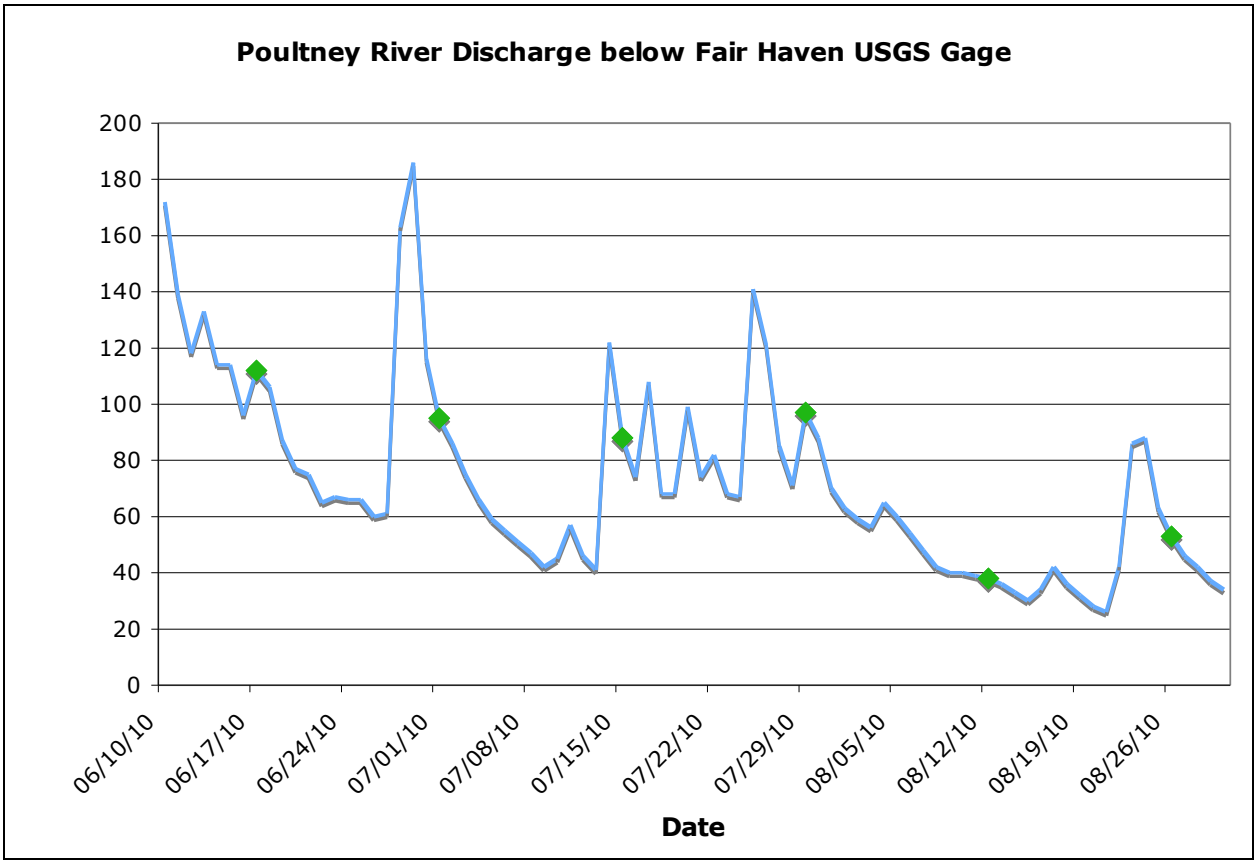
POULTNEY METTOWEE WATER QUALITY REPORT 2010
BY HILARY SOLOMON, JUNE 2011

Introduction

The Poultney Mettowee Natural Resources Conservation District (PMNRCD) has participated for many years in the LaRosa Laboratory grant program. We have partnered with Green Mountain College and the Middletown Springs Conservation Commission for sample collection and in 2009 Green Mountain College purchased equipment to take supplemental *E. coli* readings throughout the year.

