

**2010 West River Watershed Alliance (WRWA),  
dba Southeastern Vermont Watershed Alliance (SeVWA)  
LAROSA PARTNERSHIP PROGRAM FINAL REPORT**  
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December 27, 2010*

**INTRODUCTION**

West River Watershed Alliance's (WRWA's) water quality monitoring program was made possible in 2010 by the LaRosa Partnership Program and a dedicated team of local volunteers. There were 15 regular volunteer river monitors and 6 "back-up" volunteer monitors. The program was organized and run by a volunteer coordinator (Laurie Callahan) assisted by an unpaid VT DEC intern (Soren Paris) who divided his hours of services between WRWA, the Ottauquechee River Group (ORG) and Marie Caduto, VT DEC Watershed Coordinator for Basins 10, 11 & 13. The internship helped Soren to meet practicum requirements of his graduate program at Antioch New England.

There were 20 sites chosen for monitoring in WRWA's 2010 program – 9 sites were to be sampled once per month and 11 sites every 2 weeks.

A collaborative effort was established with Connecticut River Watershed Council (CRWC) in Greenfield, MA to perform WRWA's *E. coli* analyses. A services exchange was set-up between CRWC and VT DEC Water Quality Division/LaRosa Lab. Laurie Callahan donated time to assist with processing of samples at the CRWC lab on days that she delivered samples to them. Callahan was also successful at procuring an incubator to be utilized by the CRWC lab through the EPA Region 1 Equipment Loan grant program. This incubator - as an addition to CRWC's incubator - ensures that CRWC will have adequate capacity for incubating WRWA samples along with any other samples they process.

On the following pages are tables and figures with information about various aspects of WRWA's 2010 water quality monitoring program. Here are some general descriptions of those items in the order they appear on the following pages:

Table 1 lists the 2010 monitoring sites' locations. West 1.42 was the only new site added in 2010.

Figure 1 is a map showing all of the 2010 WRWA water quality monitoring site locations and the various rivers' watershed boundaries.

Table 2 lists all of WRWA's 2010 monitoring sites with dates and parameters sampled and analyzed.

Table 3 shows the number of sampling events per site for each parameter and also contains data completeness information.

Table 4 is a chart of Relative Percent Difference (RPD) calculations for all 2010 WRWA field duplicate parameters.

Quality assurance aspects of the information presented in tables 3 and 4 are addressed in the section titled "QUALITY ASSURANCE RESULTS & DETERMINATIONS" and WRWA's 2010 monitoring results and a brief overview of the results are presented in "OVERVIEW OF PROJECT RESULTS".

