

**2011 West River Watershed Alliance (WRWA),  
dba Southeastern Vermont Watershed Alliance (SeVWA)  
LAROSA PARTNERSHIP PROGRAM FINAL REPORT**

*Prepared by Laurie G. Callahan*

*January 9, 2012*

**INTRODUCTION**

West River Watershed Alliance's (WRWA's) water quality monitoring program was made possible in 2011 by the LaRosa Partnership Program and a dedicated team of local volunteers. There were 18 regular volunteer river monitors and 6 "back-up" volunteer monitors. The program was organized and run by a program coordinator (Laurie Callahan) with help from a program assistant (Rebecca Salem) and with the additional assistance of an unpaid VT DEC intern (Daniel Bougie) 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. Dan's internship was part of his program requirements at Vermont Law School.

There were 22 sites chosen for monitoring in WRWA's 2011 program – 5 sites were to be sampled once per month and 17 sites every 2 weeks.

A collaborative effort was established in 2010 with Connecticut River Watershed Council (CRWC) in Greenfield, MA to perform WRWA's *E. coli* analyses and that collaboration continued in 2011. A services exchange was set-up between CRWC and VT DEC Water Quality Division/LaRosa Lab. Laurie Callahan assisted with processing of WRWA samples at the CRWC lab on days that she delivered samples to them. Her services were provided free-of-charge to CRWC. In 2010 Callahan was 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 *E. coli* samples along with any other samples the CRWC lab processes.

On the following pages are tables and figures with information about various aspects of WRWA's 2011 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 2011 monitoring sites' locations. There were seven new sampling sites added in 2011. Those sites were West\_0.5, West\_36.1, West\_38.5, West\_39, Williams\_10.8, Williams\_8.7 and MBrWilliams\_02.

Figure 1 is a map showing all of the 2011 WRWA water quality monitoring site locations and the various rivers' watershed boundaries. Map was provided by Marie Caduto, VT DEC Basin 11 Watershed Coordinator.

Table 2 lists all of WRWA's 2011 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 2011 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 2011 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, since 2010 West River Watershed Alliance (WRWA) has been doing business as Southeastern Vermont Watershed Alliance (SeVWA).

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**Table 1. Roster of Sites:**

<b>Site ID Code</b>	<b>Site Location</b>	<b>LAT</b>	<b>LON</b>
West_.08	Brattleboro, Milk House Meadows	42.86940	-72.56050
West_.5*	New 2011 site just above West_.08	42.87062	-72.56232
West_1.42	Behind Bboro Prof. Center, Rte. 30	42.87967	-72.57383
West_6.4	Dummerston covered bridge	42.93550	-72.61350
West_13	Brookline bridge	42.99590	-72.63710
West_36	So. Londonderry, Rowes Rd.	43.18500	-72.80260
West_36.1*	So. L'derry, below Cobb's swim hole, just above Rte 100 bridge in village	43.19310	-72.81630
West_38.5*	L'derry, below Mountain Marketplace, Rte 100	43.22291	-72.81944
West_39*	L'derry village, below dam at park	43.22634	-72.80786
NBranchBrk_4.5	Pikes Falls	43.09760	-72.85150
Williams_7.0	Bartonsville bridge	43.22400	-72.53690
Williams_8.7*	Missing Link Rd. bridge, above Williams_7.0	43.23971	-72.55799
Williams_10.3	Below Chester WWTF	43.25537	-72.57410
Williams_10.7	Chester, Rainbow Rock	43.25903	-72.57848
Williams_10.8*	Just above confluence with Middle Branch Williams R., just above Rainbow Rock	43.26020	-72.57890
MBrWilliams_.02*	Mid. Br. Williams R., just above Rainbow Rock	43.25990	-72.57980
Saxtons_.19	Bellows Falls/Westminster "sandy beach"	43.12300	-72.44240
Saxtons_5.0	Below SR WWTF	43.13743	-72.50382
Saxtons_5.6	Saxtons River, above village, Stickney's field	43.13750	-72.51570
Whetstone_.2	Behind Bboro Coop	42.85070	-72.55940
<i>Whetstone_6.4**</i>	Dettman Dr.	42.86705	<i>-72.61485**</i>
Whetstone_9.6	Stark Rd.	42.86993	-72.65733

\* New sites for 2011 monitoring sites.