Streamflow and Rainfall Data

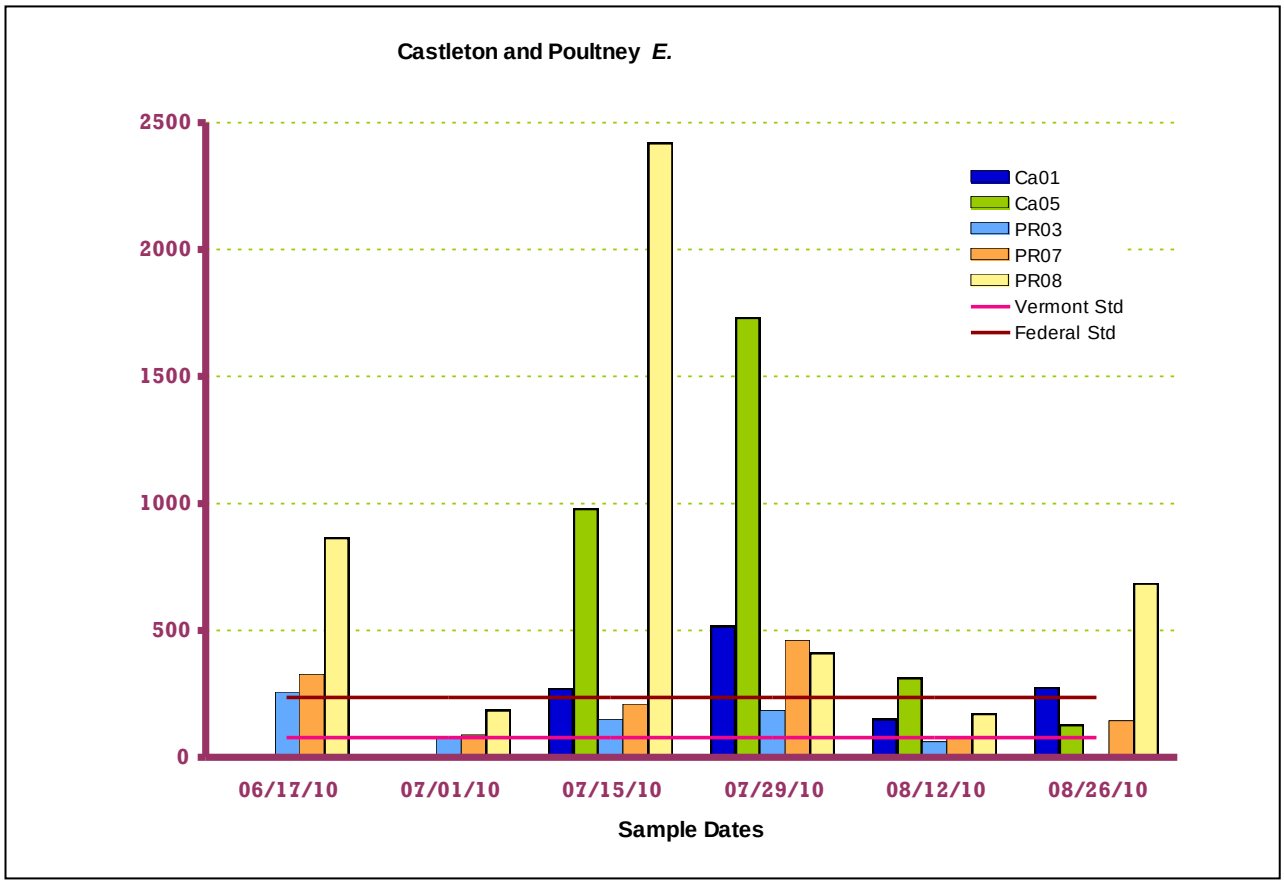
Streamflow and Rainfall data are important factors when considering nonpoint source inputs to streams through overland runoff. The following chart shows the streamflow, or discharge rate, of the Poultney River as measured by the USGS gage station located below Fair Haven, Vermont, for the 2010 sampling season. The sample dates are represented as green diamonds. Except for small flow increases on June 17 and July 29, the sample dates appear to fall on receding, not increasing, flows.



