



2015 LaRosa Partnership Final Report

Program Overview

The White River Partnership (WRP) launched a Water Quality Monitoring (WQM) Program in 2001 in an effort to identify and better understand potential threats to water quality in our watershed. Since 2001 the WRP has been monitoring water quality at locations throughout the watershed over the summer months with the help of a dedicated group of volunteers. These volunteers measure conductivity, turbidity, and sample for the presence of *E. coli*. Results are distributed to town offices and interested citizens via email, WRP website, and Facebook as they become available and are also summarized in an annual report.

Over the years our routine WQM program has highlighted sites with chronically elevated levels of *E. coli*. Bacteria levels at sites along the Second Branch of the White River have consistently exceeded the seasonal standard for *E. coli*. The WRP has recently engaged in an adaptive WQM program in an attempt to better understand those high bacteria numbers. All sample collection for the adaptive WQM is done by WRP staff and interns.

As part of this adaptive WQM program, in 2013, we bracketed three potential sources of bacteria (two farms and one village center) and three tributaries to the Second Branch. Results were interesting, but did not reveal any major bacteria sources. In wet conditions, there was a clear downstream increase in *E. coli* levels. However *E. coli* levels were also elevated all along the Second Branch. *E. coli* levels even exceeded seasonal standards at the topmost site in the watershed, above almost all of the agricultural and residential use of the valley, leading us to question the bacterial source (wildlife, agricultural runoff, failing septic systems?).

In 2014 we focused our efforts on eliminating the tributaries to the Second Branch as significant contributors of bacteria to the Second Branch. Toward this end we sampled 12 Second Branch tributaries in 2014. With a few minor exceptions, it appears unlikely that any of these tributaries are contributing much to the elevated bacteria levels observed at sites along the Second Branch, leading us to the conclusion that the *E. coli* is probably coming from sources along the Second Branch itself.

We are concerned that lots of wildlife activity or resident populations of *E. coli* (evidenced by the high *E. coli* levels detected at our topmost site in 2013) may be obscuring our ability to detect inputs from agricultural runoff and failed septic systems along the Second Branch. We would like to sample nutrients and turbidity in addition to bacteria this year at four sites high up in the Second Branch watershed to (a) investigate whether nutrients may be a more useful indicator on the Second Branch, and (b) gain more clarity about what is going on at the top of the Second Branch watershed.

In 2015 we partnered with the LaRosa Laboratory to investigate nutrient levels (Total Nitrogen, NOx, and Total Phosphorus) and turbidity at four sites at the top of the Second Branch watershed (see Table 1). WQM staff collected samples for the LaRosa Partnership four times during summer 2015: June 25, July 21, August 3, and August 17. The WRP hired Green Mountain Courier to transport the samples to the LaRosa Lab in Burlington for processing; results are available online.

Table 1: 2015 LaRosa Partnership Sampling Sites

SITE	DESCRIPTION	TOWN
SB1	Second Branch – upstream of Taylor Hill Rd	Brookfield
SB2	Second Branch – downstream of the culvert on Taylor Hill Rd	Brookfield
SB3	Second Branch – at the bridge to the gravel pit	Brookfield
SB4	Second Branch – upstream of the confluence of Sunset Brook	Brookfield

Water Quality Standards for 2015 Parameters

Total Nitrogen / NOx

In all waters nitrates shall be limited so that they will not contribute to the acceleration of eutrophication, or the stimulation of the growth of aquatic biota, in a manner that prevents the full support of uses.¹

Nitrogen should not “exceed 5.0 mg/l as NO3-N at flows exceeding low median monthly flows, in Class B waters.”²

Total Phosphorus

In all waters, total phosphorous loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses.³

Phosphorus in Vermont rivers should not exceed 12 – 27 µg/L.⁴

Turbidity

“In Cold Water Fish Habitat waters – None in such amounts or concentrations that would prevent the full support of uses, and not to exceed 10 NTU (nephelometric turbidity units) as an annual average under dry weather baseflow condition.”⁵

¹ *Vermont Water Quality Standards*, p. 21,
http://www.watershedmanagement.vt.gov/rulemaking/docs/wrprules/wsmd_wqs2014.pdf#zoom=100.

² Id, p. 22.

³ Id, p. 21.

⁴ Id, p. 35.

⁵ Id, p. 32.

LaRosa Partnership Sampling Results

The sampling done as part of the LaRosa Partnership provides a snapshot of the nitrate/nitrite, total nitrogen, total phosphorus, and turbidity at the sampling sites. The results from the 2015 sampling dates are displayed below in Table 2.

Table 2: Results from LaRosa Partnership Sampling

Sample Site	Date	Nitrate-Nitrite (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (µg/L)	Turbidity (NTU)
Second Branch-1 (SB1)	6/25/15	0.1	0.23	15	1.57
Second Branch-2 (SB2)	6/25/15	0.11	0.24	14.2	1.46
Second Branch-3 (SB3)	6/25/15	0.17	0.31	14.5	1.48
Second Branch-4 (SB4)	6/25/15	0.25	0.38	20.4	2.45
Second Branch-1 (SB1)	7/21/15	0.07	0.21	17.2	2.41
Second Branch-2 (SB2)	7/21/15	0.09	0.23	18	2.18
Second Branch-3 (SB3)	7/21/15	0.15	0.29	17.7	2.44
Second Branch-4 (SB4)	7/21/15	0.2	0.38	35.5	4.85
Second Branch-1 (SB1)	8/3/15	0.08	0.24	14.7	2.36
Second Branch-2 (SB2)	8/3/15	0.13	0.26	14	2.82
Second Branch-3 (SB3)	8/3/15	0.22	0.33	9.56	1.86
Second Branch-4 (SB4)	8/3/15	0.29	0.41	15	3.01
Second Branch-1 (SB1)	8/17/15	0.08	0.2	19.1	2.67
Second Branch-2 (SB2)	8/17/15	0.13	0.27	16.3	2.58
Second Branch-3 (SB3)	8/17/15	0.22	0.32	13.4	2.19
Second Branch-4 (SB4)	8/17/15	0.3	0.42	22.3	2.97

Quality Assurance Results

For quality assurance we collected 1 blank for each parameter, for a total of 4 blanks. The quality of the data collected can be calculated using the average blank concentration, by parameter (should be close to Reporting Limit for each parameter). The results are listed in Table 3 below.

Table 3: Average Blank Concentration by Parameter

Parameter	Blank Sample	Average Blank	Parameter Reporting Limit
NOx	SB! <0.05 mg/L	≤0.05 mg/L	0.05 mg/L
Total Nitrogen (TN)	SB! <0.1 mg/L	≤0.1 mg/L	0.1 mg/L
Total Phosphorus (TP)	SB! <5 µg/L	≤5 µg/L	≤5 µg/L
Turbidity	SB! <5 µg/L	≤5 µg/L	≤5 µg/L

Conclusions

The WRP will review the 2015 data with Vermont Department of Environmental Conservation staff to understand results and to develop a sampling strategy for 2016.

The LaRosa Partnership provides an excellent opportunity for the WRP to enhance our WQM Program and to gain a better understanding of the health of the White River watershed. The WRP hopes to continue the partnership in future years.

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