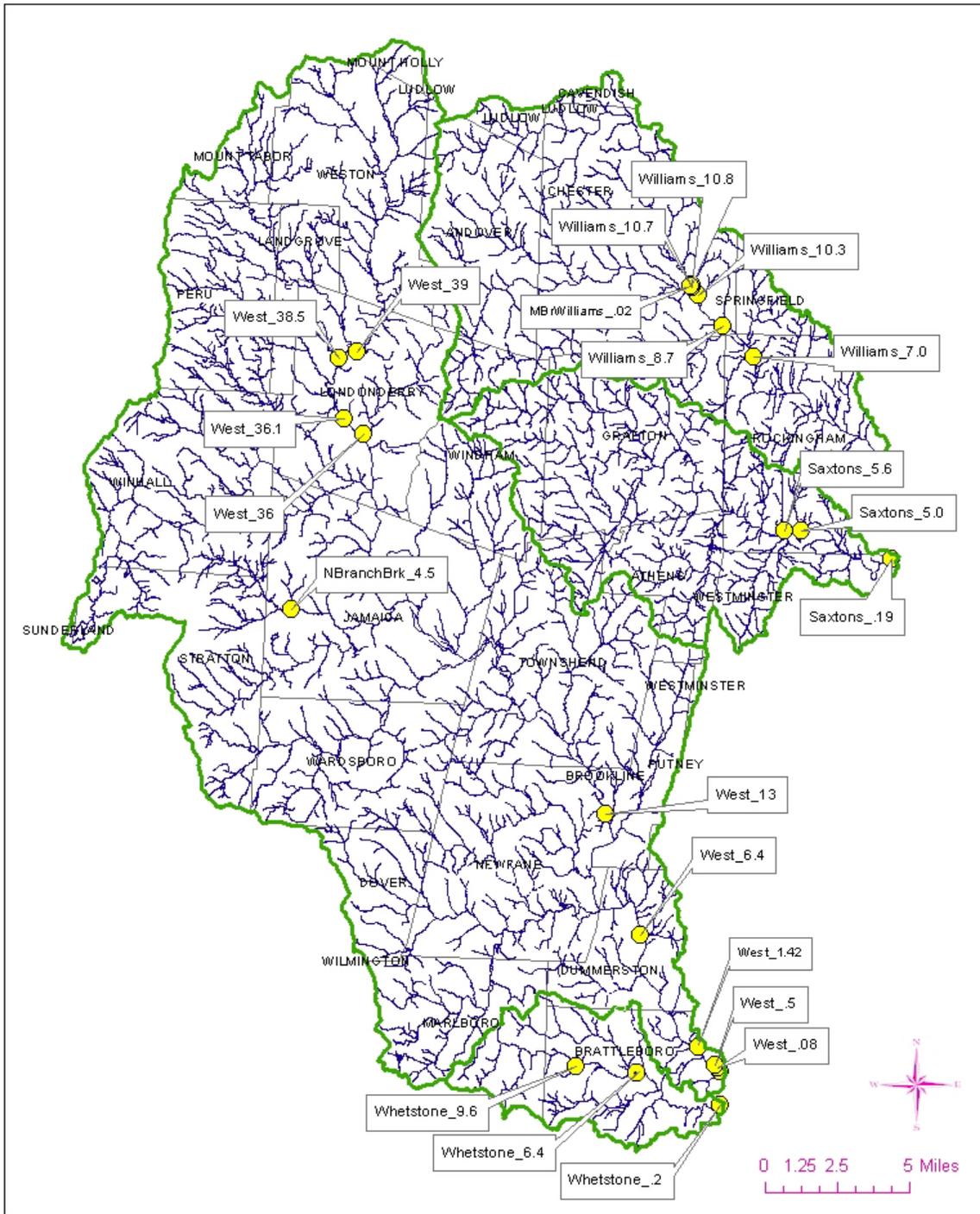
\*\* LON coordinate value corrected in 2011.

