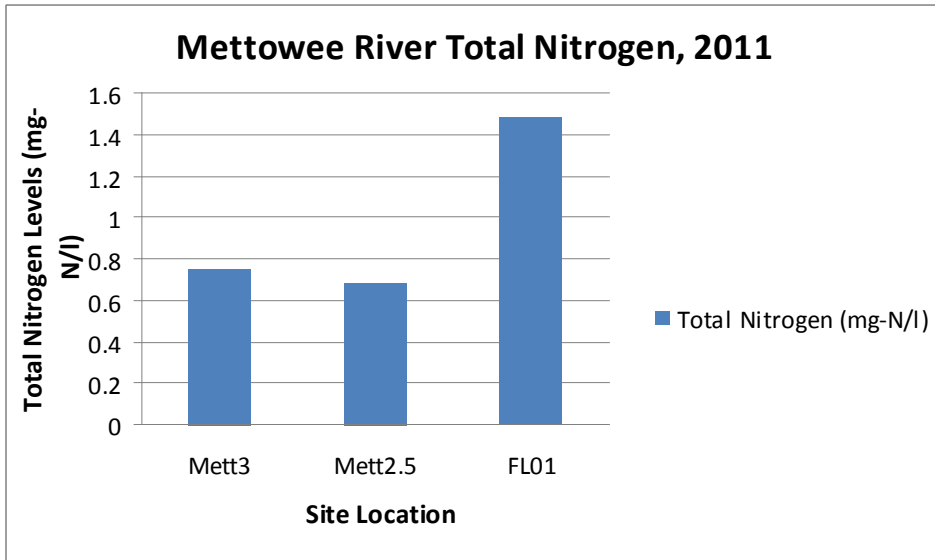
Graph 16:



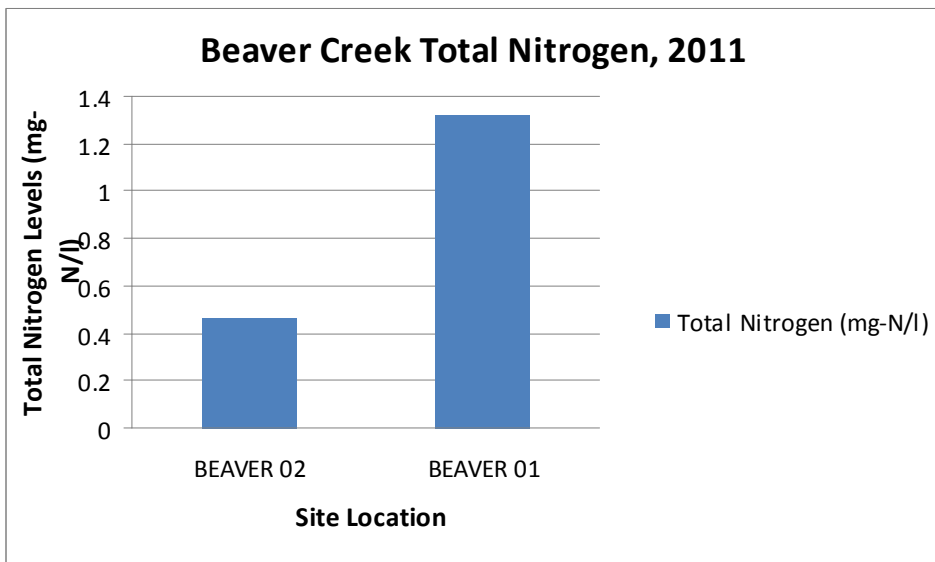
Graph 17:



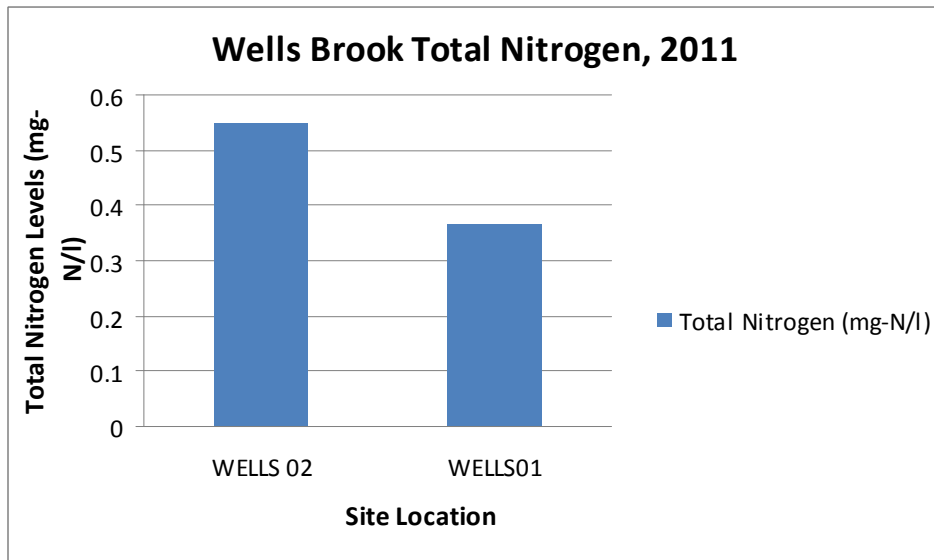
Graph 18:



Graph 19:



Graph 20:



Conclusions

Overall the PMWP water quality monitoring program has measured streams for levels of E. coli, Total Phosphorus, and Turbidity for the past eight years. 2008 was the first year that nitrogen was included in monitoring activities. The Partnership began monitoring the Poultney River in 2003 and has since included the Mettowee and several of its tributaries, the Castleton and the Hubbardton Rivers.

Throughout the study, E. coli measurements have been high according to State and Federal Water Quality Standards in all of the streams that we monitored. Sampling has shown that E. coli measurements in the watershed are particularly high after rain events. The PMWP is working to implement projects such as tree plantings (to act as buffers) and agricultural practice changes that we hope will decrease E. coli runoff to the water, and is continuing to assess streams for potential E. coli sources. Many of our partners are working directly with towns and agricultural producers to decrease E. coli in streams through projects that upgrade septic systems and exclude livestock from streams.

Data results have shown that total phosphorous is variable and dependent on water levels, or the type of runoff being received to the streams. The PMWP plans to monitor total phosphorus during storm runoff events to better quantify the levels of this nutrient reaching Lake Champlain.

Turbidity is relatively low throughout the watershed. This indicates that sediment levels in the water are relatively low. The PMWP also plans to monitor turbidity during storm events. Measuring the turbidity levels in streams carrying storm-related runoff may give a better indication of the sediment load being transported to Lake Champlain.

Tropical Storm Irene caused massive damages to watersheds in the local area. The storm also delayed the results of a few of the monitoring dates. This set back the completion time for this report significantly. In future monitoring projects done in the Poultney-Mettowee watershed it may be advantageous to compare results of sampling to dates prior to Tropical Storm Irene. This way the affect

that Irene had on watershed dynamics may be properly measured. This data could be used to determine how effective post-Irene mitigation projects have been.

References

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- Kamman, N, 2006, Vermont DEC, Water Quality Division, personal communication.
- US Geologic Survey, 2006, USGS Real Time Water Data for Vermont, website, <http://waterdata.usgs.gov/vt/nwis/rt>
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