Rainfall data collected at the Rutland Airport and archived by Weather Underground shows that there was a slight rainfall event on the first sampling date, June 17, 2010 (0.01 inches). There was another slight rainfall event on July 1 (0.03 inches). Relatively large storm events are recorded before and/or during the third and fourth sampling dates (July 13, 0.05 inches; July 14, 0.25 inches; July 15, 0.28 inches; and July 29, 0.25 inches). The August 12 sampling event occurs two days after a rain event (August 9, 0.14 inches and August 10, 0.01 inches) and the August 26 sampling event occurs three days after a relatively large storm (August 22, 0.69 inches and August 23 0.36 inches).

E. coli Concentrations

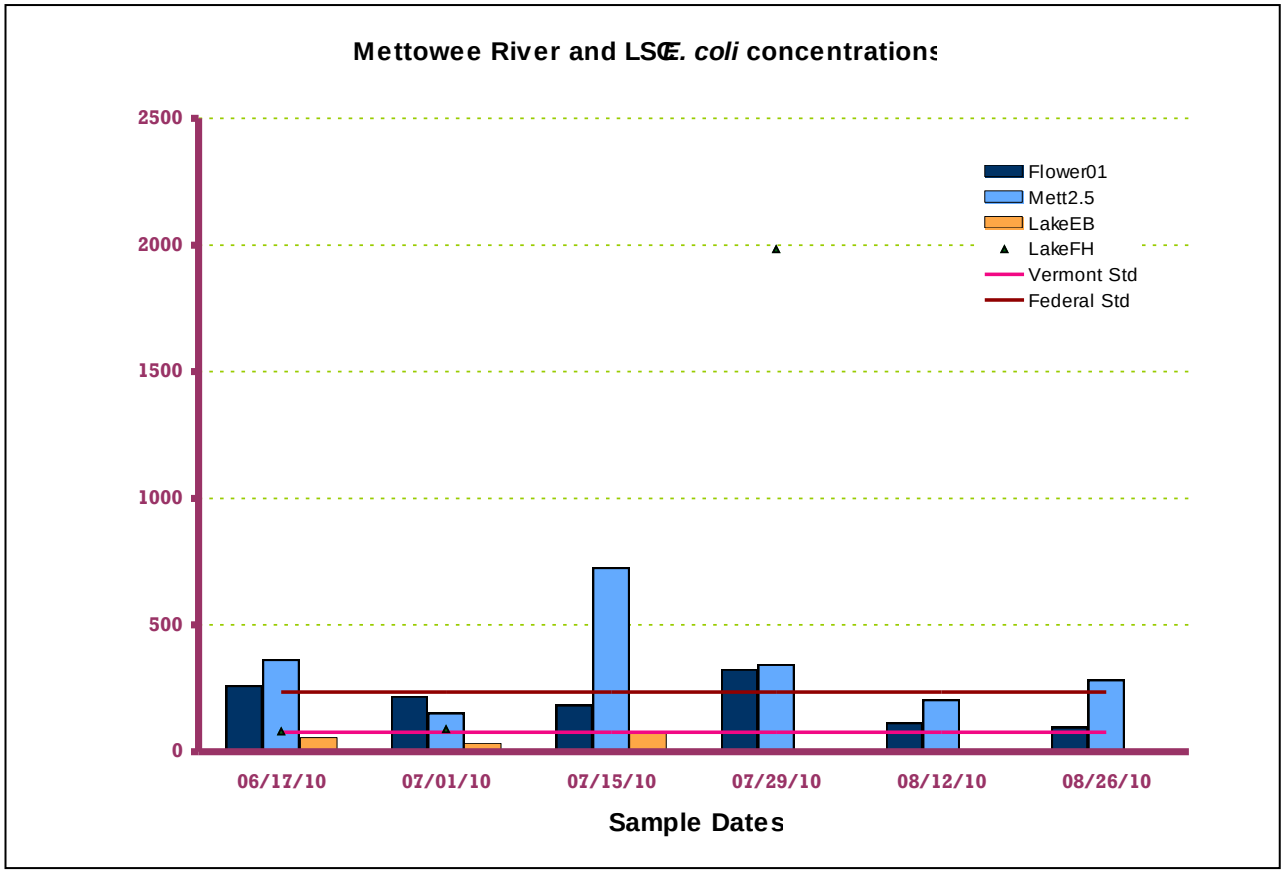
During the 2010 sampling season, *E. coli* concentrations were analyzed by both the LaRosa Lab and on equipment at Green Mountain College. The results discussed here are from the data analyzed by the LaRosa Lab.