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Figure 1. Map of 2011 Sampling Sites:

Southeastern Vermont Watershed Alliance  
Monitoring Sites 2011



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**Table 2. Sampling Dates & Parameters Measured, Sampled or Analyzed (see Note below):**

Site ID	TP, NOx	Turb	E. coli	pH, Cond
West_08	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14 c/nt	6/22, 7/20, 8/17, <del>9/14</del> c/nt
West_0.5*	NA	NA	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	NA
West_1.42	6/22, <del>7/20</del> , 8/17, <del>9/14</del>	6/22, <del>7/20</del> , 8/17, <del>9/14</del> c/nt	6/22, 7/6, <del>7/20</del> , 8/3, 8/17, 8/31, <del>9/14</del> c/nt	6/22, <del>7/20</del> , 8/17, <del>9/14</del> c/nt
West_6.4	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14 c/nt	6/22, 7/20, 8/17, <del>9/14</del> c/nt
West_13	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, <del>9/14</del> c/nt	6/22, 7/20, 8/17, <del>9/14</del> c/nt
West_36	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
West_36.1	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
West_38.5	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
West_39	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
NBranchBrk_4.5	<del>6/22</del> , 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>
Williams_7.0	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
Williams_8.7	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, <del>9/14</del>
Williams_10.3	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
Williams_10.7	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, <del>9/14</del>
Williams_10.8	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, <del>9/14</del>
MBrWilliams_.02	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, <del>9/14</del>
Saxtons_.19	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
Saxtons_5.0	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/20, 8/17, 9/14	6/22, 7/20, 8/17, 9/14
Saxtons_5.6	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/6, 7/20, 8/3, 8/17, 8/31, 9/14	6/22, 7/20, 8/17, 9/14
Whetstone_.2	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, 9/14	6/22, 7/20, 8/17, 9/14	6/22, 7/20, 8/17, 9/14
Whetstone_6.4	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>
Whetstone_9.6	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>	6/22, 7/20, 8/17, <del>9/14</del>

**Note:** Unhighlighted dates with “*strike-through*” (X/XX) indicate samples that were intended to be sampled, but were not submitted for analysis; on 8/31/11 no scheduled samples were collected as effects of Irene were still being determined; on 9/14/11 many of the scheduled samples were collected, but LaRosa Lab was not accepting samples from volunteer programs due to Irene’s impact on the State complex in Waterbury (some E. coli samples were submitted and processed by the CRWC Lab, most of the conductivity and pH samples collected were run by WRWA/ SeVWA, and highlighted samples had turbidity testing performed at Nelson Analytical in Kennebunk, ME; no 9/14/11 samples were analyzed for TP or NOx; c/nt with highlight indicates that the sample was collected, but was not tested; X/XX indicates a TP value was rejected on this date due to RPD value being exceeded (see Table 4 for more info).

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**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)].

Site	CRWC E.coli (A)	CRWC E.coli (B) <sup>1</sup>	LaRosa NOx (A)	LaRosa NOx (B) <sup>2</sup>	LaRosa TP (A)	LaRosa TP (B) <sup>2</sup>	LaRosa Turb (A)	LaRosa Turb (B) <sup>3</sup>	Nelson Turb (B) <sup>3</sup>	WRWA pH (A)	WRWA pH (B) <sup>4</sup>	WRWA Cond (A)	WRWA Cond (B) <sup>4</sup>
West_.08	7	5	4	3	4	3	4	3	1	4	3	4	3
West_0.5	7	5	0	0	0	0	0	0	0	0	0	0	0
West_1.42	7	4	4	2	4	2	4	2	0	4	2	4	2
West_6.4	7	4	4	2	4	2	4	2	1	4	2	4	2
West_13	7	5	4	3	4	3	4	3	1	4	3	4	3
West_36	7	6	4	3	4	3	4	3	1	4	4	4	4
West_36.1	7	6	4	3	4	3	4	3	1	4	4	4	4
West_38.5	7	6	4	3	4	3	4	3	1	4	4	4	4
West_39	7	6	4	3	4	3	4	3	1	4	4	4	4
NBranchBrk_4.5	4	3	4	3	4	2	4	3	0	4	3	4	3
Williams_7.0	7	6	4	3	4	3	4	3	1	4	4	4	4
Williams_8.7	7	5	4	3	4	3	4	3	0	4	3	4	3
Williams_10.3	7	6	4	3	4	3	4	3	1	4	4	4	4
Williams_10.7	7	5	4	3	4	3	4	3	0	4	3	4	3
Williams_10.8	7	4	4	2	4	2	4	2	0	4	2	4	2
MBrWilliams_.02	7	5	4	3	4	3	4	3	0	4	3	4	3
Saxtons_.19	7	6	4	3	4	3	4	3	1	4	4	4	4
Saxtons_5.0	4	4	4	3	4	3	4	3	1	4	4	4	4
Saxtons_5.6	7	6	4	3	4	3	4	3	1	4	4	4	4
Whetstone_.2	4	3	4	2	4	2	4	2	1	4	3	4	3
Whetstone_6.4	4	3	4	3	4	3	4	3	0	4	3	4	3
Whetstone_9.6	4	3	4	3	4	3	4	3	0	4	3	4	3
<b>Total Number</b>	139	106	84	59	84	58	84	59	13	84	69	84	69
<b>% Complete</b>		76.3%		70.2%		69.1%		70.2% <sup>3</sup>	85.7% <sup>3</sup>		82.1%		82.1%
Blanks	14	12	8	6	8	6	8	6	2	NA	NA	8	8
Field Duplicates	14	11	8	5	8	5	8	5	2	8	8	8	8