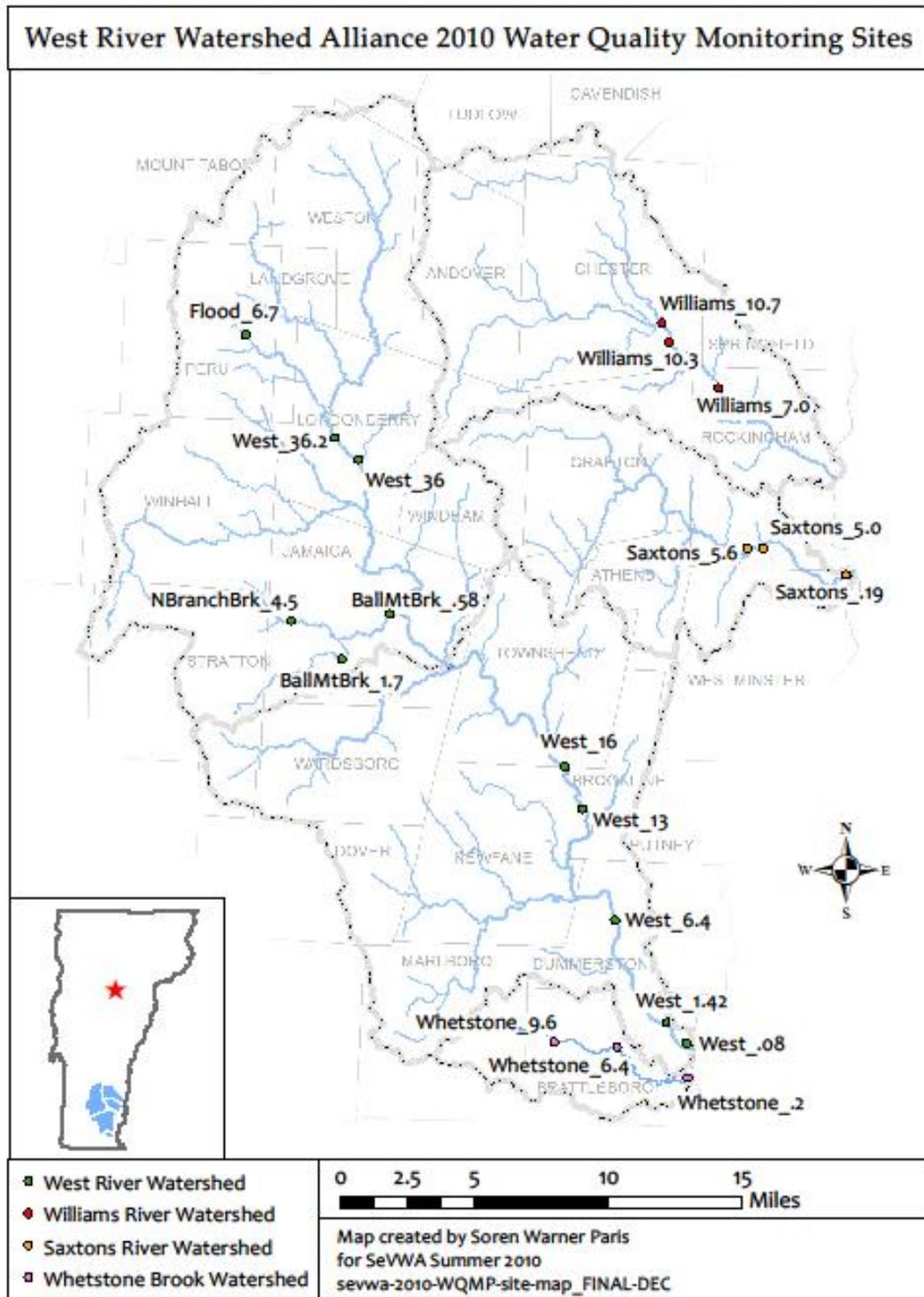
Also, as noted in the title at the top of this page, West River Watershed Alliance (WRWA) is now doing business as Southeastern Vermont Watershed Alliance (SeVWA).

**Table 1. Roster of Sites:**

<b>SITE CODE</b>	<b>SITE LOCATION</b>	<b>LAT</b>	<b>LON</b>
West_.08	Milkhouse Meadows (just upstream of the Marina)	42.86940	-72.56050
<a href="#">West_1.42</a> *	Behind the Brattleboro Professional Center	42.87967	-72.57383
West_6.4	Dummerston covered bridge	42.93550	-72.61350
West_13	Brookline bridge/Hill Road bridge	42.99590	-72.63710
West_16	Ellen Ware Rd. swim hole	43.01923	-72.65024
West_36	South Londonderry, Rowes Rd.	43.18500	-72.80260
West_36.2	Cobb's swim hole, Winhall Hollow Road, So. Lndndry.	43.19624	-72.82146
BallMtBrk_.58	Jamaica village swim hole, below Rte 30	43.10141	-72.77943
BallMtBrk_1.7	Ball Mt. Brk. at Broken Glass Lane	43.07650	-72.81595
NBranchBrk_4.5	Pikes Falls	43.09760	-72.85150
FloodBrk_6.7	Flood Brk below Hapgood Pond	43.25240	-72.88653
Saxtons_.19	Bellows Falls/Westminster "Sandy Beach"	43.12300	-72.44240
Saxtons_5.0	Below Saxtons River village WWTF	43.13743	-72.50382
Saxtons_5.6	Saxtons River, Rte 121 W of village center, swim hole	43.13750	-72.51570
Williams_7.0	Bartonsville bridge, Lower Bartonsville Rd.	43.22400	-72.53690
Williams_10.3	Below Chester village WWTF	43.25537	-72.57410
Williams_10.7	Rainbow Rock swim hole, Chester village	43.25903	-72.57848
Whetstone_.2	Whetstone Brk., downtown Brattleboro behind Bboro Coop	42.85070	-72.55940
Whetstone_6.4	Whetstone Brk. & Dettman Drive	42.86705	-72.55942
Whetstone_9.6	Whetstone Brk. & Stark Road	42.86993	-72.65733

\* [West\\_1.42](#) was the only new site for 2010 monitoring sites.