The downstream sites, Ca05 on the Castleton and PR08 on the Poultney River, showed the highest levels of *E. coli*, with the Poultney River site exceeding the (high) detection limits of 2420 colonies per 100 mL of water on July 15, 2010. Concentrations of *E. coli* were higher at these sites when sample events more closely followed the rainfall events (July 15 and July 29) indicating that *E. coli* is carried to the rivers through storm-related runoff, though it should be noted that the *E. coli* concentrations at these two sites remained above the Vermont Water

Quality Standard for *E. coli* concentrations throughout the sampling season (77 colonies per 100 ml water). Both of these sample locations are downstream of urban and agricultural landuse, which makes pinpointing the source of *E. coli* to the streams difficult.

The upstream Poultney River sites, PR03 and PR07, met the Vermont Water Quality standards for *E. coli* when streamflow was receding and no storms had occurred in the previous few days. These sample sites bracket several popular swimming areas on the Poultney River, indicating that after storm events the *E. coli* levels likely do not meet the Vermont Water Quality Standards.



The Mettowee River and Flower Brook *E. coli* concentrations were above the Vermont Water Quality Standard criteria for each of the sample dates and the Mettowee River *E. coli* concentrations were above the Federal Standard for four of the six sample dates. The Mettowee River *E. coli* concentrations appear to decrease during low-flow conditions, while the Flower Brook results remain relatively high during low flow conditions. High *E. coli* levels during low-flow conditions may indicate groundwater, or septic, inputs of fecal waste. In fact, Flower Brook is currently on the 303(d) list for *E. coli* contamination in this section of stream (0.5 miles in Pawlet town center). Both rivers have direct drainage from barnyards and pastures.