**Note 1, 2, & 4:** A couple of sites not sampled on 8/17/11 due to high water levels; all sites NOT sampled on 8/31/11 due to conditions created by TS Irene; again, due to effects of Irene, some sites not sampled or sampled-but-not-tested on 9/14/11; and 2 samples not collected by volunteers during the 2011 season for various other reasons and, due to lack of notice to coordinator, unable to schedule substitute monitor for those samples.

**Note 3:** Many monitoring sites were still very turbid on 9/14/11 and since LaRosa Lab was not accepting volunteer samples for analysis, most sites samples were tested for turbidity at Nelson Analytical in Kennebunk, ME. Those analyses were done “gratis” at that NELAC accredited lab. The 70.2% completion rate is for the seasons’ turbidity analyses performed at LaRosa lab and the 85.7% completion rate is for the 2011 turbidity analyses performed at LaRosa Lab and Nelson combined.

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**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	NELSON	WRWA	WRWA
Site	E.coli	NOx	TP	Turb	Turb	pH	Cond.
NBranchBrk 4.5	21.5%	0.0%	82.7% <sup>a</sup>	26.9% <sup>b</sup>	NA	0.4%	0.4%
Williams 10.7	19.5%	6.9%	10.6%	66.7% <sup>b</sup>	NA	0.3%	0.5%
West 6.4	13.5%	NA	NA	NA	NA	NA	NA
MBrWilliams.02	2.9%	NA	NA	NA	NA	NA	NA
West 36.1	2.1%	0.0%	17.0%	3.0%	NA	0.1%	0.2%
Saxtons 5.6	5.2%	0.0%	3.6%	12.5%	NA	0.1%	2.1%
West 1.42	12.1%	NA	NA	NA	NA	NA	NA
Williams 8.7	47.6%	NA	NA	NA	NA	NA	NA
West 13	17.2%	0.0%	47.9% <sup>a</sup>	23.5% <sup>b</sup>	NA	0.1%	0.6%
West 36	33.6%	NA	NA	NA	8.3%	0.3%	0.8%
Saxtons 5.0	NA	NA	NA	NA	0.1%	0.4%	2.0%
Whetstone .2	67.7%	NA	NA	NA	21.6% <sup>b</sup>	0.1%	1.1%
<b>Average RPD</b>	<b>22.1%</b>	<b>1.4%</b>	<b>32.4.0%</b>	<b>26.5%</b>	<b>10.0%</b>	<b>0.2%</b>	<b>1.0%</b>
<b>Average RPD w/o rejected items</b>	<b>NA</b>	<b>NA</b>	<b>10.4%</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Combined Turbidity Average RPD</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>20.3%</b>		<b>NA</b>	<b>NA</b>
<b>RPD GOAL</b>	<b>50% (&gt;25 mpn) 125 % (&lt; 25 cfu)</b>	<b>≤10%</b>	<b>≤30%</b>	<b>≤15%</b>	<b>≤15%</b>	<b>ND</b>	<b>ND</b>

**Note a:** NBranchBrk\_4.5 TP 18.2 ppb, 7.55 ppb, RPD % difference = 82.7, rejected value; West\_13, TP 26.2 ppb, 42.7 ppb, RPD % difference = 47.9, rejected value

**Note b:** None of these values rejected; NBranchBrk\_4.5 Turb RPD % difference = 26.9, Williams\_10.7 RPD % difference = 66.7, West\_13 RPD % difference = 23.5, Whetstone\_.2 RPD % difference = 21.6