Figure 1. Map of 2010 Sampling Sites:



**Table 2. Sampling Dates & Parameters Measured, Sampled or Analyzed:**

Site ID	E. coli, TP, NOx, Turb, pH, Cond, Air & H2O temperatures	TP, NOx, Turb, pH, Cond, Air & H2O temperatures	E. coli, Air & H2O temperatures
West_.08	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
West_1.42	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
West_6.4	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
West_13	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
West_16	6/30, 7/28, 8/25, 9/22		
West_36	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
West_36.2	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
BallMtBrk_.58	6/30 (air temp. rejected), 7/28, 8/25, 9/22		7/14, 8/11, 9/8
BallMtBrk_1.7		6/30, 7/28, 8/25, <del>9/22</del> , 10/12	
NBranchBrk_4.5		6/30, 7/28, 8/25, <del>9/22</del> , 10/12	
FloodBrk_6.7		6/30, 7/28, 8/25, 9/22	
Saxtons_.19	6/30, 7/28, 8/25, 9/22		7/14, 8/11, <del>9/8</del>
Saxtons_5.0	6/30, 7/28, 8/25, 9/22		
Saxtons_5.6	6/30, 7/28, 8/25, 9/22		7/14, <del>8/11</del> , 9/8
Williams_7.0	6/30, 7/28, 8/25, 9/22		7/14, 8/11, 9/8
Williams_10.3	<del>6/30, 7/28, 8/25, 9/22</del>		
Williams_10.7	6/30, <del>7/28</del> ( <i>E.coli</i> result rejected), 8/25, 9/22	7/28	7/14, 8/11, 9/8
Whetstone_.2	6/30, 7/28 (no temps), 8/25, 9/22, 10/12		
Whetstone_6.4	6/30, 7/28, 8/25, 9/22, 10/12		
Whetstone_9.6	6/30, 7/28, <del>8/25</del> , 9/22, 10/12	8/25	

**Note:** Dates with “*strike-through*” (~~XXX~~) indicate samples that were intended to be submitted, but were not submitted, for analysis.

**Table 3. Number of Sampling Events per Site & Data Completeness Information** [as percentage; number of tests that were anticipated (A) & number of tests actually collected, analyzed and/or were determined to meet data quality objectives (B)].

	CRWC	CRWC	LaRosa	LaRosa	LaRosa	LaRosa	LaRosa	LaRosa	WRWA	WRWA	WRWA	WRWA
Site	E.coli (A)	E.coli (B) <sup>1</sup>	NOx (A)	NOx (B)	TP (A)	TP (B)	Turb (A)	Turb (B) <sup>2</sup>	pH (A)	pH (B)	Cond (A)	Cond (B)
BallMtBrk_.58	7	7	4	4	4	4	4	4	4	4	4	4
BallMtBrk_1.7	0	0	4	4	4	4	4	4	4	4	4	4
Flood_6.7	0	0	4	4	4	4	4	4	4	4	4	4
NBranchBrk_.4.5	0	0	4	4	4	4	4	4	4	4	4	4
Saxtons_.19	7	6 <sup>4</sup>	4	4	4	4	4	4 <sup>2</sup>	4	4	4	4
Saxtons_5.0	4	4	4	4	4	4	4	4	4	4	4	4
Saxtons_5.6	7	5 <sup>4</sup>	4	4	4	4	4	4	4	4	4	4
West_.08	7	7	4	4	4	4	4	4 <sup>2</sup>	4	4	4	4
West_1.42	7	7 <sup>3</sup>	4	4	4	4	4	4	4	4	4	4
West_6.4	7	7	4	4	4	4	4	4 <sup>2</sup>	4	4	4	4
West_13	7	7	4	4	4	4	4	4	4	4	4	4
West_16	4	4	4	4	4	4	4	4	4	4	4	4
West_36	7	7	4	4	4	4	4	4	4	4	4	4
West_36.2	7	7	4	4	4	4	4	4	4	4	4	4
Whetstone_.2	5	5	5	5	5	5	5	5	5	5	5	5
Whetstone_6.4	5	5	5	5	5	5	5	5	5	5	5	5
Whetstone_9.6	5	4 <sup>4</sup>	5	5	5	5	5	5	5	5	5	5
Williams_7.0	7	7	4	4	4	4	4	4	4	4	4	4
Williams_10.3	4	2 <sup>4</sup>	4	2	4	2	4	2	4	2	4	2
Williams_10.7	7	6 <sup>5</sup>	4	4	4	4	4	4	4	4	4	4
<b>Total Number</b>	104	97	83	81	83	81	83	81	83	81	83	81
<b>% Complete</b>		93.3		97.6		97.6		97.6		97.6		97.6
Blanks	12	12	9	9	9	9	9	9	0	0	9	10
Field Duplicates	12	12	9	9	9	9	9	9	9	9	9	9