Nitrogen Concentrations

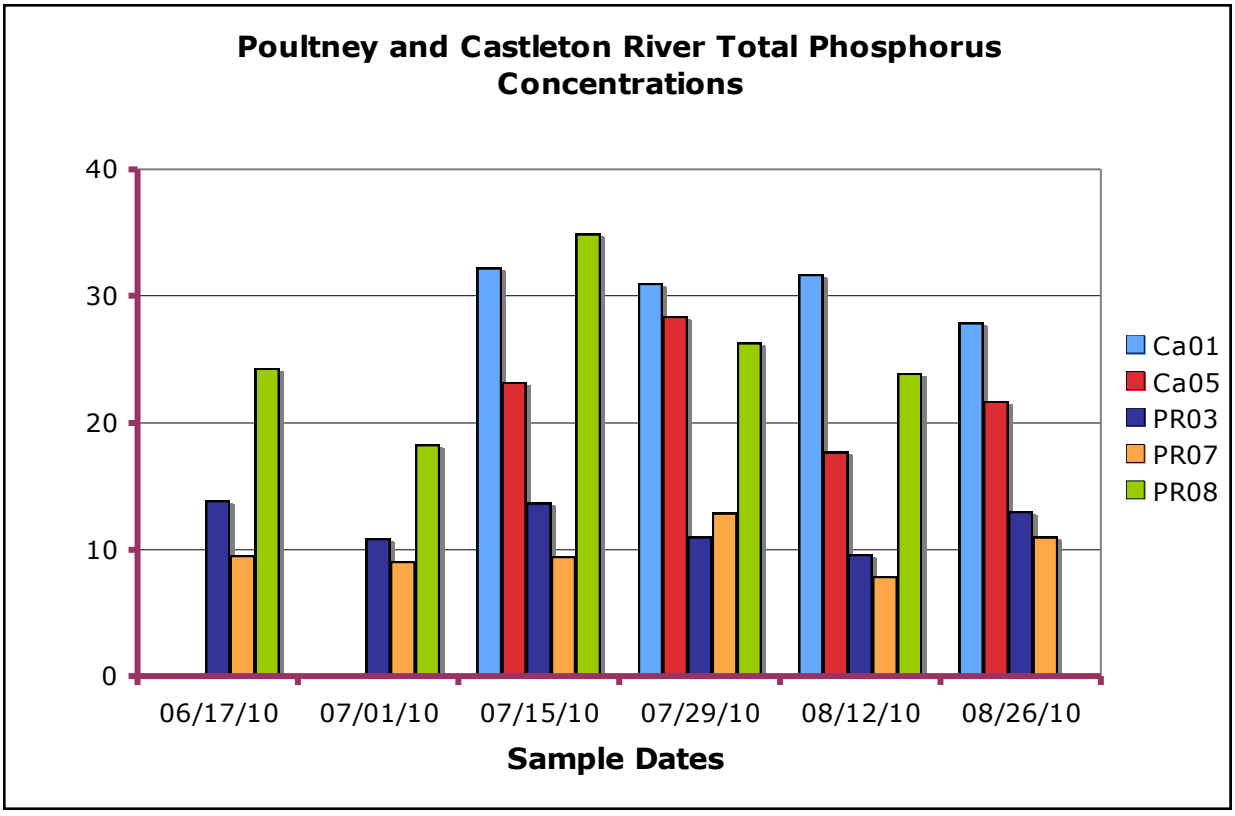
The Vermont Water Quality Standards state, "in all waters, total nitrogen loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of growth of aquatic biota, in a manner that prevents the full support of uses (p. 23)." More specifically, Class B waters shall not exceed 5.0 mg/L NO3-N at flows exceeding low mediam monthly flows (p 23).

Measured Total Nitrogen concentrations in the Poultney and Mettowee Watersheds did not exceed 5.0 mg/L. The highest measured Total Nitrogen concentration, 0.85 mg/L, occurred at Flower01 on August 12.