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

**QUALITY ASSURANCE RESULTS & DETERMINATIONS**

WRWA has not rejected any *E. coli* values for samples analyzed by CRWC laboratory in 2011. For analyses performed by LaRosa Lab in 2011, 2 TP values were rejected based on RPD values calculated for those samples and 4 turbidity values exceeded “RPD Goal” values, but data values were not rejected. For pH and conductivity analyses performed by WRWA/SeVWA, no results were rejected. Descriptions regarding QA anomalies appear below. Part 1 lists anomalies occurred, but results not rejected. Part 2 lists anomalies that resulted in data rejection. The data values rejected by WRWA are included as “flagged” entries in the data submission Excel file provided to VT DEC. Data completeness below 80% due to effects of Irene, including cancellation of 8/31 sampling.

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**Part 1:** Following are some QA anomalies that occurred, but data have not been rejected:

- CRWC *E. coli* samples: Upon receipt at CRWC a number of individual lab samples measured > 4.0 deg C. All samples held/transported between sampling time and pick-up time were kept on frozen cold packs or on ice in coolers, and then all samples from pick-up time to delivery to CRWC lab were transported on ice in coolers. On all sampling dates evidence of cooling of all samples from time of collection through delivery to CRWC lab in Greenfield was observed and documented.
- All *E. coli* samples during the season were set-up for testing at the CRWC lab within the 8 hour timeframe, though for an occasional sample receipt at the lab may have been beyond the 6 hour timeframe.
- 4 turbidity values exceeded "RPD Goal" values, but none of those values were rejected
- NBranchBrk\_4.5, 6/22/11, test sample Turb (turbidity) = 0.76 NTU, field duplicate Turb = 0.58 NTU, RPD % difference = 26.9%; both samples < 1.0 NTU
- Williams\_10.7, 6/22/11, test sample Turb (turbidity) = 0.4 NTU, field duplicate Turb = 0.8 NTU, RPD % difference = 66.7%; both samples < 1.0 NTU
- West\_13, 8/17/11, test sample Turb (turbidity) = 3.76 NTU, field duplicate Turb = 4.76 NTU, RPD %, difference = 23.5%; both samples < 10.0 NTU
- Whetstone\_2, 9/14/11, test sample Turb (turbidity) = 4.57 NTU, field duplicate Turb = 3.68 NTU, RPD % difference = 21.6%; both samples < 10.0 NTU
- % completeness for turbidity is shown in Table 3 for both LaRosa and Nelson Analytical samples separately and then also as a % completeness for all of those samples combined.

**Part 2:** Following are some QA anomalies that occurred and resulted in data rejection:

- The TP (total phosphorous) field duplicate RPD value for the June 22, 2011 NBranchBrk\_4.5 sample was 82.7%. The field duplicate result was 7.55 ppb and the test sample result was 18.2 ppb.
- The TP (total phosphorous) field duplicate RPD value for the August 17, 2011 West\_13 sample was 47.9%. The field duplicate result was 42.7 ppb and the test sample result was 26.2 ppb.
- Both of these samples and field duplicate samples were collected by "veteran" volunteer monitors that have been WQM samplers for a number of years. There is no reason to question their sampling technique, but for some reason there seems to have been an issue with these particular samples. These were 2 different volunteers that only sampled at these separate sites during the 2011 season.

**OVERVIEW: PRELIMINARY SYNOPSIS OF PROJECT RESULTS**

This overview is intended as a preliminary synopsis of results generated by the project. More descriptive data review for 2010 and 2011, with graphing and river flows/discharge information, will be reported in the very near future.

Listed below are items of interest/concern based on a preliminary look at 2011 monitoring results:

***E. coli:***

West River, 2 Londonderry and 2 South Londonderry sites (TMDL project area):

West 39 *E. coli* GEOMEAN\* = 109.8 MPN (n = 6); maximum season value = 228.2 MPN, 8/17/11

West 38.5 *E. coli* GEOMEAN\* = 66.0 MPN (n = 6); maximum season value = 139.6 MPN, 8/17/11

West 36.1 *E. coli* GEOMEAN\* = 57.4 MPN (n = 6); maximum season value = 161.6 MPN, 8/17/11

West 36 *E. coli* GEOMEAN\* = 107.5 MPN (n = 6); maximum season value = 387.3 MPN, 8/3/11

[West 39, West 38.5 and West 36.2 (just downstream from 36.2) were newly located sites in 2011.]