**Note 1:** On 6/30/10 *E. coli* samples were > 4 deg C range [see Table 4 & “QUALITY ASSURANCE (QA) RESULTS & DETERMINATIONS”]

**Note 2:** Turbidity field duplicate RPD value for these 3 sites was > 15% (see Table 4 & “QA RESULTS & DETERMINATIONS”)

**Note 3:** One *E. coli* field duplicate RPD value was 58.2% (see Table 4 and “QA RESULTS & DETERMINATIONS”)

**Note 4:** One or more samples not collected/submitted from these sites

**Note 5:** Lab error on one sample for this site; no media added to the sample

**Table 4. Relative Percent Difference (RPD)\* as calculated for all field duplicates.**

\* RPD formula used:  $RPD_{\text{field duplicate pair 1}} = \text{absolute value (sample}_1 - \text{sample}_2) / \text{average (sample}_1 \text{ and sample}_2)$

	CRWC	LAROSA	LAROSA	LAROSA	WRWA	WRWA
Site	E.coli	NOx	TP	Turb	pH	Cond.
BallMtBrk_.58	8.4	0	13.8	4.7	0.3	0.2
Saxtons_.19	1.6	3.9	4.1	<b>71.8<sup>a</sup></b>	0.6	1.2
Saxtons_5.6	20.9					
West_.08	10.2	0.0	1.7	<b>25.2<sup>a</sup></b>	0.1	1.0
West_1.42	<b>58.2<sup>a</sup></b>					
West_6.4	17.1	0.0	6.4	<b>52.5<sup>a</sup></b>	0.4	2.0
West_13	7.1					
West_36	27.4	0.0	4.7	14.3	0.0	0.1
Whetstone_6.4	31.1	0.0	4.6	0.0	0.1	0.1
Whetstone_9.6	81.9	0.0	4.9	2.9	0.3	0.3
Williams_7.0	34.1	0.0	8.4	5.2	0.4	0.2
Williams_10.7	5.3	0.0	14.6	3.0	0.3	0.1
<b>Average RPD</b>	25.3%	0.4%	7.0%	20.0%	0.3%	0.6%
<b>RPD GOAL</b>	50% (>25 mpn) 125% (< 25 cfu)	≤10%	≤30%	≤15%		

a – For more information see “QUALITY ASSURANCE RESULTS & DETERMINATIONS” below.

### QUALITY ASSURANCE RESULTS & DETERMINATIONS

WRWA has not rejected any values for samples analyzed by LaRosa Lab, only one *E. coli* value was rejected due to lab error, no pH or conductivity results have been rejected and one air temperature value was rejected due to possible incorrect value recorded by volunteer. The 2 values rejected by WRWA (the one *E. coli* and one air temperature) are not included in the data submission Excel file provided to VT DEC.