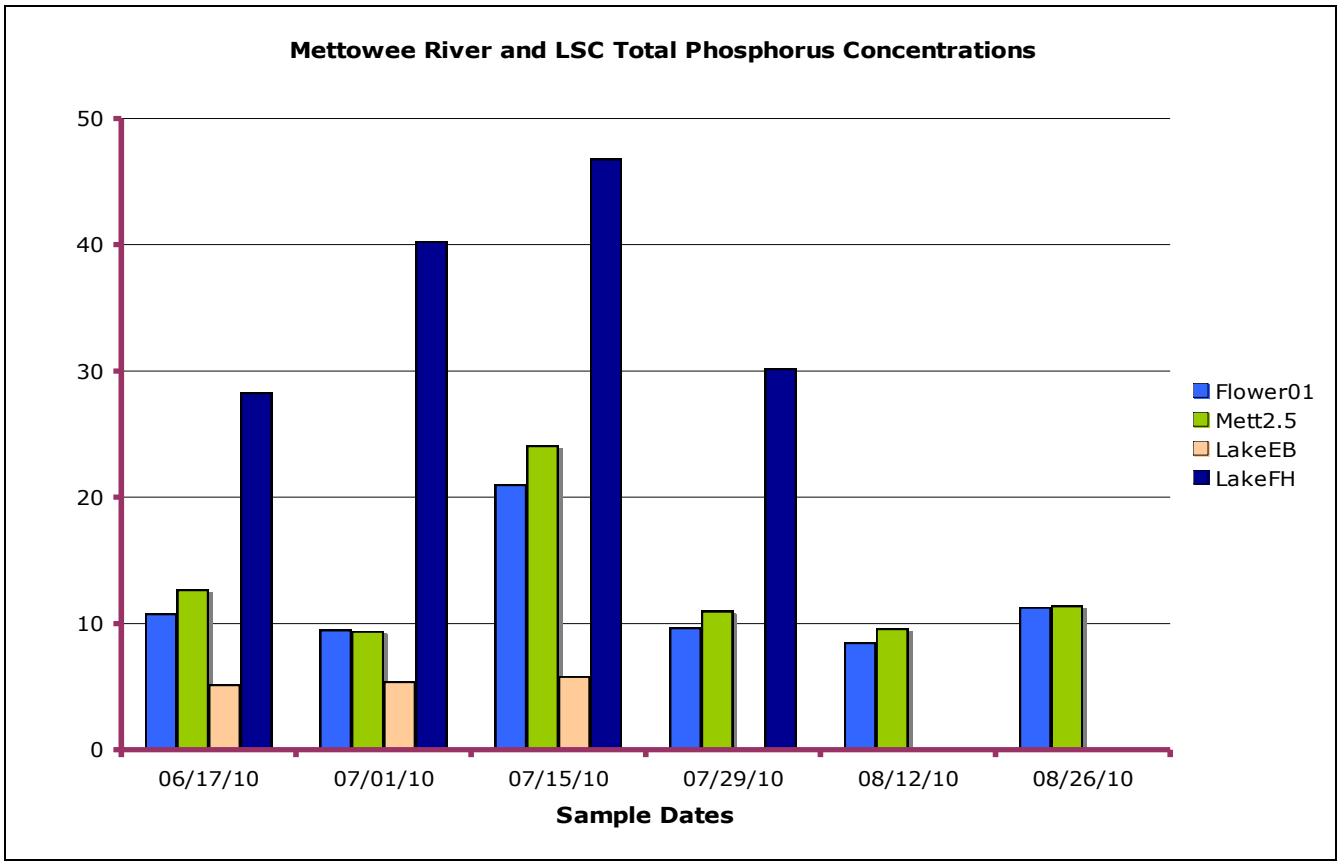
Phosphorus Concentrations

The Vermont Water Quality Standards state "in all waters, total phosphorus loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of growth of aquatic biota, in a manner that prevents the full support of uses (p. 21)." The proposed water quality criteria for Total Phosphorus would require that small, high-gradient streams not exceed 0.022 mg/L TP (currently 0.01 mg/L); medium, high-gradient streams not exceed 0.013 mg/L TP; and warmwater medium-gradient streams not exceed 0.011 mg/L TP. I believe that the number for coldwater medium-gradient streams (likely the streams measured in this study) is being developed.

In the past, the PMNRCD has used 10 ug/L (0.010 mg/L) as a conservative measure of 'high' phosphorus in our streams (the Lake Champlain South Lake B WQS is 54ug/L as cited by Vermont DEC WQS, p. 22).



The total phosphorus levels for the upstream Poultney River (Orchard Road in Middletown Springs and the Rail Trail in Poultney) are close to meeting the District Phosphorus goal. The Greene Road Poultney River Site and the measured sites on the Castleton River had phosphorus levels above the District goal for each of the sample dates. These sites are located in primarily agricultural areas (or historically agricultural areas) where studies have shown that historically applied phosphorus remains in the soils at measurable levels.



The sample results for Flower Brook and the Mettowee River were understandably similar, as the Mettowee samples were collected from the mixing zone downstream of the confluence of the Mettowee River and Flower Brook. Both locations showed relatively low total phosphorus, with the exception of July 15, during a rainfall event. The Lake St. Catherine Endless Brook site showed low total phosphorus, while the Forest House Site showed much higher total phosphorus, with levels between 30-40 ug/L during July sample dates.

Turbidity Levels

The Vermont Water Quality Standards state that the maximum turbidity level for coldwater fish habitat in Class B streams in Vermont is 10 NTUs (VTDEC, WQS, p. 32). None of the sample results were above 10 NTUs and only several sites exceeded 5 NTUs on isolated sample dates. Those measurements are as follows: PR08, 6.44 NTU, 8/12/10; PR07 9.05 NTU, 7/29/10; LakeFH 6.78 NTU, 7/15/10; and Lake FH 5.51 NTU, 7/1/10.