West River, Milkhouse Meadows site (West .08), a new 2011 site just upstream (West .5) & West 1.42:

West 1.42 *E. coli* GEOMEAN\* = 76.5 MPN (n = 4); maximum season value = 579.4 MPN, 8/17/11

West .5 *E. coli* GEOMEAN\* = 67.7 MPN (n = 5); maximum season value = 387.3 MPN, 8/17/11

West .08 *E. coli* GEOMEAN\* = 74.5 MPN (n = 5); maximum season value = 307.6 MPN, 8/17/11

(In 2010 West .08 *E. coli* GEOMEAN\* = 163.1 MPN (n = 7); max. season value = 866.4 MPN, 9/8/10/10)

[West .5 (just upstream from .08) was a newly chosen site in 2011 because of *E. coli* levels at .08 in 2010.]

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(continued)

Whetstone Brook, Whetstone\_.2, Whetstone\_6.4 and Whetstone\_9.6 (TMDL project area):

Whetstone 9.6 *E. coli* GEOMEAN\* = 113.6 MPN (n = 3); max. season value = 866.4 MPN, 6/22/11

Whetstone 6.4 *E. coli* GEOMEAN\* = 50.4 MPN (n = 3); max. season value = 118.7 MPN, 8/17/11

Whetstone .2 *E. coli* GEOMEAN\* = 327.7 MPN (n = 3); max. season value = 686.7 MPN, 7/20/11

(In 2010, Whetstone .2, *E. coli* GEOMEAN\* = 195.6 MPN (n=5); max. season value = 307.69 MPN)

Williams R., Chester – Rainbow Rock, Williams 10.7, upstream sites – Williams 10.8, MBrWilliams .02:

MBrWilliams .02 *E. coli* GEOMEAN\* = 65.3 MPN (n=5); max. season value = 104.3 MPN, 8/17/11

Williams 10.8 *E. coli* GEOMEAN\* = 143.4 MPN (n=4); max. season value = 410.6 MPN, 6/22/11

Williams 10.7 *E. coli* GEOMEAN\* = 95.3 MPN (n=5); max. season value = 142.1 MPN, 8/17/11

Williams River, Rockingham - Bartonsville bridge, Williams 7.0:

Williams 7.0 *E. coli* GEOMEAN\* = 94.9 MPN (n=6); max. season value = 222.4 MPN, 8/17/11

(In 2010, Williams 7.0 GEOMEAN = 173.8 MPN (n=7) and max. season value = >2419.6 MPN on 8/11/10)

Saxtons River, Rockingham – Saxtons River and Westminster GEOMEANS:

Saxtons 5.6, 2011 *E. coli* GEOMEAN\* = 79.9 (n=6); max. season value = 214.2 MPN, 8/17/11

Saxtons 5.0, 2011 *E. coli* GEOMEAN\* = 101.7 (n=4); max. season value = 204.6 MPN, 8/17/11

Saxtons .19 2011 *E. coli* GEOMEAN\* = 142.1 (n=6); max. season value = 261.3 MPN, 8/17/11

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

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

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

2011 MEAN = 30.7 ppb, n = 3 (2010 MEAN = 47.68 ppb);

6/22 = 34.9 ppb, 7/20 = 21.2 ppb, 8/17 = 55.1 ppb;

2011 season's TP MEANS for sites above and below this location were 11.6 and 11.0 ppb (respectively, Saxtons 5.6, n = 3 and Saxtons .19, n = 3).

West River:

TP MEANS for all 2011 sites on the West River were > 10 ppb, < 20 ppb

***Temperature:***

At some point over the course of the monitoring season from late June until early September, water temperatures at sites along the lower portion of the West River measured in ranges above 20 deg C. Some Williams R., Saxtons R. and lower portion of Whetstone Brook temperature measurements approached that 20 deg C value. It must be kept in mind that these measurements were typically made between 7-8 AM on sampling days. Site water temperatures on other days or other times later in the day on sampling days probably reached 20 deg C or greater. It may be helpful to further define actual temperature occurrences at some of these sites – especially those expected to support cold water fisheries restoration – with longer term data collection utilizing HOBO temperature monitoring devices.

As stated at the beginning of this section, this overview is intended as a preliminary synopsis of results generated by the project. More descriptive data review for 2010 and 2011, with graphing and river flows/discharge information, will be reported in the very near future and WRWA/SeVWA water quality monitoring program's 2011 data will also be submitted in the appropriate Excel format.