Following are some QA anomalies that occurred, but data have not been rejected:

- June 30 *E. coli* samples: Upon receipt at CRWC individual lab samples measured between 10.9 to 17.0 deg C, with most being around 13 deg C. All samples held/transported between sampling time and pick-up time, and then pick-up time to delivery to CRWC lab were kept on frozen cold paks in coolers except during the time that samples were sorted for delivery to Waterbury/Larosa and Greenfield/CRWC; then it was about another 45 minutes, on frozen cold paks and in coolers, for delivery to CRWC lab for *E. coli* testing. On all sampling dates after this - after picking-up samples from volunteers or from drop-off locations - samples were transported in coolers with ice. Volunteers continued to use their small coolers with frozen ice paks. On all sampling dates, conditions to promote/ensure cooling of samples was evident.
- All *E. coli* samples during the season were set-up for testing at the CRWC lab within the 8 hour timeframe, though occasionally receipt at the lab may have been beyond the 6 hour timeframe.
- The *E. coli* field duplicate RPD value for the Sep. 8 West 1.42 sample was 58.2%. The field duplicate result was 71.2 MPN and the test sample result was 39.1 MPN.
- The turbidity field duplicate RPD value for the Saxtons .19 sample was 71.8%. The field duplicate result was .7 NTU and the test sample results was .33 NTU.
- The turbidity field duplicate RPD value for the West .08 sample was 25.2%. The field duplicate result was .59 NTU and the test sample results was .76 NTU.
- The turbidity field duplicate RPD value for the West 6.4 sample was 52.5%. The field duplicate result was .97 NTU and the test sample results was 1.66 NTU
- % completeness as shown in Table 3 is based on the premise that there are no values to be rejected for samples analyzed by LaRosa Lab, only one to be rejected performed by CRWC lab due to lab error and no pH or conductivity results to be rejected. A few scheduled samples at various sites were not collected during the sampling season.

## OVERVIEW OF RESULTS & PROJECT

This overview is intended as a preliminary synopsis of the results generated by the project. More thorough data analysis, with graphing and river flows/discharge information, will be performed over the next 1-2 months by WRWA volunteers, with input from Marie Caduto, Watershed Coordinator.

Listed below are parameters and sites of interest/concern based on a preliminary look at 2010 monitoring results:

### ***E. coli:***

West River, 2 South Londonderry sites, West 36 & West 36.2:

West 36 *E. coli* GEOMEAN\* = 167.8 MPN (n=7); maximum season value = 1986.3 MPN, 7/14/10

West 36.2 *E. coli* GEOMEAN\* = 147.1 MPN (n=7); maximum season value = 866.4 MPN, 7/14/10

West River, Milkhouse Meadows site just above confluence with CT River in Brattleboro, West .08:

West .08 *E. coli* GEOMEAN\* = 163.1 MPN (n=7); maximum season value = 866.4 MPN, 9/8/10

Whetstone Brook, downtown Brattleboro site behind Coop., Whetstone .2:

Whetstone .2 *E. coli* GEOMEAN\* = 195.6 MPN (n=5); maximum season value = 307.69 MPN, 7/28

Williams River, Chester - Rainbow Rock, Williams 10.7:

Williams 10.7 *E. coli* GEOMEAN\* = 158.9 MPN (n=6); maximum season value = 290.9 MPN, 7/14

Williams River, Rockingham - Bartonville bridge, Williams 7.0:

Williams 7.0 *E. coli* GEOMEAN\* = 173.8 MPN (n=7); maximum season value = >2419.6 MPN, 8/11

(\* The GEOMEAN calculations for these values do not include the use of field duplicate sample results.)

### ***Total Phosphorous (TP):***

Saxtons River, below Saxtons River village WWTF, Saxtons 5.0:

6/30 = 62.1 ppb, 7/28 = 16.1 ppb, 8/25 = 75.9 ppb, 9/22 = 36.6 ppb; MEAN = 47.68 ppb

Flood Brook, below Hapgood Pond, Flood 6.7:

6/30 = 13.4 ppb, 7/28 = 14.7 ppb, 8/25 = 18.8 ppb, 9/22 = 16.9 ppb; MEAN = 15.95 ppb

Williams River, Rockingham - Bartonville bridge, Williams 7.0:

6/30 = 11.2 ppb, 7/28 = 13.0 ppb, 8/25 = 17.3 ppb, 9/22 = 16.1 ppb; MEAN = 14.4 ppb

West River sites:

At the sites along the West River TP values ranged from 8.5 – 14.7 ppb over the sampling season.

Whetstone Brook sites:

On 8/25 the 3 Whetstone Brook sites' TP results were remarkably higher than other dates sampled.

### ***Temperature:***

At some point over the course of the monitoring season from late June until early September, water temperatures at sites along all rivers in the program measured in ranges above optimal for cold water fisheries.